Expeditionary Air Force Leaders

Cognitive Skills for the Naturalistic Battlespace

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Synopsis

Modern expeditionary leaders must be prepared to perform in an unforgiving naturalistic setting characterized by time compression, uncertainty, and high stress. Advances in information technology have increased the quality and quantity of information that must be processed to enable action, often within the adversary's decision loop. The setting and its information demands offer a serious processing and decision-making challenge to the leader at all command levels. While recognizing the value of technical interventions currently pursued by all services, we conclude that the transformation to an expeditionary force, increased rapidity of battlespace operations, and profusion of available information has amplified the need for leaders with the mental flexibility to assess situations, make decisions, and take action under turbulent conditions.

Introduction

The dynamic nature of post-Cold War geopolitics has dramatically increased demands on the American military. Operational deployments have increased over 30 percent since 1990, involving the US military in over 100 major commitments.[1] One need only analyze the experience in Haiti, Somalia, or Kosovo to recognize that a growing number of these missions are characterized by end-state uncertainty, multiple, conflicting roles and missions, and ill-defined threats. Moreover, advances in information technology have increased the quality and quantity of information that must be processed to enable action within the adversary's ever-tightening decision loop. While these attributes are not unique to recent military operations, the frequency and intensity with which they are experienced across all segments of the force is on the rise. This reality offers serious information processing and decision making challenges to airmen at all command levels, regardless of service or functional specialty. Whether facing conventional military operations, humanitarian relief, or peacekeeping missions, United States Air Force (USAF) personnel must be prepared to execute their functions in an unforgiving setting characterized by time compression, uncertainty, and high stress.

This environment and its challenges to the modern aerospace leader are the locus of our paper. Although the USAF corporately appears to recognize that material sufficiency itself is not enough, the response to date has primarily centered on technology. While acknowledging the value of technical interventions, we maintain insufficient attention is directed toward developing the human cognitive skills required to perform effectively with advanced technology in a complex setting. With some notable exceptions, training in these skill areas is limited to a select few in operational and operational support functions. Transformation to expeditionary forces, increased rapidity of battlespace operations, and profusion of available information has amplified a need for airmen with the mental flexibility to assess situations, make decisions, and take action under turbulent conditions.

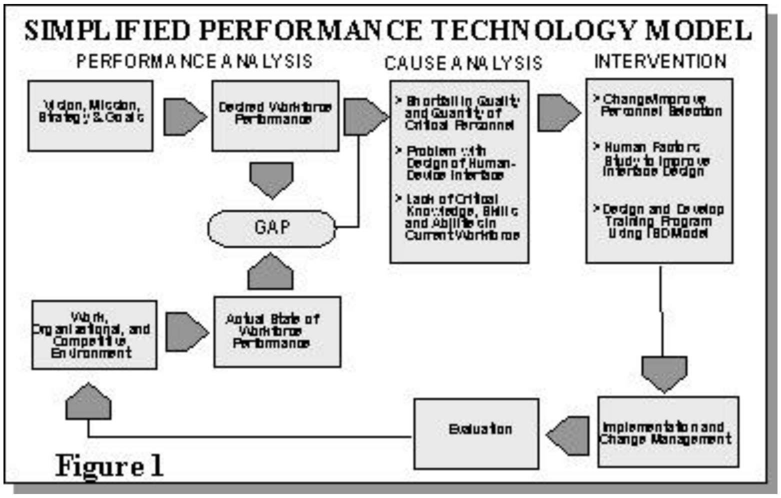


Figure 1

To optimize human performance in such an environment, the appropriate strategy must balance technology innovations with complementary human performance enhancement (HPE). Utilizing the simplified performance technology model (Figure 1), we seek HPE interventions for the critical cognitive skills required of the modern warfighter. We begin by characterizing the naturalistic environment faced by US forces. We then analyze the cognitive skills and outcomes required for optimal performance within this setting and compare them to actual experience. The causes of performance gaps are assessed and an intervention strategy for closing the gaps proffered. Building upon the broad precepts conveyed in documents such as Joint Vision 2020, our strategy consists of simple methodologies that will improve "on-the-fly" situational awareness, decision making, and execution by airmen performing in this expanding operational environment.

