



Humans in the Loop: Validation and Validity Concepts in the Social Sciences in the Context of Applied and Operational Settings

Strategic Multi-layer Assessment¹ Occasional White Paper **August 2013**

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¹ SMA provides planning support to Combatant Commands (CCMD) with complex operational imperatives requiring multi-agency, multi-disciplinary solutions that are not within core Service/Agency competency. The SMA office has developed a proven methodology merging multi-agency expertise and information to address complex operational requirements that call for multi-disciplinary approaches utilizing skill sets not normally present within any one service/agency. The SMA process uses robust multi-agency collaboration leveraging intellectual/analytical rigor to examine factual/empirical evidence with the focus on synthesizing existing knowledge. The end product consists of actionable strategies and recommendations, which can then be used by planners to support course of action Development. SMA is accepted and synchronized by Joint Staff, J3, DDGO and executed by OSD/ASD (R&E)/RSD/RRTO.

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“Operational and strategic environments are becoming more complex, less predictable, more connected, and more problematic. The way the Department of Defense (DoD) and the intelligence community (IC) conducts analysis needs to change to meet these new challenges. This requires a reorientation toward, and investment in, multi-disciplinary, holistic, and comprehensive analyses informed by rigorous sociocultural methods and tradecraft. As suggested by the Defense Science Board (DSB) Task Force on Understanding Human Dynamics, the DoD must institutionalize best practices that learn from social science programs and processes and make them available across the full spectrum of military operations to mitigate the likelihood of armed conflict.”

LTG Mike Flynn, Operational Relevance of Behavioral & Social Science to DoD Missions, SMA March 2013

"Therefore I say: 'Know the enemy and know yourself; in a hundred battles you will never be in peril.'"

Sun Tzu, The Art of War, ed./trans. Samuel B. Griffith, Oxford University Press, London, 1963, p. 84

Preface

Mr. Benjamin Riley

Threats in the 21st century are increasingly complex, requiring multiple perspectives and disciplines to understand and anticipate challenges. National security issues will require consideration of the insights that might be gained through social science analysis in order to provide broader understanding of both challenges and potential solutions. Many of the challenges and potential missions faced by the Department of Defense (DoD) will be multi-faceted in their most fundamental nature. To better understand these issues, their origins, and potential solutions, we need to think clearly about insights provided about the psychological and social dynamics impacting complex security problems. We can anticipate military operations and missions in a networked, dynamic global environment where modern media, the pace of technological change, and speed of events overlay often long standing historic social legacies and conflicts. We can turn to the social sciences to better understand the intersection of new technologies and legacies and, therefore, assist in crafting strategies to deal with current and emerging issues.

This white paper discusses the validity concepts and validation of the social sciences in the context of applied and operational settings. It focuses on a key issue: How do we gauge the degree to which our frameworks, models, and measures of human social behaviors correspond to the real issues with which DoD operators are concerned? It addresses these issues from several perspectives:

1. Scientific Validation in Social Science: What concepts are appropriate for assessing the "goodness" of the social science within the scope of DoD missions?
2. Determining Mission Applicability: Social sciences play roles at various phases of military planning. Will these necessitate varying degrees of validation?
3. The need to develop military social scientists to bridge the gap between social sciences as an academic discipline and their potential applications in strategic, operational, and tactical decision making.

Whether planning how to help train and develop a military unit, motivate an individual from another culture to participate in an activity, deter a nation-state from a course of action, stabilize a village, or persuade individuals to reject an extremist group, analytical efforts require thinking about the fundamental dynamics of people, groups, and societies. As a result, analysts, planners, and operators need to become more informed and active consumers of social science knowledge. This white paper is aimed at both motivating readers to confront that challenge and at providing some basic insights to reduce the scope of the challenge. Greater engagement with both the body of social science knowledge, and with the process of social science itself, has the potential to increase DoD effectiveness in an increasingly complex, less predictable, more connected, and more problematic world.

Use of the social science techniques in the DoD has a long pedigree. Yet the challenge remains over how to best leverage social science tools to support military operations.

Challenges in assessing reliability and validity of social science tools, techniques, and models, especially those developed for use in Information Operations, include the following.

1. Human and social science fields typically lack theoretical maturity as compared with the physical sciences. This challenges the accuracy or representation and the expertise of users.
2. Human social behavior often reflects a rich and complex problem space. This challenges the realism of the representation.
3. Human social behavior involves many unobservable phenomena. This challenges the expertise of subject matter experts and the credibility of the model to users.
4. Both psychological awareness and human behavior involve socially constructed factors and variables. This challenges the accuracy and realism of the representation.
5. Consistency in assumptions related to a model's purpose when reusing scientific statements/theories that are encapsulated in software is essential.

Essentially, validation is about what works and what does not. At the operational level, people want workable tools to current problems. In this context, a "validated" theory has to be relevant to the operations community.

In addition, the white paper highlights the need for a cadre of military social scientists that understand both the academic and operational environments and act as a bridge between these two now very different environments. These individuals should be able to elicit user requirements and then employ their domain knowledge to satisfy those requirements. Therefore, there is a need develop a strategy as to how to best provide a focused, comprehensive, and integrated social science training program for officers and enlisted that spans their entire career.

The past decade of combat has once again brought the "human domain" of warfare front and center. The classic geographic factors of physical, cultural, economic, and political have demanded attention from the strategic to tactical level of range of military operations. Operational requirements have historically inspired innovation in organizations and diversification in cross-sector collaboration. This legacy can be used as a foundation for the growth of "military social science."

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Overview

The essential concern of the social sciences is human behavior. The classic disciplines (e.g., economics, political science, sociology, anthropology, etc.) loosely align with the levels—individual, group, societal—and the subjects of those behaviors. What social scientists do is attempt to describe and explain the influences and interactions among complex sets of factors that span human behaviors. This white paper continues the SMA White Paper series, *The Role of the Social Sciences in DoD Mission Analysis and Planning*, with a discussion of validity concepts and validation in the context of applied and operational settings. In so doing, it focuses on a key issue, namely: *How do we gauge the degree to which our frameworks, models, and measures of human social behavior correspond to the real issues with which DoD operators are concerned?*

Science and the Department of Defense

Primary Contributor: Dr. Dana Eyre

The Department of Defense's relationship with science is a long and productive one. From the Manhattan project, through Lockheed's "skunk works," to the development of drones and advanced sensors today, the Department of Defense (DoD) has robustly and aggressively taken advantage of science. Traditionally, DoD's relationship has been as a commissioner of research and a recipient of products. That is, DoD has asked "science" to solve a problem (of course, sometimes "science" has come to DoD with a solution); "science" solves the problem and produces a tool that is then employed by a component of DoD. This of course is an oversimplification, but it serves to highlight a key point in the relationship: the existing relationship between DoD and "science" does not require DoD, or the operators of the technological marvels produced, to become scientists, to understand the state of the knowledge embedded in the products, or to understand the logic of the development of scientific knowledge employed in their production. Of course, this does not mean that DoD does not have substantial scientific capabilities of its own or that smart operators are not critical to performance. But, the essential relationship between science and DoD is that of a producer and a consumer of a product. An infantryman does not need to become a materials scientist to wear a new piece of personal protective equipment nor does a sensor operator need to become a physicist to employ a new sensor suite. Even DoD's existing relationship with social science for the most part operates in this way, for example, in the development of personnel screening tests. The essence of the development process is to produce a "product"—a tool that is robust, effective, and places as little burden on the operator as possible. Science, in this relationship, directly produces answers and solutions.

