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EARLY DEVELOPMENT OF THE MILITARY APTITUDE PREDICTOR (MAP)

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PERSONNEL ACCESSION AND UTILIZATION TECHNICAL AREA

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The Army Research Institute (ARI) was directed by the Deputy Chief of Staff for Personnel to develop and validate motivational measures to aid in selection of enlisted personnel. The development of the Military Aptitude Predictor (MAP) was begun in 1973 for this purpose. The initial MAP included the trainee's age, education, aptitudes, and civil court convictions (moral waiver) as predictors of military performance, and was intended for use at the Armed Forces Examining and Entrance Stations (AFEES). The 1975 version

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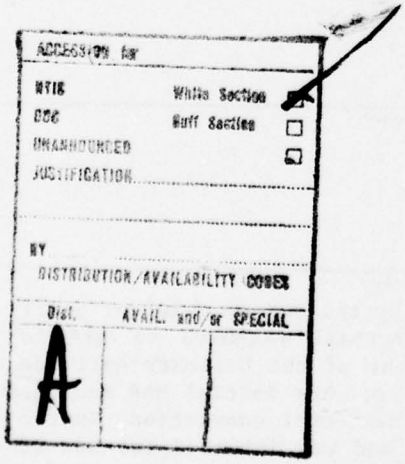
(MAP-75) was intended for use by recruiters to provide a prediction of Basic Combat Training (BCT) behavior and performance at an earlier point in time, thus saving the Army AFEES transportation and processing costs. In April 1975, the Secretary of the Army directed implementation of the MAP to begin 1 August 1975. This initial testing was conducted in one District Recruiting Command (DRC) in each of the five Recruiting Regions during the period 1 August - 30 September 1975. Its operational use was suspended on 1 October 1975 and, immediately following suspension of testing, ARI conducted interviews in the five DRC's to determine the nature and extent of problems associated with its use.



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Requirements, Retention, and Utilization

ARI Research Reports and Technical Papers are intended for sponsors of R&D tasks and other research and military agencies. Any findings ready for implementation at the time of publication are presented in the latter part of the Brief. Upon completion of a major phase of the task, formal recommendations for official action normally are conveyed to appropriate military agencies by briefing or Disposition Form.

FOREWORD

A primary concern of the Personnel Accession and Utilization Technical Area of the Army Research Institute for the Behavioral and Social Sciences (ARI) is the Army's continuing need for high quality enlisted men and women. Programs in the Technical Area deal with systematic research over wide areas and with specific problems. With every change in induction standards since the end of World War II, questions on the effects of the change on the Army's enlisted personnel system have been addressed by ARI's continuing program on selection, classification, management, and utilization of Army personnel.

The technology of screening on aptitude has been developed to a relatively high degree of maturity over more than 50 years of study. The technology of screening on adjustment and motivation is newer and hence much less precise. The research reported here is part of a set of early steps in building a parallel and comparable technology. The specific objective was to develop instruments to screen recruits for potential military delinquency--a problem previously addressed first by ARI's Retention Standards Task and later by the Selection and Behavioral Evaluation Project, Military Selection Research Division.

The Deputy Chief of Staff for Personnel (DCSPER), with the personal interest and backing of the Secretary of the Army, directed ARI in 1973 to develop an instrument capable of identifying and screening out potential military delinquents prior to induction. The present Technical Paper describes the development and testing of the resulting Military Aptitude Predictor (MAP-75). Trial implementation of the MAP-75 from 1 August to 1 October 1975 provided direction for further development, particularly in revising and enlarging the Early Experience Questionnaire (EEQ) portion now being validated in ARI.

Research was conducted as an in-house effort augmented by contracts with organizations selected for their capabilities in test development. ARI personnel developed the initial MAP instrument; Richardson, Bellows & Henry, Inc. contributed substantially, especially on the EEQ portion of the MAP, under Contracts DAHC 19-75-C-0024 and DAHC 19-76-C-0036. Human Resources Research Organization (HumRRO) personnel participated in some of the later data collection and analysis under Contract DAHC 19-75-C-0036. Further analysis and development have been done at ARI. The entire research was conducted under Army Project 2Q763731A768 and is responsive to the special requirements of DCSPER and the Secretary of the Army.

J. E. UHLANER,
Technical Director

EARLY DEVELOPMENT OF THE MILITARY APTITUDE PREDICTOR (MAP)

BRIEF

Requirement:

To develop measures of motivation as an aid in the early selection of applicants for enlistment.