The Changing Nature of US Operations

The increased pace of US military operations tempo over the past fifteen years is remarkable. Since 1986, the number of Air Force deployments has quadrupled. Over the past decade, Army deployments have increased 300 percent, while the number of deployed Navy ships has risen over 50 percent in just the past six years.[2] Not only has the quantity of operations increased, but the variety, scope, and complexity of missions has as well. In response, the Services are moving to increasingly mobile and flexible forces. For example, the USAF is well into a transition to the Expeditionary Aerospace Force (EAF), intended to increase capability to rapidly deploy forces to austere locations across the globe and immediately initiate operations. Airmen of every specialty must be prepared to mobilize quickly, developing their situation awareness at the same time they are planning and executing operations.

Revolutionary advances in technology are also changing the nature of information processing and decision making. Information superiority is a proven force multiplier; military success is increasingly dependent on the ability to process, assess, and act on relevant data more effectively than an adversary. Information technology creates its own problems, however, by contributing to data overload and "feeding the dangerous illusion that certainty and precision in war are not only desirable, but attainable."[3] Related advances are occurring in operational sophistication, leading to increased mobility, precision, and rapidity in the battlespace. The battlespace of today is no longer a sequence of discrete moves, but a continuous flow of action. According to Joint Vision 2010:

"Even for higher level commanders, the accelerated operational tempo and greater integration requirements will likely create a more stressful, faster moving decision environment. Real-time information will likely drive parallel, not sequential, planning and real-time, not prearranged, decision making."[4]

The operational environment depicted here is best described as naturalistic. Such a setting is characterized by ill-structured problems, uncertain dynamic environments, shifting, ill-defined and competing goals, action/feedback loops, time stress, high stakes, multiple players, and organizational goals and norms.[5] The experience in operations such as in Haiti, Somalia, or Kosovo suggests AEF members face ill structured problems that are difficult to understand due to the complex causal links involved. These problems take place in an uncertain, dynamic environment characterized by the absence of perfect information and a rapidly changing setting. Deployed airmen also deal with ill-defined or competing goals, which may create cognitive conflicts or require tough trade-offs. The existence of action/feedback loops in this environment forces individuals to focus not only on one decision, but on "an entire series of events, a string of actions over time that are intended to deal with the problem."[6] One choice may create the requirement for further choices, while new information and changing expectancies may force a reevaluation of previous choices. In the naturalistic battlespace, time stress leads to significant pressure on airmen and demands simpler, more efficient reasoning strategies.[7] As in all military operations, the stakes are high—life is on the line. The presence of multiple players in such complex settings leads to communication and coordination problems, as well as competing objectives. Finally, organizational goals and norms may further complicate by reinforcing or opposing personal preferences, behavior, and choices.

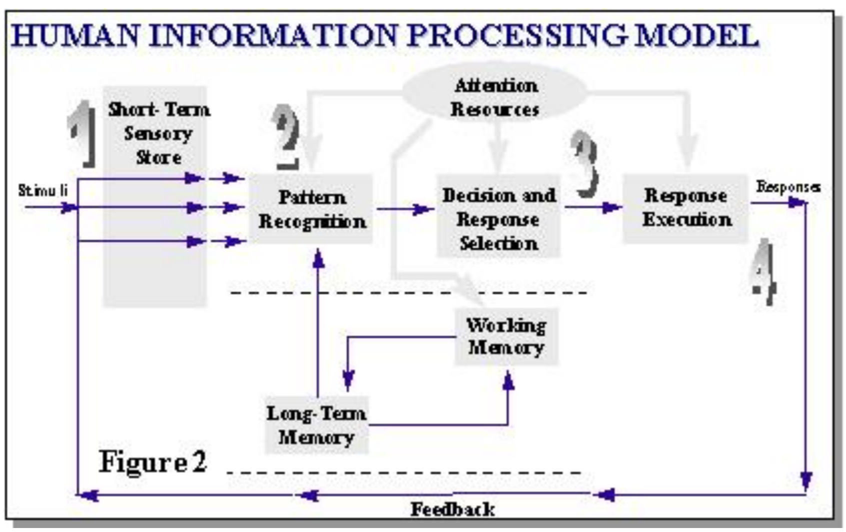
Effective decision making in such an environment requires highly developed cognitive skill-sets. Clearly, airmen do not face all characteristics of the naturalistic environment each time a decision must be made. However, most settings exhibit at least two critical qualities—time compression and information ambiguity. While the pace and complexity of operations have undergone a marked change since his day, Carl von Clausewitz aptly describes the situation commonly faced by the modern aerospace leader:

