

CHAPTER II

PROSPECTS FOR RECRUITING

Army recruitment has taken an erratic course since the inauguration of the All-Volunteer Force (AVF) in 1974. While recruiters have generally met their numerical goals, quality has fluctuated. The caliber of recruits turned sharply down in 1977, bottomed out in 1980, turned up in 1981, and has steadily improved since then. Indeed, prospects remain comparatively bright for the next few years. This chapter details past trends in recruiting, and projects Army quality for the next few years.

PAST TRENDS IN RECRUIT QUALITY

Trends in quality--defined as test scores and education--are the best measure of recruiting success, since recruiters almost always meet goals for quantity. 1/ Throughout the years of conscription from 1964 to 1972, high school graduates averaged 68 percent of the Army's recruits. Those in the lowest acceptable AFQT category (IV) averaged about 24 percent. With the advent of the All-Volunteer Force, quality took two contradictory turns. In 1973 to 1976, the proportion of recruits in the bottom AFQT category declined to an average of 15 percent. But the proportion of male recruits holding high school diplomas fell to an average of about 54 percent. In part, the Army was showing a preference for high-scoring dropouts over lower-aptitude high school graduates. 2/

Quality during the AVF's early years would have looked much worse had the Army's demand for recruits not declined. Between 1973 and 1976, for instance, yearly enlistments of AFQT I-III-A graduates dropped by 19,000, from 80,000 to 61,000. But overall enlistments of recruits without previous military service declined by about 24,000. The downward trend continued throughout succeeding years of the AVF, helping to increase high school graduate percentages.

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1. The one major exception was fiscal year 1979, when Army recruiters fell 11 percent short of their overall quota.
 2. An observation made several years ago by Richard Cooper, *op. cit.*, pp. 134-135.

In 1977, quality started on a steep slide down. Causes included an upturn in the civilian job market, a cap on increases in military pay, and the end of the Vietnam-era GI Bill. Between 1976 and 1980, high-quality male enlistments fell by over 50 percent.

To alleviate the drop in high-quality males, the Army placed greater emphasis on AFQT IIIB high school graduates--and to some extent on AFQT IIIB nongraduates. Thus, the percentage of male high school graduates rose while the proportion of recruits in the top half on test scores (categories I-III A) went down. What the Army did not know at the time, though, was that many of those category IIIB recruits actually belonged in category IV. An error on the AFQT that went unrecognized until 1979 had inflated their scores. Upon recomputation, the Defense Department discovered that category IV recruits were far more numerous than had previously been thought: the proportion of Army recruits in the bottommost category in 1980 shifted from 11 percent to 52 percent. (The proportion of male high school graduates was only 49 percent.) Thus, fiscal year 1980 marked a low point for Army recruiting.

In 1981, thanks to Congressionally mandated increases in pay and benefits, a turndown in the economy, and improved recruiter productivity, quality rebounded. Between 1980 and 1984, the Army's enlistments of high-quality males increased by more than 150 percent. By 1985, about 89 percent of all male Army recruits held high school diplomas, and fewer than 10 percent placed in category IV.

The problems of the late seventies linger in the career force, causing what the Army sees as a long-run problem: a bulge of category IV personnel. (The career force is made up of personnel who have served on active duty for more than four years.) About 38 percent of the soldiers with five to nine years of service are in the lowest AFQT category. In contrast, category IVs make up only 19 percent of personnel with 10 or more years of service.

PROSPECTS FOR MANPOWER QUALITY: THE CBO BASELINE

For the next five years, the quality of Army recruits should stay historically high (see Table 2). CBO projects that the proportion of male recruits holding high school diplomas will stay above 81 percent through 1991. Though projections that extend beyond 1988 are somewhat speculative, one thing seems certain: the Army should be able to keep well above the statutory minimum of 65 percent male high school diploma graduates.

TABLE 2. CBO'S BASELINE PROJECTIONS OF ARMY RECRUITMENT AND RETENTION, BY FISCAL YEAR

Personnel Measure	1986	1987	1988	1989	1990	1991
Enlisted Career Force (In thousands) <u>a/</u>	302	305	305	302	301	300
Demand for New Recruits (In thousands) <u>b/</u>	126	124	125	126	127	128
Supply of High-Quality Male Recruits (In thousands) <u>c/</u>	53	50	52	50	49	47
Percentage of Male Accessions with High School Diplomas <u>d/</u>	89	91	89	84	83	81

SOURCE: Congressional Budget Office.

- a. Based on retention rates from 1982 and 1984, adjusted for later changes in both military pay and civilian unemployment.
- b. Represents non-prior-service recruits who have no previous active-duty military service. CBO assumed that prior-service recruits would number 11,000 a year.
- c. Projected contracts (net of attrition) of non-prior-service high school diploma graduates in AFQT categories I-III A.
- d. Assumes 10 percent of accessions are high school graduates in AFQT category IV.

