

Performance of the All-Volunteer Force

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Describing the performance of the All-Volunteer Force (AVF) is no simple task. Legions of active duty members and reservists grouped into squads, ships, and flights; platoons; companies; battalions and squadrons; brigades, regiments, and wings; divisions and task forces; corps, fleets, and commands perform tens of thousands of tasks within hundreds of jobs across four Services with different emphases and approaches to the missions of national defense. Add to this confluence of factors the notion that performance—even for *one* person in *one* job—has many dimensions. There is no single measure of performance and no agreement on how well the force is doing on any of the constituent measures. However, among the many indicators considered when sizing up the force are end strength or personnel quantity, personnel quality, training and job performance test scores, and an elusive concept called readiness.

The People and the Jobs They Perform

To be sure, military performance is influenced by technology and other environmental factors. But, as with any organization, the bedrock of Defense lies in its people; in the knowledge, skills, and characteristics of its incumbents and their motivation to get the job done even under adverse conditions. As of the end of Fiscal Year (FY) 1998, there were almost 1.2 million enlisted soldiers, sailors, marines, and airmen on active duty backed by over 745,000 Selected Reservists. These men and women were led by over 200,000 active and 124,000 reserve officers. As Table 1 shows, although end strength has been declining since the late 1980s, U.S. military presence is formidable nonetheless.

Enlisted servicemembers are assigned and trained to perform not just in combat jobs as infantrymen and tank crew members but as mechanics, vehicle and other equipment operators, cooks, police officers and security guards, medical technicians, air traffic controllers, electronic and other equipment repairers, computer operators, dispatchers, and clerks. The officers who lead and manage the force specialize in areas such as finance, international relations, engineering, the sciences, medicine, and law in addition to serving at the helm of combat specialties formulating battle plans, guiding missile systems, directing gunnery and special operations, and piloting and navigating aircraft.

Table 1. End Strength by Component: FYs 1973-1998 (in thousands)

Fiscal Year	Active Duty		Selected Reserves	
	Enlisted	Officer	Enlisted	Officer
1973	1921.0	300.3	not available	not available
1974	1849.0	283.1	790.7	105.7
1975	1825.0	267.6	771.3	104.1
1976	1790.1	262.4	711.3	103.2
1977	1785.2	258.7	694.0	102.0
1978	1775.0	256.6	673.6	102.4
1979	1740.3	256.7	691.6	103.5
1980	1759.7	260.5	731.8	105.3
1981	1784.0	267.3	784.5	108.2
1982	1803.8	273.4	827.3	122.2
1983	1811.1	281.4	861.5	128.1
1984	1821.3	283.8	897.7	133.4
1985	1828.5	289.0	936.5	136.6
1986	1844.3	291.6	972.2	142.6
1987	1853.3	288.3	987.1	148.3
1988	1820.1	285.4	988.8	153.8
1989	1813.9	283.5	994.3	160.6
1990	1732.4	277.2	976.6	161.4
1991	1680.5	271.1	982.1	157.6
1992	1519.8	255.2	948.7	151.8
1993	1435.4	239.3	893.9	149.4
1994	1350.7	228.7	844.5	140.0
1995	1267.2	220.4	797.7	134.2
1996	1224.9	215.8	777.5	130.5
1997	1197.9	211.2	763.3	127.0
1998	1170.9	208.1	745.4	124.3

Source: Department of Defense, *Population Representation in the Military Services: Fiscal Year 1998* (Washington, DC: Office of the Assistant Secretary of Defense [Force Management Policy], 1999).

Table 2. Percentage Distribution of FY 1998 Enlisted Personnel and Officers by Occupational Area

Enlisted Personnel		Officers	
Infantry, Gun Crews, & Seamanship	16.9	General Officers & Executives	.4
Electronic Equipment Repair	9.3	Tactical Operations	38.4
Communications & Intelligence	8.7	Intelligence	5.0
Medical & Dental	7.1	Engineering & Maintenance	11.7
Other Technical & Allied	3.0	Scientists & Professionals	4.9
Functional Support & Administration	16.0	Health Care	18.9
Electrical/Mechanical Equipment Repair	20.1	Administration	6.0
Craftsman	3.6	Supply, Procurement, & Allied	8.7
Service & Supply	8.5	Non-Occupational	6.0
Non-Occupational	6.8		
Total	100	Total	100

Table 2 shows the percentage distributions of active duty enlisted personnel and officers within Service-common occupational designations as of the end of FY 1998. These are the types of occupations in which military members serve. To fill jobs within these areas, the Services rely on selection and classification systems that aim to maximize performance. Given the multitude and array of jobs with varying levels of complexity and other characteristics, in addition to evaluating applicants' overall fitness for the military, the Services must consider the person/job match.

Aptitude and Education Standards

Time was when men were selected for service on the basis of their ability to comprehend simple orders given in English.¹ Increasingly complicated and lethal weapon systems along with advances in performance assessment and aptitude testing have raised the requirements considerably. Enlisted members and officers must meet minimum physical, moral character, and aptitude and education selection standards to gain entry into service. It is the latter set of hurdles, especially for the enlisted ranks, that are scrutinized by Service and DoD policymakers, Congress, the press, and others as evidence of the functioning of the force.

Practically all commissioned officers are college graduates; most with formal study and degrees in math, science, or technical fields. In addition, appropriate cognitive test scores (e.g., Scholastic Assessment Test - SAT; American College Test - ACT; Armed Forces Officer Qualifying Test - AFOQT) are used to gauge potential performance as an officer. Perhaps because of their professional status and levels of education, not to mention the difficulties in defining and measuring leadership, officer quality has not received the same attention as has enlisted quality.²

Some prominent theorists would contend that success as a leader is, in great part, contingent upon the characteristics of followers.³ Certainly the leaders of our military units would not argue that bright, motivated troops are a key ingredient to the success of any mission. And so, in keeping with their numbers and importance, the quality of enlisted members is monitored closely.

