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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

FEDERAL PERSONNEL AND
COMPENSATION DIVISION

B-206559

MARCH 12, 1982

The Honorable Caspar W. Weinberger
The Secretary of Defense

Attention: Director, GAO Affairs

Dear Mr. Secretary:

Subject: Service Programs to Reduce Costly Attrition
By Developing and Using Biodata Inventories
(FPCD-82-27)

We have reviewed the ongoing personnel research and development efforts of the services to reduce costly first-term attrition by improving the recruit selection program. Each of the services is progressing in developing and validating similar screening instruments to supplement the Armed Services Vocational Aptitude Battery (ASVAB).

These screening instruments, sometimes referred to as biodata inventories, consist of structured, multiple-choice questions. They allow respondents to describe themselves in terms of their demographic characteristics, their life experiences, and their attitudes. Part of the rationale for using biodata is that past behavior is predictive of future behavior. These inventories have long been used by certain private employers to make hiring and job placement decisions which have resulted in fewer personnel problems.

While the services have made progress in researching, validating, or implementing their biodata instruments, we believe there may be potential for future cost savings and other efficiencies. This report discusses (1) the results of their research to date and (2) the potential cost savings and improvements that could accrue from their efforts.

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OBJECTIVE, SCOPE, METHODOLOGY

The objective of our review was to evaluate the efforts of the Department of Defense to reduce costly attrition among first-term enlistees by improving recruit selection procedures. Because of the services' and private industry's prior success in using biodata inventories, we concentrated on the services' use of these inventories to screen non-prior-service enlisted personnel. We discussed these procedures with research scientists at each of the service personnel laboratories. We reviewed pertinent Office of the Secretary of Defense (OSD) and service documents and discussed this area of personnel screening with officials of the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics) and with recognized experts from private industry and academia. We made our review from October 1980 through December 1981 in accordance with our Office's "Standards for Audits of Governmental Organizations, Programs, Activities, and Functions."

IMPORTANCE OF SELECTING QUALITY RECRUITS

Since the advent of the All-Volunteer Force and for reasons of both performance and cost, the Congress and the Armed Services have increasingly stressed the importance of selecting quality personnel for military service. Traditionally, the services have used two measures to screen applicants for enlistment (1) educational level attained (in particular, high school graduate status) and (2) scores on the ASVAB. Educational level, in particular, provides the services with an ability to separate candidates into attrition-risk groups.

The low-risk group is composed of those candidates who have earned high school diplomas. As a group, these people are more likely to complete their tours than the high-risk group composed of those candidates who have not earned a high school diploma. In both groups, however, there are enlistees who fail to complete their tours, and implementing a biodata screening program to supplement the ASVAB would help to identify some of these. However, due to the realities of the All-Volunteer Force recruit marketplace, the services are not able to pick and choose from among high school graduate candidates. Thus, little additional savings from reduced attrition would be gained from improving screening procedures for this group, although the biodata results would be of value in identifying relatively higher risk youth who could be targeted for special counseling and/or assignments. In contrast, however, of the non-high-school graduates who meet minimum acceptable standards, as determined by the ASVAB, only a few are enlisted. Among non-high-school graduates, then, there

is a capability to pick and choose, and the data resulting from biodata testing would allow the services to do this efficiently and effectively with resulting savings through reduced attrition.

Recent population and educational projections emphasize the appropriateness of this developmental effort. According to these projections, the number of 18-year-old males and the number of high school graduates in the United States will be declining during the next 20 years. By 1985, there will be one-third of a million fewer 18-year-old male high school graduates than in 1976. By 1992, the decline will have totaled more than one-half million, or 25 percent. Because of this reduced pool and expected increases in competition for them from private industry, as well as from junior colleges, colleges, and universities, the importance of being able to select the best applicants from the pool of non-high-school graduates is evident.