These baseline projections constitute a benchmark against which to analyze changes in compensation or recruitment policies. They show what is likely to happen if present policies continue through 1991. The projections assume that military pay keeps pace with increases in private-sector wages; that the civilian unemployment rate steadily declines to 6.0 percent; and that the Army limits the percentage of recruits in AFQT category IV to 10 percent of accessions, as it has done recently.

Supply Trends

Prospects for recruiting depend in large part on the willingness of youths to enlist--the "supply" of recruits. CBO projects that between 1985 and 1991 the supply of high-quality male recruits (high school graduates in AFQT categories I-III A) will decline roughly 18 percent. About three-quarters of the projected decline results from the assumed drop in civilian unemployment; the rest, from the expected 12 percent decrease in the population pool of young men 18 to 23. Under these projections, the Army should be able to draw about 47,000 high-quality male accessions in 1991--about 7,000 less than in 1985, but still 4,000 more than the number who enlisted in 1982.

That the demographic reality of a smaller youth population will have little effect on recruiting may come as a surprise. Yet a variety of econometric studies have found that the supply of high-quality recruits does not decrease one-to-one with a decline in population. Accordingly, CBO assumes that the 12 percent decrease in the size of the population pool will cut the supply of high-quality recruits only about 4 percent. ^{3/}

The Demand for Recruits

Prospects for recruiting depend not only on the supply of high-quality male recruits but also on the number of career personnel. A favorable trend in the retention of career soldiers can offset a downward trend in supply because it will drive down the demand for recruits. The larger the career force, the smaller the need for enlistees without previous military service. For example, when the career force numbered about 220,000 in 1974, the Army needed about 180,000 recruits; by 1984, when the career force had grown to 305,000, the Army needed only 132,000 new recruits.

To the pleasant surprise of Army managers, reenlistments in 1985 were much higher than anticipated, exceeding objectives by 11 percent during the first eight months of the calendar year. The 4 percent drop in the rate of civilian unemployment over the previous year should actually have encouraged more soldiers to leave, as should the limited pay raise. For

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3. One possible reason for the small population effect is that recruiters' effectiveness may remain steady. The supply of high-quality recruits depends in large part on recruiters' success in contacting eligible youths. At present, recruiters do not reach everyone, having not yet "saturated" the market. As the population of youths falls, the ratio of recruiters to youths will rise, thus helping recruiters contact as many people as before.

these reasons, last year's improved retention poses something of a puzzle. 4/

To hedge against uncertainty, CBO rests its baseline on the somewhat lower retention experience of 1982 and 1984. During 1982, a first-term soldier's willingness to reenlist was relatively unconstrained by managerial policies. The baseline extrapolates first-term retention (years of service 3, 4, and 5) from 1982 reenlistment rates that have been adjusted for later changes in relative military pay and in civilian unemployment. For retention at other points, the baseline extrapolates from the 1984 rate of reenlistment. 5/

Future Uncertainties

The future may of course diverge from CBO's baseline. For example, if a recession were to begin sometime in the late 1980s, the civilian unemployment rate could be as high as 8.7 percent by 1991, rather than the 6.0 percent rate assumed above. High-quality recruits would be in abundant supply at that rate. The opposite might happen if a so-called "cohort effect" materialized. So long as older and younger workers are not perfect substitutes for one another in the labor market, the decreasing size of future youth cohorts could force up the earnings of young workers. 6/ If so, military starting pay would lag increasingly behind youths' civilian wages.

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4. Some of the improvement in retention may stem from changes in reenlistment policy. During fiscal years 1983 and 1984, the Army set relatively demanding standards for reenlistment to weed out marginal performers (mostly those low-quality soldiers who had enlisted in 1979 and 1980 when the AFQT was misnormed). Soldiers in their first or second terms had to be in line for promotion to pay grade E-5 to reenlist. In 1985, the Army relaxed these regulations for those in their first term, so that all first-term soldiers in pay grade E-4 can reenlist.
 5. Fiscal year 1985 also brought an overall decline in the rate of attrition, thanks in part to a new Army policy discouraging early discharges. CBO's baseline projects a continuation of this recent attrition improvement.
 6. Hong Tan and Michael Ward, in *Forecasting The Wages of Young Men: The Effects of Cohort Size* (Santa Monica, Calif.: The Rand Corporation, May 1985), estimate that by 1990 real wages of high school graduates will have risen about five percentage points in comparison with those of mature workers. Some economists, however, point to several influences that might work the other way: increasing numbers of working women, increasing immigration, and declines in college enrollment. See U.S. Air Force, *An Analysis of The Effects of Varying Male and Female Force Levels, Annex Three: The Prospects of Military Enlistments* (March 1985).

LONG-TERM TRENDS

Though five-year projections figure heavily in government forecasts, military managers must plan for the longer run. Under the Army's "bottom-fed" system of managing personnel, today's recruits will shape the composition of tomorrow's career force, and hence the long-run costs of maintaining a career force. To simulate the long run, CBO extended its baseline projections to cover 30 years. Various aspects of military manpower converge to the following limiting values: the Army has 281,600 career soldiers, and demands 136,000 new recruits a year.