This paper, on validation and the validity of social science knowledge, is motivated by the author's awareness that this relationship must change if DoD is to fully exploit social science knowledge. Social science can greatly aid DoD in its current and future operational environments, but not if it is seen as a producer of "fire and forget" knowledge—neat packages of insight or answers ready to be employed—rather than as a means and a process of understanding the social world. Social science can greatly aid DoD, but it must be seen as a body of knowledge that requires substantive intellectual engagement with the nature of social science knowledge and the process of producing social scientific knowledge, in order to gain benefit from it. Rather than "using" science, to fully exploit social science DoD must "do" social science.

Why Bother?

At this point, an overburdened reader may be excused for thinking of reading no more of this essay, saying to the authors "I don't have time to become a social scientist; I've got things to do." However, there are two compelling reasons to read further and to grapple with the issue associated with the development and use of social science knowledge: 1) our problems increasingly require social science for effective analysis, and 2) our operations increasingly achieve effects through processes described by social science theories, not by the laws of physics or chemistry. Each of these points will be briefly discussed below.

Social Science: Insight and Operational Guidance

Though it is almost a truism, it is still worth remarking that the challenges and problems faced by DoD are increasingly social in their most fundamental nature and, to understand these problems, we need to think clearly about psychological and social dynamics (using "social" in the broadest sense, including cultural, social structural, political, economic, and geographical concerns). In the decades since the fall of the Soviet Union (a relatively recent event that seems as lost in the mists of time as the Middle Ages) and particularly since 9/11, there has been substantial public, and professional, reflection and debate over a critical set of questions that highlight the role of social considerations in security challenges. Who is the "foe" and what is his nature? What are the most effective policies for the conduct of effort? Indeed, what is the fundamental nature of the problem we face? What are the goals we seek? What are the goals we can attain? What is "security" and "stability"? This debate, complex in the context of Afghanistan and Iraq alone, has only gotten more complicated with the evolution of the "Arab Spring" of 2011-2013. Events in Libya, Yemen, Bahrain, Egypt, Mali, Syria, and throughout the region highlight the social and psychological complexity of the contemporary security environment.

However, it is important to realize that the centrality of social dynamics to security problems is by no means limited to the issue of Middle Eastern stability and terrorism. Indeed, social dynamics are as central to continuing and emergent global challenges as to those related to terrorism and the Middle East. The dynamics of Iranian belligerence and desire for nuclear weapons are clearly linked to, and profoundly shaped by, the social and political dynamics of Iranian society; Pakistan's stability and role in South Asia can only be understood or addressed by understanding its social evolution and dynamics. Even the most "traditional" challenges (e.g., the re-emergence of a confrontational Russia or a more nationalist and assertive China) are fundamentally conditioned by social dynamics. Understanding DoD's national security challenges requires understanding psychological and social dynamics underlying those challenges.

More importantly, achieving our most fundamental goals require an understanding of social dynamics. The most fundamental thing sought by our national security efforts, at the strategic level, is not a discrete set of objectives, but a broadly functioning social order, a social system in which people—be they in London, New York, Mumbai, Kabul, or Kirkuk—can go about their daily lives in peace and stability. Our security problems force consideration of social dynamics to the center—both to understand the dynamics of confrontation and conflict and to understand how these fundamental goals—social order, stability, peace—can be produced. The most fundamental strategic and operational effects we seek concern the evolution and change of social orders. Thus, the problem of understanding and employing social science is not the analyst's alone; it is also the operators. Whether we are seeking to build an army, support a government, disassemble a terrorist organization, sustain an alliance, or deter an opponent, the effects we seek (loyalty, fear, doubt, trust, cooperation, belief, hope, despair) are social and psychological, and clarity of thought about the psychological and social processes that achieve these effects is a precondition for success. Given the centrality of these social and psychological effects to military operations, one might venture to call contemporary military operations "social science driven operations. Whether we seek to foster a stable society, or to disrupt the capacity of an actor to produce mayhem, the social processes that achieve the effects we seek, can be described, most effectively and

rigorously, by the knowledge and vocabulary given to us by social science. This is not to say that social and psychological science provides precise answers for doing these things - but that social science represents our most rigorous, structured, empirical, body of knowledge for understanding, describing, and shaping these processes.

Social Science: Doing It Better

The second reason for attending to issues of validation and validity of social science knowledge is that throughout DoD, individuals and organizations are already engaged in ad hoc, informal, and often-unconscious "social scientific-like" analysis. When we assess the motives of a group, conduct a key leader engagement, participate in a training exercise to build an alliance, we do so on informal, often unarticulated, beliefs about causes and effects in the social realm. (We note that there are of course a large number of individuals, both with formal responsibilities as social scientists, and as analysts and operators, who do robust social science with DoD. But, we argue, such an approach has not yet penetrated the mainstream of DoD culture.) Both analysts and operators confront questions that require them to make assumptions about psychological and social dynamics, and, ideally to actually articulate those assumptions and arguments, assess their logical structure, and evaluate them against evidence. Whether planning how to help train and develop a military unit, motivate an individual from another culture to participate in an activity, deter a nation-state from a course of action, stabilize a village, or persuade individuals to leave an extremist group, the analytical efforts require thinking about the fundamental dynamics of people, groups, and societies.

Yet without conscious and aware use of social science, the intellectual frameworks employed in these efforts are often (though not always) an essentially random collection of taken for granted ideas, half-remembered theories from college 15 years ago, and a mish-mash of taken-for-granted partial truths. For example, based on an informal (and decidedly non-scientific) assessment, "Maslow's hierarchy of needs" is one of the most commonly known and accepted (or at least recognized) pieces of social science within DoD. Yet it was written in 1943, has been subject to substantial criticism since then, and has been noted, at least since 1976, as "present(ing) the student of ...motivation with an interesting paradox: The theory is widely accepted, but there is little research evidence to support it" (Wahba & Bridwell, 1976). Because human social life requires all of us to be "folk social scientists," we all develop idiosyncratic, ad hoc theories of psychological and social dynamics that fit our individual life experiences and societies. Maslow's hierarchy of needs has survived for a variety of reasons (not the least of which is that it is easily teachable) and thus has become part of the American cultural milieu out of which we construct our ad hoc, "folk" theories. Unfortunately, however, as well as these fit our individual lives and circumstances, they seldom fit other societies and circumstances. Social science provides a more robust, empirically grounded, explicit, and structured body of knowledge from which to draw.