For over 50 years, the Armed Forces Qualification Test (AFQT) has been used to estimate the “potential” of accessions (as entering recruits are called). This test of verbal and math ability is a subset of the Armed Services Vocational Aptitude Battery (ASVAB). The ASVAB comprises 10 subtests covering the AFQT constructs of word knowledge, paragraph comprehension, arithmetic reasoning, and mathematics knowledge as well as electronics information, mechanical comprehension, automotive/shop information, general science, coding speed, and numerical operations. Whereas the AFQT serves as a selection measure, various composites of ASVAB subtests are used for job classification purposes. Minimum scores are set not only for basic entry but also for assignment within specific jobs. Further, the Services seek a distribution of ability above the cutoffs.

The AFQT, for example, is reported in terms of percentiles, with scores grouped into categories of percentile ranges. Specifically, there are five categories: I through V,

¹ Mark J. Eitelberg, Janice H. Laurence, & Brian K. Waters, *Screening for Service: Aptitude and Education Criteria for Military Entry* (Washington, DC: Office of the Assistant Secretary of Defense [Manpower, Installations, and Logistics] September 1984).

² See Mark J. Eitelberg, Janice H. Laurence, & Dianne C. Brown, “Becoming Brass: Issues in the Testing, Recruiting, and Selection of American Military Officers,” in Bernard R. Gifford & Linda C. Wing, ed., *Test Policy in Defense: Lessons from the Military for Education, Training, and Employment* (Boston, Kluwer Academic Publishers, 1991).

³ See “Followership: Requisite for Effective Leadership” pp. 131-162, in Robert L. Taylor & William E. Rosenbach, eds., *Military Leadership: In Pursuit of Excellence* (Boulder, CO: Westview Press, 1996).

denoting progressively lower standing relative to the normative base of American youth.⁴ The score ranges corresponding to the AFQT categories are as follows:

<u>AFQT Category</u>	<u>Percentile Score Range</u>
Category I	93-99
Category II	65-92
Category III	31-64
Category IV	10-30
Category V	1- 9

Those who score within Category V are ineligible for enlistment. Individuals in the marginal Category IV group are enlisted sparingly. In fact, these days formal minimum standards for enlistment exclude lower scoring Category IVs. The Services actively recruit from among Categories I-III and further aim at the upper half of the aptitude distribution: from the 50th percentile on up. Thus, Category III is subdivided into IIIA—percentiles 50 to 64 and IIIB—percentiles 31 to 49.

In addition to screening on the basis of aptitude and preferring Category I-III A recruits, education credentials are also considered. The Services emphasize the enlistment of traditional high school diploma graduates and, depending upon recruiting conditions, avoid signing up non-graduates or even those with alternative secondary school credentials such as General Educational Development (GED) high school equivalency certificates. Aptitude standards are adjusted on the basis of credential with the latter groups required to score higher on the AFQT.

Whereas diploma status and AFQT percentile might get one in the door and in basic training, qualifying for technical training requires the consideration of more specific aptitudes along with recruits' preferences. That is, entry into job training first entails meeting the minimum cutoff on the ASVAB composite(s) most appropriate for the job in question. To avoid the situation wherein someone is qualified for service but not a particular job, selection standards also typically include the proviso that an applicant must meet at least one or two minimums on composites other than the AFQT.⁵

⁴ The current normative base is a nationally representative sample of approximately 10,000 youth ages 18-23 who were administered the ASVAB in 1980. Prior to 1983, the normative base was the World War II mobilization population—all men under arms as of December 31, 1944. See Department of Defense, *Profile of American Youth: 1980 Nationwide Administration of the Armed Forces Vocational Aptitude Battery* (Washington, DC: Office of the Assistant Secretary of Defense [Force Management and Personnel], 1982).

⁵ For more details on military selection and job classification, see: Brian K. Waters, Janice H. Laurence, & Wayne J. Camara, *Personnel Enlistment and Classification Procedures in the U.S. Military* (Washington, DC: National Academy Press, 1987).

Quality of Recruits

Together, aptitude level and high school graduation status are used to indicate quality. Table 3 shows, for each year of the AVF through FY 1998, the percentage of new active duty enlisted recruits who scored within the various AFQT categories and the proportion of high school diploma graduates. Further, the joint distribution of Category I-III A and high school diploma graduates, is also displayed. Except for the late 1970s, quality has been climbing since the inception of the AVF. Of late, roughly three quarters of incoming recruits have scored in the upper end of the aptitude distribution and practically all have entered with at least a traditional high school diploma. The percentage of recruits within the lowest acceptable AFQT Category (Category IV) has dwindled to no more than 1 percent. The downward “trickle” of quality statistics in the past year or so is worth noting (and monitoring) but is not yet alarming. Quality is still high—higher than under the draft and higher than the minimum quality levels expressed in 1985 and higher than the benchmarks of 60 percent I-IIIA and 90 percent high school diploma graduates set in 1991. In contrast to these figures for recruits, 50 percent of our nation’s youth, ages 18-24, score within AFQT Categories I-III A, 21 percent fall within the Category IV range, and about 80 percent hold a high school diploma. In short, military recruits stand above the norm.

Table 3. Active Duty Enlisted Accession Quality Statistics: FYs 1973 -1998 (percent)

Fiscal Year	AFQT Category					High School Diploma Graduates (HSDG)	High Quality (I-III A/HSDG)
	I-II	III A	IIIB	IV	All Categories*		
1973	34.3	23.6	28.0	12.7	100	65.6	42.8
1974	28.9	22.9	29.7	10.0	100	60.5	39.0
1975	35.4	26.7	29.6	6.3	100	65.2	44.5
1976	39.5	25.5	29.7	5.0	100	69.3	48.6
1977	22.0	11.7	21.3	27.1	100	71.5	27.1
1978	26.9	15.1	26.5	27.3	100	75.4	33.0
1979	23.7	14.2	27.2	32.7	100	72.1	29.3
1980	25.0	23.7	42.2	8.7	100	65.6	34.9
1981	29.8	17.5	31.1	21.3	100	78.6	38.0
1982	33.1	18.8	32.4	15.2	100	82.7	43.6
1983	36.8	20.6	31.4	10.7	100	88.6	50.5
1984	36.9	21.3	32.0	9.5	100	90.6	52.1
1985	37.0	23.2	31.9	7.5	100	90.0	52.7
1986	37.3	25.1	32.5	4.9	100	90.7	54.6
1987	40.7	26.3	28.2	4.7	100	92.4	59.9
1988	40.2	26.3	28.1	4.9	100	93.6	60.4
1989	37.9	26.5	28.4	6.4	100	90.4	57.1
1990	39.8	28.2	28.3	3.1	100	93.4	62.4
1991	43.4	28.7	26.5	.5	100	95.8	68.6
1992	44.6	30.2	24.5	.2	100	97.7	73.1
1993	42.5	28.6	27.7	.8	100	94.2	66.4
1994	42.6	28.0	28.3	.7	100	94.5	66.0
1995	42.1	28.0	28.8	.7	100	94.5	65.6
1996	41.2	27.3	30.0	.7	100	94.1	63.8
1997	40.1	28.3	30.3	1.0	100	93.8	62.5
1998	38.8	28.8	31.1	1.0	100	92.7	60.4

* Rows may not sum to 100 percent due to rounding and the exclusion of unknown AFQT.