In certain respects the long-run outlook compares unfavorably with the five-year outlook. Over the years after 1991, the career force loses about 18,000 members, thus increasing the Army's yearly need for recruits. Hence, the proportion of male high school graduates drops to about 79 percent. In other respects, the long-run outlook compares favorably. Though smaller, the career force is of higher quality. Today's bulge of category IV soldiers is gone, and the overall proportion of career personnel in category IV falls to about 11 percent while the proportion in the top three categories, I-III A, rises to 62 percent.

CONCLUSION

Recruiting successes are likely to continue for at least the next two years. The proportion of male recruits holding high school diplomas, now almost 89 percent, will stay at least in the mid-to-high eighties. A downturn in recruit quality is likely to begin toward the end of the decade, though the percentage of high school graduates will still be high by historical standards. Under baseline assumptions, CBO projects that the male high school graduate percentage will be 81 percent by 1991.

The problem for recruiting is that the Army's ambitious new goals for quality may be too costly. If present policies yield the relatively high levels of quality projected by CBO for the next few years, the Army would still need additional resources to support its program. Those costs are the subject of Chapter III.

CHAPTER III

THE COSTS OF HIGH QUALITY:

THE ARMY'S PROGRAM

Meeting the Army's goals for quality would affect costs in a variety of ways. Starting pay would of course have to increase, through higher wages, bonuses, or education benefits, to attract more high-quality youths. Many other expenses--including those for career pay and benefits, for training, and for travel--would also change, some up, some down. For instance, the lower attrition of high-quality recruits should save on training expenses, thus offsetting other increases. This chapter presents CBO's estimates of the costs of manning the force under the Army's program.

THE ARMY'S PROGRAM

The Army's goals for quality emphasize recruiting substantial percentages of high school graduates and of youths with high mental aptitude:

- o At least 90 percent of recruits should hold high school diplomas;
- o No more than 10 percent should be in the lowest acceptable AFQT category IV, made up of those who score in the 10th to 30th percentile score range; and
- o From 65 percent to 69 percent of recruits should be in the top three AFQT categories I-III, which include the 50th to 99th percentile score range.

The objective for the top AFQT categories (a range of 65 percent to 69 percent) resulted from analytic adjustments to recommendations by the

Army's training schools. Last year, the Army's Deputy Chief of Staff for Personnel (DCSPER) asked the Army's training schools to identify their requirements for soldiers in various AFQT categories. The Infantry School at Fort Benning, for example, recommended that 68 percent of its recruits place in AFQT categories I-III A. Some schools aimed higher, others lower, but on average they recommended that 65 percent of recruits place in these top three categories. Cost was not a consideration in the schools' recommendations.

DCSPER later appraised the cost-effectiveness of the 65 percent objective, found it "economically conservative," and so proposed raising it by four percentage points. For that reason, this report distinguishes two versions of the Army's program--one calling for 65 percent of recruits in AFQT categories I-III A, the other for 69 percent. Both versions aim to have 90 percent high school graduates, and no more than 10 percent of all recruits in the AFQT category IV. ^{1/}

FIVE-YEAR COSTS OF MANNING THE ACTIVE ARMY

CBO projects the variable costs of manning the Army's active-duty enlisted force over the next five years at about \$96.6 billion in current dollars (see Table 3). Supporting the higher version of the Army's recruiting program (69 percent in AFQT categories I-III A) would add about \$785 million to the baseline costs over the next five years. The less ambitious version of the Army's program would increase five-year spending by about \$410 million. In either case, most of the increase would fund additional recruiting resources, which this report assumes would take the form of higher enlistment bonuses. Such targeted benefits represent an efficient means of attracting large numbers of high-quality recruits. (See the box for a discussion of key technical details influencing CBO's bonus calculations.) Relative to CBO's baseline, the Army's program would modestly reduce the overall demand for recruits through 1991, and so slightly reduce the "turnover" costs associated with moving and training personnel.

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1. The Army actually expressed its AFQT goals under the new population reference. According to this, the training schools' recommendation was 59 percent in AFQT categories I-III A; DCSPER's recommendation was 63 percent. For details, see Office of the Assistant Secretary of Defense for Manpower, Installations, and Logistics, Report to the House and Senate Committees on Armed Services, *Defense Manpower Quality*, vol. 2, Army Submission (May 1985).

ESTIMATING ENLISTMENT BONUSES

Studies of recruiting typically treat cash enlistment bonuses as increments to pay [see, for example, Armor and others, *Recruiting Aptitudes and Job Performance* (Santa Monica, Calif.: The Rand Corporation, September 1982)]. If econometric analyses show that a 10 percent change in earnings would attract enough additional high-quality recruits, then the appropriate enlistment bonus becomes that 10 percent. The larger the earnings base, the larger the bonus necessary to attract any number of high-quality recruits.