Social Science: The Problematic Truth

Unfortunately, as potentially valuable as social science knowledge is, and as important as it is for non-specialists to engage it, the organization of social science knowledge does not facilitate easy engagement by the non-specialist. A variety of factors combine to shape the body of social scientific

knowledge in ways that make it difficult to assess and integrate into analysis and operational planning, and which highlight the requirement for analysts, planners, and operators to engage in social scientific thinking, and assessment of validity, on their own. Before turning to the core of this work—how to engage in the validation of social science knowledge for defense application—we will briefly review the both the complicated structure of social science as a body of knowledge and the processes that produce this structure. Two factors contribute to the complicated structure of social science: the story-telling nature of human life (which has two consequences) and the disciplinary structure of the modern academy.

We should begin with an understanding of a fundamental (indeed, some argue, the fundamental) characteristic of human life: its interpretative, story-telling, cultural nature. Other creatures have the capacity to live in small groups, to cooperate, or communicate basic information, but only humans create and tell complex and continuing stories that anchor themselves in a wider world, interpret it, and create characters and abstractions. This capacity is fundamental to our ability to live in large groups; without it, we could not have armies or nation-states.

This fundamental story-telling capacity has two consequences for the organization of social scientific knowledge. First, as a consequence, social science tends to divide up into two broad camps: one, dealing with the stories that people tell and the meaning they create, is variously labeled “cultural,” “qualitative,” or “interpretive” social science. The other camp takes a more abstract, analytical, “birds eye” view of society, seeking to identify, not how people understand their lives, but the patterns of those lives, whether the participants see them or not. This camp may be labeled the “structuralists” and most often employs quantitative analysis. The difference can be illustrated by thinking about a topic such as health care. One can focus on how individuals experience “health,” how they make sense of a health care system, how they define “well” and “ill health,” or how participants make sense of their roles in the system. Anthropologists and interpretive sociologists write books about these topics with titles like “Boys in White” (a classic study of the process of becoming a doctor in the early 1970s and taking on the professional identity). Or, one could study the pattern of life chances—which group is more likely to suffer from a given disease or to have access, or lack access, to health care. These social scientists publish tests such as “An Analysis of Disparities in Health Status and Access to Health Care in the Appalachian Region.” Of course, engaging in a social situation, and seeking to change it, requires both forms of knowledge—what are the patterns of life, and how do people understand their lives. One could not address the issue of access to health care in the Appalachian region without having both an overarching structural view—of the economic and political dynamics and of the social structure of the region. But attracting doctors would also require an understanding of the motivations of doctors—how they view their profession and their practice. Both camps, structuralists and interpretivists, therefore offer critical insights, but they are too often distinct communities who do not refer to each other’s work, and drawing upon and integrating knowledge from both camps is a challenge for the user.

Second, our exceptional human capacity to tell stories means that even social scientists tell many stories. Unlike the physical and biological sciences, which tend to have generally common vocabularies at a given level of analysis (that is, all chemists use the periodic table, and all ecologists would recognize the concepts of predator and prey and of nutrient cycles in an ecosystem), social science is organized, or

more properly split, by the stories they tell, the way they tell those stories, and what is considered evidence to support those stories. Sociologist Andrew Abbott has referred to this as the "Chaos of Disciplines" and notes that, uniquely, the social sciences "stand uneasily between (two) modes of knowledge, the mode of facts and the mode of values." Political scientists tend to tell stories of conflict and struggle; the dominant metaphor is power, with the implicit physical metaphor of force underlying our use of the term power. Economists see a world of individuals, exchange, rational choice, and maximization. Sociologists tend to see groups, identities, cohesion, gender, loyalties, rivalries, and status. Historians, focusing on specific cases rather than the development of abstract and general knowledge, tend to draw upon idiosyncratic combinations of all of these approaches. Abbott describes sociology (and more generally, all of the social sciences) as a caravansary on the Silk Road, filled with all sorts and types of people and beset by bandit gangs of positivists, feminists, interactionists and Marxists..." Of course, each of these theoretical lenses (known variously as paradigms or orienting strategies) captures an aspect of human social life. So stories proliferate, integrate, separate, and evolve. Abbott notes that social science is beset by (by also can be understood through) a continuing set of distinctions, producing a fractal organization. The social sciences are "unwilling to let go of pure or practical reason, of objectivity or subjectivity, of analysis or narrative, positivism or interpretation." Social life, in all its complexity, cannot be understood from a single stance. The social sciences are therefore inherently multi-paradigmatic; human social life can only be understood from multiple theoretical perspectives. But, as a result, again, the burden is (unfortunately but unavoidably) placed on the user to integrate knowledge that is fragmented by the metaphors and methods that social scientists use to animate and evaluate their theories. A caravansary is a rich and exciting environment, but a buyer must definitely be aware of what they are buying and from whom they are buying it.

Finally, we should note that the disciplinary structure of the modern academy is, to say the least, slightly complicated. "Core" or "basic" disciplines—what might be considered the "primary" social sciences (sociology, political science, economics, psychology, geography)—are supplemented by a vast array of departments that focus on particular societies, issues, or problems; draw upon all of these "core" disciplines; and become academic communities in their own right. These communities both draw upon the theoretical vocabularies of the "core" disciplines, generate their own theory, and produce more practically focused knowledge as well. Area studies (e.g., Middle Eastern Studies), education, marketing, organizational behavior, counseling psychology, social work, and journalism are but a few examples of what might be called focused or problem-centered disciplines. Historians and much of the humanities draw on all of these vocabularies, but also feed back into the social science discourse, enriching it, but also adding more complexity to the caravansary. And even this "traditional" disciplinary "structure" is being disrupted by both the rise of integrative and trans-disciplinary efforts and by the integration of insights from neurology, computational social science, ecology, and other disciplines.

A Worthwhile Challenge

This overview has made a simple argument: social science is of increasing importance to DoD, both for understanding the world and for informing and guiding the logic of our operations. As a result, analysts, planners, and operators need, not to become social scientists, but to become more informed and active consumers, indeed co-creators, of social science knowledge. This task is not an easy one—the structure of social science as a body of knowledge is itself an obstacle to engaging in it. This work is aimed at both motivating readers to confront that challenge and to provide some basic insights to reduce the scope of the challenge. Social science cannot produce "fire and forget" knowledge, but it does offer insights, understanding, rigor, and methods for tackling critical national security challenges. Greater engagement with both the body of social science knowledge, and with the process of social science itself, has the potential to increase DoD effectiveness in an increasingly complex, less predictable, more connected, and more problematic world.

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Background

Primary contributors: Drs. Chuck Ehlschlaeger and Anne McGee

The military is a planning organization. We develop plans for potential conflicts, for purchasing weapons, for future manpower needs. Much of that planning is intended to expose decision-makers to the types of choices they will have to make during conflicts, in the way that doctrine is intended to inform leaders' decisions by encapsulating predecessors' experiences. As can be seen in Joint Doctrine Publication 5-0, Joint Operation Planning, we use many social science-based analytic approaches, to include the ideas inherent in PMESII (political, military, economic, social, information, and infrastructure) system analysis, operational art, center of gravity analysis, effects-based operations, intelligence preparation of the battlefield, red teaming, war-gaming, etc. Much of it is focused on identifying cause-and-effect relationships in situations where we might or might not have experience or doctrine to inform our choices.