These quality statistics do indicate how enlisted personnel stack up relative to the civilian personnel pool, but, more fundamentally, relationships with performance stand behind this array of data. Decades of study results have affirmed that recruits who score higher on the ASVAB also perform better in training and on the job. Enlisted personnel with traditional diplomas are more likely to complete their contracted term of enlistment and otherwise adjust to the military better than do non-graduates or persons with alternative secondary school credentials.

Individual Performance

The underpinnings of job performance include knowledge, skill, and motivation; for example, one must know how to fix an engine and demonstrate effort in the application of that knowledge.⁶ The Army succinctly refers to performance comprising “can do” and “will do” components. A similar distinction is between maximal and typical performance. In keeping with the many facets of performance, there are, likewise, alternate ways of assessing proficiency or effectiveness—the results of performance. Among the criterion measures upon which selection standards rest are technical training grades, administrative records, supervisory ratings, job knowledge test scores, and hands-on measures. These assessment tools tap the dimensions of job performance in varying degrees. For instance, training grades and formal job samples tap more of the “can do” or “maximal” aspects of performance whereas administrative records and supervisory ratings extend into the “will do” and “typical” dimension.

Though all types of assessment tools have been applied in measuring job performance in the military, the most common and routinely used are administrative measures (attrition—or failure to complete the first term of enlistment—in particular) and training outcomes.⁷ Reliance on these job performance criteria stems in large part from their availability and relatively low development and administrative costs. This is not to say that they are bad measures of performance; after all, learning and being present and accounted for are prerequisites to actually *doing* the job.

Aptitude Matters. In efforts to efficiently, effectively, and fairly select citizens for service who will contribute to the military’s goals, over the years, psychologists have relentlessly measured aptitudes, abilities, background characteristics, temperaments, and other traits so as to uncover potential performance predictors. Time and again, in research and operational settings alike, aptitude has been shown to matter. Not only do higher ability military personnel do better in job training, but level of aptitude has distinguished fighters from non-fighters during the Korean Conflict,⁸ been found to be

⁶ For a theoretical discussion of performance see, John P. Campbell, Rodney, A. McCloy, Scott, H. Oppler, & Christopher E. Sager, “A Theory of Performance” in Neal Schmitt, Walter C. Borman, & Associates, ed., *Personnel Selection in Organizations* (San Francisco, CA: Jossey-Bass, 1993) pp. 35-70.

⁷ See Deirdre J. Knapp & John P. Campbell, *Building a Joint-Service Classification Research Roadmap: Criterion-Related Issues*, AL/HR-TP-1993-0028, (Armstrong Laboratory [Human Resources Directorate, Manpower and Personnel Research Division], Brooks Air Force Base, TX, 1993, July).

⁸ In 1953, a series of tests was administered to a sample of combat infantryman identified as good and poor performers in combat. In addition to being, first and foremost, more intelligent, fighters (those who provided leadership, took aggressive action, performed supporting tasks under fire, remained calm, and exhibited personal responsibility) were

relevant in specific jobs such as armor crewmember, general vehicle repairman, supply specialist, and cook.⁹ On job-specific Skill Qualification Tests (SQT)¹⁰ administered by the Army from 1977 to 1991, high-AFQT soldiers were more likely to achieve passing scores and qualify for promotion.¹¹ As another of the many examples, smart tankers have been found to be better tankers. That is, during training exercises, as the tank commander's or gunner's level of aptitude goes from Category IV to IIIB there is a 20 and 33 percent increase in tank "kills," respectively.¹² Aside from armor, higher quality soldiers have outperformed lower quality when the task was in the infantry's realm and involved maintenance of the TOW launcher missile system. Whereas 98 percent of Category I-III A soldiers were successful on the first try at operator maintenance, only 79 percent of IIIB and IV soldiers were successful.

Experience With Low Aptitude. The importance of aptitude to military performance levels can also be gleaned by the almost visceral reactions of military leaders to Project 100,000 and the ASVAB Misnorming. In 1966, when the draft was still in effect and the Vietnam War was building, then Secretary of Defense Robert S. McNamara embarked upon a social experiment to have the military uplift the disadvantaged by accessing and training 100,000 Category IVs per year. Project 100,000 lasted until 1971 and during its tenure some 300,000 low aptitude personnel were admitted. A litany of post mortem studies that addressed the performance of the New Standards Men, as they were called, concluded that they performed more poorly on a number of dimensions (e.g., completion of training, advances in pay grade, supervisory ratings, time to learn, and work sample tests) than their higher ability peers. Similar conclusions based on research and anecdotal evidence were reached regarding the over 400,000 Category IVs enlisted between 1976 and 1980 as a result of the Misnorming, when there were errors in the ASVAB score scales.¹³ (Table 3 above shows the effects of this test calibration error on the quality indicators between FYs 1776 and 1980.)

found to be more socially mature, in better health and so on. See Robert L. Egbert, Tor Meehland, Victor B. Cline, Edward W. Forgy, Martin W. Spickler, & Charles Brown, *Fighter I: An Analysis of Combat Fighters and Non-Fighters*, Technical Report 44, (Alexandria, VA: Human Resources Research Organization, 1957).