> "War is the realm of uncertainty; three quarters of the factors on which action in war is based are wrapped in a fog of greater or lesser uncertainty….the commander must work in a medium which his eyes cannot see; which his best deductive powers cannot always fathom; and with which, because of constant changes, he can rarely become familiar."[8]

Some advocates of technology suggest that developments in imaging, automated information processing, and communications have cleared the fog, eased friction, and offset demands created by the naturalistic battlespace. While such advancements are critical, technology may actually contribute to indecision in this new, complex environment; more data is leveraged only insofar as airmen can process data, extract useful information, make timely decisions, and possess the will to act. Joint Vision 2020 cautions that information superiority neither equates to perfect information, nor does it mean eliminating the fog of war. Rather, information systems, processes, and operations add their own sources of friction and fog to the operational environment.[9] In the past two centuries, Clausewitz's dilemma has thus evolved from a lack of decision making certainty caused by want of data, to a lack of decision making certainty brought about by the unsettling demands of the naturalistic battlespace, exacerbated by an overabundance of data. This new reality calls for keen cognitive and decision making skills not only of commanders, but also of every participant in combat and combat support. Recognizing this, the success of the USAF response to challenges presented by the modern battlespace must be assessed. We will do so--using the simplified performance technology model--by analyzing desired and actual performance, identifying performance gaps, and suggesting some elements of an effective intervention strategy.

Performance Analysis

Success in a naturalistic setting demands cognitive skills that are distinct from those required during routine, peacetime operations. The optimal aerospace leader possesses skills relevant to a broad range of settings and is more adept at processing information and making decisions than the adversary. Critical competencies in the naturalistic environment include, but are not limited to, situation awareness, dynamic decision making, and synchronization.



As a theoretical baseline, human information processing may be modeled in the four stages portrayed in Figure 2: sensory processing, pattern recognition, decision and response selection, and response execution.[10] These stages are related to the aforementioned critical competencies: situation awareness (stages 1-2), naturalistic decision making (stage 3), and synchronization (stages 3-4). Although arranged sequentially, the skills and stages are interrelated– each feeds, reinforces, and alters the others. For all skills, effectiveness (accuracy and timeliness) is a function of attention resources, which are adversely affected by too much or too little information.