A problem arises in defining the earnings base. Is it basic pay only, or regular military compensation (RMC) which includes basic pay, food and housing allowances, and the concomitant tax advantage? Or is it some measure of perceived pay, since enlistees often underestimate their actual wages [Armor, *op. cit.*]? Should the base encompass the first year of earnings, or earnings discounted over a full three- or four-year term?

CBO followed a middle route, defining earnings as the present discounted value of basic pay over the first three years of service (about \$22,000), assuming a personal discount rate of 15 percent. Alternative assumptions that CBO tested were, at the low end, the present discounted value of RMC over one year (making the earnings base about \$12,000); and at the high end, the discounted value of RMC over three years (about \$35,000).

A five-year increase of \$785 million would add just under 1 percent to the variable costs of manning the Army, and substantially less to the total defense budget. Viewed another way, however, the necessary changes could mean a substantial increase in the Army's present enlistment bonus program--which may be difficult to achieve in today's austere budgetary climate. Moreover, the costs could be much higher if retention or recruitment proved weaker than expected.

HIGHER-COST ALTERNATIVES TO BONUSES

Though enlistment bonuses are an efficient recruiting tool, they lack political popularity. Some people look askance on giving teenagers large

TABLE 3. PROJECTED VARIABLE COSTS OF MANNING THE ACTIVE ARMY UNDER THE PRESENT RECRUITING PROGRAM AND UNDER THE ARMY'S TWO ALTERNATIVE PROGRAMS, FISCAL YEARS 1987-1991 (In millions of current dollars) a/

Type of Cost	1987	1988	1989	1990	1991	Five-Year Total
Baseline						
Recruiting <u>b/</u>	240	245	240	240	240	1,205
Turnover <u>c/</u>	625	660	685	715	750	3,435
Pay and Benefits <u>d/</u>	12,840	13,610	14,395	15,255	16,185	72,285
Retirement Accrual <u>e/</u>	3,395	3,605	3,825	4,060	4,320	19,205
Enlistment Bonuses	55	80	105	105	110	455
Total	17,155	18,200	19,250	20,375	21,605	96,585
Army Program (65 percent)						
Recruiting <u>b/</u>	245	255	265	270	275	1,310
Turnover <u>c/</u>	625	660	685	710	745	3,425
Pay and Benefits <u>d/</u>	12,840	13,615	14,390	15,255	16,180	72,280
Retirement Accrual <u>e/</u>	3,395	3,605	3,825	4,060	4,320	19,205
Enlistment Bonuses	60	110	170	200	235	775
Total	17,165	18,245	19,335	20,495	21,755	96,995

(Continued)

TABLE 3. (Continued)

Type of Cost	1987	1988	1989	1990	1991	Five-Year Total
Army Program (69 Percent)						
Recruiting <u>b/</u>	260	275	285	295	305	1,420
Turnover <u>c/</u>	625	660	690	710	745	3,430
Pay and Benefits <u>d/</u>	12,840	13,615	14,390	15,250	16,180	72,275
Retirement Accrual <u>e/</u>	3,395	3,600	3,820	4,055	4,315	19,185
Enlistment Bonuses	<u>80</u>	<u>155</u>	<u>235</u>	<u>270</u>	<u>320</u>	<u>1,060</u>
Total	17,200	18,305	19,420	20,580	21,865	97,370

SOURCE: Congressional Budget Office.

- a. Estimates of inflation and wage increases originate from CBO's medium-term economic projections.
- b. Includes costs of examining and processing recruits, supporting the U.S. Army Recruiting Command, and the accrual cost of maintaining the Army College Fund (supplemental education benefits with an estimated accrual value of about \$1,140 per high-quality recruit).
- c. Includes variable expenses of training recruits--civilian salaries, ammunition, maintenance, and installations--amounting to about \$1,600 a recruit. (Source: U.S. Army, *TRADOC Resource Factor Handbook*, vol. 2, Resource Estimating Relationships). Also, the expense of soldiers' travel between home and military installation (accession and separation permanent change of station moves).
- d. Includes pays and allowances in the Military Personnel Account (such as basic pay, quarters allowance, reenlistment bonuses), plus operation and maintenance costs of medical care (inpatient and outpatient), plus reimbursement for travel not included in c.
- e. Calculated as a percentage of basic pay, with the overall factor dependent on the composition of the enlisted force. For 1985, CBO calculates an accrual charge particular to the Army of 41.1 percent--about 10 percentage points less than the charge for all of the Defense Department that is used in budget calculations.

sums for enlisting. More popular alternatives for attracting personnel are education assistance and across-the-board raises in military pay.

Education Assistance

Relying on education assistance to draw high-quality recruits would raise the Army program's cost. Since young recruits generally prefer money now to money later, a given amount of education assistance--with its deferred benefits--will not attract as many as a bonus of equal size. Increased education assistance could therefore raise the costs of the Army's program by several hundred million dollars over the next five years.

