

Battle-Wisdom

Improving Cognitive Performance in Network Centric Warfare

Dr. Irv Lachow, Mr. David Gompert, Mr. Justin Perkins

ABSTRACT

Operations in Afghanistan and Iraq have demonstrated that cognitive pressures on military personnel are extremely high. Decisions that were once made by colonels are being made by captains and the consequences of those decisions are having global impacts. It is imperative that the U.S. military improve the ability of soldiers to make quick, accurate, and reliable decisions in complex, dynamic and ambiguous situations. To do so, soldiers must be able to move between formal reasoning and intuitive decision making quickly and seamlessly. We call this ability “battle-wisdom” and believe that it may be a decisive factor in determining the outcome of future conflicts. If the U.S. military is to remain operationally superior in network centric warfare, it needs to increase the overall level of battle-wisdom in its forces.

We have identified several promising options for attracting, developing, and keeping battle-wise soldiers: lateral entry; rigorous and intense training in unfamiliar, ambiguous, and urgent circumstances; educational emphasis on analytic thinking and cross-boundary leadership; rigorous sorting before the 10-12 year mark; a more flexible retirement system; a steeper pay scale; and increased use of variable monetary incentives. Further research is needed to determine whether and how these ideas should be pursued.

INTRODUCTION

We've had to transition to more unconventional warfare in some highly complex terrain that includes not only cities and towns, but also rivers, valleys, wetlands and desert I've been most impressed with adaptability of our leaders and soldiers, especially the ability of relatively junior leaders to take on roles that were far beyond the traditional scope of a company or battalion commander. Those officers are running towns in Iraq, helping organize and working with civic leaders, making tough decisions day and night, even while conducting combat operations around the clock *I think that kind of adaptability and sophistication is something we need to fold back into the batter here as we think about shaping the future Army We want an adaptive organization full of problem solvers. We want them to know how to think, not just what to think.*¹ [Emphasis added]

--General Peter Schoomaker, Army Chief of Staff

Iraq . . . is precisely the kind of unpredictable environment in which a cohort of hidebound and inflexible officers would prove disastrous *the exigencies of the Iraq war are forcing decision-making downward; tank captains tell of being handed authority, mid-battle, for tasks that used to be reserved for colonels.*² [Emphasis added]

--Dan Baum, *The New Yorker*

The United States is well on its way to integrating Network Centric Warfare (NCW) into its war fighting doctrine. At the same time, adversaries are leveraging networking technologies and concepts to further their aims. Although many of these adversaries are technologically inferior to US forces in firepower, their use of network centric concepts can potentially affect the costs (and maybe even the outcome) of war. Operations in Afghanistan and the ongoing insurgency in Iraq provide glimpses of what US forces are likely face in the future. These conflicts demonstrate that cognitive pressures on military personnel are already extremely high for a number of reasons. First, soldiers must often make complex decisions in a split-second that can have deadly implications and severe penalties for being wrong. Second, because of the ubiquity of video cameras and news teams, the consequences of a military decision may end up on television or the Internet, possibly with international political ramifications. Third, these life-and-death decisions may be complicated by ambiguities, such as the blurred lines between war and peace, between combat and law enforcement, and between hostile civilians and plain-clothes insurgents. Fourth, soldiers face opponents who are trying to confuse, disrupt, outsmart, and harm them. They must contend with self-preservation and face their own mortality on top of their other burdens. As opponents become more sophisticated in their own use of networks (both technical and human), military operations are likely to grow even more complex, stressful, ill-defined, and politically sensitive.

One result of this trend is that junior ranks of enlisted personnel and officers are being given increasing levels of responsibility. Decisions that were once made by colonels are being made by captains and majors, and the consequences of those decisions can have global impacts. Thus, it is imperative that the U.S. military improve the ability of soldiers—especially junior ones—to make quick, accurate, and reliable decisions.

Clearly, a necessary condition for achieving this goal is to provide soldiers with more and better information. Increased access to information, if it is gathered, processed, analyzed, filtered and presented properly, can certainly improve decision-making. A great deal of effort is currently being expended to solve that problem. Our analysis focuses instead on the cognitive domain of NCW: the area that focuses on how decisions themselves are made. In particular, we are interested in the decision-making process itself and the traits that enable some people to make better decisions than others. We believe that the best soldiers in NCW will be those who make the best decisions, and that this will require a combination of more timely reasoning (formal decision-making) and more reliable intuition (naturalistic decision-making). The former (exemplified by the Military Decision Making Process) has the advantage of being rigorous and repeatable (and thus more easily communicated to others), but it is often time-consuming. The latter is well suited for time urgent, complex and ambiguous situations, but it relies on pattern matching and/or extrapolation (usually subconsciously) from prior experience. If prior experience is either missing or irrelevant, then the utility of this approach is diminished. In addition, intuitive decision making is highly idiosyncratic, and thus hard to explain to others. This has serious implications for the communication of command intent—a critical component of NCW.³

We believe that current and future operational environments call for the integration of reasoning and intuition into a savvy yet thoughtful quality we call “battle-wisdom.”⁴ A battle-wise soldier relies on intuition when decisions must be made extremely quickly and under great duress. By relying on experience and focusing on finding a “satisficing” solution, such a soldier can quickly zero in on a good course of action. In contrast, if a battle-wise soldier is under less time pressure, he or she can take a more formal approach to decision-making that allows him or her to analyze more data, evaluate and compare options, and possibly obtain advice from other people. Even if this person ends up making an intuitive decision, he or she can use an analytic approach to check whether his/her instincts are on track before the decision is communicated to others. In essence, a battle-wise person will have a “sixth sense” for when to go with his/her gut and when to stop, gather more data, and use a formal decision-making approach. He/she will be able to take the initiative when necessary, but also know when to pull back and wait, analyze, or ask for help. Such traits will prove vital in urban warfare, counter-insurgencies, peace-keeping, and other types of military operations that are likely to face US forces in the coming years.

In summary, our notion of battle-wisdom reflects the ability of soldiers to move seamlessly from one method of decision-making to another as the situation dictates. This is not easy. Each method involves different cognitive abilities and uses information differently. Each has strengths and weaknesses. Each is best used in different situations. We believe that it is critical for the U.S. military to recognize battle-wisdom as a critical ability that may prove to be one of the decisive factors in determining the outcome of conflict in the coming decades. Whatever its strength on paper, if the U.S. military is to remain operationally superior in networked warfare, it

needs people who are more battle-wise, and it needs many such people. The more battle-wise each soldier is, the better he or she will be able to function effectively in the chaotic, unstructured, ambiguous, and perilous situations that await him or her. And the more battle-wise individuals there are in the military, the better U.S. forces will be able to work collectively (or self-synchronize) in unpredictable environments to gain a cognitive edge in networked warfare. Because of the importance of on-the-ground information, initiative, and authority, the U.S. military will not succeed if it relies solely on a battle-wise few at the top of the command chain; if anything, it is probably more important for battle-wise soldiers to be found at the lowest ranks because that is where the action is and where lives are lost.