⁹ See Robert Vineberg, Thomas G. Sticht, Elaine N. Taylor, & John S. Caylor, *Effects of Aptitude (AFQT), Job Experience, and Literacy on Job Performance: Summary of HumRRO Work Units UTILITY and REALISTIC*, HumRRO Technical Report 71-1, (Alexandria, VA: Human Resources Research Organization, February, 1971); Robert Vineberg & Elaine N. Taylor, *Performance in Four Army Jobs by Men at Different Aptitude (AFQT) Levels: 4. Relationships Between Performance Criteria*, HumRRO Technical Report 72-23, (Alexandria, VA: Human Resources Research Organization, August, 1972); and Robert Vineberg & Elaine N. Taylor, *Performance in Four Army Jobs by Men at Different Aptitude (AFQT) Levels: 3. The Relationship of AFQT and Job Experience to Job Performance*, HumRRO Technical Report 72-22, (Alexandria, VA: Human Resources Research Organization, August, 1972).

¹⁰ See Roy C. Campbell, *The Army Skill Qualification Test (SQT) Program: Annex A to Augmented Selection Criteria for Enlisted Personnel*, IR-PRD-94-05, (Alexandria, VA: Human Resources Research Organization, 1994).

¹¹ See Michael P. Wagner, Robert P. Dirmeyer, Barbara Means, & Margery K Davidson, *Analysis of Aptitude, Training, and Job Performance Measures* (Arlington, VA: McFann-Gray & Associates, Inc., February 1982).

¹² See Barry L. Scribner, D. Alton Smith, Robert H. Baldwin, & Robert W. Phillips, *Are Smart Tankers Better Tankers: AFQT and Military Productivity* (West Point, NY: Office of Economic and Manpower Analysis, Department of Social Sciences, United States Military Academy, December 1984).

¹³ For details on Project 100,000 and the Misnorming see, Janice H. Laurence & Peter F. Ramsberger, *Low Aptitude Men in the Military: Who Profits, Who Pays?* (New York: Praeger, 1991).

Advances in Job Performance Measurement. The Misnorming's large inadvertent infusion of low quality recruits early in the modern AVF not only led to diagnosing the force as hollow but also resulted in a carefully planned, large scale, long term, Joint Service job performance measurement (JPM) project commencing in 1980.¹⁴ The Misnorming not only alarmed Congress regarding personnel quality and the viability of the volunteer force but it brought to their attention the fact that selection and classification standards for the ASVAB were linked to training performance. Sure there were studies showing that the ASVAB aptitude composites were valid predictors of performance in isolated jobs, but the JPM was designed to take advantage of improvements in job performance measurement and include a representative sample of jobs across all four Services. Carefully constructed hands-on performance tests were administered to over 9,000 first-term soldiers, sailors, marines, and airmen within 30 jobs.

In addition to participating in the JPM project, the Army embarked upon its own ambitious effort called Project A. The Army's long-term research program included not only job samples or hands-on performance tests within the Military Occupational Specialties (MOS) that were part of the JPM study but other performance assessments (e.g., job knowledge tests, ratings), and a variety of predictors in addition to the ASVAB composites (e.g., temperament scales, an interest inventory, psychomotor and spatial tests). Also, Project A studied the relationship between the various predictors and aspects of performance not only within the 9 or 10 JPM jobs¹⁵ but it also added the vantage point of 11 more MOS.¹⁶

No doubt about it, the selection and classification battery used for enlisted personnel was shown to be a valid predictor of performance; and for the Army this included general soldiering proficiency and core technical proficiency. Temperament, on the other hand, was better at identifying soldiers that demonstrate effort and leadership and maintain high degrees of personal discipline. When all 30 JPM jobs were combined using hands-on performance tests as the benchmark, job performance was shown to be related to both aptitude and experience (months on the job). That is, job performance levels increased with aptitude and experience. However, experience did not wash away the effects of aptitude. In fact, Category I and II enlistees with 0 to 12 months of experience had higher average job sample scores than did Category IV enlistees with over 3 years' experience.¹⁷ Project A found that the benefits of selection and

¹⁴ See, for example, Department of Defense, *Joint-Service Efforts to Link Military Enlistment Standards to Job Performance*, Report to the House Committee on Appropriations (Washington, DC: Office of the Assistant Secretary of Defense [Force Management and Personnel], April 1992).

¹⁵ The introduction of a new tank during the course of Project A necessitated the inclusion of MOS 19K as well as the old 19E.

¹⁶ The cost and labor intensive hands-on assessments of job specific technical proficiency were not made within the additional 10 Project A jobs. For further details of Project A see a special issue of *Personnel Psychology: Project A: The U.S. Army Selection and Classification Project*, *Personnel Psychology*, Volume 43, Number 2, Summer 1990.

¹⁷ See Department of Defense, *Joint-Service Efforts*, p. 2-5.

classification using the ASVAB held not only over the course of the first enlistment term but also into the career force as a predictor of non-commissioned officer effectiveness.¹⁸

Can Do How Much? With all the definitive proof that as AFQT and ASVAB composite scores increase so too does training and job performance, there is no easy way to talk about how well people are doing. Validity coefficients abound but still there is no magic number—no three or six or nine on a ten-point scale that says how well the force is doing. Although the ASVAB works and is the best predictor of core and general technical proficiency, the scores tell only how well someone is expected to perform relative to others in the youth population rather than predicting an absolute or specific level of performance. In other words, the ASVAB and its AFQT composite are norm referenced rather than criterion referenced.

Hands-on (job sample) data from the JPM project have been used to inform the discussion regarding the competence of the force in terms of how much of the job a person can do. Scores purportedly (and reasonably) represent the percent of high frequency, important job tasks that can be performed successfully. Across the JPM jobs, incumbents accessed in FYs 1982 and 1989 with at least 2 years of service were able to perform 66 percent of the job tasks successfully, on average. Performance levels varied significantly by job in a manner consistent with, but exceeding level of personnel quality. Whether this percentage is good enough is still an open question. Unfortunately, determining the degree to which performance is marginal, acceptable, or outstanding still rests upon judgments that tend to have low reliability and vary with the method employed. However, targets somewhere between 60 and 80 percent have been suggested as the starting range for investigation.¹⁹