LARGE COST SAVINGS WOULD RESULT
FROM REDUCTIONS IN ATTRITION
AMONG NON-HIGH-SCHOOL GRADUATES

During each of the All-Volunteer Force years, the services have enlisted large numbers of the more attrition-prone non-high-school graduates. The proportion of such enlistees has ranged from a high of about 35 percent to a low of about 19 percent. In fiscal year 1980, for example, the 4 services enlisted 115,000 non-high-school graduates, 73,000 of whom were enlisted by the Army. In fiscal year 1981, the number of non-high-school graduate enlistees was 63,000, 24,000 of whom were enlisted by the Army.

It is too early to document the attrition level of these enlistees over the full 3- or 4-year terms of their enlistment agreement. The Department of Defense is predicting, however, that about 44 percent of them will fail to complete their tours. This predicted rate is somewhat lower than the rate actually experienced by the services in earlier cohort groups, wherein attrition levels reached more than 50 percent, and it is based on the plan of the services to manage the attrition outflow more tightly. At the same time, attrition rates for the high school graduates have been and are predicted to remain at about one-half of the non-high-school graduate rates.

The cost of attrition is very high, and significant savings could be realized if the attrition rates among non-high-school graduates are reduced. However, specific documentation of the exact costs of attrition is lacking, although several studies have provided estimates. Our report entitled "High Cost of Military Attrition Can Be Reduced" (FPCD-79-28, Feb. 16, 1979) stated that 445,000 persons entering the services during fiscal years 1974 through 1977 were separated from service before their committed discharge date. We estimated that these early separations cost the Government \$5.2 billion, or about \$11,700 for each person leaving the service early. Then, in 1981, Defense provided the Congress with more refined data, breaking down the overall estimate into separate estimates for high school graduates and nongraduates in each of the services. Although the Department of Defense estimate for attrition costs among high school graduates paralleled that of our report, its estimate of the attrition costs for nongraduates was lower, ranging from \$5,300 in the Air Force to \$7,350 in the Army. 1/

Earlier, however, in 1976, the Defense Manpower Commission 2/ estimated that for each person not completing his enlistment term, the Department of Defense was incurring a cost of \$7,688 in salary payments alone. Another study 3/, issued in 1977, claimed that the Army had invested \$5,100 in each person leaving the service by the end of advanced individual training. According to that study, the costs associated with recruiting replacements, the indirect costs of unit turbulence, as well as the costs of the judicial/medical/administrative efforts required to separate each individual had to be added to the \$5,100 figure to determine an overall cost.

1/House Committee on Veterans Affairs, Hearing, March 19, 1981, Insert for the Record, Transcript, p. 81.

2/Defense Manpower: The Keystone of National Security, Report to the President and the Congress, April 1976, pp. 200-201.

3/Smithsonian Institution Conference Report, "First Term Enlisted Attrition," Vol. I papers, June 1977.

RESULTS OF SERVICES' RESEARCH
EFFORTS ARE PROMISING

Concerning ongoing development of biodata screening programs within the Department of Defense, much has been done by the individual services. For example, the research and testing of various selection measures by the services' research laboratories has resulted in the implementation of new screening instruments for certain groups in both the Army and the Air Force; the Navy is in the process of validating its instrument. (The Navy effort also is being applied to personnel from the Marine Corps.) Findings for the Army and the Air Force indicate that these instruments, for the groups tested thus far, help to predict which candidates will not complete their first term of enlistment. Navy's preliminary findings indicate that its biodata instrument also reasonably predicts attrition for both Navy and Marine Corps personnel.

Army's Military Aptitude
Profile is operational

The Army's Military Aptitude Profile (MAP) project, begun in 1973, was designed to reduce personnel attrition by predicting adaptability of applicants to military service. In July 1979, MAP was authorized for operational use at the Armed Forces Entrance and Examining Stations (AFEES) for 17-year-old non-high-school graduate applicants.