The U.S. military has several policy levers that it can use to increase the battle-wisdom of its personnel. Recruiting strategies can be used to find and attract people with battle-wise abilities and potential. Sorting strategies are important for identifying, grooming and assigning people capable of effective cognition in operations. Education and training can be used to improve the intuition, reasoning, and specific battle-wise abilities of individual soldiers and teams. Retention policies are essential for keeping the requisite numbers of battle-wise people in the military for as long as they are needed. And all of these endeavors must reinforce one another. The sections that follow will examine how. Specific recommendations will be presented in the areas of recruiting, education and training, and retention. The result is a broad program for strengthening the cognitive abilities of U.S. forces.

RECRUITING

There is little doubt that one of the most critical factors in creating a top-notch all-volunteer military is the ability to recruit the right people. Recruiting is the first step in the process of fielding a force of battle-wise soldiers. One of the key challenges facing the military, of course, is that the private sector competes with them for the same pool of talent. This challenge is particularly difficult when it comes to individuals who have the cognitive qualities that allow them to excel in information-rich, complex, pressurized, time-sensitive environments. Compounding this challenge is the fact that people join the military for a variety of reasons. A survey of the roughly 200,000 people who volunteered for active duty between 1996 and 1998 found that:⁵

- 30% joined to finance their college education;
- 20% joined for job training and experience;
- 20% joined for the pay and/or travel; and
- 10% joined out of a sense of duty.

Thus, there is no single policy lever that can be used to attract recruits across society. Because NCW will require responsibility to be pushed down to lower levels in the military, the DOD will need to recruit more battle-wise soldiers in both the enlisted ranks and the officer corps. However, the challenges that it will face in identifying and “capturing” personnel of each type will differ. We begin by analyzing enlisted troops.

Enlisted Personnel

Two criteria are used to identify “high quality” enlisted recruits: scores on the Armed Forces Qualification Test (AFQT) and level of education. The former is used to weed out recruits who are not likely to succeed in the military: “The AFQT is designed to measure the trainability of potential recruits—more specifically, to identify individuals who are at high risk of not completing the initial training program.”⁶ It does this by assessing achievement and aptitude rather than pure intelligence (which is why scores on the AFQT tend to rise with age). The latter is used as a proxy of both intelligence and achievement. Current enlistment standards require that 90 percent of recruits have a high school diploma and that 60 percent score in the upper half of the AFQT.⁷ High-quality enlisted recruits satisfy both criteria.

While education and aptitude as measured by the AFQT do provide some ability to predict military performance, these measures do not capture a number of the intangible attributes of outstanding soldiers.⁸ In fact, those intangibles often do not reveal themselves until people are placed in situations that simulate combat: “...research has shown that only on-the-job experience can reveal certain important but previously unobserved aspects of quality, such as effort, reliability, leadership, ability to work as part of a team, and communication skills.”⁹ To be more precise, research performed by the RAND Corporation has found that roughly 75% of a soldier’s “quality” is related to the intangibles that show up during performance of their duties, while about 25% of “quality” is related to education level and AFQT score.¹⁰ In addition, the Government Accountability Office has found that it takes four years to measure the full performance of a given recruiting “class.”¹¹

Thus, predictions of military performance cannot be made with the current metrics used to recruit enlisted personnel. Individuals capable of anticipation, initiative, quick reactions, and learning in action may be better network centric war-fighters than others who lack these qualities, even if the former have less education and/or lower AFQT scores than the latter. Yet, identifying inexperienced people who have such traits is not easy; if it were, the military would already be using those methods to recruit at least some of its soldiers. The reality is that until the armed services are able to develop new tests and methods to evaluate battle-wise traits in potential enlisted recruits, they have little choice but to continue using AFQT scores and education as filtering criteria.¹²

Once promising enlisted recruits are identified, they need to be convinced to sign up for military service. This is becoming increasingly difficult because of the growing imperative for young people to attend college in order to obtain gainful employment in the private sector. The better educated potential recruits are, the more career options they have, and the higher their salary demands will be. A great deal of research has been done to find the optimal approach for recruiting in this new environment. For example, researchers at RAND have examined this problem and concluded that the best approach for the services is to focus on loan repayment for college expenses.¹³ This seems like a reasonable solution, but we are not experts in this field. We encourage the interested reader to examine the literature that explores this issue in great detail.

Officers

Officers are generally selected via one of the three ways: admission to a service school (e.g. U.S. Naval Academy), Reserve Officers' Training Corps (ROTC), or promotion from the enlisted ranks. Each of these paths has its own method for identifying both high performers and those unlikely to survive a career in the military. Although these recruiting methods are different than those used for recruiting enlisted personnel, level of education and achievement are still used as filters, albeit through different means. For example, some service schools rank-order students based on both academic standing and performance in boot-camp-type professional training.¹⁴ In all three recruiting methods used for officers, the military has some way of observing recruits in either simulated or real operational exercises. As a result, the armed services should be able to do a better job of identifying battle-wise officers than battle-wise enlisted personnel. In fact, research has shown that it may be possible to predict the leadership performance of officers by looking at a small set of cognitive and personality traits.¹⁵

In general, officers have more years of education than enlisted personnel and thus have more attractive career options and earnings potential in the private sector. Although the military can try to match the starting compensation packages offered by companies, it will be hard-pressed to succeed in this strategy. One problem is that it has less flexibility in its ability to offer variable forms of compensation (e.g. bonuses, stock options, etc.) because its pay structure is primarily based on rank and tenure rather than skill set, scope of responsibility, and occupation.¹⁶ On the other hand, if the Defense Department simply tried to pay all of its officers at the equivalent private sector rate, it would end up grossly overpaying some while underpaying others. In any case, this strategy is unaffordable.

While salary is important for recruiting officers, by itself it may prove insufficient for attracting battle-wise officers in large numbers. To recruit high quality officers today, the armed forces currently focus on a mix of tangible and intangible benefits that one can receive from the military. They should continue to do so. In particular, prospective education and training are key levers at the military's disposal. The armed services offer top notch education and training to officers at little or no cost. This is an attractive proposition for many highly skilled and ambitious people, plus education and training are essential in their own right for developing battle-wise people. Other tangible benefits include free health care and generous retirement benefits. Intangible benefits include the chance to "see the world" and to be of service to one's country. These benefits are explored further in the section on retention.

Lateral Entry

The current US active-duty personnel system is considered "closed" in the sense that one must generally enter at the bottom of the hierarchy and climb to the top. (There are exceptions to this rule, as we will discuss below). This is different than the civilian personnel system used by the Defense Department, which allows people to enter its workforce at middle and senior levels of management. One reason that the current active-duty system is closed is that it is based on an outdated assumption that incoming people are unskilled and inexperienced high school graduates.¹⁷

There are two problems with this assumption. The first is that the number of high school graduates who are pursuing college degrees is growing. These potential recruits are gaining

education and skills that are valued in the private sector, and thus expect higher salaries, more responsibility, and more seniority than are provided to unskilled high school graduates. With college as a popular option, the traditional pool of “high-quality” enlisted applicants is shrinking. Simultaneously, the demands being placed on enlisted recruits are increasing: “Requirements are shifting toward enlisted personnel who are knowledgeable decision-makers who can apply general principles in technical fields, define problems and reach conclusions, and communicate these technical issues effectively to co-workers.”¹⁸ A similar problem is found in the officer ranks. For example, due to shortages at the rank of captain, the Army has begun to recruit extra lieutenants and rush them to promotion a year early, whether or not they are qualified – hardly a way to upgrade cognitive capabilities for networked warfare.¹⁹

One implication of these trends is a potential shortage of battle-wise personnel at the very time when the military needs more of them. One approach that deserves examination is to expand lateral entry into the military to provide a new stream of future war-fighters.²⁰ There are four potential benefits associated with this idea:²¹

- It can fill gaps in certain fields where young recruits are hard to find or where skills gaps exist due to attrition;
- It can expand the potential pool of applicants;
- It can provide entrants with backgrounds and abilities that are relevant to war-fighting.
- It can reduce training costs.