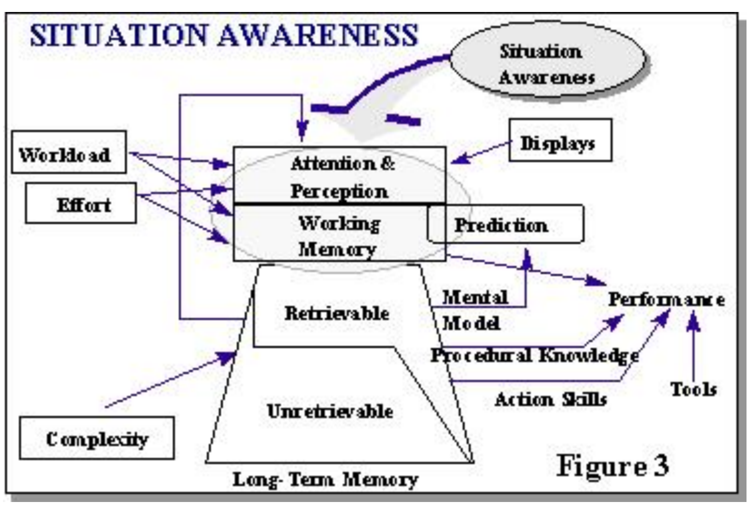
Desired Decision Making Performance

Joint Vision 2020 describes the model fighting force as one that will take advantage of superior information, converted to superior knowledge, to achieve "decision superiority"—better decisions arrived at and implemented faster than an opponent can react, at a tempo that allows US forces to shape the situation. Decision superiority does not automatically result from information superiority.[11] This is an important caveat. To attain decision superiority, airmen must not only have the technology available to gather and process data, but must excel at cognitive disciplines such as situation awareness, decision making, and synchronization.

Situation awareness may be the most important of the three competencies. Research in this area suggests that once an individual understands what is going on, a decision path is usually evident.[12] Defined, situation awareness is:

> "...the continuous examination of information about a system or environment, the combination of this information with previous information from working and long-term memory to form an integrated mental model, and the use of that model in forming further perceptions, anticipating and responding to future events."[13]

Essentially, it is sensing and understanding what is going on around you. Doing so becomes increasingly difficult as the stimuli increase and the situation becomes more complex.



One model for developing an actionable mental picture is shown in Figure 3.[14] The Wickens model depicts perceptual and cognitive processes involved in maintaining situation awareness, as well as the factors influencing those processes. For clarity we need to step through the model. Consider the example of an intelligence officer responsible for assessing real-time adversary military operations. First, sensory input is obtained from electronic displays, text message traffic, and oral input. These stimuli are integrated to form perceptions about enemy activity. Drawing primarily from information in working memory and portions of long-term memory, these perceptions are refined and associated with a mental model that enables the formulation of an expected future status—what the enemy will do next. The intelligence officer's situation awareness is influenced by factors such as workload, attention resources, experience, and knowledge. The level of complexity and available tools also impact the degree of perceptual accuracy and timeliness.[15] As a significant complicating factor, the span of immediate human memory is limited to about 7, plus or minus 2, "chunks" of information at any one time.[16] Since data is fast-flowing and split-second timing is critical in the naturalistic setting, airmen must be skilled in data encoding and situation awareness.

The Recognition-Primed Decision-making (RPD) process model ably describes the desired decision making performance of aerospace leaders in the naturalistic battlespace. RPD depicts how experienced individuals make decisions in time-constrained situations when circumstances do not allow for development and evaluation of multiple alternatives.[17] Emphasizing the role of experience in situation awareness and generating outcomes distinguish the RPD model. RPD asserts, "experienced decision makers can identify a reasonably good option as the first one..."[18] The model also differs by stressing serial generation and evaluation of options as opposed to concurrent, or parallel processes. Additional characteristics include an emphasis on "satisficing" by selecting the first workable option.[19] Rather than attempt to evaluate all possible options, the decision maker focuses on making a reasonable decision early, then modifies it as challenges emerge. Described as seeking a "70 percent solution," this approach frees the naturalistic decision maker from a time-consuming—and rarely feasible—search for the optimal choice. The dynamic nature of the naturalistic environment creates a constant state of action and feedback in which the decision maker must be primed to act.

