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AIR FORCE INSTITUTE OF TECHNOLOGY

THE EFFECTS OF LOWER ARMED SERVICES VOCATIONAL APTITUDE BATTERY (ASVAB) MECHANICAL SCORE REQUIREMENTS ON THE NUMBER OF APPLICANTS ELIGIBLE FOR TRAINING IN MAINTENANCE OCCUPATIONS AND THE PERCENTAGE OF TRAINING FAILURES

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The Effects of Lower Armed Services Vocational Aptitude Battery (ASVAB) Mechanical Score Requirements on the Number of Applicants Eligible for Training in Maintenance Occupations and the Percentage of Training Failures

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ABSTRACT

This study investigated the impact of lowering the minimum Armed Services Vocational Aptitude Battery (ASVAB) Mechanical composite (MECH) scores required for recruits to enter maintenance career fields. The sample included (N=48,009) Air Force technical school trainees who attended school between 1990 and 1995. A contingency table showing the relationship between predictor scores and success/failure in technical school and logistic regression analyses suggested that required scores should be raised for five Air For ce Specialties (AFSs) and should remain at the present level for four others. No linear relationship was apparent between test scores and technical school grades or pass/fail criteria for two AFSs. Results provided little evidence that reducing minimum MECH score requirements <u>slightly</u> will increase the rate of technical school failures. The need to collect technical school grades for unsuccessful trainees was identified.

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The Effects of Lowering Armed Services Vocational Aptitude Battery (ASVAB) Mechanical Score Requirements on the Number of Applicants Eligible for Training in Maintenance Occupations and the Percentage of Training Failures

Maintenance occupations play a critical role in sustaining the Air Force's mission capabilities in combat operations and strategic airlift. It has become increasingly difficult to sign up enough high quality recruits to fill Air Force entry-level jobs in aircraft, vehicle, and equipment maintenance (Chapman, 1996). If present trends continue, there may come a time when recruiters will be unable to fill manpower requirements for these Air Force Specialties (AFSs) and the service's ability to accomplish its mission will be constrained by the lack of qualified technicians. This report investigates one approach toward solving this problem.

Cut-off scores

One way to increase the number of applicants eligible for AFSs involving mechanical skills (referred to as maintenance occupations in the rest of the paper) is to lower the minimum Armed Services Vocational Aptitude Battery (ASVAB) mechanical aptitude (MECH) scores required for entry into these jobs. Cut-off scores have been established for each AFS to ensure recruits entering initial technical training have at least the minimum level of ability needed to complete the training successfully. If cut-off scores are set too low, technical training failure rates will increase, leading to higher recruiting and training costs. On the other hand, if cut-off scores are set too high, applicants who would be successful in technical school will be erroneously rejected. Score requirements that are higher than necessary reduce the size of the pool of applicants eligible for a job, make recruiting more difficult, and increase the likelihood that minority applicants will be excluded. MECH score requirements are a tradeoff between the competing needs to keep manning at acceptable levels and to obtain recruits capable of completing technical school training on very complex systems. Before making any changes, it is necessary to estimate the impact of changes on the number of applicants eligible for technical training and on academic failure rates expected for various levels of aptitude scores.

Changes in training criteria

The technical training criterion scores available for this study span a period marked by change. It includes Desert Storm/Desert Shield, implementation of a new wing structure, the relocation of several technical training schools from bases being closed to other sites, and a continuing effort to downsize the force. Utilization and Training Workshops in many AFSs also directed changes in course content and length that directly affect training criteria.

Another significant change is the growing use of work sample tests in technical schools. Instructors in courses that train recruits to the level necessary for Mission Ready Technician (MRT) certification must grade trainees' performance on a large number of critical tasks. If much weight is given to these work sample performance assessments in technical training, it is necessary to demonstrate the validity and reliability of these measures (American Psychological Association, 1985). They must also be incorporated in the selection criteria used in validation research. Work sample criterion measures were not available for the present study.

Previous research

Previous studies have examined the validity of ASVAB composites for predicting technical school grades over a large range of jobs (e.g., Wilbourn, Valentine, & Ree, 1984) or in examining the potential to improve prediction by combining ASVAB sub-tests in different ways (e.g., Ree & Earles, 1992). There has been little research addressing the impact of different cut-off scores on the number of applicants eligible for specific occupational specialties, or on the effect of lower minimum qualifying scores on academic failure rates. An important goal of this study was to determine whether or not cut-off scores could be lowered to increase the number of applicants eligible for maintenance jobs without increasing technical school failure rates to unacceptable levels. For the purposes of this study failure rates up to and including five percent were deemed to be acceptable.

This study's contribution

Analyses for each AFS were expected to support one of the following conclusions:

1. There is no evidence of a linear relationship between MECH scores and criteria representing technical training success. Additional research is needed to develop and validate predictors for the AFS.

2. There is evidence that a linear relationship exists between MECH scores and criteria representing technical training success, and ...

   a. The MECH cut-off score for an AFS should be raised because the failure rate associated with the current MECH cut-off score is unacceptably high.

   b. The MECH cut-off score for an AFS should not be lowered because analyses predict an unacceptably high failure rate for applicants with MECH scores below the current cut-off score.

   c. The MECH cut-off score for an AFS can be lowered incrementally because the rate of failures is very low and there is no evidence that failure rates would increase to unacceptable levels if the cut-off scores were lowered a few points.

This approach acknowledges that decisions based on predictor-criterion information depend in part on the type and quality of information available. It also recognizes that decisions about the allocation of scarce resources (in this case applicants with high MECH scores) must consider a variety of issues that go beyond the kind of data analysis reported here. This paper is intended to support the decision process.

OBJECTIVES

The objectives of this study were: (1) to investigate the quality of recruits entering maintenance technical training courses in recent years, (2) to examine the validity of the predictors of success in technical training presently in use, and (3) to estimate the effect of lowering ASVAB mechanical test scores on technical school failure rates and the number of applicants expected to qualify for entrance into maintenance AFSs.