The traditional argument against lateral entry is that recruits are not capable of functioning effectively in the military without starting at the bottom and working their way up through the ranks. While this assumption certainly held true when the vast majority of recruits had relatively low skills and education, we have already seen that today’s applicants are both better educated and higher skilled than in the past. There are some aspects of military training, especially combat, that are unquestionably unique. However, the private sector now provides many of the general skills that the military teaches to its recruits, especially in the areas of combat support and combat service support. Thus, the armed forces have the opportunity to bring in experienced people at more senior levels and provide them with military-specific training rather than general skills training. This allows the services to get qualified people with experience and proven, relevant abilities into the force quickly. In fact, the armed services do this already with their Reserve forces. The key question is whether this approach should be broadened to people with no prior military experience.

In our judgment, the more the military relies on network centric concepts, the more attractive and feasible lateral entry becomes as an option to supplement current recruiting methods. Depending on the work experience that one has before joining the military, it may be easier to identify battle-wise traits in such recruits. For example, if someone were to switch from being a fireman or police officer to being a soldier, the military might be able to assess fairly accurately how that person would perform under urgent, life and death circumstances. It goes without saying that recruits who join the military via lateral entry must still undergo basic and advanced military training. While, it is possible that this training could be abbreviated, the real benefit of

this approach is that the military is likely to end up with more battle-wise soldiers when the training is done than if it had recruited people right out of school.

The Navy and that Army are currently experimenting with lateral entry programs for enlisted occupations and having limited success.²² However, these programs have not focused on attracting soldiers with battle-wise characteristics. On the contrary, they tend to focus on technicians, medical support staff, and musicians. Other programs that focus on lateral entry into the officer corps (e.g., for medical doctors and lawyers) appear to be more successful. In addition, the heavy reliance on and excellent performance of reservists in Operation Iraqi Freedom and its aftermath demonstrate the value of at least some forms of lateral entry. We believe that the potential benefits of lateral entry justify continued experimentation to determine if this recruiting strategy can increase the number of battle-wise soldiers in the military.

For example, why not recruit a college-educated firefighter or police officer with a few years of experience, run them through basic military training, and then give them a rank that puts them in charge of recruits who have had no experience dealing with complex, life-and-death situations? Is it not possible that a firefighter or police officer with five years of experience facing time urgent, life-and-death decisions is equivalent to a military officer with one or two years of experience? It behooves the military to explore this in earnest, especially given the fact that many of its current and future operations will involve counter-insurgency tactics, peacekeeping operations, and urban warfare.

There are limits to how far a lateral-entry strategy can go, even if it proves successful in the lower ranks. The military has unique training requirements, and the higher one goes in the organization the more one needs the in-depth knowledge that can only be acquired within that organization. Intensive training can only provide so much information; the rest must be learned through experience. There are also potentially serious implications of lateral entry for unit cohesion and morale. Therefore, we suggest a deliberate and experimental approach, addressing important questions before such a system is implemented on a large scale.²³

- What occupations will be open for lateral entry? Will combat positions be filled?
- What levels of training and experience will be required of lateral entrants?
- What incentives will be provided to attract lateral entrants?
- How will potential recruits be identified?

Lateral entry should be explored as one way to address the looming demand for more battle-wise war-fighters. If nothing else, it could be an option when a need arises to increase rapidly the number of battle-wise soldiers – a need that cannot be met quickly enough via traditional “start-at-the-bottom” recruiting strategies. But even if lateral entry is adopted, it will account for only a small fraction of total recruits. For the most part, the military must still bring in soldiers at the bottom of their hierarchy. Given the challenges associated with trying to identify battle-wise people before they join the military, the armed services have little choice but to focus heavily on evaluating people in their junior years in order to identify people with the potential to be battle-wise war-fighters (while still using filter tools like the AFQT to weed out likely drop outs). This process, called “sorting,” will be discussed in more detail below.

Whichever recruiting strategy is adopted, the military will still need to compete with the private sector for people. It is important for the military's tangible benefits (base pay, bonuses, retirement pay, health care) to be competitive with, if not equal to, those found in the private sector. However, we believe that the key to diverting talent away from business and other non-military professions lies with the intangible benefits (skills, education, career development, job excitement and satisfaction, esprit de corps) that the military can bring to bear because that is where the military has advantages over the private sector.

While recruiting is a critical first step in populating the armed services with growing numbers of battle-wise personnel, it alone cannot solve the challenge faced by DOD. In addition to training and educating new recruits when they "walk in the door," the services must increase the battle-wisdom of soldiers who are already in the fold. The next section explores this challenge.

TRAINING AND EDUCATION

"...transformation of the military will substantially increase the cognitive demands on even the most junior levels of the military. In short, everybody must think. Our current training and educational processes will not adequately prepare our people to cope with these increasing and constantly changing cognitive requirements."²⁴

-- *Defense Science Board Task Force on Training for Future Conflicts.*

Generally speaking, military education provides foundational and contextual knowledge for the military profession, while training focuses sharpening specific skills. Both are important levers for enhancing battle-wisdom for networked warfare by improving the ability of war-fighters, both individually and in teams, to blend intuition with reasoning in order to solve complex problems, seize opportunities, exhibit adaptability, and take responsibility for hard choices under extreme pressure and urgency.

Training

The requirement to gain cognitive superiority in networked warfare implies a growing need for training intuition and reasoning to enhance the abilities we identify with battle-wisdom. As the Defense Science Board (DSB) put it: "The future will require that more of our people do new and much more complicated cognitive tasks more rapidly and for longer continuous periods than ever before...this amounts to a qualitative change in the demands of our people that can not be supported by traditional kinds of training."²⁵ The DSB got it right. In fact, the current operation in Iraq is demonstrating quite clearly that the "future" is here now.

Training today has both a traditional component and, increasingly, a component that responds to the unfamiliarity and unpredictability of the current security environment and operational contingencies. The requirement to train soldiers in standard skills and forms of military operations is not going to disappear. They must know how to operate equipment, including information systems, carry out orders, and work together in small and large units. However, there is a risk that focusing on "by the book" tactics, techniques, and procedures will not produce the kind of cognitive training needed by troops in today's military operations. As early as 2000, General Eric Shinseki, US Army Chief of Staff, stated that about half of a soldier's training was

meaningless and “non-essential.”²⁶ Subsequent research by the Army War College revealed that:

...the problem was not “bogus” training exercises but worthwhile training being handled in such a way as to stifle fresh thinking. The Army had so loaded training schedules with doctrinaire requirements and standardized procedures that unit commanders had no time—or need—to think for themselves. The service was encouraging “reactive instead of proactive thought, compliance instead of creativity, and adherence instead of audacity.”²⁷

The current US Army Chief of Staff, General Peter Schoomaker, concurs with that assessment but notes, quite rightly, that changes are underway: “In the past, you were measured on how you complied with doctrine and used it to organize and accomplish your objectives. Today, we’re designing training scenarios that put people in a continual zone of discomfort...that’s where we want them. That’s how you stretch yourself.”²⁸ The quote is telling because it implies doubts – healthy ones, in our view – about the value of compliance with doctrine (coming from the chief of the service for which doctrine has always been paramount). Also implicit in General Schoomaker’s statement is that change will produce bewildering circumstances for which the trainee must be stretched beyond the familiar. Intense training that stresses cognitive abilities can help soldiers develop more reliable intuition about warfare by having them experience situations with a wide range of patterns, solve various types of problems, and learn to think in strange and confusing circumstances. This will help trainees to gain a time-information advantage over adversaries and improve their ability to utilize both reasoning and intuition as needed.