Pay Increases

Raising military pay, either for recruits or for all personnel, would be a straightforward way of solving the personnel problem. A difficulty with increasing only starting pay, whether by bonuses or by other means, is "pay compression." The Congress has previously expressed concern that senior personnel are already paid too little relative to their juniors. A platoon sergeant (pay grade E-7) with more than 14 years of service earns 2.5 times more in basic pay than a private (pay grade E-1). An enlistment bonus of, say, \$5,000 would compress the differential even more. Even though pay compression does not seem to have hurt the Army's ability to retain personnel, it could ultimately lessen career soldiers' motivation and reduce their productivity should they feel that high enlistment bonuses are unfair to them.^{2/} An across-the-board raise would be one answer to the problem of compression. But such an approach would raise the cost of the Army's program by several billion dollars.

COSTS IN THE LONG RUN

Since five years is too short a period to appraise all the effects of a change in recruiting policies, CBO has also made a long-run projection that covers a period of 30 years. Table 4 shows how the Army's variable manpower costs (calculated in 1987 dollars) would change in the long term under the proposed new program. The 65 percent goal for AFQT categories

2. Some economists contend that, because of "interdependent" preferences, workers often look at their coworkers' wages to decide if they are being fairly paid. See Lester Thurow, *Dangerous Currents: The State of Economics* (New York: Vintage Books, 1984).

TABLE 4. LONG-RUN VARIABLE COSTS OF MANNING THE ACTIVE ARMY UNDER THE ARMY'S TWO ALTERNATIVE PROGRAMS (In millions of 1987 dollars) a/

Type of Cost	Baseline	65 Percent Program	69 Percent Program
Recruiting <u>b/</u>	305	345	370
Turnover <u>c/</u>	905	880	880
Pay and Benefits <u>d/</u>	16,840	16,880	16,865
Retirement Accrual <u>e/</u>	4,390	4,455	4,435
Enlistment Bonuses	<u>110</u>	<u>325</u>	<u>450</u>
Total	22,550	22,885	23,000

SOURCE: Congressional Budget Office.

- a. Assumes that manpower related costs increase at a real rate of 1 percent a year (for a total of about 30 percent over the projection period).
- b. Includes costs of examining and processing recruits, supporting the U.S. Army Recruiting Command, and the accrual cost of maintaining the Army College Fund (supplemental education benefits with an estimated long-run accrual value of about \$1,480 per high-quality recruit).
- c. Includes variable expenses of training recruits--civilian salaries, ammunition, maintenance, and installations--amounting in the long run to about \$2,080 a recruit. (Source: U.S. Army, *TRADOC Resource Factor Handbook*, vol. 2, Resource Estimating Relationships). Also, the expense of soldiers' travel between home and military installation (accession and separation permanent change of station moves).
- d. Includes pays and allowances in the Military Personnel Account (such as basic pay, quarters allowance, reenlistment bonuses), plus operation and maintenance costs of medical care (inpatient and outpatient), plus reimbursement for travel not included in c.
- e. Calculated as a percentage of basic pay, with the overall factor dependent on the composition of the enlisted force.

I-III A would add \$335 million to those costs, an increase of about 1.5 percent; the 69 percent goal would add \$450 million, about a 2 percent increase. ^{3/}

As in the five-year projections, higher enlistment bonuses would account for the largest part of the Army program's long-run costs. But growth in the career force, brought on by the 90 percent proportion of high school graduates, would trigger large increases in various other payroll costs. The Army's 65 percent program would expand the career force by 3,000 soldiers, and so would add \$105 million to pay and benefits and retirement. The 69 percent program would add less--\$70 million--because of a more modest career force expansion. (Since first-term soldiers in the top three AFQT categories are less likely than other first-termers to reenlist, the 69 percent AFQT goal would add only 1,900 career soldiers.) A larger career force would of course moderate other costs by holding down the demand for recruits, with likely savings of about \$25 million a year in turnover-related costs.

The decrease in turnover accompanying the Army's program would make the enlisted force more efficient. With fewer recruits, the Army could maintain a smaller training establishment, and would require less overhead in general, for any given number of operating forces (such as combat divisions, and tactical support units). But such efficiencies would probably not be reflected in budgetary savings, because the services have to take many other influences into account in deciding their active manpower programs--the pace of modernization, the productivity of logistics units, the readiness of Reserve units, and the political mood, to name but a few. The Army's five-year manpower program is a good case in point. Despite large gains in retention over the last few years, the Army has held steady to earlier plans not to increase the size of the active force.

CONCLUSION

The Army's proposed standards for recruiting represent a historically ambitious program to raise the enlisted force's quality, at relatively small cost. Even the higher standard that would recruit 69 percent in AFQT categories I-III A, as well as 10 percent in category IV, with 90 percent high

3. In making these estimates, CBO assumed that manpower-related costs would generally increase at a real annual rate of 1 percent.

school graduates, might raise costs only modestly. Over the next five years, the annual cost of manning the Army would increase by \$785 million, or slightly less than 1 percent of variable costs.