METHOD

Subjects

Subjects were 48,009 first term recruits who entered the service between January, 1990 and September, 1995, and were assigned to a mechanical AFS. There were 42,980 graduates, 1,229 academic failures, and 1,050 subjects who were eliminated because of medical problems or other non-academic reasons. The remaining 2,750 subjects either did not complete Basic Military Training or were re-routed to a non-mechanical technical school. Demographics are shown in Table 1.

TABLE 1. CHARACTERISTICS OF SUBJECTS IN THE STUDY

PERCENTAGE OF ENLISTEES BY YEAR OF ENLISTMENT

YEAR	1990	1991	1992	1993	1994	1995	TOTAL
Number:	8651	8173	10503	7384	8640	4658	48009
AGE							
18 or Less	24.2	21.2	20.6	25.2	21.1	11.6	21.3
19 or 20	51.4	47.0	48.7	46.7	46.7	49.5	48.7
21 or More	24.4	31.8	30.7	28.1	28.1	38.9	30.0
SEX							
MALE	94.7	94.0	94.8	95.3	95.6	95.8	95.0
FEMALE	05.3	06.0	05.2	04.7	04.4	04.2	05.0
RACE							
WHITE	89.1	90.3	90.4	87.5	86.8	84.2	88.5
BLACK	08.1	06.4	06.7	08.7	08.0	08.6	07.6
OTHER	02.7	03.2	02.9	03.8	05.2	07.3	03.9

Note: Figures for 1995 are based on partial year data.

Predictors

Subjects' scores on the ASVAB Mechanical (MECH) composite were used as the main predictor. The MECH score is the sum of the Mechanical Comprehension (MC), General Science (GS), and Auto and Shop Information (AS) subtests of the ASVAB. Ree and Earles (1992) reported the internal consistency reliability for the MECH composite was .90 (N=88,724). Entrance requirements for some AFSs specified minimum MECH scores and one other ASVAB composite score (i.e., electrical, general, or administrative). In these cases, MECH was used as the predictor by itself, and in combination with the other score.

Criteria

There were two criterion measures. Final School Grades (FSGs) were used in correlational analyses. FSGs were computed as the average of the subjects' scores on written tests they completed during technical training. Pearlman, Schmidt, and Hunter (1980) reported the alpha reliability of FSGs as .80. A limitation of the current study is that FSG scores were available only for subjects who had successfully completed training. The lack of criterion measures covering the full range of subject's scores has been noted in other research for the Air Force (Ree & Earles, 1992) and Navy (Borack, 1996). FSG scores in the current study ranged from the minimum passing score of 70 to 99. This restriction in range directly impinges on the variability of the criterion exacerbating the range restriction that occurs as a consequence of explicit selection on the predictor (MECH scores). A pass/fail criterion measure was used in logistic regression analyses. It was available for students who were successful and who failed academically. Those who did not complete training for non-academic reasons were excluded.

Criterion groups

The use of cut-off scores is based on the assumption that the level of aptitude required for success in training varies among the technical training courses. Thus, different cut-off scores are set for different AFSs. Previous validation studies (e.g., Wilbourn, et al., 1984) have implicitly assumed that individual courses and associated criterion measures are fairly consistent over time. In view of all the changes in course content, length, location, and emphasis that had occurred over the five years of data available for the present study, it was clear that course criteria had changed for at least some AFSs. Thus it was necessary to avoid combining groups of recruits who were trained in the same AFS at different times and whose courses and course criterion measures had differed substantially. The method outlined below was used to decide which training groups for a single AFS were homogenous enough to be combined and which groups differed in some way.

1. Training course managers for each AFS provided information on changes in course content, emphasis, length, and location that might cause differences in the criteria. As a result 1-4 criterion sub-groups were established for each AFS included in the study.

2. Procedures described by Cohen (1988) were used to test the differences between correlations of MECH and FSG scores for each pair of training groups in the same AFS. Since MECH scores were stable between 1990 and 1995, finding a significant difference in two correlations seemed likely to reflect changes in FSG criteria.

   a. If differences in the correlations were <u>not</u> large enough to be significant, the training groups were combined in subsequent analyses.

   b. If the differences were large enough to be significant, the training groups were kept separate.

Additional information on the statistical test and the correlations between MECH and FSG scores for the initial groups can be found in Appendix A.

RESULTS

Quality of accessions

Table 2 shows that the quality of recruits entering maintenance occupations between January, 1990 and September, 1995 was high. Nearly all were high school graduates who had earned MECH scores that placed them in the top three enlistment categories.

TABLE 2. QUALITY OF ACCESSIONS BY YEAR OF ENLISTMENT

ASVAB MECHANICAL APTITUDE SCORES

	1990	1991	1992	1993	1994	1995	TOTAL
MEAN	72.5	72.7	72.6	71.3	72.3	71.6	72.3
ST DEV	14.2	14.4	14.3	14.8	13.8	14.2	14.3
N	8591	8112	10401	7137	8190	4363	46794

PERCENTAGE OF RECRUITS IN EACH ENLISTMENT CATEGORY

CATEGORY	1990	1991	1992	1993	1994	1995	TOTAL
I (Highest)	01.9	02.7	02.9	02.7	04.2	04.4	03.0
II	38.1	42.0	40.4	38.9	45.7	43.0	41.2
III	59.6	55.1	56.2	58.2	49.9	52.2	55.4
IV (Lowest)	00.3	00.0	00.4	00.1	00.3	00.4	00.3
TOTALS	8591	8112	10401	7137	8190	4363	46794

PERCENTAGE OF RECRUITS WITH HIGH SCHOOL DIPLOMAS

EDUCATION	1990	1991	1992	1993	1994	1995	TOTAL
HS DIPLOMA	98.8	99.1	98.6	98.8	98.5	98.1	98.7
GED	1.0	0.8	1.3	1.1	1.4	1.7	1.2
NO DEGREE	0.2	0.1	0.1	0.1	0.1	0.3	0.1
TOTALS	8651	8173	10503	7384	8640	4658	48009

PERCENTAGE OF RECRUITS SUCCESSFUL IN TECHNICAL TRAINING

OUTCOMES	1990	1991	1992	1993	1994	1995	TOTAL
SUCCESS	89.1	88.2	89.4	93.7	94.5	77.2	42980
FAILURE	3.2	2.8	3.4	2.0	1.7	1.5	1229
OTHER	7.8	9.0	7.2	4.3	3.8	21.3	3800
TOTALS	8651	8173	10503	7384	8640	4658	48009

NOTE: 1995 data is incomplete. Recruits who had entered training in 1995, but had not completed it at the time the data were collected are included in the "other" category.