Elaborating further, one way to improve decision-making is to isolate the *types* of decisions that one would come across in a certain situation or job function, practice those decisions repeatedly, review the success or failure of those decisions, and make appropriate adjustments next time around. In fact, the U.S. Army’s National Training Center (NTC) follows a process that is quite similar to the one we have just described.²⁹ NTC’s approach follows several key tenets:

- The best learning comes from the most stressful situations.
- Learn about what matters.
- Use hard data to eliminate subjective debate about outcomes (i.e. did your decision succeed or fail).
- Learning requires facilitators who coach rather than lecture.
- Promote a learning mind-set that endures beyond the training exercise.

NTC’s training methods are well-suited for increasing battle-wisdom:³⁰

- Training must be realistic so that soldiers can gain experience recognizing patterns that are relevant to real-life combat situations.
- Soldiers are encouraged to experiment, which allows them to gain experience in recognizing what options work in which situations

- After Action Reports are conducted directly after an exercise so that soldiers learn from their mistakes while the experience is still fresh in their mind. Also, through their facilitated approach, the Army forces soldiers to recognize their own successes and failure and determine what other courses of action might have worked. Because they are in charge of their own learning, these soldiers are much more likely to internalize these lessons and incorporate them into their intuition.

A key feature of such training is to condition people to take chances and allow failure. “When you allow people to innovate and to lead, you invite failure.”³¹ This is important for two reasons. First, it is better to have U.S. soldiers learn from failure when training than to do so when facing an unforgiving enemy on the battlefield. Second, unless taxed to the point of failure, the learning and abilities of trainees may not be fully realized. A further benefit of NTC’s approach to training is that it focuses on unit performance as well as individual performance. This is critical in helping the military improve its ability make collective decisions—one of the capabilities that we believe will be critical in future operations.

A good example of a group whose training methods clearly enhance battle-wisdom is the Navy’s Sea, Air, Land teams (SEALs).³² SEAL recruits are subjected to multi-dimensional stress: rather than being faced with a single stress-inducing task (such as a long run), they must often perform two or three difficult tasks simultaneously. For example, recruits are asked to dive into a deep tank carrying three ropes which they must tie to a rope that is fixed six inches from the bottom. Each knot has to be tied one at a time in a different style. Once they have accomplished this task, recruits must repeat the exercise blindfolded. As a result, recruits learn to handle multiple types of stress while working in an environment they do not control—they learn to “normalize the abnormal.” Such exercises are used to build teamwork, leadership, and trust among SEALs. While they involve strength, endurance, and dexterity, these exercises are as much about cognitive skills as physical skills.

SEALs also train their recruits to failure. This is not only useful for weeding out those who lack what it takes to become special operations soldiers, but it teaches the recruits to recognize their limits and learn how to succeed despite those limits. Although SEAL training is extremely demanding physically, it is worth exploring how the principles and cognitive features used by SEALs and other special operations forces (SOF) could be incorporated more widely in the less strenuous training methods used for other troops.

Another issue that bears on cognitive development is experimentation. The military has focused a great deal on experimentation in the last decade. It has even created a command focused specifically on joint experimentation.³³ While there is certainly value in pursuing experimentation, especially to strengthen joint warfare concepts and integration, there appears to be a mismatch between the current form of experimentation and that which is required to increase battle-wisdom. This mismatch occurs because experimentation is tied strongly to exercises, and the latter are traditionally used to improve performance in existing operations. Soldiers in exercises do not necessarily gain experience in a wide range of operations that can improve their intuition when faced with novel situations: “In reality, experimental objectives are often at variance with operational requirements--operations each (combatant command) must be prepared to execute....because the exercises usually stress traditional operational practices,

asymmetric threats, alternative methods of conflict deterrence, and support to peace operations are relegated to secondary importance.”³⁴

In other words, exercises are often designed so that specific technologies, doctrines and tactics can be evaluated in a controlled set of circumstances. Unfortunately, the constraints placed on the opposing forces (OPFOR) in such scenarios are often unrealistic (or assume a less-than-clever adversary) and thus undermine the validity of the exercise results. Such a problem occurred with a major exercise called Millennium Challenge ‘02 that was designed to test one of the key concepts of net centric warfare: effects-based operations. The retired general heading the OPFOR utilized unconventional and innovative tactics that proved so disruptive and destructive to the “blue” side’s operations that exercise officials re-set the game to ignore the effects of the enemy’s unorthodox tactics.³⁵ The OPFOR commander literally quit the game, and “blue” went on to victory – a victory that failed to test the limits of “blue” problem-solving in the face of a clever, unorthodox enemy.

Our purpose is not to denigrate the utility of exercises and experimentation; both have an important role to play in military training. However, if the military wishes to improve battle-wisdom in junior officers and enlisted personnel, it needs to provide them with a wide range of experiences, including ones that are unorthodox or unusual, in a short period of time. Exercises may be useful in augmenting the training of battle-wise soldiers -- by improving their ability to perform in joint operations and international coalitions, for example -- but they cannot form the core of cognitive preparation.

One area in particular where experimentation has not been used enough is in evaluating personnel policies themselves. The DOD should consider creating experimental units to test out new personnel policies. One group that would be a good candidate for such experiments is the OPFOR that resides at NTC. However, any unit or coherent group of soldiers (such as a career field) could be used to test out new approaches for recruiting, training, and retention.³⁶

Our analysis to this point has shown that the training methods used by NTC and the special operations community appear well-suited to facilitating battle-wisdom. Other training methods, such as large-scale exercises, may not be as useful. This is not to say that every aspect of training needs to focus on producing battle-wise characteristics, but many soldiers today are not receiving the kind of training they need to be prepared for networked warfare.³⁷ The military establishment should explore the expanded use of NTC and SOF training methods across the military as a whole.