Use of the social science techniques in the DoD has a long pedigree. From marketing, recruiting, induction, training, education, and organizational structure, the military services are grounded in a series of practices, honed over decades of experiences. From this, a practical knowledge base has been developed, maintained, and broadened by academic disciplines described as the social sciences. Every officer is a product of collegiate education founded upon a liberal arts educational model. Every service school that trains military leaders in the art of leadership, management, and the science of their practice is another example of institutional reliance on the fields of psychology, sociology, and education. These officers and leaders have primary responsibility to conceptualize, analyze, and articulate plans, programs, and procedures that inform all military operations across the service staffs, COCOMs, et.al. Everyone understands the need for greater integration of the energy and expertise found in the disciplines of economics, political science, and all the other social sciences. Yet the challenge remains on how to best to leverage the tools based in the social sciences to support those who must deal with military operations?

The military wants tools and methodologies to identify and address problems in every phase of operations. Yet the difficulty has always been with the integration of these assets and trust in its efficacy. If social science solutions are introduced by mission planners as part of the planning process, these solutions should be validated.

'Social Science' and 'validation' mean different things to different people. This paper sees social science from the viewpoint of the military's operational planners and decision makers, not social science academics. From the military viewpoint, a set of validated social science theories are a good foundation for building a framework capable of informing decision-making. However, these social science theories are NOT validated for specific military decision-making processes. Academic validation is the repeated hypothesis testing in order to disprove or set the limits on articulated theories. The academic validation process is determined by each scientific discipline and changes as the discipline adopts new methods and techniques to discover and refine their foundation of knowledge. Non-academics often see peer-review articles and books as "pieces of the knowledge foundation." Academics recognize that the

publication of an individual article is not validation but only the first step of articulating an anti-thesis to an existing thesis. It is only after enough peer-review articles are published that thesis and anti-thesis can be discarded in favor of the synthesis. (The synthesis then becomes the “old thesis” that needs to be improved.) See Montello and Sutton (2006) for an easy-to-read overview of the logic and philosophy of various sciences, including social sciences, intersecting the geographic domain. Thus, it is *dangerous* for a non-scientist to treat a discipline’s theories as fact without first consulting with scientists familiar with the limits of those theories. The Encyclopedia of the Social Sciences (2008) describes validation as a process, not a specific activity. During the process of performing a social science analysis, specific interpretations of the analysis can be validated, but the analysis model or framework can never be proven. Instead, results should be tested by evidence outside of the modeling analysis. Military planners and decision makers need to consider:

- Social science theories and approaches are constantly evolving as understanding of human behavior deepens. Even theories that have been published in peer reviewed journals that are generally considered to be accepted remain open to debate, unless they have been clearly debunked or advanced, both of which are part of an evolving social science discipline. Behaviors are shaped by perceptions of reality, not necessarily objectivity—and behavior is at the center of socio-cultural analysis.
- It would be useful to distinguish among the various multidisciplinary social science theories and analytical approaches (history, sociology, political science). Developing a menu of analytical methodologies could help guide the analyst.
- Discriminating against accepted social science theories severely limits the tools available to analysts and undermines creativity.
- Rigorous debate is necessary to determining the relevance of disciplinary theories applied in analysis.
- Discussions of sources needed to carry out socio-cultural analytic projects are critical, but often overlooked.

Translating the appropriate social science theories in a useful framework gives military planners and decision makers a starting point for developing models, both conceptual and computational, for analyzing geographic locations and the knowledge necessary to successfully complete their missions. The verification process of initially designing the framework as well as the validation process for adjusting the framework and its models is guided by the military’s experience and information collection techniques. This paper discusses social science validation from the context of this process.

In this white paper, we address these issues from four perspectives:

- Scientific Validation in Social Science: What concepts are appropriate for assessing the "goodness" of the social science within the scope of DoD missions?
- UK "fitness for purpose" approach to reliability and validation
- Determining Mission Applicability: Social sciences play roles at various phases of military planning. Will these necessitate varying degrees of validation?

- The need to develop military social scientists to bridge the gap between social science as academic disciplines and the operational world

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What Does Validation Mean? Scientific Validation in Social Science

Primary contributors: Mr. Gary Ackerman and Dr. Anne McGee

This section addresses several interrelated questions:

- Validity Concepts, Warranted Knowledge Claims, and Theories of Change
- The bounds of confidence and what we can *know* from any scientific theory
- The issues of bias and “subjectivity” in measurement of behavior

In modeling and simulation, “validation” is defined broadly as the process of determining the extent to which the model and or simulation adequately represents the real world. This would suggest empirical evidence ought to be the principal method to validate social science, thus preventing subjective opinion from skewing the observation. In the human domain, different “experts” observing exactly the same behaviors often perceive the same observations differently. Many experts have biases and are not objective observers (often unintentionally) (Password, 2007, p. 11). Indeed studies have shown that expert opinion is often as wrong as or more wrong than novice opinions (Green & Armstrong, 2007). Empirically driven social science takes a variety of approaches to deal with these challenges by trying to test and validate arguments analytically so that they are not just a matter of opinion. Some work uses rigorous qualitative approaches to do this (see the classic work on social revolutions by Skocopl, 1994) and a great deal of work uses quantitative statistical approaches (see Singer’s work, e.g. 1994 on trying to measure international wars empirically). Thus, empirically driven social science tries to use a variety of methods to test expert opinion and argumentation.

History can play an important role as a key social science. It is replete with examples of successes, failures, and consequences.² It often falls in the grey area between social sciences and humanities, but has been critically important to militaries, national security strategists, and planners for centuries. In some sense, military strategists have used historical case studies as their research tool, relying on them heavily in their educational institutions and in their professional reading. This is partly due to our inability to conduct field experiments for both ethical and practical reasons. The challenge has always been to identify the correct dependent and independent variables and leads to more precise crafting of potential research questions, such as: is my current challenge in Helmand Province akin to the COIN situation the U.S. faced in Vietnam or more like that the British faced in Malaysia? Or maybe closer to Fallujah? Am I placing too much emphasis on the parallels with history, or not enough?

Thus, to study military history is to learn from others' successes and failures. While on the one hand gaming and simulation has evolved enough that we can run more of these field experiments in a simulated context, there are still so many variables to deal with that we will never really be able to

² History also has another application, especially for a COCOM such as PACOM. Asian cultures have a very specific way of looking at the present and future that are based on historical premises. This is a way of thinking that is completely alien to many Westerners – it is why that we as a culture often misunderstand events/reactions in China and other East Asian nations

identify all of the key ones or manipulate them in all the possible permutations. Even so, social sciences can help us by identifying the most critical variables and by teaching us to ask the right questions. In the end, when we put social science into practice, the decisions made and actions taken will have been informed by academically rigorous theoretical constructs.