The MAP questionnaire consists of 60 background items and takes about 25 minutes to complete. An analysis of the results of using the MAP for the period July 1979 to December 1980 is now in process. According to the Army Research Institute, preliminary test results for 15,500 17-year-old non-high-school graduate recruits show that MAP reduced trainee attrition by one-third of the previous rate, i.e., from about 19 percent to about 13 percent. If these results are extended for the examined group throughout the full terms of their enlistment, the predicted attrition rate of 44 percent will be reduced significantly. Gains also could be expected if the MAP questionnaire were used for all other non-high-school graduate applicants, although the degree of gain is impossible to project without additional testing.

An expanded MAP validation effort began in January 1982. This effort differs from past validation efforts in that, among other things, it is extending testing to all Army applicants instead of only 17-year-old non-high-school graduates. The Army Research Institute's goal in this research effort is

to further refine its biographical questions so that its instrument can be used for all Army applicants.

Air Force's history-opinion inventory is operational

Since 1975, the Air Force has used the history-opinion inventory (HOI) to screen recruits for adaptability to service life. This inventory, made up of 50 biodata items and taking about 30 minutes to complete, has been given to all new recruits (about 450,000) since the HOI became operational. About 80,000 new recruits take it each year.

The HOI, unlike the Army and Navy instruments, is used as a preliminary screening device after an Air Force recruit arrives for basic training. Because the HOI was found to be only moderately accurate as an indicator of potential problems, it is used as the first phase of a three-phase process for identifying those who might benefit from more extensive psychiatric screening and counseling or who should be discharged. From the program's inception until March 31, 1980, over 22,000 persons were identified as potentially unable to adjust. Of those, almost 3,400 were recommended for discharge on the basis of the subsequent interviews and tests, or were hospitalized, or were discharged for other reasons before evaluations could be completed.

Validation of Navy's recruit background questionnaire

The Navy's efforts to develop a biodata inventory for recruit selection, begun in 1979, have resulted in the recruit background questionnaire. This questionnaire consists of about 55 items and takes about one-half hour to complete. From December 1979 through June 1980, about 30,000 Navy and 22,000 Marine Corps applicants were given the questionnaire at the AFEES.

The Navy plans to validate the questionnaire by determining how well it predicts attrition. Final results for the first 18 months' service should be known in mid-1982. According to a senior official supervising the research, preliminary findings indicate the questionnaire reasonably predicts attrition. Although the questionnaire is given to all applicants, the Navy's intent is to aim its supplemental screening program at non-high-school graduates.

Efforts by joint-service
group to develop instrument
stopped in 1978

Before 1978, the ASVAB Joint Working Group, an organization composed of selection/testing officials from the four services, was developing a joint-service biodata screening instrument. This effort supplemented the work of the group in developing the joint-service ASVAB. Before 1976, the services used separate selection devices, often administered by their own recruiting personnel.

The research of the Joint Working Group on a biodata instrument was stopped because of competing demands for the research scientists to address ASVAB-related problems and service beliefs that their own unique biodata programs would be of greater value. Since 1978, no further work on a joint instrument has taken place.

EXPERT SUPPORT FOR BIODATA SCREENING

According to experts with whom we spoke, biodata inventories have proven to be valuable tools for selection in a wide variety of settings. The professional literature provides considerable support for this judgment. For example, a recent, comprehensive review ^{1/} of nearly a dozen different selection procedures reported that biodata was one of the most valuable in making accurate predictions. The review summarized results from 58 studies involving the use of biographical information for selecting such diverse personnel as police officers, managers, scientists, engineers, custodial workers, bus drivers, and sales and clerical staff. According to the authors of this review, the evidence from these

^{1/}"Validity and Fairness of Alternative Selection Procedures," Richard R. Reilly and Georgia T. Chao, Personnel Psychology, Spring 1982. The information on which the review was based was gathered from three sources. First, questionnaires were sent to all 1,763 members of the Division of Industrial and Organizational Psychology of the American Psychological Association. Second, published literature was screened, in particular articles appearing in the leading applied psychology journal during the 1970-79 period. Third, a computer search was done to identify published literature and technical reports resulting from Federal Government funding.

studies, as well as from studies which had been summarized in earlier reviews, "is strong enough to support the presumption that biodata would be predictive" of job performance and tenure in a wide variety of settings.