Procedure:

Successive steps included: (1) Construction and tryout of a Military Aptitude Predictor (MAP) based on age, education, aptitude test scores, and record of civilian court convictions. While satisfactorily screening out potential failures, the measure also screened out unduly large numbers of potentially successful soldiers. (2) Addition to the MAP of an Early Experience Questionnaire (EEQ) covering additional activities and experiences. This composite was also found to screen out more good soldiers than poor against three criteria--disciplinary records, Basic Combat Training (BCT) "soldiering" and completion of BCT versus separation under the Trainee Discharge Program (TDP). (3) Development of MAP-75 consisting of age, education, civilian court convictions, school grades, the EEQ, and a physical fitness measure ("Leg-ups"). MAP-75 was administered to 195 EM successfully completing BCT and 83 awaiting TDP discharge. Analysis was conducted both on the total sample and a subsample of non-high school graduates and GED's.

Findings:

In the non-high school graduate sample of 151, including GED's, the most effective qualifying score was 35, which would disqualify 22 percent of those failing BCT and 2 percent of those completing BCT. Since this was not a typical applicant sample, the result, although highly encouraging, was not considered conclusive.

Utilization of Findings:

By direction of the Secretary of the Army, the MAP-75 was in operational use from 1 August to 1 October 1975 with a qualifying score of 35. Interviews with 58 recruiters revealed reservations about use of such an early screening test in view of the number of recruits needed to fill manpower requirements in relation to the small supply of applicants

Continuing effort under the early screening program focuses on shifts in content and expansion to improve the EEQ and possible inclusion of a measure of physical condition as well as performance-oriented tests of cooperativeness and dependability.

EARLY DEVELOPMENT OF THE MILITARY APTITUDE PREDICTOR (MAP)

CONTENTS

TABLES (Continued)

EARLY DEVELOPMENT OF THE MILITARY APTITUDE PREDICTOR (MAP)

BACKGROUND

In 1973 the Army Research Institute (ARI) was directed by the Deputy Chief of Staff for Personnel (DCSPER), with the personal interest and backing of the Secretary of the Army, to conduct a research effort to develop and validate motivational measures to aid in selection of enlisted personnel. An accurate predictor of success in the Army would be useful for pre-enlistment differentiation of those applicants who would not be expected to satisfactorily complete their training from those who seemed reasonable military adjustment risks.

FIRST STEPS

The development of the Military Aptitude Predictor (MAP) was begun in 1973. The initial MAP included the trainee's age, education, aptitude test scores, and record of prior civil court convictions as predictors of successful military adjustment. These variables were combined into one score, ranging from 0 to 10.

The form was employed on an experimental basis by the U.S. Army Recruiting Command (USAREC) using a sample of 1,000 applicants throughout CONUS from 15-30 October 1973. The results, including an evaluative questionnaire completed by the Armed Forces Examining and Entrance Station (AFEES) Guidance Counselors, were checked by Department of the Army headquarters (HQDA). No significant errors were detected in the completion of the form. Evaluation of questionnaires from 22 Guidance Counselors showed that they had no difficulty in using the form, and that one minute or less was required to determine a score.

MAP scores were then constructed by ARI on approximately 4500 September 73 enlistees randomly selected from data available at HQDA. Data pertaining to early discharges for adverse reasons, and to accelerated promotions, were retrieved from the Military Personnel Center (MILPERCEN) data base for use as sucess criteria. Soldiers were classed as failures (separated from service), satisfactory performers, and highly sucessful performers (accelerated promotion). The MAP scores were then evaluated to determine their usefulness as predictors of these criteria.

The results of this analysis are presented in Table 1. These findings indicate that the qualifying cut-off scores on the MAP which would most successfully screen out potential failures would unfortunately also screen out unduly large numbers of successful soldiers. Accordingly, further research was deemed necessary.