Following on this line of thinking, in the academic world, it is the norm for a theory to be constantly tested and, if disproven, to be discarded or modified at a later date. In the DoD context, that may be problematic if faulty assumptions are made since often lives may be put at risk. This is accentuated since the DoD does not have a good quality control system in place to ensure the validity of social science theories as they do for other disciplines (e.g., environmental sciences, etc.). Thus, it is critical to have a structure in place so that social sciences present information in a way that DoD can consume it. Furthermore, it is equally important that DoD insist on rigorous testing of assumptions and arguments using the best empirical data available.

Quantitative and empirical qualitative social sciences can help us by identifying primary variables and by teaching us to ask the right questions. If we can collect the right data and analyze it in a way that does not bias the results, we can use historical information to give us leverage on what is likely to happen in the future. Quantitative approaches allow us to generalize and also give us the advantage of being able to put confidence intervals around our results—in other words, it allows us to have some sense of what the level of uncertainty is in our analyses. However, this approach makes it harder to capture certain factors that are very hard to turn into numbers—or even think about in terms of numbers. Qualitative work, on the other hand, allows us to be much more in depth about the specific cases we are looking at but makes it much harder to generalize about the findings to other cases or regions of the world.

Any analysis of this type demands credible, reliable data or risks producing misleading results, so data validation becomes part of the overall process of validating social scientific analysis. While many of the issues associated with data validation in the social scientific context are similar to those in the realm of intelligence analysis (including the credibility, bias, and competence of sources), some data issues are especially prominent in social scientific research, such as uneven geographic coverage in the open sources. The bottom line is that rigorous social science should explicitly capture and reflect the degree of uncertainty inherent in both its input data and analytical procedures. One important additional issue is how to make use of existing social science models, which are almost always developed and tested on open source information, while incorporating classified data available to DOD, since most social scientists do not have clearance to access such data. There are a number of interesting avenues for addressing this issue, including the development of a cadre of military social scientists (see the separate section below) and an institutionalized low-side/high-side partnership wherein the academic social scientists develop the analytical tools and models, and validate them with open-source data, but then design them from the beginning to be capable of easily being transferred to the high side by contractors or DOD personnel.

In the end, when we put social science into proper practice, those actions will be based on our assumptions and theory of change, but we need to be aware of the fact that we can never know if there are issues related to missing variables or data. Empirical research, though, is not about achieving

absolute knowledge, but it does allow us to gain traction on how phenomena are related to each other and to test our assumptions of those relationships.

One example of where social science can be helpful is to assess the impact of cultural bias. In this sense, there is a need to understand and discern where action is needed to mitigate or not offend indigenous cultural norms. To do so, one must define and peer review "universal" definitions (e.g., meta-narratives are a "universal" common to all cultures and civilizations, and people and groups). If done properly, social science can contribute to a much better understanding of how social norms can impact behavior and how those social norms can change over time.

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UK "Fitness for Purpose" Approach to Reliability and Validation

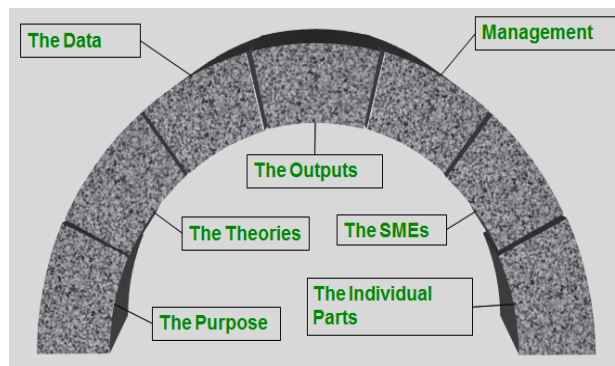
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New comprehensive guidance to support the decision of the fitness of a tool, technique, or model (TTM) for a specific purpose was developed by the Defence Science and Technology Laboratory to address concerns raised in a 2003 report issued by the UK Defence Scientific Advisory Council regarding the assessment of the reliability and validity of Information Operations related tools, techniques, and methods intended to affect human/social behavior. The "fitness for purpose" decision is based on a formal system of reliability and validity (R&V) assessment that occurs iteratively from "cradle to grave" throughout the lifecycle of the TTM from requirement/inception/development to deployment and beyond. In comparison to a sequential process of accreditation, the R&V assessment should occur continuously and inform the revision of TTMs. A certain TTM may be appropriate for one use and not another—the decision is not categorical. The objective of this guidance is to ensure that tools, techniques, and models, which may be qualitative in part or in whole, are rigorous, objective, and have been adequately assessed and validated in order that their pros and cons/risks—including any uncertainty—for fulfilling the intended purpose are well understood.

The determination of whether a tool, technique, or model is fit for a purpose ultimately depends on the overall confidence in both the reliability and validity (R&V) of the TTM, accrued during the R&V assessment process. *Reliability* is based on consistency and repeatability; thus, human/social/behavioral TTMs are reliable if they repeatedly reproduce a process with consistently accurate outputs. *Validity* is based on appropriateness, accuracy, and utility; thus, TTMs are valid if they use appropriate techniques, theories, input from Subject Matter Experts (SMEs), data, personnel, provide as accurate an analysis of a subject as that subject would provide of themselves, and are useful to their intended user for a specific purpose. Assessment of key R&V issues, including repeatability, consistency, appropriateness, accuracy and usefulness, occurs in an iterative series of reviews and test phases. These phases can be conducted concurrently and/or repeated as applicable and/or feasible. The reviews include peer reviews by qualified colleagues for continual assessments of progress during development, expert reviews by SMEs—both external and internal (e.g., a multi-disciplinary expert panel or presentation/paper at a conference or symposium), customer reviews on the utility of TTM outputs and/or outcomes and expert reviews after TTM development by an Oversight Group (developers, users and SMEs) to ensure relevance and currency of the TTM. The testing includes testing of individual components (e.g., comparison of manual outputs with outputs from coding/content analysis software), predictive assessments in controlled test cases, if relevant, and comparison of specific analytic outputs/forecasts between similar TTMs and with retrospective data or actual real world developments. The TTM is modified based on the assessments in review/test phases. A log book is recommended throughout the R&V assessment process, documenting all relevant R&V activity and evidence and providing an audit trail of the process and highlighting areas for improvement.

A TTM can be judged to be assessed at Level 0, 1 or 2. Level 0 is “unvalidated,” Level 1 is “assessed by review,” and Level 2 is assessed “against real events.” The overall strategy for assessing R&V is tailored depending on the nature of the TTM; that is, TTMs that enable an analyst to better reason about an issue or assist a planner in understanding appropriate courses of action or facilitate improved situation awareness could be assessed differently than TTMs that provide general or specific predictions. Typically, Level 1 is recommended for TTMs that do not provide specific analytic outputs and, thus, would undergo the series of reviews, but not the testing phase. Those TTMs that do have a specific analytic output are recommended to be assessed at Level 1 and Level 2 (testing and comparative analysis of the output[s]). Ideally, the overall R&V campaign (including timing of review/test phases) should be laid out and agreed to by the developer and users when development commences, based on the level of risk they are willing to accept, the level of confidence required to establish a TTM is fit for a specific purpose as well as time and resources. Fitness for purpose criteria include (1) accuracy of the representation, (2) realism of the representation, (3) expertise of both the users and subject matter experts, and (4) credibility of the tool and its outputs. A balance must be achieved across these different criteria; otherwise, this creates a risk for the users of the model. Achieving the right balance depends upon the specific use of the model. The objective of the R&V assessment is to enable the user to evaluate the risk of using and not using a particular TTM.