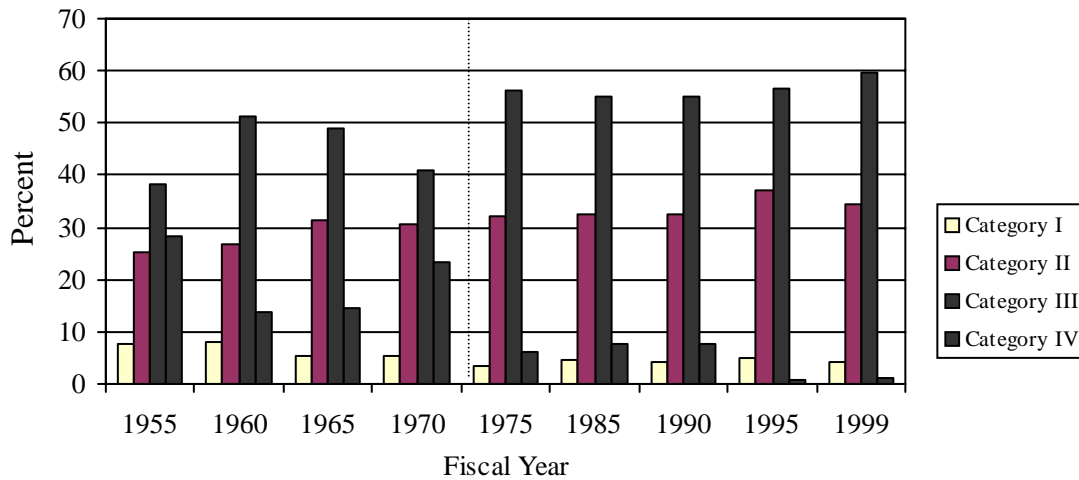
How does the quality of today's volunteers compare to personnel quality during the draft? Table 3 (above) showed quality statistics beginning in FY 1973. From the JPM results, rising aptitude levels suggest that job performance in the military has been improving, but how good is it compared to pre-1973? Figure 1 shows that, compared to the draft era, Cat IVs and Is are down whereas the others are up.²⁰ In fact, the decline in Category I personnel is slight compared to the rise in Category II and III and the drop in Category IV recruits. As a whole, average quality levels are higher under the AVF, but are they high enough? Before tackling this issue, it is important to discuss other important performance measures, most notably, attrition.

¹⁸ Project A's focus on first-term performance was followed by project "Career Force" which extended into the second term. For a discussion of both see, Lola M. Zook, *Soldier Selection: Past, Present, and Future*, Special Report 28 (Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, 1996).

¹⁹ See Bert F. Green & Alexandra K. Wigdor, "Measuring Job Competency," in Alexandra K. Wigdor & Bert F. Green, ed., *Performance Assessment for the Workplace, Volume 2* (Washington, DC: National Academy Press, 1991); and Laurence L. Wise, "Setting Performance Goals for the DoD Linkage Model," in Bert F. Green, Jr., & Anne S. Mavor, ed., *Modeling Cost and Performance for Military Enlistment* (Washington, DC: National Academy Press, 1994).

²⁰ It is important to note that while the AVF quality figures displayed do not include the Misnorming, they also exclude statistics from the height of Project 100,000 (1966-1970) a DoD War on Poverty program in which low-aptitude personnel were intentionally admitted into service. For details see Laurence and Ramsberger, *Low Aptitude Men in the Military*, 1991.

**Figure 3. AFQT Category Distribution of Enlisted Accessions:
Selected Fiscal Years Pre- and Post-Draft**



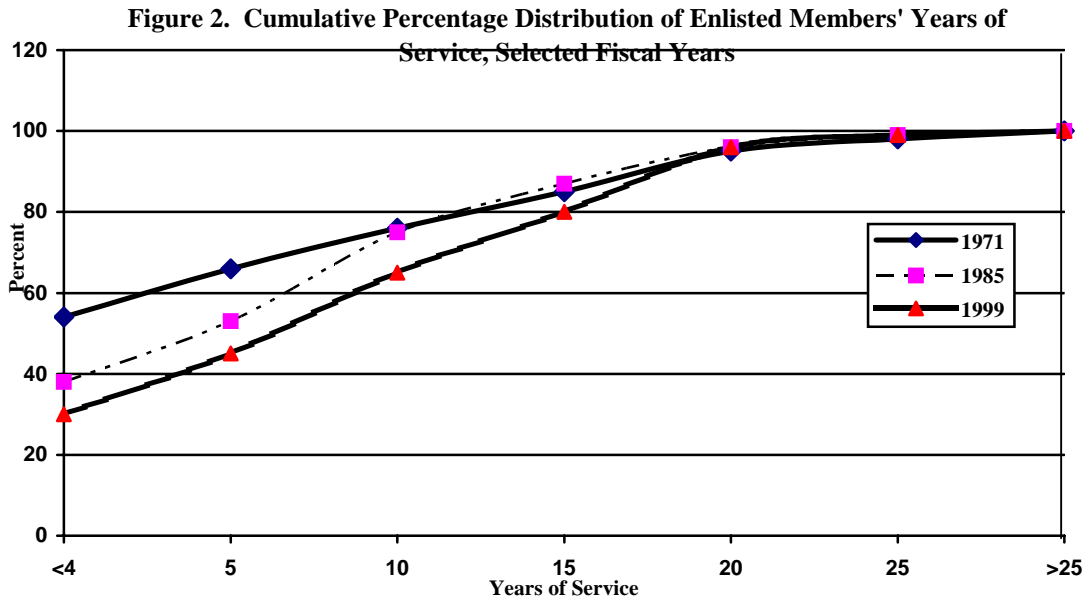
Note: Data prior to 1975 are for males only and include draftees.

Sources: Mark J. Eitelberg, Janice H. Laurence, & Brian K. Waters, *Screening for Service: Aptitude and Education Criteria for Military Entry* (Washington, DC: Office of the Assistant Secretary of Defense [Manpower, Installations and Logistics], September 1984) and Department of Defense, *Population Representation in the Military Services: Fiscal Year 1998* (Washington, DC: Office of the Assistant Secretary of Defense [Force Management Policy], 1999).

Will Do How Much? Effectiveness depends on more than maximal performance on important aspects of the job. Experience is an important dimension to consider as well. Also, typical performance together with policy results in other outcomes including disciplinary actions, decorations, promotion, attrition, and retention. Figure 2 contrasts the experience levels of active enlisted members at three points in time: just before the end of the draft in FY 1971; FY 1985; and FY 1999. Clearly, the AVF can tout more years of service for the rank and file than was the case under conscription. For example, whereas over half of enlisted personnel had fewer than 4 years of experience as of 1971, by 1999, less than one-third had fewer than 4 years under their belts. About two-thirds of those in service at the end of FY 1971 had 5 or fewer years compared to about two-fifths by the end of FY 1999. No doubt these trends are linked to longer enlistment terms for today’s volunteers. Regardless, as the above mentioned studies have indicated, this still means increased job proficiency.