Table 1

MAP SCORES OF NEW ENLISTEES, BY GROUP

MAP Score	Failures (Separated from Service) No.	%	Satisfactory Soldiers No.	%	Highly Sucessful (Accelerated Promotion) No.	%	Total No.	%
10	5	2.2	165	3.9	8	4.7	178	3.8
9	24	10.5	1161	27.2	71	42.0	1256	26.8
8	27	11.8	812	19.0	50	29.5	889	19.1
7	51	22.4	832	19.5	16	9.5	899	19.3
6	62	27.2	711	16.7	15	8.9	788	16.9
5	38	16.7	380	8.9	6	3.6	424	9.1
4	17	7.4	185	4.3	3	1.8	205	4.4
3	4	1.8	22	0.5	0	0.0	26	0.6
2	0	0.0	0	0.0	0	0.0	0	0.0
1	0	0.0	0	0.0	0	0.0	0	0.0
TOTALS	228	100.0	4268	100.0	169	100.0	4665	100.0
ILLUSTRATIVE CONSOLIDATIONS OF MAP SCORES								
8-10	56	24.6	2138	50.1	129	76.3	2323	49.8
7	51	22.4	832	19.5	16	9.5	899	19.3
1-6	121	53.1	1298	30.4	24	14.2	1443	30.9
1-5	59	25.9	587	13.8	9	5.3	655	14.0

Note. Data From MILPERCEN, September 1973.

ADDITIONS TO THE INSTRUMENT

At this point an Early Experience Questionnaire (EEQ)[1] was added to the MAP as a fifth variable. This autobiographic questionnaire inquired about such prior civilian activities as community and extracurricular school activities, participation in sports, reasons for dropping out of school where applicable, personal activities, and civilian job experience. Following DA judge advocate opinion that there were no legal obstacles to use of the form, but that there might be individual offense taken, perhaps on invasion of privacy grounds, procedures for field research were prepared by ARI to determine the receptiveness of applicants to the EEQ, and its usefulness in the MAP.

[1]Bell, D. B., Kristiansen, D. M., and Seeley, L. C. Initial Considerations in the Development of the Early Experience Questionnaire (EEQ). Army Research Institute, Research Memorandum 74-10, July 1974.

The field research tryout was conducted during the week of 4 March 1974 at four Reception Stations (Forts Ord, Dix, Jackson, and Leonard Wood). A total of 1428 new enlistees completed the questionnaire. In addition, 233 of the enlistees were interviewed in private to determine their reaction to the questions. Analysis of the interview data showed the following:

(1) Twenty-nine (29) of the 233 considered one or more of the EEQ questions to be sensitive.

(2) Most of the comments from the 29 individuals concerned three particular items (running away from home; being in juvenile court; and knowing how to start a car without a key).

Of the 1428 enlistees completing the EEQ, criterion information was available on 1235. To determine the EEQ's screening value, the scores of these 1235 individuals were compared with 3 criteria: (1) disciplinary records, (2) ratings on soldiering in general during Basic Combat Training (BCT); and (3) completion or non-completion of BCT. Results are shown in Table 2.

Here again on the EEQ, just as in the MAP cases of Table 1, we find that although percentage comparisons were favorable--i.e., much larger percentages of failures would have been screened out than of good soldiers--in terms of numbers of men, many more good soldiers would have been lost than poor. The obvious reason for this is that there were (and are) so very many more good soldiers than failures: the ratio for BCT completions to separations under the Trainee Discharge Program (TDP) was close to 20:1; for clean versus adverse disciplinary record, about 10:1, for satisfactory versus poor soldiering, about 3:1.

Additional analyses were subsequently conducted on the EEQ and three other selected questionnaires.[2] These instruments were administered in various combinations to a total of 6682 respondents at Recruiting Stations, AFEES, and Reception Stations. Results of these analyses are reported in ARI Technical Report TR-77-A6, The Feasibility of the Use of Autobiographical Information as a Predictor of Early Army Attrition.

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[2] The Work Environment Preference Schedule (WEPS), New York, The Psychological Corporation; What's Your Opinion?, ARI scale of attitudes toward authority; and the Enlistee Profile 1975, another ARI-developed autobiographical questionnaire.