A fitness for purpose model developed by DSTL is shown in Figure 1. As depicted in this diagram, the validation of model output is built upon two arches. Along one arch is an assessment of the model’s purpose, the model’s theoretical underpinning, and the model’s data. Along the other arch is an assessment of the individual parts of the model, the expertise of the subject matter experts, and the management of the model’s use and maintenance.



When considering the purpose of the TTM, it is important to establish that there is, indeed, an interested end-user with a specific purpose for the TTM to fulfill and, assuming no suitable alternatives exist, the ability to develop a suitable TTM to fulfill the purpose in a certain timeframe and level of effort by a developer with a clear understanding of the TTM purpose. For those TTMs for which the purpose is to influence or shape behaviors, it is also critical to establish the feasibility of achieving the purpose based on direct interaction/consultation with the subject or indirect consultation with friends, relatives, colleagues, and SME’s in order to accurately assess attitudes, behavior, norms and thus avoid or minimize unintended consequences. Assessment of the constituent parts of a TTM may involve determining the appropriateness of interviews or surveys for certain countries, cultures, situations or contexts, assessing the comparative fitness for purpose of competing approaches (e.g., automatic coding versus manual coding), assessing the consistency, reproducibility, and bias of outputs from focus groups and structured discussions as well as inputs from humans (e.g., consistency of their training and/or inter-rater reliability).

Assessment of the theoretical foundation of a TTM requires an assessment of the credibility and appropriateness of theories from various social science domains (e.g., psychology, sociology, international relations, etc.). Controversial, overly narrow, biased, or unsupported (in the academic literature or by insufficient or not representative data) theories should be avoided. Chosen theories should be appropriate for the specific purpose for which they will be utilized and should have been tested or used previously for analysis of a similar topic. The credibility and appropriateness of theories should be reassessed periodically, based on monitoring academic literature and new developments that challenge the credibility or appropriateness of a theory. Finally, theories should be appropriately utilized, accurately interpreted, and incorporated into a TTM (as assessed by relevant SMEs) and the end users should have a sufficient, consistent understanding of the theory and how it is applied.

Developing TTMs often involves the use of both quantitative and qualitative data, including the use of SMEs. The reliability and validity of the SMEs should be assessed based on whether their expertise is based on relevant experience, their reputation in their domain of expertise, the extent to which they are recommended by credible sources, their historical record of using their expertise to support TTM development, and the consistency of the information they provide relative to other sources (real world events, other SMEs). Data sources, both quantitative and qualitative, should be assessed for bias and uncertainty. Ideally, only data from a credible source should be used, and the input data should have an audit trail. Guidance provided on preferred and recommended data should be reassessed periodically to ensure credibility and currency. Decisions to use less credible data sources should be made based on the end users required confidence, assessment of risks associated with using the data, and making appropriate caveats on dependent outputs. For consistent data interpretation, a standardized template or format should be used to detail the approach for analyzing and interpreting data, extracting information and forming conclusions. Multi-source interpretations should be compared for confidence and confirmation and, ideally, interpretations should be reviewed by peers and/or SMEs. TTM outputs based on different interpretations should be compared to assess the impact.

The R&V of TTMs depends, to a large degree, on the people that develop and use them. Developers should have sufficient skill and expertise, including potentially subject area expertise or TTM development. Users should receive sufficient training to understand the purpose, how the TTM works, associated theories, approach for data utilization, and how the TTM fulfills the purpose. Skill and training requirements, including academic or professional requirements, for use of the TTM should be defined. The TTM is only reliable and valid when used under certain conditions. These “boundary conditions” are established during development, and the users should understand these limits as well as the risks of not adhering to them.

The outcomes of the use of a TTM will vary (e.g., situation awareness, support for planning). Fitness for purpose of a TTM is based on process validity and outcome utility. Ultimately, the validity of an outcome depends on the reliability and validity of the overall process used to achieve the outcome. The outcome validity is highly dependent on the utility to the end user. That is, the TTM output should support decision-making, planning, and execution and provide additional insights to a user in an acceptable timeframe in a manner (e.g., language) that is clearly understood. Utility and ease of use or convenience are not the same; an unreliable or invalid TTM that is easy to use should not be used.

Challenges in assessing the reliability and validity of social science tools, techniques, and models, especially those developed for use in Information Operations, include the following.

1. Human and social science fields typically lack theoretical maturity, as compared with the physical sciences. This challenges the accuracy or representation and the expertise of users.
2. Human social behavior often reflects a rich and complex problem space. This challenges the realism of the representation.
3. Human social behavior involves many unobservable phenomena. This challenges the expertise of subject matter experts and the credibility of the model to users.
4. Both psychological awareness and human behavior involve socially constructed factors and variables. This challenges the accuracy and realism of the representation.
5. Consistency in assumptions related to a model's purpose when reusing scientific statements/theories that are encapsulated in software is essential.

How Operators Should Use Input They Receive From the Social Sciences Mainly Working Outside Their Realm (Determining Mission Applicability)

Primary contributor: Dr. Laura Steckman

The key issue discussed in this section is knowing whether an approach, model, or measure is appropriate to the mission in the planning phase. One needs to define best practices and ensure an appropriate level of their application in strategic, operational, and tactical mission analysis and course of action development, and war gaming.

At bottom, validation is about what works and what does not. At the operational level, people want workable tools to current problems. In this context, a “validated” theory has to be relevant to the operations community. Thus, a theory may be scientifically good but operationally may fall short. For example, anthropologists may believe in their techniques and they may be validated. However, the challenge remains how to validate the models in a theater engagement plan in a way that planners feel that the constructs they pull from anthropology are strong enough to stake lives on. Social science also attempts to define what an expected outcome may be based on current available information. So how would the military commander be able to decide or define what is valid when outcomes may not be known for a long time, especially with constant evolution of a society and its interaction with its environment? Thus to ensure commanders and battle staff have some fundamental level of confidence, social science must inform campaign/mission planning/analysis (determining specified and implied tasks), course of action development, war gaming, and red teaming. In this context, we need to address Phase Zero, as well as all other phases. Ultimately, all operations occur in a spatial context. Thus, additional integration of social science tools with geographic information science and spatial theories is required as well.

How do we gauge the degree to which our models and measures of human social behaviors correspond to the real issues with which DoD operators are concerned?