Another option for strengthening the battle-wise thinking and decision-making of soldiers via training is through the use of simulations. Again, parts of the US military seem to be on the right track. One of the most promising systems under development is called the Joint Fires and Effects Trainer System (JFETS), which provides realistic 3-D simulations of warfare.³⁸ The motivation behind this effort is to prepare troops for the increasing complexity they are facing in the field:

The backbone of military training for centuries was rote learning. The goal of the punishing routines and endless drills was to replace thinking

with instinct so that at the sound of gunshots, a soldier would automatically return fire. But this kind of schooling, the Pentagon now believes, is inadequate to prepare soldiers for hot spots like the Sunni Triangle, where it's not enough to be a good marksman. These days, grunts fresh out of basic training must also be versed in the nuances of street-level diplomacy with an increasingly hostile citizenry in densely populated neighborhoods where allies can turn into opposing forces overnight.³⁹

The focus of the JFETS training program is to develop soldiers' cognitive skills and decision-making ability in high-pressure, time-sensitive environments -- in other words, to improve battle-wisdom:

JFETS [is] designed to train the individual soldier in a decentralized, networked model of warfare in which even the lowest-ranking officer can call in an air strike or a tank battalion....The Army decided that it needed to think less about educating people on the physics of artillery tubes and start teaching them how to make smart discriminations very quickly in close urban fights - *training in cognitive decision-making rather than skills.*"⁴⁰ [emphasis added]

By using JFETS, soldiers can train in a wide variety of combat (or non-combat) environments in an extremely short period of time. The simulations are much less expensive than real-life exercises and they can be changed in a day to reflect up-to-the minute intelligence. This allows the military to improve a soldier's intuition by increasing the number of combat situations they experience in a given time period. While systems like JFETS are clearly important, use of simulations is not limited to large-scale, multiple-user environments; a wide variety of electronic training aids and devices can be used by individuals as part of either a formal or self-directed learning program.⁴¹ Given the fact that the number of soldiers in the military that grew up playing video games is growing rapidly, soldiers will be increasingly open to utilizing virtual environments as part of their training. In fact, the use of simulations can even have a significant impact on recruiting: "An Army survey of potential recruits found that the game [*America's Army*—a video game in which players take on the role of new soldiers], which cost only \$4 million to develop, has made a more positive impression than all the Army's other recruiting initiatives combined."⁴²

We have recommended a number of options for improving the training of soldiers for networked warfare. Whatever approaches the armed forces take, it is critical to develop a methodical approach for measuring the efficacy of its training methods. Without this information, there is no reliable, timely way to know if a particular training system is having the desired effects. This is especially true for cognition-related training. To that end, the performance of forces undergoing training must be assessed at the individual, unit, and force-wide levels. The latter is important because there is too much variation at the individual or small unit level to draw broad conclusions about a military-wide training program. One way to do this is to require the armed services to deliver an annual training report card directly to the Secretary of Defense.⁴³ In addition to providing metrics on the military's training programs, this approach would help raise

the visibility of training and address the chronic under-funding of training: “Training’s achievements, its failures, and its costs are not routinely visible to those with authority over discretionary funding in the Defense Department.”⁴⁴ If training continues to play second fiddle to other highly visible funding priorities such as weapon systems, U.S. forces will pay the price—especially when faced with well-trained, intelligent, networked adversaries.

Education

The U.S. military has an excellent system of professional military education (PME). Much of the instruction that goes on at the nation’s Service schools and Joint institutions of higher learning is built around theory and case studies. This educational approach is quite effective in supporting learning around a solid body of knowledge (such as doctrine). However, it is less effective for teaching soldiers to develop reasoning skills under uncertainty. In addition, students who exhibit unorthodox thinking are sometimes penalized despite the fact such thinking may be an explicit goal of the educational system. As a result, students may be susceptible to “groupthink.” This is partly due to the fact that soldiers are trained from day one to be aware of rank, even in the classroom, and partly due to the fact that students are acutely focused on grades. Promotions at higher ranks are extremely competitive and student performance in Service and Joint schools is a key factor in promotion decisions. Thus, students are often reluctant to jeopardize their academic standing by challenging the system and potentially hurting their grades. As a result, PME sometimes fosters an environment where students are taught to mimic the thought processes either of their instructors or of their superiors in the classroom.⁴⁵

Another challenge facing the military, particularly the Army, is that peacekeeping operations call for different skills and knowledge than battlefield operations, but its education system is still primarily focused on war fighting: “While many basic leadership skills carry over from war to peacekeeping, the latter calls for more patience and political and cultural sensitivity. The Army recognizes this challenge, but there is little evidence that it has significantly broadened the education of its rising leaders...”⁴⁶ Part of the problem is that the decision-making styles involved in peacekeeping operations may be quite different from those used in a war-fighting situation. Thus, the Army must educate (and train) soldiers to function effectively using two different decision-making styles. This is not easy, and once again points to the need for recruiting, training, and retaining those who are best able to switch between these cognitive approaches; that is, those who are battle-wise.

While there is no easy solution for altering the military’s PME system to support different (and often opposing) needs, there are some steps that appear promising. One option for encouraging innovative thinking is to strictly enforce a policy that all educational institutions leave rank at the door. This is especially important as a new generation of soldiers who have grown up with computer technology enter the force. Another idea is to change how these schools grade their students, or how the Services take academic performance into account in their promotion decisions. Again, the goal is to move away from an overly strong focus on compliance with theory and doctrine to more creative thinking (not to say that theory and doctrine are not important—they are—we are simply proposing a change in emphasis). A more direct strategy might be to focus the teaching curriculum on the problem of groupthink itself. One concept that may be useful in this regard is termed cross-boundary leadership:

Cross-boundary leaders must be public servants who are very skillful at communicating, coordinating, and collaborating as members of networks across sectors, levels, departments, and agencies. As participants in networks they must foster trust among members, be selfless risk-takers, and effectively focus on intended outcomes to achieve lofty goals as well as concrete goals for their customers...and the senior leaders of their own organizations. They must think systematically, influence others without relying on organizational authority, and share responsibility and accountability with other cross-boundary participants. To be effective, cross-boundary leaders must appreciate cultural and organizational differences, and appreciate, create, and take advantage of networks that rely on technology, management, policy, and people.⁴⁷

It is evident that cross-boundary leaders have the potential to increase the collective wisdom of military organizations. The challenge facing the military is how to integrate cross-boundary leadership principles into its PME curriculum. While there are examples of this concept being integrated in military institutions of higher learning (e.g. at the Information Resources Management College), more work is needed to adapt this approach to both Service and Joint colleges. By reinforcing battle-wise training with cross-boundary leadership, the military can strengthen a culture that values the innovative, adaptable, and creative thinking required in today's complex environment.

RETENTION

If the military proves successful in recruiting, educating, and training battle-wise people, it will then face the challenge of keeping them. There are several obstacles to achieving this goal. Perhaps the biggest one is the fact that the characteristics that define battle-wise soldiers are in high demand in the private sector. The business world generally offers better pay and more desirable career opportunities than the military, especially for individuals with the sorts of abilities we would stress. As a result, there is a risk that some of the most capable soldiers will leave the military before it has received sufficient payback for the education and training it has provided them.

The flip side of this problem is that the existing personnel system makes it difficult for the military to release soldiers that it does not need. The result of these two conflicting challenges is that the military has a poor mix of soldiers: "On average between 1999 and 2002, the services had shortages in about 30 percent of their occupations, while they were overstaffed in 40 percent."⁴⁸ The options for fixing this problem fall into three general categories: career development, tangible benefits, and intangible benefits.

Career Development

As indicated earlier, the ability to predict how well a young recruit will perform in military operations based on prior education and test scores is limited. While there are certain traits that can be correlated with high quality in the military (leadership, communication), it is extremely difficult to discern who has such qualities during the recruiting process because they do not appear until a person is placed in combat situation that forces the recruit to reveal his/her true

nature. Therefore, it is incumbent on the military to identify battle-wise individuals as soon as possible in their careers. This process is called sorting.