Table 2

PERCENTAGE OF TRAINEES IN VARIOUS CRITERION CATEGORIES ATTAINING SPECIFIED EEQ SCORES

	Total	EEQ Screen-Out
A Score of 10:		
Adverse disciplinary record	108	34 (31.5%)
No adverse disciplinary record	1127	158 (14.0%)
	100% = 1235	
Poor Soldiering (Drill Sgt. evaluation)	345	70 (20.3%)
Satisfactory Soldiering (Drill Sgt. evaluation)	890	122 (13.7%)
	100% = 1235	
TDP Separations	62	15 (24.2%)
Successful Completion of BCT	1173	177 (15.1%)
	100% = 1235	
A Score of 8		
Adverse Disciplinary record	108	58 (53.7%)
No adverse disciplinary record	1127	391 (34.6%)
	100% = 1235	
Poor Soldiering (Drill Sgt. evaluation)	345	161 (46.7%)
Satisfactory Soldiering (Drill Sgt eval)	890	287 (32.3%)
	100% = 1235	
TDP Separations	62	32 (51.6%)
Successful completion of BCT	1173	417 (35.5%)
	100% = 1235	

Note. At this point a low score on the EEQ was favorable, a high one unfavorable. Subsequently the scale was inverted and the more conventional system was adopted in which a high score is desirable.

DEVELOPMENT OF THE 1975 VERSION (MAP-75)

Based on these earlier experiences, the MAP-75 was developed. The MAP-75 was intended for use by recruiters rather than at AFEES, to provide a prediction of BCT behavior and performance at an earlier point in time, thus saving the Army AFEES transportation and processing costs. It consisted of age, education, record of civil court convictions, school grades (in place of aptitude test scores, which are unknown at this point), the EEQ, and the best measure of physical fitness derived from parallel ARI performance test research.[3] A pre-operational tryout of the MAP-75 was administered by ARI to basic trainees at Ft. Jackson and Ft. Leonard Wood during the period 12-16 May 1975. This tryout was conducted to determine how accurately the screening procedure would differentiate successful and unsuccessful soldiers, if employed as an operational prescreen. Additionally, the tryout provided useful information on the consequences of various potential qualifying scores.

PROCEDURE

The MAP-75 was administered to 195 enlisted men who were successfully completing BCT, and to 83 who were awaiting discharge under the Trainee Discharge Program. The BCT group was termed the "success" group, while the TDP men were defined as the "failure" group.

VARIABLES

The MAP variables for this analysis were as follows:

Old EEQ: The EEQ score computed using the original scoring key, based on all 25 items.

New EEQ: The EEQ score computed using a second-generation scoring key, based on only 19 items.

Age: Trainee's age in years at the time of enlistment.

Education Level: Highest grade completed in school.

Education Code: High School diploma, General Education Development qualification (GED), or non-graduate.

Grades: Average school grades as reported by trainee.

AFQT: Score from trainee's record.

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[3] Seeley, L. C. and Fischl, M. A. Development of Performance Tests as Supplementary Enlistment Screening Measures: An Interim Report. Army Research Institute, Research Memorandum 75-8, July 1975.

Waiver: Whether moral waiver, due to civil court convictions, was required for enlistment.

Exercise: Score on Leg-Ups exercise.

MAP-AA: Number of aptitude areas in which the trainee scored above a standard score of 90, from records.

CORRELATIONAL ANALYSIS

Biserial correlation coefficients of the MAP-75 variables with the success criterion, both for the total sample and for a subsample consisting of only non-high school graduates and GED's,[4] are presented in Table 3, and the complete intercorrelation matrices of the MAP-75 variables and the criterion are presented in Tables 4 and 5.

Table 3

ZERO ORDER CORRELATION OF MAP-75 VARIABLES WITH SUCCESS IN BCT

	Total Sample (N = 278)	Non-High School Graduates and GED (N = 151)
Old EEQ	.26	.28
New EEQ	.28	.29
Age	.00	.02
Education Code	.09	.10
Education Level	.09	.04
Grades	.25	.28
AFQT	.17	.[a]
Waiver	-.03	.10
Exercise	.09	.05
MAP-AA	.16	.16

Note. Success is defined as successfully completing BCT (N = 195) vs. awaiting separation under the Trainee Discharge Program (N = 83).

[a]AFQT scores were not tabulated for this subsample.

[4]Many of the remaining analyses were conducted separately on these two samples, since the possibility was anticipated that the MAP-75 might be used to screen only non-high school graduates and GED's.