Training completion data for 1990-1994 show that the proportion of trainees who successfully completed technical training increased slightly during this period.

Table 3 shows that the quality of the recruits entering each AFSs remained consistently high between 1990 and 1995. Two rows are shown for the same AFS in cases where two groups of students experienced different training conditions or grading standards because of changes in training content, methods, or objectives.

TABLE 3. MEAN ASVAB MECHANICAL APTITUDE (MECH) SCORES FOR RECRUITS ENTERING MAINTENANCE TECHNICAL TRAINING (1990-1995)

AFS	DESCRIPTION OF AFS	TECH SCHOOL CLASS DATES	MECH, FSG CORR	RQD SCORE	1990 MEAN	1991 MEAN	1992 MEAN	1993 MEAN	1994 MEAN	1995 MEAN	OVER-ALL MEAN	N
2A3X3A	F-15 MAINTENANCE	9006-9409	.36	51	73.89	76.33	73.99	74.73	74.88		74.61	1572
2A3X3A	F-15 MAINTENANCE	9412-9509	.53	51					69.04	76.73	71.24	417
2A3X3B	F-16 MAINTENANCE	9003-9509	.36	51	73.39	74.11	73.62	73.33	72.82	73.20	73.46	2008
2A3X3C	F-111 MAINTENANCE	9006-9509	.39	51	72.08	75.37	74.86	81.75	73.26	70.60	73.61	448
2A3X3E	A-10 MAINTENANCE	9012-9509	.35	51	75.48	71.29	64.42	72.06	73.24	73.63	72.44	268
2A5X1A	C-141 MAINTENANCE	9306-9509	.56	51				74.82	72.84	76.00	74.05	258
2A5X1B	C-130 MAINTENANCE	9309-9509	.43	51				71.78	71.85	72.88	72.07	522
2A5X1C	C-5 MAINTENANCE	9309-9509	.46	51				73.49	73.69	76.57	74.16	255
2A5X1D	C-17 MAINTENANCE	9312-9509	.44	51				71.50	70.93	73.49	71.81	235
2A5X1F	B-52 MAINTENANCE	9312-9409	.36	51				74.55	72.69		73.78	102
2A5X1F	B-52 MAINTENANCE	9406-9509	.59	51					73.46	77.26	73.89	166
2A5X1H	KC-10 MAINTENANCE	9409-9509	.45	51					76.04	73.12	74.94	181
2A5X2	HELICOPTER MAINTENANCE	9309-9509	.29	51				83.85	79.61	79.09	80.77	142
2A6X1A	PROPULSION-JET ENGINE	9006-9303	.21	44	71.21	70.45	72.01				71.29	1507
2A6X1A	PROPULSION-JET ENGINE	9309-9509	.37	44				65.33	69.15	63.23	67.27	807
2A6X1B	PROPULSION-TURBO	9003-9509	.41	57	79.39	81.33	78.59	71.12	79.48	74.85	78.68	672
2A6X2	AEROSPACE GRND EQPMT	9003-9509	.38	51	77.26	78.71	78.42	68.88	72.62	72.31	75.32	2945
2A6X3	EGRESS MAINTENANCE	9006-9509	.21	57	79.31	79.62	74.00	81.70	79.46	73.51	77.77	316
2A6X4	AIRCRAFT FUEL SYSTEMS	9006-9509	.38	51	74.96	72.80	77.54	77.48	72.91	69.88	74.43	1048
2A6X5	PNEUDRAULICS	9006-9209	.12	57	76.04	76.18	75.54	78.39			76.05	884
2A6X5	PNEUDRAULICS	9306-9509	.38	57				78.31	75.75	75.89	77.24	546
2A6X6	ELECTRICAL & ENVIR SYS	9403-9509	.28	45				67.27	71.81	73.49	71.02	772
2A7X1	AIRCRAFT METALS	9006-9509	.42	51	76.59	72.90	77.00	67.76	72.58	72.55	73.68	320
2A7X3	AIRCRAFT STRUCTURAL	9003-9509	.26	51	72.30	74.11	72.87	70.47	72.23	73.87	72.62	1693
2A7X4	FABRICATION	9006-9509	.18	44	68.72	69.46	65.40	63.81	68.44	52.97	66.11	387

Note: Training dates indicate which classes are included in each criterion group. All correlations (CORR) are significant (p<.05) unless otherwise indicated (ns=non-significant, p>.05).