Early sorting to identify battle-wise individuals will allow the military to focus resources not only on developing those individuals but also retaining them. They could receive higher base pay, performance bonuses, specialized education and training, and career tracks that stress operations. This approach is used for SOF, pilots, and other high-value occupations. The challenge will be to extend it more broadly across the combat forces.⁴⁹

In addition to identifying battle-wise soldiers at the beginning of their careers, the military should also consider highly rigorous sorting around the 10-12 year mark, which generally coincides with promotion from O3 to O4 in the officer ranks: "...it is important that people not reach 10 to 12 years of service without having been selected for their knowledge, skills, initiative, and effort."⁵⁰ Because the current retirement system does not vest until 20 years of service, soldiers who make it past the 10-12 year threshold tend to remain in the military until year 20. It also becomes harder to justify releasing soldiers after 12 years based on performance. This is a major cause of overstaffing.

Yet another problem with the current personnel system is that the military often loses the people it most wants to keep beyond 20 years, when their cognitive effectiveness may be at its greatest and most needed. After they have vested in their retirement system, many soldiers leave the military to begin second years in the private sector. Rigorous sorting before soldiers reach the 10-12 year mark can target those who will provide value in the long run and focus on retaining those soldiers beyond 20 years. According to Bernard Rostker, former Undersecretary of Personnel and Readiness:

In the twenty-first century, the U.S. military needs a competitive up-or-out system in the junior grades with relatively high selection rates, and then stringent selection of only about 30 percent into a career force. Once in the career force, the norm would be very high promotion rates, perhaps 90 percent to O-6 (colonel) rather than the 50 percent of today. Longer tenure and higher remuneration for those selected to join the "career force" should encourage people to stay for a full career that would end at about forty years of service. Compensation packages must be structured to motivate the best to stay and to encourage those whose potential is limited to leave.⁵¹

While sorting policies may be used to optimize the mix of junior and senior soldiers in the military, they are only one piece of the puzzle; compensation policies are another key factor for improving retention of battle-wise personnel.

Tangible Benefits

One of the primary means that the armed forces use to retain people is a mix of tangible benefits that includes pay and non-monetary (in-kind) benefits, such as housing, medical care, and assistance with child care and education.⁵² Because the private sector usually offers higher base salaries and bonuses than the military, one strategy that the military has used to retain its people

is to offer generous medical and retirement benefits. Thus, individuals can receive compensation that may rival what is found in business if they are willing to defer those rewards for 20 years.⁵³ However, the fact that retirement benefits do not accrue until 20 years of service causes some soldiers to stay in the military longer than would be optimal for the force as a whole. This ends up costing a great deal of money and also sub-optimizes their allocation of resources since those funds that could be used to entice “high-aptitude individuals” to remain in the military are tied up with lower quality soldiers who are staying in the military primarily to obtain their retirement benefit.⁵⁴

The dilemma here is that retirement benefits, triggered at the 20-year point, are one of the advantages the military has over the private sector, which make them an excellent retention tool. The challenge is to retain the best and discourage those who provide little value to the organization. It seems clear that a more flexible retirement system would help the military retain its best and brightest while releasing those people whom it no longer needs. While there are numerous options for modifying the retirement system, we believe that the following changes merit serious consideration:⁵⁵

1. Adopt a new retirement system that includes full vesting between 5 and 10 years.
2. Increase government contributions (matching funds) for military personnel who participate in the Thrift Savings Plan.
3. Remove the one-size-fits-all twenty-year annuity in favor of one that allows for differences among occupations.

While overhauling the military’s retirement system would help in retaining battle-wise individuals, other tangible benefits play an important role in retention. Of course, one of the biggest factors that causes prized people to leave the military is the difference in pay between it and the private sector. Companies can offer employees higher base pay, significant bonuses (often exceeding base pay at senior levels), and stock options. While it is difficult for the military to match such compensation, it does not have to do so in order to retain its people. The military offers numerous other tangible and intangible benefits that can compensate for differences in pay; however, monetary compensation in the military must be “close enough” to what is offered in the private sector that the differences there do not outweigh the other benefits of military service.

The Defense Department has two levers at its disposal in this area: base pay and variable pay (bonuses). One obvious approach for increasing retention (and helping recruitment) is to increase significantly the base pay of all members of the military. However, the costs associated with a pay raise of this magnitude are so exorbitant as to make it a non-starter. A steeper pay table, by which promotions would produce ever-larger step increases, could offer substantially greater compensation for those who stay and excel.⁵⁶ Taking responsibilities into account, military pay tends to become less competitive with the private sector the higher the rank to which one rises and the longer one stays in the service. The present value of future pay is a major factor in retention decisions, especially for highly educated and able individuals who think about long-term financial well-being and know that companies pay senior people well.

The advantage of using base pay as a lever for increasing retention is that it minimizes uncertainty and perceived inequity for people in the system: everyone at a given level in a given branch of service will get the same pay. The disadvantage of this approach is that it lacks the flexibility to reward and motivate battle-wise abilities and performance. In contrast, variable pay options such as performance bonuses are extremely flexible and thus well suited to rewarding strong performance by war-fighters facing cognitive challenges. One idea that appears particularly well-suited for retention of battle-wise soldiers is capability pay, which is designed to “provide compensation and incentives for superior individual capability, especially current and prospective future leadership potential.”⁵⁷ Capability pay provides a mechanism for reward performance outside of the promotion system. As a result it provides greater flexibility to personnel managers and encourages personnel who excel in their jobs to remain in the military. Because capability pay can be skewed to become steeper at higher ranks, it can be useful in retaining high value personnel past the 20-year mark.

While variable pay has many advantages, it does carry some challenges. One disadvantage is that variable pay mechanisms may create incentives for “me-first” behavior. One way to minimize this problem is to tie the bonuses to the types of behaviors that improve performance in a networked environment, such as collaboration, sharing, and teamwork.⁵⁸ This would create a shared sense of responsibility. On the other hand, assessing team performance can be difficult and will become more so as the composition of combat teams becomes fluid and crosses service lines, as will be the case in networked operations. Another challenge is that systems that reward outstanding behavior must be based on a rigorous set of standards that are perceived as being applied fairly.⁵⁹ If this is not done well, the variable pay system may foster a climate of competition and parochialism.