After initially experiencing the situation, RPD involves two processes, displayed in Figure 4: situation assessment and mental simulation. Situation assessment, closely related to situation awareness, involves four elements:

1) Understanding the types of goals that can be reasonably accomplished;

2) Increasing the salience of cues that are important within the context of the situation;

3) Forming expectations that can check the accuracy of the situation assessment;

4) Identifying the typical action to take.[20]

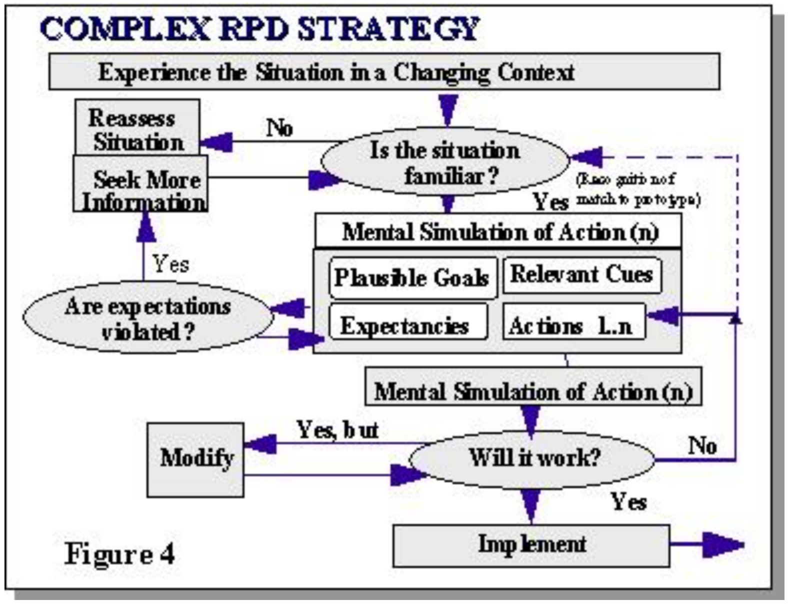


Figure 4

Mental simulation entails "mentally enacting" a sequence of events associated with the course of action selected.[21] The more experienced the decision maker, the more likely it is the mental simulation will realistically consider plausible outcomes. The process can also involve evaluating the situation and its likely development, modifying courses of action based on the simulation, and generating expectancies for the course selected.[22]

A third necessary skill is synchronization—arranging activities in time and space to achieve a desired outcome.[23] The time dimension implies both simultaneous and sequential arrangements, requiring the leader to orchestrate events in the proper sequence-to-time relationship. The space dimension is recognition that the location of activities impacts outcome. For example, a finance officer may face crisis if knowing when and where to obtain funding authorization is critical to subsequent action by a commander. Synchronization has strong roots in current military doctrine; US Army Field Manual 100-5 proffers that some activities must occur before the decisive moment and, although separated in time and space, they must be well synchronized if their combined effects are to be felt at the decisive time and place.[24] Synchronization cannot be achieved until leaders first mentally simulate the consequences to be produced and how they must sequence their activities to yield the overall desired outcome—"synchronization thus takes place first in the minds of commanders."[25]

In summary, desired performance requires, of all airmen, skill maturity in each of the three critical competencies. Accompanied by effective technology interventions, this will enable the joint force of 2020 to "use superior information and knowledge to achieve decision superiority, to support advanced command and control capabilities, and to reach the full potential of dominant maneuver, precision engagement, full dimensional protection, and focused logistics."[26]

Current Decision Making Performance

Joint Vision 2020 concedes that advances in information capabilities are proceeding so rapidly that there is a risk of outstripping the ability to capture ideas, formulate operational concepts, and develop the capacity to assess results.[27] Our shared experiences suggest that airmen in a naturalistic setting do not always exhibit high levels of situation awareness, nor make quality decisions. Rather, they are often overwhelmed by the demands of the naturalistic battlespace. Military leaders are beginning to recognize this and are seeking ways to strengthen the force. For evidence, consider the massive investment in technology solutions by all Services, as well as HPE efforts undertaken by the US Army and Marine Corps (USMC). The Army, concerned that the increase in information flow will drown staff officers in data "while their commanders thirst for information," has initiated a simulator-based training program to improve the accuracy of situation assessments and the quality of decisions.[28] The USMC is also in the forefront, making naturalistic decision making a guiding principle for The Basic School (TBS) and the Infantry Officer's Course (IOC). According to a former commandant, Colonel Robert E. Lee, "we develop the leader who can commit to a decision, communicate the decision, and have the will to act."[29]