For a more complete assessment of performance, it is necessary to consider indices in addition to technical proficiency—indices that address typical performance or the “will do” dimension. As mentioned above, first term attrition is perhaps the most analyzed performance criterion. Without the job incumbent, there is no individual performance. A variety of behaviors may result in dismissal from the military sooner than called for by the enlistment contract. Medical conditions and other non-pejorative

causes are relatively rare in comparison to inaptitude, behavior disorders, alcoholism, motivational problems, acquired civil court convictions, drug use, financial irresponsibility, and on other grounds of misconduct.²¹



Source: Defense Manpower Data Center

Unlike hands-on performance scores or other “can do” measures, attrition is apparently easily interpretable. Table 4 shows 36 month attrition rates for accession cohorts from 1973 through 1996. While experience has increased under the AVF, unfortunately, so too has attrition. About 30 percent of recruits leave service before three years and before completing their enlistment contract. Although this rate may be higher than under a draft environment, it is important to be cognizant of factors that confound a simple comparison between pre- and post-AVF attrition. When people are pressed into service, the Services must avoid *rewarding* intentional misconduct with a discharge and thus constrain attrition. Under volunteer conditions, the Services *punish* such misconduct by “firing” recalcitrant recruits. Evidence—including the stable rates depicted in Table 4—suggests that attrition is managed and thus the apparent interpretive ease is clouded.²²

²¹ See Janice H. Laurence, “Education Standards and Military Selection: From the Beginning,” pp. 1-40 in Thomas Trent & Janice H. Laurence, eds., *Adaptability Screening for the Armed Forces* (Washington, DC: Office of the Assistant Secretary of Defense [Force Management and Personnel], 1993)

²² See Janice H. Laurence, Peter F. Ramsberger, & Jane M. Arabian, *Education Credential Tier Evaluation*, FR-EADD-96-19, (Alexandria, VA: Human Resources Research Organization, September 1996); and Janice H. Laurence, Jennifer A. Naughton, & D.A. Harris, *Attrition Revisited: Identifying the problem and its solutions*, FR-PRD-95-1, (Alexandria, VA: Human Resources Research Organization, 1995).

Table 4. Percent 36-Month Attrition Among Non-Prior Service Accessions: FYs 1973-1996

Fiscal Year	Service				
	Army	Navy	Marine Corps	Air Force	DoD
1973	31.5	34.3	32.8	30.2	32.0
1974	38.6	37.6	37.1	31.0	36.7
1975	36.6	35.1	38.6	29.3	35.2
1976	37.3	31.4	35.4	26.6	33.8
1977	35.0	28.4	29.3	26.8	31.2
1978	30.4	25.1	30.0	36.4	28.7
1979	32.1	26.0	30.9	28.1	29.8
1980	37.1	26.8	31.7	27.2	32.2
1981	32.9	27.3	33.4	26.4	30.0
1982	31.8	26.6	32.7	23.9	28.9
1983	31.2	22.8	29.7	20.2	26.8
1984	29.9	24.2	29.3	20.6	26.6
1985	28.9	28.8	31.5	22.0	27.7
1986	29.3	32.5	33.5	22.4	29.2
1987	28.4	30.4	30.6	21.7	28.0
1988	28.9	30.4	27.8	20.4	28.0
1989	31.2	31.2	28.9	22.5	29.6
1990	32.0	30.0	33.1	25.1	30.4
1991	33.0	28.1	30.9	25.2	29.9
1992	31.8	29.9	29.0	22.7	29.2
1993	34.6	33.4	29.4	25.6	31.9
1994	35.6	35.3	30.2	26.1	32.9
1995	33.4	36.4	31.5	27.4	32.8
1996	33.1	34.1	28.1	25.8	31.2

Source: Defense Manpower Data Center

Though it is difficult to judge attrition, even relative to the days of the draft, such early departure is problematic. Lost investments in training, recruiting, and the like, together with negative effects on morale and readiness take their toll and make attrition a vital measure of performance.²³ Unlike technical performance, attrition varies not so much with level of aptitude but with other background characteristics and temperament. Education credential is the best single predictor of attrition, with non-high school diploma graduates and holders of alternative secondary school credentials having about twice the rate of attrition as high school diploma graduates.²⁴ In addition to credential, the Services have developed and tested other non-cognitive measures, including biographical and temperament inventories. Although the results have been promising in a research setting, there are reservations about the reliability of these “will do” measures in the operational recruiting environment.²⁵ Certainly, leadership and other organizational factors contribute to personnel retention. In light of the stresses on today’s volunteers, it may be time to control attrition through training and other interventions in addition to expeditious discharges of unmotivated recruits.²⁶

²³ Laurence, “Education Standards and Military Selection,” 1993.

²⁴ Ibid.

²⁵ See Trent & Laurence, *Adaptability Screening*.

²⁶ Janice H. Laurence, Jennifer A. Naughton, & Dickie A. Harris, *Attrition Revisited: Identifying the Problem and its Solutions*, FR-PRD-95-01, (Alexandria, VA: Human Resources Research Organization, 1995)

The Cost of Quality. Screening on the basis of aptitude and education credentials advances the organizational goals of maximizing technical performance and minimizing attrition. Despite the common sense notion that more is better, the question remains: How much quality is enough? The answer, as can be surmised from the discussion above regarding individual performance, is hardly straightforward. Minimum standards and quality goals are somewhat arbitrary, varying according to the principles of supply and demand. Since 1973, the Services have set entry standards as high as applicant supply and recruiting resources permit.