OUR OBSERVATIONS

We believe that the success experienced by the personnel research organizations in developing biodata inventories, along with the success experienced in other settings, argues forcefully for wider application of this type of selection procedure. However, certain management decisions will need to be made to insure the services receive maximum benefit from implementing such inventories. The key decisions are whether

- the Air Force ought to do biodata screening earlier in the selection process and
- parallel development efforts should occur in each service or whether there should be a joint-service effort with coordination provided by OSD.

Earlier biodata screening in the selection process

Concerning the timing of the Air Force program, there would be significant advantages and potential cost savings to the Air Force if biodata screening occurred earlier in the selection process. As currently designed, the screening occurs on the second day of basic training. If the timing was changed, however, modifications should be made to improve the accuracy of the HOI, or a new instrument should be developed, so that extensive psychiatric screening does not have to be done at the AFEES. The Air Force may want to consider pursuing the latter course through a joint-service effort.

Identifying individuals with adjustment problems before enlistment would save the Air Force the cost of transporting them to basic training and the cost of the training they receive before being processed out. In addition, by identifying these individuals early, the Air Force would avoid whatever negative sentiment it creates among this group of people who have to return to their home communities or have to face their family and friends after failing to become a member of the Air Force.

Parallel versus joint-service/
development efforts

Beyond the question of the appropriate timing for the administration of biodata screening instruments is the question concerning the appropriateness of continuing with individual service developmental efforts or whether there should be a joint-service effort coordinated by OSD.

In our view, now that the initial development and validation efforts for biodata screening instruments are being completed by the individual services, better use of the resources available within the services for continuing efforts could be realized through a joint-service program.

Value of joint-service program

Such a program, which could be coordinated once again by the ASVAB Working Group, has a greater potential than the individual service efforts for profiting from state-of-the-art developments that have already occurred and would provide greater assurance that useful instruments, once developed, are used as widely as possible in all services.

To date, the services have consumed considerable resources in doing research and development work on biodata instruments. This work has consumed the time of in-house researchers and has consumed funds for contract research. Nonetheless, we believe that the work to date by the three services has been justifiable because the collegial competition helped each one develop procedures which its parent service was willing to use. The fact that the research was done in-house, by "people who know our kind of problems" contributed to positive acceptance.

Added costs of individual
service programs

Another resource which the services have consumed in their research and development work on biodata inventories has been the time of recruits and personnel at the AFEES. This resource will continue to be consumed in further testing and evaluation efforts. If the services proceed with the development of separate instruments, then a complete evaluation of their chances of success would require three or four times the investment it would take to complete a single, joint-service inventory which could contain some service-unique questions and be scored differently for each service. Administrative and service staffing demands also would be lessened with a joint-service program.

Developing a joint-service inventory would also provide the services with an opportunity to capitalize on advances in the state of the art which have occurred since they began developing their own inventories. In this regard, the Navy recruit background questionnaire, which is the newest of the inventories and which was developed after close study of the questions used in the Army and Air Force inventories, as well as inventories used in private industry and earlier in the Navy, may represent an appropriate point at which to start.


Our views on a joint-service program

In a previous report, "Follow-up on Actions to Improve Coordination and Utilization of Human Resources Research and Development" (FPCD-81-62, July 23, 1981), we discussed the reluctance of the services to actively support joint ventures, including ad hoc working groups and lead laboratories, because each service believes it has unique needs and changing funding priorities and should be a leader instead of a follower. We also stated our belief that these perspectives could be overcome by forceful action on OSD's part to identify the Defense-wide manpower issues on which research ought to be conducted through joint-service efforts. We believe that use of biodata for recruit screening is one such issue and that benefits could be realized through OSD coordination and leadership and through the development of a plan identifying departmental objectives, system design and implementation, a service lead laboratory, responsible offices, and resources and milestones for accomplishing intermediate and final goals.

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We are sending copies of this report to the Secretaries of the Army, Navy, and Air Force.

Sincerely yours,


Clifford I. Gould
Director