These institutions and others are beginning to recognize that the traditional, rational approach to information processing and decision making is inadequate in the naturalistic setting. Traditional analytical theories focus on the decision event and call on the decision maker to survey a situation, gather information, develop alternatives, assess alternatives based on established criteria, and choose the optimal option. The problem is that the results of such an approach—particularly when impacted by time constraints, conflicting goals, cognitive inflexibility, and so forth—often do not match desired outcomes. In fact, single-mindedness on the traditional approach may actually prevent timely, effective decision making, because a philosophy that requires soldiers to seek the "100 percent solution" creates crucial decision making limitations in the naturalistic battlespace; operating within an environment unsympathetic to such cognitive disciplines, airmen hesitate. Moreover, the rational process feeds into constraining bureaucratic forces that require decision makers to seek approval or coordinate decisions prior to action. Unfortunately, too many organizations depend on the rational process to prepare decision makers. Indeed, it is even institutionalized on the USAF officer's performance report, where leaders are expected to make decisions that "emphasize logic."[30] These conditions represent negative gaps between desired and actual performance for which solutions must be found.

Cause Analysis

Within the USAF, performance gaps may be attributed to at least three major factors. First, we place disproportionate emphasis on technology solutions to a socio-technical problem. Second, the functional orientation of personnel segments the joint force. Third, training for effective performance in the new setting is provided only to a select few.

In New World Vistas, the USAF Scientific Advisory Board (SAB) asserts that the pace of modern warfare has outstripped the capabilities of the human operator to handle the information-processing load. To overcome these limitations, the SAB asserts, "human-computer interactions will be facilitated by operating logic, displays and controls that assure the leader has all the information needed to address almost instantly all contingencies."[31] This outlook, implying that the operator will make a correct decision based upon automated information sources, is representative of the USAF approach. Improvements in cockpit displays and intelligence systems are well-documented examples of technology advancements. Another illustration is the USAF financial management community's Automated Battlefield System (ABS), a man-portable system capable of supporting accounting requirements and military pay service in near real-time from a deployed location.[32] These kinds of innovations are critical, but address only the technical component of the socio-technical system; absent complementary cognitive competencies, undo expectations of, and dependence on, technology may lead to severe mission failure in future conflict.

The second gap, functional myopia, occurs as a result of naiveté and isolation, conditions that the USAF inadvertently promotes. For example, USAF recruits have traditionally not been effectively indoctrinated on the role or application of airpower, but are trained primarily in their functional specialty. The USMC, in particular, has made great strides closing this gap at TBS and IOC. The USAF's Air and Space Basic Course is another step in the right direction, although its ability to inculcate airmanship remains to be seen. But while many enlisted academies and officer schools encourage some interaction across functional lines, this brief experience is contained within an academic setting and often limited to a select few. As a result, the USAF has created an affiliation with occupational specialties at the expense of commonality. The weakness of such a culture surfaces in the EAF as unnecessary bureaucracy and unrealistic functional constraints. Moreover, it discourages aerospace leaders from assessing situations and taking actions that affect other specialties.

The third major cause of negative performance gaps is that the training necessary to succeed in the naturalistic setting is not provided to the great majority of personnel. For example, although simulation has greatly enhanced effectiveness in areas such as aircrew training, the use of high fidelity simulation has only recently begun to propagate to support career fields. The USAF financial management community developed the Top Dollar mobility exercise to reproduce actual deployment conditions, stresses, and decision making scenarios. Other exercises, such as Olympic Arena for missile operators, do the same for their respective specialties. Woefully, this training is normally reserved for "elite," representative teams. In the best circumstances, the experience provides some anecdotal enrichment for the participants' home units, but it is far more common that only the competitors benefit.