TABLE 3. MEAN ASVAB MECHANICAL APTITUDE (MECH) SCORES FOR RECRUITS ENTERING MAINTENANCE TECHNICAL TRAINING (1990-1995)

AFS	DESCRIPTION OF AFS	TECH SCHOOL CLASS DATES	MECH, FSG CORR	RQD SCORE	1990 MEAN	1991 MEAN	1992 MEAN	1993 MEAN	1994 MEAN	1995 MEAN	OVER-ALL MEAN	N
2E6X1	COMMUNICATIONS-ANTENNA	9012-9509	.11ns	51	72.33	74.43	71.33	71.10	72.13	71.09	72.10	218
2E6X2	COMMUNICATIONS-CABLE	9006-9509	.31	51	75.04	73.40	72.38	72.86	73.64	71.58	73.20	645
2F0X1	FUELS	9003-9409	.08	51	70.65	68.60	69.15	71.09	72.73		69.93	2185
2F0X1	FUELS	9409-9509	.29	51					71.36	68.14	70.08	472
2M0X1	MISSILE SYS MAINTENANCE	9006-9303	.18	51	73.00	71.97	72.94				72.63	479
2T2X1	AIR TRANSPORT EQPMT	9003-9509	.20	51	70.10	69.27	69.06	67.61	69.01	69.67	69.15	2987
2T3X1	SPECIAL PURP VEHICLE	9006-9509	.40	51	76.46	74.21	74.27	73.30	72.87	71.45	73.86	843
2T3X2A	FIRE TRUCK MAINTENANCE	9006-9306	.09	44	73.83	73.57	70.98				72.30	125
2T3X2B	REFUELER MAINTENANCE	9006-9306	.23	44	61.07	72.39	63.29				65.91	163
2T4X1	GENERAL PURP VEHICLE	9006-9509	.39	51	73.09	73.21	71.07	75.28	73.25	71.03	72.65	856
2W0X1A	MUNITIONS-CAS	9312-9509	.19	61				62.26	74.71	73.77	71.48	424
2W0X1B	MUNITIONS-PRODUCTION	9003-9509	.36	61	73.30	73.94	73.09	70.42	72.46	73.07	72.62	3166
2W1X1C	A-10 ARMAMENT	9006-9403	.35	61	77.13	79.00	72.83	63.86			73.30	175
2W1X1E	F-15 ARMAMENT	9009-9509	.32	61	75.00	77.56	79.16	70.94	74.19	75.95	76.01	987
2W1X1F	F-16 ARMAMENT	9006-9509	.36	61	71.62	70.56	73.05	67.45	68.94	68.07	70.60	1240
2W1X1H	F-111 ARMAMENT	9006-9312	.25	61	85.67	86.91	88.02	88.75			87.22	190
2W1X1K	B-52 ARMAMENT	9103-9403	.27	61	88.39	85.14	88.11	88.07			87.60	206
2W1X1L	B-1 ARMAMENT	9009-9312	.49	61	68.24	75.13	73.67	66.57			71.19	114
2W1X1Z	HC-130 ARMAMENT	9006-9403	.27	61	74.13	76.68	80.48	71.63			76.82	111
2W2X1	NUCLEAR WEAPONS	9006-9403	.19	61	78.36	79.02	77.99	78.99			78.58	485
3E0X2	ELECT POWER PRODUCTION	9009-9509	.34	57	76.95	76.37	76.64	77.97	74.92	72.42	76.28	814
3E1X1	HTG,VENT & AIR COND	9006-9509	.39	51	68.39	70.39	71.88	65.86	64.91	65.18	67.26	596
3E2X1	PAVEMENTS	9003-9506	.45	44	72.61	74.49	69.50	67.95	65.29	68.93	70.26	1346
3E3X1	STRUCTURES	9006-9506	.28	51	72.28	71.78	70.42	72.16	72.34		71.78	811
3E4X1	UTILITIES	9312-9509	.33	51			71.70	67.11	72.67		69.23	267
3E8X1	EXPLOSIVE ORD DISPOSAL	9003-9509	.20	61	79.54	79.00	80.75	80.26	78.82	79.27	79.58	532
3F4X2	LIQUID FUEL SYSTEMS	9006-9406	.30	51	74.02	77.93	71.22				72.67	162
3P1X1	COMBAT ARMS MAINTENANCE	9312-9509	.09ns	51				57.45	76.40	78.78	74.09	138

Note: Training dates indicate which classes are included in each criterion group. All correlations (CORR) are significant ($p<.05$) unless otherwise indicated (ns=non-significant, $p>.05$).

TABLE 3. MEAN ASVAB MECHANICAL APTITUDE (MECH) SCORES FOR RECRUITS ENTERING MAINTENANCE TECHNICAL TRAINING (1990-1995)

AFS	DESCRIPTION OF AFS	TECH SCHOOL CLASS DATES	MECH, FSG CORR	RQD SCORE	1990 MEAN	1991 MEAN	1992 MEAN	1993 MEAN	1994 MEAN	1995 MEAN	OVER-ALL MEAN	N
452X5	TAC ELECT & ENVIR SYS	9009-9406	.15	45	73.46	70.90	69.33	71.03			71.26	415
454X5	STRAT ELECT & ENVIR SYS	9006-9306	.27	45	76.51	75.47	70.78				74.39	425
454X6	ALFT ELECT & ENVIR SYS	9009-9306	.12	45	74.16	74.20	73.24				73.85	584
552X0	MASONRY	9003-9212	.34	51	68.58	64.50	71.05				68.56	236
552X5	PLUMBING	9006-9303	.34	51	68.87	69.20	72.88				70.56	302
566X1	ENVIRONMENTAL WATER	9003-9403	.28	51	63.88	64.92	66.12	67.73			65.83	439

Note: Training dates indicate which classes are included in each criterion group. All correlations (CORR) are significant ($p<.05$) unless otherwise indicated (ns=non-significant, $p>.05$).

The usefulness of MECH scores for predicting training outcomes

Correlations between MECH scores and FSG are shown in the third column of Table 3. The average correlation across all AFS groups was r=.28 (N=39246). The pattern of correlations suggests that trainees with low MECH scores would fail more often than those with medium or high scores.

MECH scores and the number of qualified applicants

Figure 1 compares the distribution of scores for high school students who expressed interest in the Air Force with the distribution of scores for those who actually joined the Air Force. It shows the percentage of individuals scoring at each level in the applicant and recruit samples multiplied by the number of persons in those groups in an average year.