Table 4

INTERCORRELATION MATRIX, TOTAL SAMPLE (N = 278)

	Mean	S.D.	MAP-AA	Exercise	Waiver	Grades	Education Level	Education Code	Age	New EEQ	Old EEQ	Success Criterion	AFQT
MAP-AA	3.29	0.78	-										
Exercise	18.80	8.87	.13	-									
Waiver	1.97	0.18	-.14	.03	-								
Grades	2.88	0.79	.16	.21	-.08	-							
Education Level	11.23	1.37	.15	.19	-.04	.29	-						
Education Code	2.05	0.92	.13	.11	-.08	.27	.75	-					
Age	19.52	2.56	.11	.12	-.05	.07	.42	.33	-				
New EEQ	15.29	2.38	.05	.14	.06	.34	.37	.36	.20	-			
Old EEQ	17.40	3.19	.06	.07	.09	.34	.36	.29	.14	.71	-		
Success Criterion	1.70	0.46	.16	.09	-.03	.25	.09	.09	.00	.28	.26	-	
AFQT	52.65	18.78	.65	.11	-.20	.24	.18	.13	.11	.10	.14	.17	-

Table 5

INTERCORRELATION MATRIX NON-HIGH SCHOOL GRADUATES AND GED's (N = 151)

	Mean	S.D.	MAP-AA	Exercise	Waiver	Grades	Education Level	Education Code	Age	New EEQ	Old EEQ	Success Criterion
MAP-AA	3.25	0.76	-									
Exercise	18.16	8.58	.09	-								
Waiver	1.98	0.14	-.14	-.02	-							
Grades	2.71	0.83	.10	.25	.01	-						
Education Level	10.31	1.02	.14	.11	.09	.24	-					
Education Code	1.27	0.44	.28	.14	-.02	.21	.31	-				
Age	18.83	2.48	.08	.06	.09	.00	.18	.22	-			
New EEQ	14.60	2.50	-.07	.07	.07	.39	.22	.22	.13	-		
Old EEQ	16.56	3.21	-.08	.03	.13	.37	.21	.09	.05	.69	-	
Success (Criterion)	1.68	0.47	.16	.05	.10	.28	.04	.10	.02	.29	.28	-

Using the intercorrelation matrices, multiple regression equations were computed (Appendix A) to determine the ability of various linear combinations of the MAP-75 variables to predict the success criterion. Multiple R's for combinations of the MAP-75 variables were in the range of 0.30 to 0.33 for the total sample as well as for the non-high school graduate GED sample. These R's were shrunken but not cross-validated.

MAP-75 SCORING

Several alternative methods were devised to weight the MAP-75 variables to produce a final score. These alternatives were then reduced to two, termed single and double scoring, since the latter method doubly weighted the point values for the variables EEQ, Waiver, and Grades. The complete scoring procedure for these two methods is presented in Appendix B. Here and in subsequent steps a high score is a good score, in contrast to earlier phases where a low score was desirable.

MAP scores were computed for all trainees in the Ft. Jackson/Leonard Wood sample using each of these procedures. Distributions of both scores for both success and failure groups are presented in Appendixes C and D. The distributions of the two methods of scoring are quite similar.

To further compare the scoring systems, a detailed analysis was conducted of the consequences of screening decisions which would be made based on each of these methods. All high school graduates were excluded from these analyses, since at this point MAP screening was anticipated only among non-graduates, and Table 6 summarizes the consequences of using certain scores from the single-weight procedure as a prescreen, while Table 7 presents results of a parallel analysis using the double-weight procedure.

Table 6

CONSEQUENCES OF USING CERTAIN SINGLE WEIGHTED MAP QUALIFYING SCORES TO SCREEN 151 NON-HIGH SCHOOL GRADUATES AND GED'S

Qualifying Score	Action	Consequences	
		49 TDP Failures	102 BCT Successes
35	Pass	78%	98%
	Fail, Deny Enlistment	22%	2%
39	Pass	55%	82%
	Fail, Deny Enlistment	45%	18%
44	Pass	18%	44%
	Fail, Deny Enlsitment	82%	56%
46	Pass	6%	23%
	Fail, Deny Enlistment	94%	77%

Table 7

CONSEQUENCES OF USING CERTAIN DOUBLE WEIGHTED MAP QUALIFYING SCORES TO SCREEN 151 NON-HIGH SCHOOL GRADUATES AND GED'S

Qualifying Score	Action	Consequences 49 TDP Failures	103 BCT Successes
59	Pass	71%	96%
	Fail, Deny Enlistment	29%	4%
66	Pass	55%	82%
	Fail, Deny Enlistment	45%	18%
69	Pass	43%	72%
	Fail, Deny Enlistment	57%	28%

These tables do not show any significant improvement for the double weight procedure over the single-weight method and, since the double weight scoring procedure is more cumbersome, it was dropped.