There is not a simple answer to this question. It seems that DoD operations could not perform optimally without input from the social sciences, as its models and measures can identify drivers of, and correlations to, human behaviors that might not be otherwise known, or not well understood. Social science also provides mechanisms to tailor general models to specific cases, taking into account the socio-cultural, linguistic, and ethno-religious variation that could lead to better outcomes for DoD operations. On the other hand, DoD has developed its own systems and standards to meet heavy demands. DoD’s systems are designed to, when possible, save time and valuable resources while achieving an acceptable outcome. Therefore, social science has the ability to offer great insights to DoD about its real world problems. However, the degree to which DoD and social science are compatible is very low at the outset; both groups will need to compromise in a way that does not jeopardize integrity or cost lives.

Selecting a methodology knowing that it is valid and applicable

There are many types of validity, and there is often a definitional disconnect between social science validity and the military's validity requirement (the ideal is 100%, but when this cannot be met or has a strict deadline, lower percentages of correctness are acceptable). This is a critical juncture where many people may opine that social scientists' and DoD's needs are incompatible. Social scientists want to produce good science with the resources required to complete the task. The military wants quality information, but may need to act prior to a project's completion; the military does not need to be exactly right and often can afford to have a greater margin of error than researchers. This is a divide that needs to be addressed.

There are several possibilities for choosing best-fit or at least better-fit methodologies. While none of these replaces the benefit of completed social science research, they attempt to juxtapose the need for quality research results and meet operational demands.

1. Draw upon methods known for high quality information. Select from methods known to be reliable, or in cases where the method remains experimental, work with a researcher with a solid reputation for methodological applications and ethics, with the understanding that discerning the answer will take time. Quality results may not be possible on a snap deadline.
2. Collaborate with individuals and organizations with good track records and high standards. Provide specific requirements based around a question that articulates which precise piece(s) of information are necessary outputs of the project. More precision at the outset may help to shorten turnaround times, depending on the question's complexity, best-fit methodology, and required data collection techniques.
3. Initiate projects that include developing training materials for DoD non-social science researchers (develops common vocabulary, promotes knowledge of various methods and their potential for implementation, teaches about timelines required for good science). Many military officials see value in social science methods and would like to understand better what these methods are and what they can do. Being cognizant of their lack of time but genuine interest, social scientists can cultivate stronger relationships by engaging interested parties. Making compromises between the two approaches—if this even makes sense, the military perspective may be that social science has to be subjugated to military interests to fulfill its needs—is a step-by-step process. It is important not to dismiss the benefits social science can provide the military if it is integrated without being compromised.

Effects-based research,³ considering needed outcome

Traditionally, social science methods have produced information of limited value to the DoD—not because they cannot, but because projects are designed differently from DoD intelligence needs even though social science research can produce richer, more complete knowledge than some non-social

³ Which should not be confused with effects-based operations (EBO), though EBO/EBAO has seen a rise in support since mid-2012

science tools. Better analysis could lead to better planning and ops, but the output of a social science project needs to be recognized as an output rather than an outcome.

To meet criteria of military validity and remain good social science, social science methods may be better utilized by the DoD specifying what the desired outputs and required data granularity are when preparing to assess or work with a problem set. And thus, if the military's planning or operations intended outcome is X, the output(s) from the social science research can be stated upfront as needing outputs A, B, and C. A, B, and C would then become inputs, most likely to be combined with other inputs, for devising the path that best leads to outcome X. Note this needs to be qualified: in specifying a desired research output, which is analogous to having a research question answered—or perhaps even multiple questions answered, the people requesting a specific output must ask a broad enough question related to human behavior so as not to force a pre-decided or fictional output. This approach would be more suited to some projects than others, depending on task requirements, such as scope, resources required, time frame, etc.).

The area where social science and DoD needs may be most compatible is in developing transitions that flow from developed, validated social science studies to tools with which the military is more comfortable and conditioned. Working to develop transitional strategies, such as social science -based mechanisms (i.e., formulas, mechanisms, models) that can be implemented on demand and function as repeatable processes, can take an idea more quickly from proof of concept to operationalization. Transitional mechanisms have the potential to turn social science results into information that the military can use. With the proper calibration, these mechanisms may provide improved outputs; optimally, they would lead to actionable information.

Thoughts on the Need to Develop Military Social Scientists

Primary contributor: Lt Col Alex Barelka, PhD

This section addresses several interrelated issues:

- The key role of military social science
- How to translate "validated" concepts in social science into the operational world
- Discussion of pitfalls

As previously mentioned, how to select, validate, and then use social science theories can be a very complicated and difficult issue. Perhaps, one of the biggest obstacles to overcome is simply connecting social scientist and military members. In fact, it is hard to imagine two environments that are more different. Each is famous for having its own strong and unique culture including nomenclature, standards, schedule, and level of regimentation. Further, the focus of the jobs and the tools members of each culture use are typically very different. The social scientist cares most about precision and exactness. As a result, they take an extraordinary amount of time using complicated theories, experiments, methodologies, statistics, and mathematics to make their decisions. In contrast, the military member often does not have the luxury of time and is sometimes forced to make difficult decisions with much less than perfect information. Complicating this is that fact that these decisions often relate to the application of force, which is often difficult to undo. Such "faultlines" that exist between these two environments often limit the amount of interaction that is possible between them. Therefore, what is necessary is the development of a group of military social scientists that can understand both environments and act as a bridge between them. These individuals would elicit user requirements and then use their domain knowledge to satisfy those requirements.

Unfortunately, instead of training military members as social scientists, the DoD often does the exact opposite. They use contracted social scientists to work in the military. This is not the same and does not satisfy the requirement. The driving requirement is for the military to have access to social scientists that have the correct training AND a cultural knowledge of the military, which takes years to develop. Taking trained academics out of their own strong culture and placing them temporarily in a military context does not allow them to act as a bridge between these two environments. Instead, it just provides them another context in which to operate. This is valuable for the scientist but does not afford the military the benefit of having someone who can span social science training and the military culture. Given the need for military social scientists, it is important to consider the training, personnel, and material necessary to develop these individuals.

With regard to training for officers, a significant amount of attention seems to be applied to these sciences in the DoD during the baccalaureate years, but almost all of this evaporates for advanced degrees. For example, the service academies have thriving, relevant, and important social science programs, but only a few social science classes are taught at the service graduate schools. As a result, the DoD seems to believe that it is wise for the social sciences to form the educational basis for a significant portion of their Officer Corp but not important enough to emphasize during the later stages

of an individual's education when the relevance and importance of this topic has the ability to matter even more. Some might suggest that the DoD still sends people to civilian institutions to get social science advanced academic degrees, but those numbers have never been very high and have even been falling over the past decade. Others might suggest that providing such an education is the responsibility of the Professional Military Education (PME) system. After all, this is a system that touches not only officers but enlisted troops so all uniformed personnel might benefit. However, the stated goals of these programs revolve around the ability to prepare students to develop, employ, and command ground, naval, air, space, and cyberspace power in joint, multinational, and interagency operations. This is very different from developing the knowledge, skills, and abilities of individuals to create and validate social science models.

Specifically for the enlisted ranks, the education and training opportunities are even grimmer. These individuals are often only given cursory training on how to operate as social scientists but are often required to perform many of the same social scientists related jobs as officers. For example, Sergeants with only a few days of training have found themselves to be the senior ranking military assessment member inside an Information Operations (IO) orientated organization in Afghanistan.