Such an increase seems small against the Army's total spending on pay and benefits, retirement, recruiting, training, and travel. Over the longer run, however, the program would be accompanied by an expansion in the career force that would raise payroll costs. In the long run, therefore, the Army program would add about 2 percent to total variable costs--discounting the possibility of hidden savings in the operating forces.

While small in proportion, such increases would represent a sizable expansion of today's recruiting resources. Moreover, the outlays could become considerably larger if the Congress chose to rely on education assistance, rather than higher enlistment bonuses, to attract enough recruits, or if it decided to raise pay across the board.

The uncertainty as to costs may be reason enough to consider a less far-reaching standard for recruit quality. But costs are only part of the story. Higher recruiting standards are intended to add to military effectiveness; would they increase effectiveness enough to justify the extra spending? To begin answering this question, Chapter IV discusses the case for manpower quality: the relationship of recruiting standards to military performance.



CHAPTER IV

THE RELATIONSHIP OF QUALITY TO PERFORMANCE

When the Army first began using tests of mental aptitude in 1917, a draftee with a very low test score was said by his commander to be "a model of loyalty, reliability, cheerfulness, and the spirit of serene and general helpfulness. . . .What," the officer asked, "do we care about his intelligence?" ^{1/} Though research has long since established the connection between measured aptitude and success in training, the longer-run connection between individuals' AFQT rank and their performance as soldiers is still at issue. This chapter draws upon a variety of research to discuss some of the questions basic to setting the Army's need for quality:

- o How strong is the connection between mental aptitude, as measured by AFQT ranking, and individual performance during the first term of service?
- o Is high school graduation also connected to individual performance during the first term?
- o Does military experience weaken the connection, if any, between recruit quality and performance in the career force?
- o What is the connection between individual recruits' quality and the performance of the groups (or teams) to which they belong?
- o What effect will the Army's equipment modernization drive have on the need for quality?

Although researchers have drawn few firm conclusions, they agree that AFQT rank goes a long way to predicting individual performance during the first three or four years of service. Studies suggest that first-term

1. Daniel Kevles, "Annals of Eugenics: A Secular Faith," *The New Yorker* (October 15, 1984), p. 84.

soldiers who score in AFQT categories I-III A outperform lower-aptitude soldiers by 10 percent to 20 percent. High school graduation also contributes, in varying degrees, to first-term performance. Beyond these findings, connections between quality and performance are speculative. This chapter discusses how researchers measure performance, and details their results.

DEFINING PERFORMANCE

For years the military services have used written tests to sort through large numbers of recruits. In this respect they are a step ahead of civilian employers, only a handful of whom use written tests to distinguish acceptable from nonacceptable prospects. The military's tests have been developed to predict training success rather than job performance. Yet training requirements do not necessarily coincide with the requirements of military jobs. Training may favor those with good memory or strong verbal ability, as opposed to competence on the job. ^{2/} Hence the long-held realization that elements of on-the-job performance need more adequate identification to improve selection criteria. ^{3/}

Using Proxies to Measure Performance

Ultimately, individual performance matters only to the extent it contributes to the Army's effectiveness as a fighting force. But measuring military effectiveness is intrinsically difficult. How, for instance, does one attach relative values to readiness and sustainability? Moreover, any army has multiple, continuous objectives and outputs that may vary with the situation. So difficult is measuring military effectiveness that some researchers believe it is futile to try. ^{4/}

More often, researchers substitute proxies for measures of military output. They observe how individuals score on tests of job proficiency and job knowledge, how they are rated by their supervisors, and how fast they

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2. Milton Maier and Catherine Hiatt, *An Evaluation of Using Job Performance Tests to Validate ASVAB Qualification Standards* (Center for Naval Analyses, May 1984).
 3. Paul Nelson, "Personnel Performance Prediction," in Roger Little, ed., *Handbook of Military Institutions* (Beverly Hills, Calif.: Sage Publications, 1971).
 4. Nicholas Bond, Jr., *17th International Symposium on Applied Military Psychology* (London: Office of Naval Research, London Branch, U. S. Department of the Navy, July 1981).

are promoted. If AFQT I-III A soldiers do better than others against each proxy, then they probably contribute more to the Army's effectiveness.

Problems with Proxies

No proxy stands out as the best measure of performance on the job. Tests of job proficiency ("hands-on") and job knowledge have the seeming advantage of objectivity, since they show whether soldiers are able to perform the tasks specific to their specialties. But they may suffer from problems of measurement: how well do the tasks or questions actually reflect duties on the job? The Sergeant Major of the Army raised this concern about the Army's premier test of job knowledge, the Skill Qualification Test (SQT), a written exam that decides qualifications for promotion and reenlistment. He urged a more performance-oriented SQT that would test soldiers on "what they do every day rather than asking them a bunch of questions on theory and subjects they may not need to know for several years." ^{5/} Another problem is that soldiers generally take tests in a testing environment rather than in a natural job environment. And finally, tests of short duration may not allow scope for individual differences in motivation.