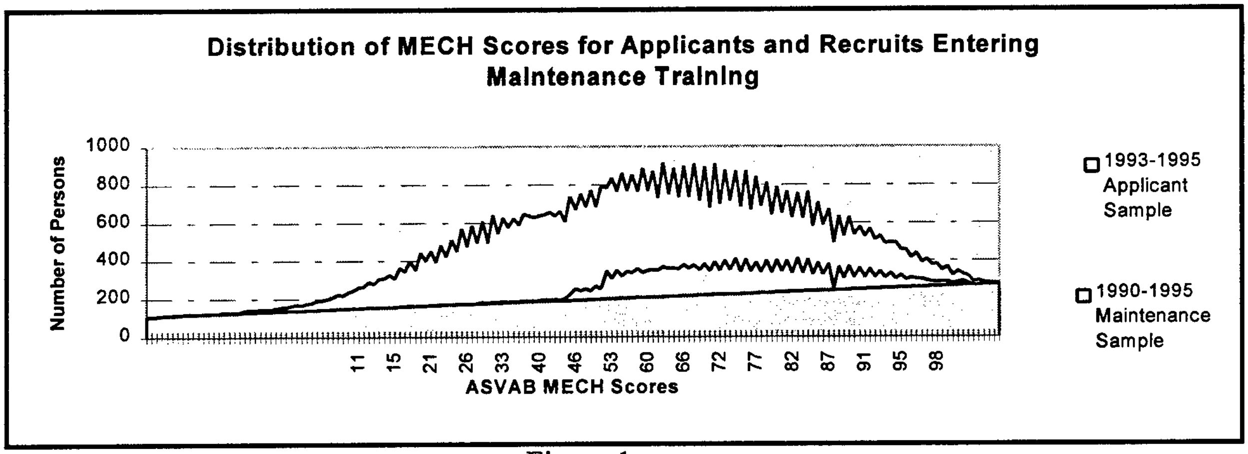

Figure 1.

It is clear that recruits entering maintenance training had average to high MECH scores, and that the availability of potential trainees varies across MECH score ranges.

MECH scores and success/failure in training

Finding that the number of failures increases as MECH scores decrease would be consistent with the hypothesis that the MECH score is an important predictor of success in technical school. A contingency table was developed to examine the relationship between the level of MECH scores and the number of failures. Table 4 provides little support for this point of view. Failures occurred at nearly all levels of MECH scores. On the other hand, MECH scores do predict FSG scores for trainees who are successful in training in most AFSs. This suggests that, given an adequate level of ability, slight differences in ability among trainees' do not predict success or failure.

Table 4 also shows that only a few current training courses have failure rates greater than or equal to 5 percent for any range of MECH scores. The applicant sample was used to estimate the percentage of the applicant population with scores less than or equal to the lowest score in each range of scores. These estimates are shown at the bottom of Table 4.

TABLE 4. CONTINGENCY TABLE: CUMULATIVE PERCENTAGE FAILING FOR VARIOUS MECH SCORES

AFSC	DESCRIPTION	N	ASVAB MECH SCORE 95	90	85	80	75	70	65	60	55	50	45	40	35
2A3X3A	F-15 MAINTENANCE	402						0.7	0.7	1.7					
2A3X3B	F-16 MAINTENANCE	1965				0.8	1.1	1.7	2.0	2.5	3.2	3.8			
2A3X3C	F-111 MAINTENANCE	439				0.7	0.9	0.9	1.1	1.1	1.4	1.6			
2A3X3E	A-10 MAINTENANCE	256							0.8	1.2	1.2	2.0			
2A5X1A	C-141 MAINTENANCE	272						1.5	2.2	2.9	3.3	4.0			
2A5X1B	C-130 MAINTENANCE	508						0.8	0.8	1.2	1.4	1.6			
2A5X1C	C-5 MAINTENANCE	252									0.8				
2A5X1D	C-17 MAINTENANCE	233													
2A5X1F	B-52 MAINTENANCE	155			1.3	1.3	1.3	1.3	1.3	1.3	1.3	2.6			
2A5X1H	KC-10 MAINTENANCE	175													
2A5X2	HELICOPTER MAINTENANCE	142													
2A6X1A	PROPULSION -JET ENGINE	774										0.5	0.6		
2A6X1B	PROPULSION-TURBO	662					0.6	0.9	2.1	2.6	2.6	2.6	2.7		
2A6X2	AGE MAINTENANCE	2893			0.7	1.2	1.5	2.6	3.1	4.3	**5.2**	**5.9**			
2A6X3	EGRESS	315													
2A6X4	FUEL SYSTEMS	1033									0.6				
2A6X5	HYDRAULIC	537									0.6				
2A6X6	ACFT ELEC & ENVIRO SYS	745			0.5	0.7	0.7	0.8	0.8	1.3	1.6	1.7	2.8		
2A7X1	AIRCRAFT METALS	314					0.6	1.3	1.3	1.3	1.3	2.2			
2A7X3	AIRCRAFT STRUCTURAL	1682								0.5	0.9	1.0			
2A7X4	AIRCREW SURVIVAL	383									0.8				
2E6X1	COMM (ANTENNA)	210				1.0	1.9	1.9	2.4	3.3	3.8	4.3			
2E6X2	COMM (CABLE)	631					1.1	1.7	1.9	2.9	3.6	4.0			
2F0X1	FUELS	468								0.6	0.9				
2M0X1	MISSILE MAINTENANCE	466													
Percentage	of Applicants with Lower Scores		97.0	92.6	87.3	81.6	75.9	68.2	61.5	54.5	48.5	42.2	36.3	29.3	23.7

Note: Table entries show the cumulative percentage of academic failures for (1990-1995) trainees as MECH scores decrease. Scores in the shaded area do not meet current standards for entry into the AFS. Failure rates of 5% or higher are shown in bold print.