The two qualifying scores of the single-weight procedure which appear to be the most effective are 35 and 39. As Table 6 shows, a cut at 35 minimizes the risk of erroneously turning away potentially good soldiers, while correctly denying entry to almost one-fourth of the failures. A cut at 39 correctly denies entry to almost one-half of the failures, but at a cost of turning away almost one good soldier in five. In different recruiting markets, one or the other could be considered.

For MAP-75 scores of 35 and 39, Tables 8 and 9 present summaries, evaluating the entire procedure of forwarding all high school diploma graduates to AFEES, and forwarding only those non-graduates who attain the qualifying MAP-75 score.

The same caution presented in a previous section should again be pointed out. Specifically, the figures of Tables 8 and 9 are based on a conveniently available sample in which the ratio of BCT successes to TDP failures was only a little larger than 2:1. This is not typical of Army input in general, in which closer to 10:1 would be the case. Thus the favorable percentage of rejections among failures compared with successes, must be weighed against the number of applicants of both types who would be rejected when typical Army input is examined.

Table 8

EFFECT OF A TOTAL PROCEDURE OF QUALIFYING ALL DIPLOMA GRADUATES AND THOSE NON-GRADUATES ATTAINING A MAP-75 SCORE OF 35

Action	Consequences: TDP Failures n	TDP Failures %	BCT Successes n	BCT Successes %
Pass				
All Diploma Graduates	34	41	93	48
Non-Graduates Scoring 35 or More	38	46	100	51
Total Pass	72	87	193	99
Fail, Deny Enlistment Non-Graduates Scoring Less than 35	11	13	2	1
Total N	83	100%	195	100%

Table 9

EFFECT OF A TOTAL PROCEDURE OF QUALIFYING ALL DIPLOMA GRADUATES AND THOSE NON-GRADUATES ATTAINING A MAP-75 SCORE OF 39

Action	TDP Failures n	TDP Failures %	BCT Successes n	BCT Successes %
Pass				
All Diploma Graduates	34	41	93	48
Non-Graduates Scoring 39 or More	27	33	84	43
Total Pass	61	74	177	91
Fail, Deny Enlistment Non-Graduates Scoring Less than 39	22	26	18	9
Total N	83	100%	195	100%

IMPLEMENTATION

On 28 April 1975 the Secretary of the Army directed implementation of the MAP-75, to begin 1 August 1975. This initial testing was conducted in one District Recruiting Command (DRC) in each of the five Recruiting Regions.[5] For non-high school graduates, a qualifying MAP-75 score of 35 was required. Recruiters were to discourage applicants who scored below 35 from continuing their enlistment processing by traveling to AFEES.[6] Some high school graduates were also tested for research purposes.

The operational use of the MAP-75 was suspended on 1 October 1975. Immediately after the suspension of testing, ARI personnel conducted interviews with recruiters in the five DRC's to determine the nature and extent of problems associated with such screening.

CONDUCT OF INTERVIEWS

Interviews with 58 recruiters were conducted between 29 September and 10 October 1975. The recruiters were selected from various parts of the DRC's to the extent allowed by distance, transportation availability, and the USAREC mission requirements, and they were equally representative of rural, city, and suburban areas. Thirty-three of the 58 recruiters had met their recruiting objectives during the month of August. The interviews were conducted both individually and in groups. Personal interviews lasted approximately one hour, while the group interviews lasted approximately two hours. Each session was guided by asking prepared questions. Interviewees seemed candid and usually attempted to be constructive in their remarks.

The pay-grades of the 58 interviewees were as follows: Grade E7 (31%), E6 (52%), E5 (16%), and E4 (1%). They described their number of years of recruiting experience as:

Less than 1 year:	17%
1 to 2 years:	35%
2 to 4 years:	25%
More than 4 years:	23%

With few exceptions, these recruiters had been in their present duty assignments for the entire time they had been recuiters.

INTERVIEW RESULTS

The general results of the interviews with recruiters can be summarized as follows:

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[5] Philadelphia, Peoria, San Antonio, Portland, Miami.

[6] Relatively few applicants were actually turned away for low scores by participating recruiters. Ten out of 665 non-high school graduates scored below the cut-off score.

Most recruiters felt that screening out "non-quality" applicants was part of their responsibility; however, meeting recruiting objectives was more important.

Recruiters had not received an adequate explanation of the rationale or purpose of the MAP.

The Army has not lost any enlistments because of the MAP.