Different proxies may not necessarily act as substitutes for one another: each may measure a different aspect of ability. Some psychologists theorize that ability comes "bundled" into sets of know-how, into procedures for doing things. Some people excel in linguistic ability, the capacity to deal with verbally presented material, either in speech or in writing; others excel in spatial ability, the capacity to perceive the visual world accurately. ^{6/} Still others are strong in psychomotor ability, the capacity to coordinate perception and motor output, as in pointing a rifle. Correlations among different aspects of ability are, at best, modest. ^{7/}

Problems in measuring performance (or output on the job) are not unique to the military. In the civilian sector, research into productivity at

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5. Sergeant Major of the Army Glen Morrell in *Army Times*, September 2, 1985.
 6. Howard Gardner, *Frames of Mind: The Theory of Multiple Intelligences* (New York: Basic Books, 1983).
 7. United State Army, Training and Doctrine Command, *Soldier Capability-Army Combat Effectiveness*, vol. 3 (December 1980), pp. A-5, A-6.

the level of the firm or establishment is still in the "dark ages." ^{8/} Companies often rely on supervisory ratings as proxies for output, just as economists are often reduced to using workers' earnings as a measure of productivity.

THE CONTRIBUTION OF QUALITY TO FIRST-TERM PERFORMANCE

Research on military performance yields one firm conclusion: during their first term of service, soldiers in the top three aptitude categories I-III A typically score higher on job tests, get better supervisory ratings, and receive faster promotions than lower-aptitude soldiers. The difference between AFQT I-III A soldiers (who place above the 50th percentile) and soldiers who are AFQT IIIB and IV (between the 10th and 50th percentiles) averages between 10 percent and 20 percent on these performance criteria. Averages, though, mask considerable variation. In many occupations, a substantial proportion of soldiers in AFQT categories IIIB and IV do as well or better than AFQT I-III A soldiers. And in some occupations AFQT scores appear to have relatively little bearing on performance.

The connection between high school graduation and performance is less certain. Studies based on job tests generally find that diplomas do not compensate for low AFQT scores. The typical AFQT I-III A high school dropout outperforms the typical graduate in AFQT category IV, though the dropout is less likely to complete the first term of service. These results suggest that the Army ought to give more weight to AFQT scores than to high school graduation, an important consideration since the Army usually has an excess of nongraduate and category IV recruits. But other studies, based on supervisor judgments of performance, rate high school graduates more highly.

AFQT and Performance

Strong connections between AFQT and performance emerge from job tests. A typical example appears in Table 5, which shows results from early job task tests prepared by the Human Resources Research Organization (HumRRO). The tests included tasks that soldiers would ordinarily perform as part of a single operation in performing one of four jobs: armor

8. Hinotaku Takeuchi, "Productivity Measurement at the Level of the Firm," in Nahil Adam and Ali Dogramaci, eds., *Productivity Analysis at the Organizational Level*, (Boston: Martinus Nyhoff, 1981).

TABLE 5. AVERAGE PERCENTAGE SCORES ON PERFORMANCE TESTS IN FOUR ARMY JOBS, BY AFQT CATEGORY AND EXPERIENCE

AFQT Category <u>a/</u>	Months on the Job		
	10-24	25-60	More than 60
Armor Crewmen			
I-II	73	83	77
III	68	73	83
IV	62	72	82
Ratio of I-II to III	1.07	1.14	0.93
Ratio of I-II to IV	1.18	1.15	0.94
Cooks			
I-II	67	68	80
III	66	63	75
IV	54	63	71
Ratio of I-II to III	1.02	1.08	1.07
Ratio of I-III to IV	1.24	1.08	1.13
Repairmen			
I-II	76	90	87
III	71	76	83
IV	68	73	88
Ratio of I-II to III	1.07	1.18	1.05
Ratio of I-II to IV	1.12	1.23	0.99
Supply Specialists			
I-II	69	73	75
III	64	74	75
IV	58	61	74
Ratio of I-II to III	1.08	0.99	1.00
Ratio of I-II to IV	1.19	1.20	1.01

SOURCE: Robert Vineberg and Elaine Taylor, *Performance in Four Jobs: The Role of Mental Ability and Experience*, Professional Paper 31-70 (Alexandria, Va.: Human Resources Research Organization, December 1970).

- a. Categories I and II cover the percentile score range of 65 to 99. Category III includes percentiles 31-64. Category IV includes percentiles 21-30.

TABLE 6. EFFECT OF AFQT AND EDUCATION ON THE SIMULATED PROBABILITIES OF PASSING SKILL QUALIFICATION TESTS a/

Occupation and AFQT Category <u>b/</u>	High School Graduates	Non-graduates
Infantryman		
I	96	96
II	94	93
IIIA	89	87
IIIB	82	80
IV	73	69
Multichannel Communications Equipment Operator		
I	80	73
II	67	58
IIIA	45	36
IIIB	28	22
IV	16	12
Medical Specialist		
I	86	78
II	82	72
IIIA	75	63
IIIB	68	54
IV	60	46

SOURCE: Congressional Budget Office.