TABLE 4. CONTINGENCY TABLE: CUMULATIVE PERCENTAGE FAILING FOR VARIOUS MECH SCORES

			ASVAB MECH SCORE												
AFSC	DESCRIPTION	N	95	90	85	80	75	70	65	60	55	50	45	40	35
2T2X1	AIR TRANS EQPMT MAINT	2955					0.5	0.7	0.9	1.3	1.4	1.6			
2T3X1	SPECIAL PURP VEHICLES	805				0.7	1.4	2.0	2.2	3.1	**5.6**	**6.1**			
2T3X2A	FIRETRUCK MAINTENANCE	121					1.7	2.5	4.1	4.1	**5.0**	**5.0**	**5.0**	**5.8**	
2T3X2B	REFUELER MAINTENANCE	157						1.3	1.9	1.9	2.5	3.8	4.5		
2T4X1	GENERAL PURP VEHICLES	841					0.7	0.8	1.2	1.4	1.7	1.9			
2W0X1A	MUNITIONS CAS	415						0.7	1.0						
2W0X1B	MUNITIONS PRODUCTION	3149							0.6	0.7					
2W1X1C	A-10 ARMAMENTS	171						0.6	0.6	0.6	0.6	1.8	2.9		
2W1X1E	F-15 ARMAMENTS	974				0.7	0.9	1.5	1.6	1.9	1.9	1.9	1.9	1.9	2.2
2W1X1F	F-16 ARMAMENTS	1217							1.0	1.1	1.3	1.4	1.5	1.6	1.9
2W1X1H	F-111 ARMAMENTS	198			0.5	0.5	0.5	2.0	2.5	2.5	3.0	3.5	4.0	4.0	4.5
2W1X1K	B-52 ARMAMENTS	211				0.9	1.4	1.9	1.9	1.9	2.4	3.3			
2W1X1L	B-1 ARMAMENTS	109										0.9	1.8		
2W1X1Z	HC-130 ARMAMENTS	110						1.8							
2W2X1	NUCLEAR ARMAMENTS	475													
3E0X2	ELEC POWER PRODUCTION	802						1.0	1.4	2.1	2.4				
3E1X1	HEAT, VENT, & AIR COND	591					0.5	0.8	1.4	1.9	2.5	2.9	3.2	3.6	4.7
3E2X1	PAVEMENT MAINTENANCE	1338								0.5	0.6	0.6	1.0		
3E3X1	STRUCTURES	805						0.6	1.0	1.2	1.6	1.9			
3E4X1	UTILITIES	265						1.1	1.1	1.5					
3E8X1	EXPL ORDINANCE DISP	492	1.8	4.9	**8.7**	**14.8**	**19.7**	**24.4**	**29.1**	**31.7**	**31.7**				
3F4X2	LIQUID FUEL SYS	161			0.6	0.6	1.2	1.9	2.5	2.5	2.5	3.1			
3P1X1	COMBAT ARMS MAINTENANCE	136				0.7	0.7	1.5							
Percentage	of Applicants with Lower Scores		97.0	92.6	87.3	81.6	75.9	68.2	61.5	54.5	48.5	42.2	36.3	29.3	23.7

Note: Table entries show the cumulative percentage of academic failures for (1990-1995) trainees as MECH scores decrease. Scores in the shaded area do not meet current standards for entry into the AFS. Failure rates of 5% or higher are shown in bold print.

For the three years of data included in that sample, there were about 40,000 applicants each year, so a one percent change would represent about 400 applicants per year. The bottom row of Table 4 shows the percentage of applicants with lower scores. The impact of lowering cut-off scores from 55 to 45 can be estimated by using the percentages on the bottom row of the appropriate columns to calculate the number of additional applicants that would be eligible at the lower cut-off score. In this case (48.5-42.2)=6.3 and 6.3 x 400 = 2520, so about 2520 more applicants would qualify. Note that the number of applicants differs across the range of MECH scores. Appendix B contains more accurate information.

Linear regression

The empirical information provided in Table 4 can be supplemented with other validity information. Procedures typically involve developing a linear regression model in the form of: $FSG = B_0 + B_1(MECH_1)$ and substituting values of the independent variable MECH into the equation to compute a predicted value for the dependent variable, FSG (Cascio, 1987). In the equation, B_0 represents the Y-intercept and B_1 represents the increase in FSG for a one unit increase in the MECH score. Unfortunately, 41 of the 47 Y-intercept (B_0) values computed for the current data exceeded the passing FSG score level of 70.0. Since there are no MECH scores below 1, adding $B_1(MECH)$ to B_0 will increase the predicted score farther above the failing score for these cases. Thus, the lack of data for the full range of criterion scores (i.e., FSG scores for unsuccessful as well as the successful students) was a serious impediment to this analysis.

Logistic regression

Logistic Regression analyses using the pass/fail criterion were completed to supplement the contingency table information in Table 4. The usefulness of MECH scores in predicting success or failure was evaluated by examining the significance of path coefficients, determining whether or not the model predicted the pass/fail outcomes, and by testing the model's ability to explain the variance in the data (Hosmer & Lemeshow, 1989). The odds of failing to were calculated for each set of five MECH scores ranging from 30 to 99 for each current AFS using equations (1 and 2) from by Fox (1984).

$$\Lambda(z) = \frac{1}{1+e^{-z}} \tag{1}$$

$$\text{where: } z = -(\alpha + Bxi)$$

$$\text{and: } e \cong 2.718$$

$$odds = \frac{\Lambda(z)}{1-\Lambda(z)} \tag{2}$$

Results (Table 5) show that the odds of failing at different MECH score levels differ among criterion groups. Given the goal of maintaining a failure rate under 5%, Table 5 suggests cut-off scores should be raised for five AFSs and lowered for four others. Although the logistic regression models for these AFSs fit acceptably well, none of them predicted any failures. The logistic regression models obtained for the other criterion groups did not fit the data well. Detailed results can be found in Appendix C.