Intangible Benefits

Although efforts to improve retention of battle-wise people should begin with tangible benefits, intangible benefits must not be neglected. The military cannot top private sector pay for effective thinkers and decision-makers. In fact, focusing primarily on money may prove counterproductive: “the more compensation shifts toward tangible rewards, the more likely it is that professionals who seek the intangible rewards will leave. Their departure, in turn makes the military a less attractive place for other professionals, creating a vicious cycle away from professionalism toward bureaucracy.”⁶⁰

As mentioned earlier, perhaps the most important benefits the military can offer soldiers are high-quality, low-cost education and training. The military can provide exceptional people with a rewarding and beneficial experience of lifelong learning; in fact, it should do so in order to improve performance as well as retention. People with battle-wise potential will tend to value such a benefit, and the military should give such people priority for educational opportunities. Training and education are especially valued if they are useful outside the military, which is the case for the basic cognitive abilities that make up battle-wisdom. One would think that the better job the armed forces do in developing battle-wise people, the harder it will be to retain those people. While there is almost certainly some truth to this, evidence also shows that if an organization gives people marketable skills, its employees will actually stay longer than if they do not receive such skills: “There is a strong correlation of psychological commitment and intent to stay (loyalty) with an organization’s efforts to make an individual more marketable; the

risk of losing employees is greatly increased when organizations fail to provide such opportunities.”⁶¹

Finally, the military can offer people the feeling of camaraderie and satisfaction that comes from working with others to serve one’s country. Many soldiers view their military service and military lives as a “calling,” and their relationship to the Nation as a “compact.” Of course, the Nation must do its part to ensure that its soldiers are not taken for granted or put in harm’s way unnecessarily. The stresses and strains of frequent, long, and or dangerous deployments can take an immense psychological, emotional, and financial toll on both active duty and reserve personnel and their families.⁶²

CONCLUSION

There is ample evidence that the nature of warfare is changing. Both the United States and its enemies are taking advantage of networks to disseminate, utilize, and control information. Simultaneously, military operations are taking place in a grey zone between peacekeeping and warfare. As a result of these trends, decision making is becoming both more important and more difficult at all levels of the military. Our thesis is that cognitive skills that allow soldiers to make good decisions in multiple environments, and using multiple approaches, are becoming a key factor in the success of military operations. We have used the term “battle-wisdom” to describe those cognitive skills, and believe that the U.S. military needs to recognize explicitly such capabilities as it creates and trains its future forces. Unfortunately, when it comes to attracting, developing, and keeping battle-wise people, there are no silver bullets available to the military. Having said that, several ideas seem promising and deserve consideration: lateral entry; rigorous and intense training in unfamiliar, ambiguous, and urgent circumstances; educational emphasis on analytic thinking (especially when faced with uncertainty) and cross-boundary leadership; rigorous sorting before the 10-12 year mark; a more flexible retirement system; a steeper pay scale; and increased use of variable monetary incentives. Further research is needed to determine whether and how these (and other) ideas should be pursued.

ABOUT THE AUTHORS

Irv Lachow is a Professor of Systems Management at The National Defense University and Director of the Information Resources Management College's Advanced Management Program. Previously, Dr. Lachow was a Senior Associate at Booz Allen Hamilton where he managed projects in the areas of IT Strategy and Planning for numerous government clients. Dr. Lachow has extensive experience in both IT and national security. He has worked for the RAND Corporation and the Office of the Deputy Under Secretary of Defense (Advanced Systems & Concepts). Dr. Lachow received his Ph.D. in Engineering & Public Policy from Carnegie Mellon University. He earned an A.B. Political Science and a B.S. in Physics from Stanford University.

David Gompert is a Distinguished Research Professor at the Center for Technology and National Security Policy, The National Defense University. Prior to this, he was the Senior Advisor for National Security and Defense at the Coalition Provisional Authority, Iraq. Mr. Gompert has held senior positions at the State Department, the National Security Council, and the RAND Corporation, and in the information technology industry. He has published extensively on international affairs, national security policy, and information technology. His books include *Right Makes Might: Freedom and Power in the Information Age* and *Mind the Gap: A Transatlantic Revolution in Military Affairs*. Mr. Gompert holds a Master of Public Affairs degree from the Woodrow Wilson School, Princeton University and a Bachelor of Science degree in engineering from the United States Naval Academy.

Justin Perkins is a Research Associate with the Center for Technology and National Security Policy, The National Defense University. Before working with NDU, he served as COO for World Blu, Inc., a consulting firm pioneering the field of organizational democracy, and as co-founder and director of Afrique Profonde, a human rights organization in Congo. He also has been involved with several small businesses and served for several years as a water resources administrator for the State of Colorado. Mr. Perkins holds a Masters of Business Administration from the University of Colorado and a B.A. in History and World Perspectives.

ENDNOTES

¹ “On the Record,” *Government Executive*, December 2004, p. 18.

² Dan Baum, “Battle Lessons: What the Generals Don’t Know,” *The New Yorker*, January 17, 2005, p. 44.

³ A more detailed discussion of the features, advantages and disadvantages of naturalistic decision making can be found in: Gary Klein, *Sources of Power: How People Make Decisions* (Cambridge, MA: MIT Press, 1999). For more detailed comparisons of the utility of analytic reasoning and naturalistic decision making in military operations, see Major A.B. Vowell, *Between Discipline and Intuition: The Military Decision Making Process in the Army’s Future Force* (Fort Leavenworth, KA: School of Advanced Military Studies, United States Army Command and General Staff College, AY03-04) and Major John J. Marr, *The Military Decision Making Process: Making Better Decisions Versus Making Decisions Better* (Fort Leavenworth, KA: School of Advanced Military Studies, United States Army Command and General Staff College, AY00-01).

⁴ This notion is the military equivalent of “street-wise.” It implies an intrinsic quality—some people will naturally be more battle-wise than others—but like most (if not all) cognitive abilities, it can be improved via proper training.

⁵ Admiral Bill Owens, *Lifting the Fog of War* (New York: Farrar, Strauss & Giroux, 2000), pp. 49-50. The data presented in this source do not add up to 100%.

⁶ M. Rebecca Kilburn, Lawrence M. Hanser, and Jacob Alex Klerman, *Estimating AFQT Scores for National Education Longitudinal Study (NELS) Respondents*, MR-818-OSD/A, (Santa Monica, CA: RAND, 1998).

⁷ Paul F. Hogan, “Overview of the Current Personnel and Compensation System,” *Filling the Ranks: Transforming the U.S. Military Personnel System*, ed. Cindy Williams (Cambridge, MA: MIT Press, 2004), p. 30.

⁸ James R. Hosek, “The Soldier of the 21st Century,” *New Challenges, New Tools for Defense Decisionmaking*, MR-1576 (Santa Monica, CA: RAND, 2003) p. 191. “Quality” is understood as the level of job match between the member and the military. It is often correlated with promotion speed: the faster someone gets promoted, the higher their “quality.” For more information, see James R. Hosek and Michael G. Mattock, *Learning About Quality: How the Quality of Military Personnel is Revealed Over Time*, MR-1593-OSD (Santa Monica, CA: RAND, 2003), p. xi.

⁹ Hosek, p. 196.

¹⁰ Phone conversation with Dr. James R. Hosek, RAND Corporation, October 8, 2004.

¹¹ Major Richard J. Koucheravy, *Whence the Soldier of the Future? Recruiting and Training for the Objective Force*, (Fort Leavenworth, KA: School of Advanced Military Studies, United States Army Command and General Staff College, AY00-01), p. 24.

¹² For further discussion of the challenges associated with identify high quality recruits (both enlisted and officers), see Koucheravy, pp. 23-24.

¹³ For more information on this and other policy choices related to recruiting from the college market, see Beth Asch, Can Du, and Matthias Schonlau *Policy Options for Military Recruiting in the College Market: Results from a National Survey*, MG-105-OSD, (Santa Monica, CA: RAND, 2004).

¹⁴ An interesting and insightful insight into the life of cadets at West Point is provided in David Lipsky, *Absolutely American: Four Years at West Point* (Boston, MA: Houghton-Mifflin, 2003).