Intervention Strategy

If present and future negative "performance gaps" exist, what intervention strategies are available to tackle the problem? Joint Vision 2020 asserts the importance of decision superiority, but what meaningful steps may be taken now to prepare the joint force of tomorrow? Drawing on HPE theory and some recent real-world successes, we propose a two-phase education and training strategy. First, the USAF must educate present and future leaders on how information processing and decision making occur in the naturalistic setting. Second, simple, inexpensive training methodologies for developing these skills through learning and practice must be deployed. Because it is important to relate theories about training to specific opportunities for training, the linkage between theory and application must be woven throughout.

Educating aerospace leaders on how human information processing and decision making occur requires creating a general comprehension of, and a sense of urgency about, cognitive performance gaps.[33] The EAF transformation should itself heighten awareness of the expanding naturalistic environment and its unique skill requirements. Complementing this reality, the USAF should emphasize programs to educate personnel on models that describe cognitive processes, enabling decision makers to grasp situations and solutions faster and more clearly. The models provided in this paper are examples of the mental "tools" necessary for an effective HPE strategy.[34] The USAF should also explore differences between expert and novice decision makers, with the goal of to identifying and promoting useful heuristics. By drawing from the past, the decision making skills of less experienced soldiers may be raised.

There are ample opportunities for the USAF to incorporate such education into existing programs. Graduated levels of decision making education in formal venues—from basic training to the Senior NCO Academy, the ASBC to the Air War College—will enhance the skills of the enlisted and officer corps. Moreover, functional specialty schools should be founded in a decision making framework, much the way the USMC does with TBS and IOC. Joint training should reinforce Service-specific training by similarly emphasizing the threat of performance gaps and importance of conceptual models. Simply, the military should firmly inculcate cognitive skills' awareness into every training program.

Exposure to conceptual models is an important element of the strategy. Such foundations will unlikely take hold, however, without the opportunity for soldiers to develop experience, think through their mental processes, and practice. The USAF should develop these skills using three interrelated approaches: examining strategies used by decision making "experts," debriefing their own processes, and practicing the skills in high fidelity settings.

Paraphrasing noted military historian S.L.A. Marshall, if there is no excuse for not having a 3000 year-old mind, then the Services must employ available resources to enhance pre-combat preparation. Studying the history of warfare and the decision processes of winners and losers is one means of examining expert strategies to develop experience. Along with the social benefit of students being exposed firsthand to military history, social learning theory posits that individuals can model the behavior of others. Simply put, learned behaviors become part of a student's repertoire of potential behavior even though it may not be overtly performed for some time.[35] Mentoring is another incredibly effective means of developing experience. Veteran leaders should provide developing soldiers with "war stories" that focus on how situations were recognized, decisions made, and actions taken. Mentoring as "naturalistic experience" should be a central part of on-the-job training (OJT) programs. Incorporating war stories into training of all kinds will increase both the historic "glue" that binds servicemen and women together as soldiers, as well as the probability of modeled behavior in time of crisis. Such efforts are currently an informal part of some training programs, but formalizing and globalizing them across the force is essential.

The debriefing is an excellent means of thinking through mental processes. For the combat pilot, debriefings are an integral part of any mission. In fact, training missions may be considered successful, despite substandard flying, if the debriefing is excellent. Often, more learning occurs during the debriefing than the actual flight. In-depth debriefing skills are important because critical learning points typically reside not in the first (and simplest) level of detail, but in the underlying mental processes. For example, a debrief should include discussions regarding what assumptions were made, where these assumptions led, what critical cues were used, what was ignored, what feedback was pursued, opportunities for process improvement, and so forth. Good debriefings expose assumptions and processes that led to particular decisions and actions. The challenge here is to embrace debriefing techniques as an integral part of every airman's training; it is a critical learning opportunity that, when employed effectively, may even eclipse the value of the training task itself.