TABLE 5. CUMULATIVE PERCENTAGE OF TRAINEES EXPECTED TO FAIL FOR VARIOUS MECH SCORES

			ASVAB MECH SCORE												
AFSC	DESCRIPTION	N	95	90	85	80	75	70	65	60	55	50	45	40	35
2A3X3B	F-16 MAINTENANCE	1965	1.4	1.8	2.1	2.6	3.2	3.9	4.7	**5.7**	**6.9**	**8.4**	**10.1**	**12.1**	**14.5**
2A6X1B	PROPULSION-TURBO	662	0.6	0.9	1.2	1.8	2.5	3.6	**5.1**	**7.1**	**9.9**	**13.7**	**18.5**	**24.6**	**31.9**
2A6X2	AGE MAINTENANCE	2893	2.3	2.8	3.5	4.3	**5.2**	**6.4**	**7.8**	**9.5**	**11.5**	**13.9**	**16.7**	**19.9**	**23.6**
2A6X6	ELECT & ENVIR SYSTEMS	745	0.7	0.9	1.2	1.5	1.9	2.4	3.0	3.8	4.8	**6.0**	**7.5**	**9.4**	**11.7**
2E6X2	COMM (CABLE)	631	1.5	1.9	2.3	2.8	3.3	4.0	4.8	**5.8**	**7.0**	**8.4**	**10.0**	**11.9**	**14.1**
2T3X1	SPECIAL PURP VEHICLES	805	1.3	1.7	2.4	3.2	4.4	**6.0**	**8.1**	**10.9**	**14.4**	**18.9**	**24.3**	**30.7**	**38.0**
2W1X1C	A-10 ARMAMENTS	171	0.4	0.5	0.8	1.1	1.5	2.0	2.8	3.9	**5.3**	**7.3**	**9.9**	**13.3**	**17.6**
2W1X1F	F-16 ARMAMENTS	1217	0.8	1.0	1.1	1.3	1.5	1.7	2.0	2.3	2.6	3.0	3.4	3.9	4.5
3E0X2	ELEC POWER PRODUCTION	802	0.3	0.5	0.7	1.1	1.7	2.6	4.0	**6.0**	**8.9**	**13.1**	**18.8**	**26.2**	**35.0**
3E1X1	HEAT, VENT, & AIR COND	591	1.2	1.4	1.8	2.2	2.6	3.3	4.0	4.9	**6.0**	**7.3**	**8.8**	**10.7**	**12.9**
3E2X1	PAVEMENTS	1338	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.2	1.5	1.8	2.1	2.6	3.1
3E3X1	STRUCTURES	805	0.6	0.7	0.9	1.1	1.4	1.8	2.2	2.8	3.5	4.3	**5.4**	**6.7**	**8.4**
Percentage	**of Applicants with Lower Scores**		**97.0**	**92.6**	**87.3**	**81.6**	**75.9**	**68.2**	**61.5**	**54.5**	**48.5**	**42.2**	**36.3**	**29.3**	**23.7**

Note: Results are reported only for current technical training schools with statistically significant logistic regression models ($p<.05$). Table entries indicate the proportion of trainees with the MECH score at the head of the column that are expected to fail. Scores in the shaded area do not meet current standards for entry into the AFS. Projected failure rates of 5% or higher are shown in bold print.

Analyses for AFSs requiring minimum scores on the MECH and one other ASVAB aptitude test, or AFSs in which qualification required a minimum score on either the MECH or another ASVAB composite are shown in Table 5. Acceptable fit statistics and significant beta weights for MECH and ASVAB electrical aptitude test (ELEC) scores were obtained for two AFSs: 2A6X2 (Aerospace Ground Equipment Maintenance) and 3E1X1 (Heating, Ventilation and Air Conditioning). In both cases adding ASVAB ELEC to the model improved prediction significantly ($p<.05$). Other logistic regression analyses provide evidence that ELEC may be useful in selecting recruits for training in AFS 3E0X2 (Electrical Power Production), and 2W1X1F (F-16 Armament Systems). The ASVAB general aptitude test (GEN) was a statistically significant predictor of success in 2W0X1A (Munitions Combat Ammunition Systems) and 3E8X1 (Explosive Ordinance Disposal). In addition the ASVAB administrative aptitude test (ADMIN) was a significant predictor of success in AFS 2T2X1 (Air Transportation Equipment Maintenance). Details of these and the other logistic regression analyses can be found in Appendix C.

DISCUSSION

Results provide evidence that the recruits entering maintenance technical training courses between January, 1990 and September, 1995 were high quality accessions. Despite concerns about declining MECH scores in the pool of military service-eligible young people (Chapman, 1996), these recruits appear to have had the requisite levels of mechanical aptitude. The low failure rates that occurred during this period make it hard to conclude otherwise. Tables 2 and 3 show that their average MECH score was 72.3; nearly all (99.7 percent) were in the top 3 enlistment categories, and 99.9 percent had earned a High School Diploma or GED.

The correlations in Table 3 indicate that a linear relationship exists between MECH scores and FSGs for all but two of the AFSs. However, finding significant correlations between MECH and FSG addresses only part of the issue. The combination of a low failure rate and the lack of FSG criterion data for students who failed their technical training courses limited the usefulness of linear regression and correlational techniques for differentiating between students likely to complete training successfully and those likely to fail.

Because of these problems, the impact of lowering MECH cut-off scores on training course attrition could not be estimated for all the maintenance occupations included in this study. Furthermore, the strength of the evidence supporting changes in MECH cut-off scores varied among the maintenance schools.

The contingency table (Table 4) and logistic regression results (Table 5) show that MECH scores are only weakly related to technical training failure for recruits selected for maintenance technical schools with the present criteria. This does not imply that MECH scores are not important criteria for entry into these occupations. The correlations in Table 3 make it clear that in all but two cases, failure rates would be higher without the use of this predictor (Brogden, 1946). Instead, it suggests that given that a recruit's MECH score is high enough to qualify for a maintenance AFS, his or her success in technical school depends more on other factors such as motivation, self-discipline, interest, or disposition than on the exact level of his or her MECH score.