¹⁵ Paul T. Bartone, Scott A. Snook and Trueman R. Tremble, Jr. “Cognitive and Personality Predictors of Leader Performance in West Point Cadets,” *Military Psychology*, 2002, 14(4), pp. 321-338. This study focused on the leadership performance of cadets during their four-year tenure at West Point. If the predictors in this study are shown to be robust when applied to officers after they graduate from West Point, we recommend that that they be tried out on enlisted personnel.

¹⁶ Thomas M. Strawn, “The War for Talent in the Private Sector,” *Filling the Ranks: Transforming the U.S. Military Personnel System*, ed. Cindy Williams (Cambridge, MA: MIT Press, 2004), p. 75. There are some notable exceptions to this statement. Officers in certain highly competitive and in-demand occupations such as aviation, medicine, and nuclear engineering receive significant sign-on and retention bonuses. We will discuss this point later in the chapter.

-
- ¹⁷ Donald J. Cymrot and Michael L. Hansen, "Overhauling Enlisted Careers and Compensation," *Filling the Ranks: Transforming the U.S. Military Personnel System*, ed. Cindy Williams (Cambridge, MA: MIT Press, 2004) p. 120.
- ¹⁸ *Ibid.*, p. 121.
- ¹⁹ Cindy Williams, "Introduction," *Filling the Ranks: Transforming the U.S. Military Personnel System*, ed. Cindy Williams (Cambridge, MA: MIT Press, 2004), p. 2.
- ²⁰ Lateral entry can be defined as allowing recruits to enter that military at a rank other than the E1 or O1 (the bottom of the pyramid).
- ²¹ Dina Levy et. al., *Expanding Enlisted Lateral Entry: Options and Feasibility*, MG-134, (Santa Monica, CA: RAND 2004), p. xiii.
- ²² See Levy et. al. for further details.
- ²³ *Ibid.*
- ²⁴ Defense Science Board Task Force on Training for Future Conflicts, *Memorandum for the Chairman, Defense Science Board*, July 9, 2003.
- ²⁵ Defense Science Board Task Force on Training for Future Conflicts, *Final Report*, June 2003.
- ²⁶ Baum, p. 42.
- ²⁷ *Ibid.*
- ²⁸ *Government Executive*, p. 18.
- ²⁹ See Richard Pascale, "Fight. Learn. L*E*A*D," *Fast Company*, August/September 1996, p. 65.
- ³⁰ See Klein and the Army's Center for Lessons Learned at <http://call.army.mil/>.
- ³¹ Baum, p. 43.
- ³² The information on SEAL training was provided by RADM Ray Smith, USN (Ret.) in an interview on January 10, 2005. Although our discussion here focuses only on Navy special operations forces (SOF), the other services use similar methods to train their SOF units.
- ³³ See <http://www.jfcom.mil>.
- ³⁴ Thomas M. Cooke, "Reassessing joint experimentation - out of joint," *Joint Forces Quarterly*, Spring-Summer, 2001.
- ³⁵ See Sean D. Taylor, "War Games Rigged? General says Millennium Challenge 02 'was almost entirely scripted'", *Army Times.com*, and Malcolm Gladwell, *Blink: The Power of Thinking Without Thinking* (New York, NY: Little, Brown and Company, 2005), p. 145. For an in-depth discussion of both this exercise and Gen. Van Riper's military philosophy (he was the OPFOR commander), see Gladwell, pp. 99-146.
- ³⁶ For more details on this idea, see Stephen Peter Rosen, "Implementing Changes in U.S. Military Personnel Policy," *Filling the Ranks: Transforming the U.S. Military Personnel System*, ed. Cindy Williams (Cambridge, MA: MIT Press, 2004) p. 295.
- ³⁷ See DSB Task Force reports for more details.
- ³⁸ See Steve Silberman, "The War Room," *Wired*, September 2004, pp. 151-155, 171-173. This system was the brainchild of the Institute for Creative Technologies (ICT) at the University of Southern California. ICT is collaboration between the DOD, film and gaming companies, and Silicon Valley.
- ³⁹ Silberman, p. 153.
- ⁴⁰ *Ibid.*
- ⁴¹ Koucheravy, p. 38. For a good discussion of the use of tactical decision exercises and simulations to improve both leadership training and decision making, see Vowell, pp. 53-55.
- ⁴² Shawn Zeller, "Training Games," *Government Executive*, January 2005, p. 46. According to Koucheravy, p. 4, the DOD's budget for recruiting advertising was \$265 million in FY2000. Thus, the cost effectiveness of America's Army is striking.
- ⁴³ DSB, *Final Report*, p. 70.
- ⁴⁴ DSB, *Final Report*, p. 7.
- ⁴⁵ There are obvious exceptions to these points: we are making rather broad generalizations based on our observations and experiences because we believe that they contain a grain of truth that needs to be expressed.
- ⁴⁶ Thomas L. McNaugher, "Refining Army Transformation," *The U.S. Army and the New National Security Strategy*, MR-1657-A, ed. Lynn E. Davis and Jeremy Shapiro (Santa Monica, CA: RAND, 2003), p. 299.
- ⁴⁷ Elizabeth A. McDaniel, "Facilitating Cross-Boundary Leadership in Emerging E-Government Leaders," *Electronic Government*, Vol. 1, forthcoming.
- ⁴⁸ Williams, p. 2.

⁴⁹ Details on sorting strategies can be found in Hosek, pp. 204-207.

⁵⁰ Hosek, p. 204. If they reach the 10-12 year threshold, officers tend to remain in the military until they hit 20 years (barring serious issues with performance). Enlisted personnel have a less obvious threshold because their promotions are less tied to time-in-grade.

⁵¹ Bernard Rostker, "Changing the Officer Personnel System," *Filling the Ranks: Transforming the U.S. Military Personnel System*, ed. Cindy Williams (Cambridge, MA: MIT Press, 2004) pp. 160-161. Mr. Rostker has also served as Undersecretary of the Army and Assistant Secretary of the Navy for Manpower and Reserve Affairs.

⁵² Elizabeth A. Stanley-Mitchell, "The Military Profession and Intangible Rewards for Service," *Filling the Ranks: Transforming the U.S. Military Personnel System*, ed. Cindy Williams (Cambridge, MA: MIT Press, 2004) p. 94.

⁵³ Of course, this depends on a number of factors, including one's rank, career field, and years of service. It is also worth noting that many soldiers who retire at 20 years enter the private sector and thus end up with the best of both worlds: generous retirement and health benefits from the military plus private sector salaries and bonuses. This is another reason why military personnel who make it past the 10-12 year mark tend to stay until 20 years and then leave: they know that they can begin second careers at a relatively young age while still taking advantage of the military's retirement and health benefits.

⁵⁴ Hosek, p. 204.

⁵⁵ See Strawn, p. 88.

⁵⁶ This idea is examined in James Hosek and Beth Asch, *Air Force Compensation: Considering Some Options for Change*, MR-1566-1-AF (Santa Monica, CA: RAND, 2002).

⁵⁷ Hosek and Asch, p. xv.

⁵⁸ See Strawn, p. 78.

⁵⁹ Hosek and Asch, p. xvi.

⁶⁰ Stanley-Mitchell, p. 94.

⁶¹ Strawn, p. 89.

⁶² See James R. Hosek and Mark Totten, *Does Perstempo Hurt Reenlistment? The Effect of Long or Hostile Perstempo on Reenlistment*, MR-990-OSD (Santa Monica, CA: RAND, 1998).