Therefore, what is needed is a focused, comprehensive, and integrated social science training program for officers and enlisted that spans their entire career. Just as officer social scientist training often begins during the baccalaureate years, enlisted social scientific training should begin either in basic training or at least technical training. Further, these individuals should be allowed to improve their skills with advanced technical training or academic degrees in this area. An emphasis should be placed on this in the PME schoolhouses, but this should not be thought of as a replacement for a more complete social science education and training program. Instead, PME students should be taught the importance of the social sciences in Phase Zero, "left of bang" operations. This will allow them to gain an appreciation for the power of this capability and how to employ it in the future.

Of course, no amount of training can be effective unless those that receive it operate within a personnel system that adequately utilizes their knowledge, skills, and abilities. Unfortunately, such a system does not exist within the DoD. For example, Operations Researchers or Analysts are often responsible for performing Socio-Cultural Analysis (SCA). These individuals are typically trained and educated, even at the PhD level, to perform quantitative analyses in environments with deterministic elements that allow for optimal, or near-optimal, solutions to be achieved such as logistics scheduling, network optimization, or manpower resource models. As a result, few of these individuals are trained to measure and analyze the values, beliefs, and behaviors of people, which is a very different skill set compared to what is required to develop and operate models used to analyze deterministic processes. Recently, when these individuals staffed organizations in ISAF tasked to develop a behavioral understanding of the populace, the majority of this work was performed by civilian and NATO contractors with the required background and education.

In other places, the situation has the potential to be better, but the reality is still the same. Some enlisted forces have Mental Health Service workers, but these individuals are more clinical orientated and part of the medical community. They are not trained social scientists. Some services have a behavioral scientist career field, which would be an ideal group of people to task with developing and operating a social modeling effort, but these career fields are often small and fractured. As a result, these individuals often only teach others basic psychology or act as laboratory assistants. Due to the lack of opportunities and potential for career advancement, some individuals in this career field have started to cross train into acquisition or operational related career fields. One such related strategy that organically developed over time has the potential to become a model for how to best integrate these individuals into a social-cultural modeling effort. Some Air Force Behavioral Scientist (61B) officers have begun to train into the Army Military Information Support Group (MISO). MISO operates the physiological operations program for most of the DoD and Air Force behavioral scientists have found a home developing and assessing these efforts. These individuals flourish in this environment given their knowledge and experience of social and behavioral science. As a result, they would be an ideal group of individuals to develop a dedicated Social-Cultural Analysis (SCA) program within the DoD.

Therefore, what is needed is a viable social scientist career field within each service that is integrated across services. The unique mission of each service would result in slightly different social scientist requirements, but those requirements should then be integrated at the DoD level to ensure that maximum effectiveness and efficiencies exists within the entire Department. For example, the Army is responsible for MISO activities but the Air Force has a requirement for Social-Cultural Analysis inside organizations such as the National Air and Space Intelligence Center (NASIC) and the Air Force Targeting Center (AFTC). MISO social scientist requirements might differ slightly from NASIC and AFTC requirements but not so much that each cannot leverage the capabilities of the other in a meaningful way.

In addition to training, education, and a functioning social science career field, a suite of tools and capabilities are needed to significantly increase our ability to effect change in the human domain. Technologies such as social media, and systems that integrate large databases with analytics, particularly sparsity-cognizant algorithms and other algorithms for data that adheres to models beyond classical linear regression are each very promising. Specific programs might include efforts to mine social and mass media in order to enable sensemaking from the information. Issues such as the sources of information, their ability to help forecast future behaviors, and how they can be combined with each other (and traditional intelligence sources) must all be addressed. These types of programs will become even more important as we pivot towards anti-access area-denial (A2AD) regions. In these areas, U.S. forces may not have the freedom of maneuverer that they currently enjoy. They might not be able to collect information overheard in coffee shops, administer opinion surveys to the populace, or access leaders. In these regions, open source intelligence collected by other sensors including social and mass media may be the only information able to be collected. Therefore, it becomes even more important that meaning is able to be developed from it.

Other systems could also be developed that would integrate such meaning with other factors to form a broader Situation Awareness (SA). Such a “Worldview” system would serve the dual purpose of not only providing a more complete and holistic understanding of how cultures, societies, institutions, and organizations operate but also provides a framework for teaching analysts how to think about these issues. Many intelligence analysts often are not provided the tools necessary to help them develop Socio-Cultural SA, but by providing them a single unified construct to operate within, they would be able to help develop a better understanding of what is needed when performing such an analysis. A “Worldview” system would provide this.

Observations and Conclusions

Primary Contributors: Mr. Ben Jordan and Dr. Ivan Welch

The past decade of combat has once again brought the “human domain” of warfare front and center. The classic geographic factors of physical, cultural, economic, and political have demanded attention from the strategic to tactical level of war. Operational requirements inspired innovation in organizations and diversification in cross-sector collaboration. This legacy can be used as a foundation for the growth of “military social science.”

Army doctrine incorporates Wide Area Security (WAS) as one of the two major constructs within Unified Land Operations; WAS includes COIN and stability Operations which are inextricably linked to political, economic, and social phenomena. All WAS planning requires the contextual integration of human, social, and cultural behavior.

Consequently, primary staff officers (particularly operations and intelligence) need the capacity to assess—even interpret—social science related reporting. To accomplish this, social science and accompanying research methods ought to be taught at basic and advanced courses at the Command and General Staff College and the War College.

Currently, the Army’s Foreign Area Officer (FAO) program educates officers in the social sciences through area studies corresponding to Combatant Command’s area of interest, influence, and operations. Nevertheless, graduate level education within “area studies” is necessary but not sufficient.

Expanding this education to incorporate social science “research methods” is essential to build the technical capacity within the officer corps to evaluate social science theory, models, and data sets that are provided by human terrain teams, contractors, and FAOs. Such an approach would naturally enable social science validation within a military context and, equally as important, enhance communication between military leaders and academe.

Appendix: Lexicon

- Precision concerns the fineness of distinctions made between the attributes that compose a variable. The operationalization of concepts must be guided partly by an understanding of the degree of precision required.
- Reliability is a matter of whether a particular technique applied repeatedly to the same object yields the same result each time. Reliability does not ensure accuracy any more than precision does. It is the quality of measurement method that suggests that the same data would have been collected each time in repeated observations of the same phenomenon.
- Validity describes a measure that accurately reflects the concept it is intended to measure.
 - Criterion validity is the degree to which a measure relates to some external criterion.
 - Construct validity is the degree to which a measure relates to other variables as expected within a system of theoretical relationships.
 - Content validity is the degree to which a measure covers the range of meaning included within a concept.
 - Face validity is that quality of an indicator that makes it seem a reasonable measure of some variable.
- For a chapter describing the criteria of measurement quality in the social sciences, please see Babbie, E. (2006). *The practice of social research*. 11th Edition. Belmont, CA: Thomson Wadsworth, pp. 143-151.