Simulations—as basic as unit level, in-house exercises, or as complex as major joint maneuvers—represent opportunities to practice decision making skills. Simulations are designed to replicate the essential characteristics of the real world that are necessary to produce learning and transfer. These efforts range from flight simulators, which have a substantial degree of physical fidelity, to role-playing methods, in which the degree of physical simulation is minimal. In any case, the purpose of the simulation is to produce psychological fidelity—to reproduce in the training tasks those behavioral processes that are necessary to perform the job.[36] Enhanced fidelity increases the positive transfer between the simulated experience and actual behavior in the naturalistic environment.[37]

One relatively simple and inexpensive simulation, the Tactical Decision Game (TDG), is used effectively by the USMC. Each month, The Marine Corps Gazette publishes a scenario-based TDG challenging readers to assess a tactical situation and decide on a course of action (COA). While the complex naturalistic setting is not inherent to the TDG, some leaders, such as those at the USMC's TBS, introduce additional psychological fidelity through time-compression. They also debrief the subordinate's decision making, sometimes in conjunction with other possible COAs. Moreover, subordinates are graded not on whether they determined the "best" solution, but on how well they recognize their assumptions and mental processes, focusing primarily on decision making skills.[38] This kind of approach may be employed as a low cost simulation starting point for all personnel through Professional Military Education (PME) and on the job. The USAF should employ similar decision simulations—published in periodicals and available on-line—geared toward the development of common skills. The goal is to provide meaningful decision making training to as much of the force as possible.

TDGs are a relatively simple first step. This strategy also calls for greater use of simulations with increased physical and psychological fidelity. For example, effective incorporation of cognitive skills' development into major joint or live-fire exercises should enhance transfer, and thus preparation for decision making challenges in combat. Improved simulation in greater numbers should also be incorporated into existing PME and functional specialty training, along with a complementary debriefing strategy.

The three interrelated complex cognitive tasks—situation awareness, dynamic decision making, and synchronization—require a unique blend of mental skills. Our intervention plan for developing these skills calls for education and training, generally through simple, inexpensive methods tied into existing organizational structures. The strategy begins by educating all personnel about the naturalistic environment and appropriate mental models. It requires the USAF to develop experience and expertise by embracing history while institutionalizing "war story" mentoring and debriefing. Finally, it calls for continual honing of cognitive and decision making skills through curriculum enhancement in existing formal training, as well as informal simulations such as decision games. Periodically, this plan should be assessed and revised so the strategy matures along with the force.

Closing Remarks

Military success or failure in the information age depends not only upon the capability of employed technology, but the minds of military personnel. The United States Air Force must institutionalize the reality that in future warfare all personnel will be required to perform in a naturalistic environment, and a conviction that these settings present challenges that cannot be effectively addressed solely through technology solutions. Aerospace leaders must develop complementary naturalistic skills with which to enable quick action within the adversary's decision loop. Situational awareness, RPD, and synchronization—a few of the many cognitive competencies that leaders must understand, develop, and practice—are applicable to any airman facing the 21st century's pedigree of Clausewitz's fog and friction. The USAF must continue work to take advantage of simple, powerful techniques that emphasize exposing and understanding thinking processes, studying the strategies of experts, and developing experience through practice. Borrowing from a USMC mantra, we must "equip the man vice man the equipment."

Notes

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Captain Sam Grable currently serves in the Office of the Assistant Secretary of the Air Force for Budget Operations. Specializing in financial management, his assignments include three overseas tours in Europe, tours of duty on the Air Staff and Joint Staff and most recently as a Joint Strike Fighter Program analyst at the Boeing Developmental Center in Seattle, WA. He holds a Masters Degree in Organizational Management from George Washington University and a Masters in International Relations from Troy State University.

Captain Jim Stratton is currently assigned to the Defense Language Institute for language training prior to serving as an exchange pilot with the Royal Canadian Air Force. An F-15C pilot, he was most recently stationed at RAF Lakenheath in the United Kingdom where he participated in Operation ALLIED FORCE. His experience includes an operational tour in the 1st Wing at Langley AFB and in the OSD Office of Net Assessment. He holds a Masters Degree in Organizational Management from George Washington University.