In 1985, concerned about the ability to sustain recruiting success, increasing technological sophistication, and mounting personnel costs, Congress asked the Services to define and project their quality needs. Blending art, science, and past experience, the Services responded that between 80 and 95 percent high school diploma graduates were needed. Regarding the percentage of accessions needed within Categories I-III A, the Army desired 59 percent; the Navy and Marine Corps each stated a goal of 63 percent; and 68 percent was estimated for the Air Force. At the lower end of the scale, the desired percentage of Category IV recruits ranged from 5 percent for the Air Force to 12 percent for the Navy.²⁷ Since that time, the Services have exceeded their goals as stated in 1985. Recall, for example, from Table 3 that across the Services the Category I-III A count has been above 60 percent and high school diploma graduates have totaled more than 90 percent since 1985. In fact, since 1990, the military personnel quality statistics have exceeded even the Air Force's projected "needs."

Although there is no *one* correct answer to setting appropriate minimum standards or the optimal quality mix within and across jobs, the JPM project, with its measures of technical proficiency across a range of military occupations, has led to improvements toward these ends as well. Cost/performance tradeoff models (CPTM) have been developed that solve for the quality mix necessary to meet a performance goal (defined on the basis of hands-on test scores²⁸ and attrition) at minimum costs. *The answer is still lacking but using the performance levels for the FY 1990 cohort as the standard, the CPTM indicates that with today's smaller force levels, higher quality minimizes the costs of achieving the same performance goal.*²⁹ Since 1985 and the CPTM, DoD has established new benchmarks for quality, namely, the recruitment of 90 percent high school diploma graduates and 60 percent Category I-III A.

²⁷ See Department of Defense, *Defense Manpower Quality, Volume I*, Report to the House and Senate Committees on Armed Services (Washington, DC: Office of the Assistant Secretary of Defense [Manpower, Installations, and Logistics], May 1985).

²⁸ Job performance scores were estimated for the non-JPM jobs on the basis of individual and job characteristics. The job characteristics were derived from the worker function and trait ratings contained in the Dictionary of Occupational Titles and crosscoded to military jobs. For details see Rodney A. McCloy, "Predicting Job Performance Scores Without Performance Data," pp. 61-99, in Bert F. Green, Jr., & Anne S. Mavor, eds., *Modeling Cost and Performance for Military Enlistment* (Washington, DC: National Academy Press, 1994).

²⁹ For details of the CPTM see Paul F. Hogan & Dickie A. Harris, "Policy and Management Applications of the Accession Quality Cost/Performance Trade-Off Model," pp. 129-157, in Bert F. Green, Jr., & Anne S. Mavor, ed., *Modeling Cost and Performance for Military Enlistment* (Washington, DC: National Academy Press, 1994).

After Selection, Then What?

The consistent theme from the study of individual performance is that personnel quality is related to military effectiveness. However, selection and job classification are only the starting points. Clearly something must be done with the raw abilities and temperaments that enlisted recruits bring into service and on the job. Well planned and executed training and leadership shape the basic individual characteristics into an effective fighting (or peacekeeping) force.

The U.S. military is often heralded as the nation's (if not the world's) largest educational and training institution. After basic training comes technical training in formal schools and on the job. Professional development of members of the military is also provided for so that enlisted members and officers can take part in academic and/or professional military education to further their careers. Complementing such individual development are leadership and collective training.

All of these activities are vital to ensure that personal characteristics such as aptitude and motivation contribute not only to individual performance but also to unit effectiveness. Yes, "practice makes perfect," but "perfect practice" is also becoming an adage. High fidelity training environments exist today in the form of flight simulators and other virtual reality weapon systems. In fact, entire combat scenarios with realistic tactics, operations, equipment, and logistics can be practiced at specially designed training environments such as the Army's National Training Center in California and during large-scale individual and joint-Service exercises.³⁰

Without training, practice, and orchestration, fighting vehicles, multiple-launch rocket systems, PATRIOT missiles, APACHE helicopters, ABRAMS tanks, TRIDENT and POSEIDON submarines, F-18s, F-15s, STEALTHS, and the like cannot be victorious on the ground, at sea, or in the air. This is not to say that equipment doesn't provide an edge. For example, although smart tankers are better tankers, smart *and* slower tankers perform better in Abrams M-1 tanks than in the old M-60s. However, "U.S. national security ultimately relies on the quality and commitment of the men and women who serve in uniform...."³¹

There are other important dimensions to military effectiveness such as morale, discipline, and cohesion; unfortunately such constructs are even more difficult than job performance to define operationally and measure reliably. However, attitude surveys and common sense show that attention to quality of life (e.g., pay and benefits, housing, family services) in the military has profound effects on morale and productivity. Commitment works two ways—to the military and to the officer or enlisted member.

³⁰ Jack H. Hiller, "Deriving Useful Lessons From Combat Simulations" pp. 7-15 in Robert F. Holz, Jack H. Hiller, & Howard H. McFann, eds., *Determinants of Effective Unit Performance* (Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, 1993).

³¹ "Chapter 12: Personnel" in William J. Perry, *Annual Report to the President and the Congress* (Washington, DC: Department of Defense, March 1996), p.87.

Events such as the recent Defense drawdown that affect morale create more than statistically significant attitude and perception assessment findings. Concerns over military career prospects in the face of a stepped up pace or operating tempo (OPTEMPO) show themselves through increased turbulence, lowered retention, and recruiting difficulties.³² High quality and experience levels cannot be expected to withstand the ravages of personnel shortages, especially when a booming economy beckons.

Perhaps these trying times will launch earnest efforts to embrace the presence and career progression of minorities and women. Change typically meets with resistance and causes temporary friction. And, defining the role of women in the military will likely lead to change. However, acceptance of diversity not only fosters teamwork, cohesion, and commitment in the long run, but also eliminates barriers to performance.³³ For example, with regard to the integration of men and women for basic training, the Army experience showed that performance levels rose for women and remained stable for men. The degree of perceived cohesion, morale, and satisfaction also rose for women. Whereas men's attitudes in gender-integrated units were initially more negative than in all-male units, over time, and with exposure, they converged and more positive perceptions prevailed.³⁴ It may be time not only to weather the temporary disruptions of full integration but also to examine untapped performance dimensions and styles that promote military readiness and effectiveness in the modern military.

Ready? Set?