Recruiters would prefer a screening test correlated with the AFQT/ACB.

Most of the MAP's were administered incorrectly. Thus, data collected during the period are of limited value.

The "Leg-ups" excercise is useful because it gives recruiters some idea of the applicant's physical capacity.

Most recruiters did not understand the value of the EEQ.

In the present market, time spent on the MAP could have been better spent on other activities.

If the MAP concept is to be explored further, a revised instrument should be used.

CONCLUSIONS

It is clear that appropriate screening and selection are more feasible when there are many applicants to chose from. When the number of recruits needed to fulfill manpower requirements is large in relation to the supply of applicants, such that practically all applicants are needed, screening and selection can be of only limited value.

It is doubtful that many recruiters can be motivated to use faithfully any screening instrument if they receive credit only for production and not for correctly identifying and rejecting potentially poor soldiers.

It is particularly doubtful if recruiters will be willing to use an instrument that consumes considerable time. An instrument requiring only nominal time to administer is much more likely to be used.

A universal problem exists in setting cut-off scores. Since 85-90% of new accessions perform and adapt satisfactorily, any cut-off score that maximizes the number of applicants rejected as poor risks will also screen out a very sizable number of potentially satisfactory soldiers. Finding ways of protecting (fencing off) low-risk applicants from being screened out by the procedure is under investigation. High school graduate status is one such "fence;" others need to be explored.

The technology for screening on aptitudes has been developed to a relatively high degree of maturity over more than 50 years of study. The technology for screening on adjustment/motivation is much newer and hence much less precise. The present research program is a set of early steps in building a parallel and comparable technology.

The August - September 1975 operational evaluation was informative and useful. The focus of future development is to build an instrument for use under AFEES auspices, in the same spirit in which the aptitude testing program is administered under AFEES auspices.

Research will be continued to develop improved MAP measures. The "Leg-Ups" measure of physical condition is useful, but might well be replaced with a less cumbersome task. Additional performance-oriented tests designed to measure cooperativeness and dependability might prove useful.

Most promising, perhaps, is the return on the substantial effort which has been undertaken in developing the EEQ and similar autobiographical predictors. Initial results, as noted earlier in this report, have been published. Further research is under way with the intent of revising or replacing ineffective questions with better ones, with increasing overall predictive ability, and with construction of a large pool of alternates. Improvement in the EEQ may well be the most cost beneficial way to improve validity of the MAP.

APPENDIXES

APPENDIX A

ALTERNATIVE MULTIPLE REGRESSION EQUATIONS PREDICTING SUCCESS

TOTAL SAMPLE

1. Success = .96 + .04 New EEQ + .07 Age - .01 Education Level
   + .10 Grades - .10 Waiver + 0.0 Exercise
   Multiple R (original) = .33 N = 281
   Multiple R (shrunken) = .31 n = 6

2. Success = .75 + .09 MAP-AA + .05 New EEQ + .07 Age - .11 Education
   level - .09 Waiver + 0.0 Exercise
   Multiple R (original) = .33 N = 281
   Multiple R (shrunken) = .30 n = 6

NON-HIGH SCHOOL GRADUATES AND G.E.D.

3. Success = .44 + .04 New EEQ + .02 Age - .03 Education Level
   + .12 Grades + .30 Waiver - 0.0 Exercise
   Multiple R (original) = .36 N = 154
   Multiple R (shrunken) = .32 n = 6

4. Success = -.11 + .13 MAP-AA + .06 New EEQ + .37 Age
   -.35 Educational Level + .39 Waiver + 0.0 Exercise
   Multiple R (original) = .37 N = 154
   Multiple R (shrunken) = .33 n = 6

5. Success = .18 + .04 New EEQ + .25 Age + .02 Education Code
   + .11 Grades + .28 Waiver - 0.0 Exercise
   Multiple R (original) = .36 N = 154
   Multiple R (shrunken) = .32 n = 6

APPENDIX B

MAP-75 SCORING CONVERSIONS

	Raw Score	Single Weighting	Double Weighting
AGE	18, 19, 20	1	2
	17, 21+	0	0
EDUCATION	12	12	12
	11	11	11
	10	10	10
	9	9	9
GRADES	A's	15	30
	A's and B's	12	24
	B's and C's	9	18
	C's and D's	6	12
	D's	3	6
WAIVER	No	6	12
	Yes	0	0
EEQ	19	19	19
	18	18	18
	17	17	17
	16	16	16
	15	15	15
	14	14	14
	13	13	13
	12	12	12
	11	11	11
	10	10	10
	9	9	9
	8	8	8
	7	7	7
	6	6	6
	5	5	5
	4	4	4
	3	3	3
	2	2	2
	1	1	1
	0	0	0
EXERCISE	13+	2	2
	1-12	1	1
	0	0	0