- a. Simulations are for enlistees in fiscal years 1976 through 1980 who had served one to one and one-half years, based on statistical analysis by Richard Fernandez and Jeffrey Garfinkle, *Setting Enlistment Standards and Matching Recruits to Jobs Using Job Performance Criteria* (Santa Monica, Calif.: The Rand Corporation, January 1985).

The average AFQT I soldier was assumed to have an aptitude area score 20 percent above the mean score; the average AFQT II soldier, 15 percent above; the average AFQT IIIA soldier, 6.5 percent above; and the average AFQT IV soldier, 5 percent below. See the ability distribution of infantry recruits entering training in 1978, in David Armor and others, *Recruit Aptitudes and Army Job Performance: Setting Enlistment Standards for Infantrymen* (Santa Monica, Calif.: The Rand Corporation, September 1982).

- b. Brief descriptions of each occupation appear in Appendix B.

crewman, cook, repairman, or supply specialist. During the first five years of service, high-AFQT soldiers scored significantly better than others, with those in AFQT categories I and II outperforming their category III peers by around 10 percent, and their category IV peers by roughly 20 percent. ^{9/}

Amplifying these results, researchers at the Rand Corporation and in the Army have analyzed the connection between AFQT and performance on Skill Qualification Tests. The Rand analysts statistically controlled for a variety of variables (including AFQT score, education, and months on job) to calculate a soldier's probability of passing the SQT. ^{10/} CBO used Rand's figures to simulate the effect of AFQT, as shown in Table 6. First-term infantrymen who are high school graduates in AFQT categories I-III A are about 15 percent more likely than AFQT III B graduates to pass the SQT; AFQT I-III A high school dropouts are about 10 percent more likely than AFQT III B graduates to pass. AFQT rank is important for first-term medical specialists, but in that job high school graduation also has a strong effect on performance; AFQT III B graduates are about 8 percent more likely than AFQT III A nongraduates to pass the SQT.

The Army analyzed data from job sample tests (including the SQT) for numerous military occupations. Tables 7 and 8 feature typical results, which corroborate other researchers' findings. Though occupational differences are important, high-aptitude soldiers outperform their lower-aptitude peers on job tests by significant percentages. The Army also found that speed of promotion (from pay grades E-4 to E-5, and from E-5 to E-6) is also related strongly to AFQT, even though promotion boards do not have access to AFQT scores (see Table 9). High school graduates in AFQT category II reach grades E-4 and E-5 about 10 percent sooner than graduates in category III B. High school graduation itself has some importance, in that nongraduate soldiers who are AFQT II generally get promoted only slightly faster than graduates who are AFQT III B. (In one occupation, Unit Supply, AFQT III B graduates actually do better than higher-aptitude nongraduates.)

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9. Robert Vineberg and Elaine Taylor, *Performance in Four Jobs: The Role of Mental Ability and Experience*, Professional Paper 31-70 (Alexandria, Va.: Human Resources Research Organization, December 1970).
 10. Rand looked at SQT data for skill level 2, which signifies proficiency needed up to pay grade E-5. See Richard Fernandez and Jeffrey Garfinkle, *Setting Enlistment Standards and Matching Recruits to Jobs Using Job Performance Criteria* (Santa Monica, Calif.: The Rand Corporation, January 1985).

TABLE 7. AVERAGE SCORES ON PERFORMANCE TESTS AMONG SOLDIERS IN SELECTED OCCUPATIONS BY AFQT CATEGORY (Percent correct)

Occupation <u>a/</u>	I-III A	IIIB	IV	Ratio of I-III A to:	
				IIIB	IV
LANCE Missile Crewman	72	70	67	1.03	1.07
HAWK Missile Crewman	65	57	44	1.14	1.48
HAWK Fire Controller Crewman	74	62	55	1.19	1.35
HAWK Firing Section Mechanic	89	86	83	1.03	1.07

SOURCE: *Defense Manpower Quality*, Army Submission (May 1985), Appendix F.

a. Brief descriptions appear in Appendix B.

TABLE 8. PROBABILITIES OF PASSING SKILL QUALIFICATION TESTS AMONG SOLDIERS IN VARIOUS OCCUPATIONS, BY AFQT CATEGORY a/

Occupation <u>b/</u>	I	II	IIIB	IV	Ratio of II to:	
					IIIB	IV
Administrative Specialist	68	59	41	29	1.44	2.03
Cavalry Scout	95	90	74	51	1.22	1.76
Infantryman	98	97	91	81	1.07	1.20
Radio Teletype Operator	98	97	93	87	1.04	1.11
Light Wheel Vehicle Mechanic	99	99	98	98	1.01	1.01

SOURCE: *Defense Manpower Quality*, Army Submission (May 1985) Appendix I.

a. Simulated for high school graduates at skill level 2 after 20 months' service.

b. Brief descriptions appear in Appendix B.