Together, recruiting, organizing, equipping, training, and educating the requisite numbers of high quality military personnel enhance operational readiness. The objective, short of fighting and winning a war, is the preparation of personnel and weapon systems to carry out assigned missions without delay. The assessment of and agreement regarding individual performance levels is difficult enough, but a determination of unit and ultimately collective force readiness is problematic at best.³⁵ Yet commanders consider variables such as personnel strength and proficiency as well as the number of weapons authorized and on-hand in rating readiness from C1 (ready) to C4 (not ready). In between are ratings reflecting minor or major deficiencies. With advances in the state-

³² Edwin Dorn, "Sustaining the All-Volunteer Force" pp. 3-22, in J. Eric Fredland, Curtis Gilroy, Roger D. Little, & W.S. Sellman, *Professionals on the Front Line: Two Decades of the All-Volunteer Force* (Washington, DC: Brassey's, 1996).

³³ See Janice H. Laurence, "Military Personnel Challenges and Demographics: Beyond Gender and Race," Invited address before the Defense Equal Opportunity Management Institute's Third Biennial EO/EEO Research Symposium, (Patrick Air Force Base, FL, December 1999).

³⁴ Jacquelyn Mottern, David Foster, Elizabeth Brady, & Joanne Marshall-Mies, *The 1995 Gender Integration Basic Training Combat Study*, Study Report 97-01, (Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, 1997).

³⁵ See Irving Heymont, "A New Cure for an Old Headache," *Army*, Volume 4, No. 7, July 1974; and Irving Heymont, "Measuring Unit Training Proficiency" pp. 28-35, *Military Review*, June 1977.

of-the-art of war gaming, improvements in the measurement of unit readiness and standards of performance should follow.³⁶

There is evidence that cognitive ability level, á la the ASVAB, is an integral ingredient for readiness. Not only are recruit quality statistics and individual outcome measures (e.g., attrition, retention) used as indicators, but there is more solid proof. Project A soldiers who participated in Operation Desert Shield/Storm during 1990 provided an opportunity to update the findings from the “Fighter” studies of the Korean War era. Assessments via Project A performance measures (i.e., can do and will do) were found related to actual combat performance. Furthermore, ASVAB as well as non-cognitive predictors (e.g., temperament and interest inventories) were related to Desert Storm effectiveness ratings.³⁷

But again, although correlates of readiness readily surface, the issue of readiness standards remains. Not too long ago, one of the Army’s own echoed former Army Chief of Staff, General Shy Meyer’s “hollow Army” epithet of the late 1970s and proclaimed that: “The U.S. Army cannot reasonably expect to be successful in wartime missions except for lower spectrum of conflict type war (e.g., Grenada).”³⁸ Although this warning occurred before victory in the Persian Gulf and deployment to the Balkans, readiness concerns remain. Accurate monitoring and managing *total force* personnel quantity, quality, interest, morale, experience and skill levels, and training opportunities as well as equipment and facilities will continue to be a challenge.

Go!

So, how should one assess the force? Is it hollow or is it hearty? While the size, shape, roles, and responsibilities of the total force are being recast in the new millennium, the tempo has not slowed to await the impending resolutions of such weighty issues. Quality is not a shortcoming of today’s force. The downsized quantity and skill mix are predicated on the assumptions of the 1993 Bottom-Up Review, which set its sights on deterring and, if necessary, fighting and winning two simultaneous major regional conflicts. Concerns over the forces being lean are countered by arguments that technology, not to mention the demise of formidable foes enables us to do more with fewer albeit more qualified soldiers, sailors, marines, and airmen. A case is also made for increased *judicious* reliance on the Reserves with the “total force” concept being less talk and more action.³⁹

³⁶ Thomas Lewman, William J. Mullen, III, & James Root, “A Conceptual Framework for Measuring Unit Performance” pp. 17-38, in Robert F. Holz, Jack H. Hiller, and Howard H. McFann, eds. *Determinants of Effective Unit Performance* (Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, 1993).

³⁷ See Zook, *Soldier Selection*.

³⁸ William D. Henderson. *The Hollow Army* (New York: Greenwood Press, 1990), pp. 19-20.

³⁹ There is ongoing discussion regarding appropriate missions for the Reserves with avoidance of using them in situations that call for intensive training, highly technical military applications, continuous presence, or high tempos. See Total Force Policy Study Group, *Total Force Policy Report to the Congress* (Washington, DC: Office of the Secretary of Defense, December 1990).

After only five years, military scholars hedged their assessments claiming: "...The duration of the all-volunteer force has coincided with a period without major military hostilities; therefore the effectiveness of the all-volunteer force—and in particular that of the ground forces—has not been put to the test."⁴⁰ By the 25-year mark, there had been plenty of tests of mettle. Since the withdrawal of U.S. forces from Vietnam, our military has seen battle in places around the globe including Lebanon, Panama, Grenada, the Persian Gulf, Bosnia, and the Balkans. In addition to combat missions, there have been scores of operations other than war to include: peacekeeping, peacemaking, arms control, treaty compliance monitoring, security assistance, counter-drug operations, disaster relief, and humanitarian assistance both at home and abroad.⁴¹ Not all AVF operations and missions have been successful. But examples of less than victorious outcomes such as the bungled attempt to free the hostages in Iran in 1980 have more to do with politics and leadership outside the military than with individual or unit performance. And indeed there have been failures during the draft as well (e.g., the Bay of Pigs and the Vietnam War). There are lessons to be learned from travesty and triumph.

The deployments and other missions conducted over the course of the past 25 plus years encompass military performance—from the building blocks of recruit aptitudes through training, unit performance, cohesion, and readiness to leadership and deployment. According to Secretary of Defense Cohen, "the Department has maintained the highest quality, best-trained, and most diverse armed forces in history."⁴² There is always room for improvement but accumulating evidence regarding the performance of the all-volunteer force shows that the men *and* women can do and will do.

⁴⁰ Morris Janowitz & Charles C. Moskos, Jr. "Five Years of the All-Volunteer Force: 1973-1978," pp. 171-218, *Armed Forces and Society*, Volume 5, Number 2, p. 174.

⁴¹ For a description of recent missions, see John D. Sherwood, *U.S. Army Operations Other Than War Since 1989* (Washington, DC: Army Center of Military History [Staff Support Branch, Research and Analysis Division], 7 April 1995).

⁴² "Chapter 9: Personnel and Quality of Life" in William S. Cohen, *Annual Report to the President and the Congress* (Washington, DC: Department of Defense, 1999), p. 103.