APPENDIX C

SINGLE WEIGHTED MAP SCORE DISTRIBUTION FOR
NON-HIGH SCHOOL GRADUATES AND G.E.D.'s (N = 151)

Score	Failure			Success		
	N	%	Cum %	N	%	Cum %
52	0	0.0	99.8	3	2.9	100.1
51	0	0.0	99.8	0	0.0	97.2
50	0	0.0	99.8	2	2.0	97.2
49	1	2.0	99.8	1	1.0	95.2
48	1	2.0	97.8	6	5.9	94.2
47	0	0.0	95.8	5	4.9	88.3
46	1	2.0	95.8	6	5.9	83.4
45	3	6.1	93.8	10	9.8	77.5
44	3	6.1	87.7	12	11.8	67.7
43	5	10.2	81.6	9	8.8	55.9
42	5	10.2	71.4	6	5.9	47.1
41	3	6.1	61.2	9	8.8	41.2
40	5	10.2	55.1	8	7.8	32.4
39	0	0.0	44.9	7	6.9	24.6
38	4	8.2	44.9	1	1.0	17.7
37	3	6.1	36.7	6	5.9	16.7
36	2	4.1	30.6	5	4.9	10.8
35	2	4.1	26.5	4	3.9	5.9
34	3	6.1	22.4	1	1.0	2.0
33	2	4.1	16.3	0	0.0	1.0
32	2	4.1	12.2	1	1.0	1.0
31	1	2.0	8.1	0	0.0	0.0
30	3	6.1	6.1	0	0.0	0.0

APPENDIX D

DOUBLE WEIGHTED MAP SCORE DISTRIBUTION FOR
NON-HIGH SCHOOL GRADUATES AND G.E.D.'s (N = 151)

Score	Failure			Success		
	N	%	Cum %	N	%	Cum %
93	0	0.0	99.8	1	1.0	100.1
90	0	0.0	99.8	2	2.0	99.1
87	0	0.0	99.8	2	2.0	97.1
85	1	2.0	99.8	1	1.0	95.1
84	0	0.0	97.8	1	1.0	94.1
83	0	0.0	97.8	3	2.9	93.1
82	1	2.0	97.8	2	2.0	90.2
81	0	0.0	95.8	2	2.0	88.2
80	0	0.0	95.8	3	2.9	86.2
79	1	2.0	95.8	8	7.8	83.3
78	1	2.0	93.8	3	2.9	75.5
77	3	6.7	91.8	8	7.8	72.6
76	1	2.0	85.7	5	4.9	64.8
75	2	4.1	83.7	7	6.9	59.9
74	3	6.1	79.6	2	2.0	53.0
73	2	4.1	73.5	6	5.9	51.0
72	3	6.1	69.4	3	2.9	45.1
71	2	4.1	63.3	3	2.9	42.2
70	1	2.0	59.2	6	5.9	39.3
69	0	0.0	57.2	5	4.9	33.4
68	2	4.1	57.2	3	2.9	28.5
67	3	6.1	53.1	4	3.9	25.6
66	1	2.0	47.0	4	3.9	21.7
65	3	6.1	45.0	1	1.0	17.8
64	1	2.0	38.9	1	1.0	16.8
63	1	2.0	36.9	1	1.0	15.8
62	2	4.1	34.9	4	3.9	14.8
61	1	2.0	30.8	1	1.0	10.9
60	0	0.0	28.8	5	4.9	9.9
59	0	0.0	28.8	1	1.0	5.0
58	3	6.1	28.8	2	2.0	4.0
57	2	4.1	22.7	1	1.0	2.0
56	2	4.1	18.6	0	0.0	1.0
55	1	2.0	14.5	0	0.0	1.0
54	2	4.1	12.5	0	0.0	1.0
52	0	0.0	8.1	1	1.0	1.0
50	1	2.0	8.1	0	0.0	0.0
49	2	4.1	6.1	0	0.0	0.0
48	1	2.0	2.0	0	0.0	0.0

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