Recent studies (Motowidlo & Van Scotter, 1994; Van Scotter & Motowidlo, 1996) have shown that interpersonal and motivational factors account for a sizable proportion of variance in the work performance ratings of Air Force mechanics. The same relationships may hold true for performance in training. These studies along with other research (e.g., Barrick & Mount, 1991; Tett, Jackson & Rothstein, 1991) have shown that personality traits such as conscientiousness and agreeableness are important in job performance in a variety of civilian and military occupations.

RECOMMENDATIONS

General

A selection or classification system is only as good as its performance criteria. Without data on the performance of both successful and unsuccessful candidates, the selection and classification system cannot support the Air Force's war fighting mission effectively. Technical training written test scores and trainees' ratings on the performance items used in MRT hands-on training are essential. In the absence of this data it is impossible to ensure the accuracy, efficiency, equal opportunity, and fairness of personnel decisions. Organizations using tests in hiring or classification decisions also are ethically (and legally) responsible for ensuring that criterion measures used to validate those tests are relevant and appropriate (American Psychological Association, 1985).

Recommendations for ensuring selection criteria are effective.

1. Require schools to collect criterion data on successful and unsuccessful students. This data should be maintained with other personnel data files.

2. Conduct research to determine the reliability and validity of hands-on performance evaluations.

3. Investigate the use of alternate (i.e., motivational and dispositional predictors of performance).

Recommendations on cut-off scores.

4. For the two courses listed below there was <u>no evidence</u> of a linear relationship between MECH scores and technical training success (Table 3). Research is needed to develop and validate predictors for these specialties immediately.

   a. 2E6X1, Communications (Antenna)
   b. 3P1X1, Security Police Combat Arms

5. The MECH cut-off scores for the courses listed below should be raised because the failure rate (Table 4) associated with the current MECH cut-off score is unacceptably high.

    a. 2A6X2, Aerospace Ground Equipment (AGE) Maintenance
    b. 2T3X1, Special Purpose (SP)Vehicle Maintenance
    c. 2T3X2A, Fire Truck Maintenance
    d. 3E8X1, Explosive Ordinance Disposal

6. The MECH cut-off score for the courses listed below should not be lowered because the failure rates for applicants with MECH scores below the current cut-off score is within one percent of the five percent maximum (Table 5).

    a. 2A5X1, C-141 Maintenance
    b. 2T3X2B, Refueling Vehicle Maintenance

7. For all remaining courses examined in this study there is no evidence that failure rates would increase to unacceptable levels if the cut-off scores were gradually lowered.

It is important to remember that the results reported here are based on 1990-1995 data. Changes may have occurred in some technical training courses after mid-1995 that would impact these results and recommendations.

Appendix A

Procedures Used to Identify Criterion Groups

The procedures used to identify groups of trainees in an AFS who received similar technical training, and for whom similar criterion measures were available are described here. The goal was to avoid distorting the relationship between trainees' MECH scores and final technical school grades (FSG) by combining dissimilar trainee groups.

1. Training course managers helped us determine when significant changes had occurred in any of the AFSs examined in this study. Typical include changes include implementation of Utilization and Training Workshop recommendations affecting course content, sequencing of materials, or the length of a course. During the time period encompassed by this study there were also a number of changes that were out of the ordinary. They were the result of the restructuring of many maintenance career fields, the closure of training bases such as Chanute AFB, as well as changes that resulted from "Air Force Year of Training" initiatives. With the help of the training course managers 1-4 subgroups were identified for EACH AFS. The initial groups are listed in the next few pages.

2. Mech scores and FSGs were computed for each subgroup. Differences between the correlations for groups of trainees in the same AFS were tested using using a method described by Cohen (1988). Since the MECH test had not been changed during the period covered by the data used in this study the correlations were not expected to differ significantly between groups of trainees in the same AFS unless the course had changed in some important way. If the correlations did differ, it seemed likely that it was because of changes in the FSG criterion. The test procedure was as follows:

a. Because the sample sizes (n) differed among the groups it was necessary to compute the harmonic mean of the two sample sizes as shown here.

$$n' = \frac{2(n_1 - 3)(n_2 - 3)}{n_1 + n_2 - 6}$$

b. Correlations were transformed into Fisher **zs** using tables provided by Cohen (1988).

c. A test statistic was computed as $q_s = |\mathbf{z}_1 - \mathbf{z}_2|$.

d. The test statisitic was compared the tabled criterion value, $q_{c,}$, for n' to determine if the difference in the **rs** was significant at the p <.05 level (Cohen, 1988; p.139).

e. If the correlations differed significantly the samples were analyzed separately. If the test did not provide evidence of a difference the samples were combined for the remainder of the analyses. Table 3 shows the results of this process.

Appendix A
Initial Criterion Groups and Test Results

SAMPLE	AFSCS	DESCRIPTION	TECH SCHOOL CLASS DATES	N	MECH, FSG CORR	SIGNIFICANT DIFFERENCE	GROUP FOR ANALYSIS
1	2A3X3A OR 452X4A	F-15 MAINTENANCE	9006-9409	1487	0.36	YES	1
2	2A3X3A OR 452X4A	F-15 MAINTENANCE	9412-9509	379	0.53		2
4	2A3X3B OR 452X4B	F-16 MAINTENANCE	9003-9304	1491	0.37	NO	3
5	2A3X3B OR 452X4B	F-16 MAINTENANCE	9305-9504	90	0.39		3
6	2A3X3B OR 452X4B	F-16 MAINTENANCE	9505-9509	292	0.38		3
7	2A3X3C OR 452X4C	F-111 MAINTENANCE	9006-9401	276	0.39	NO	5
8	2A3X3C OR 452X4C	F-111 MAINTENANCE	9402-9509	139	0.28		5
9	2A3X3E OR 452X4E	A-10 MAINTENANCE	9012-9406	122	0.39	NO	6
10	2A3X3E OR 452X4E	A-10 MAINTENANCE	9407-9509	129	0.28		6
13	2A3X3H	U-2 MAINTENANCE	9003-9206	77	0.43	N/A	Dropped*
15	2A5X1A OR 457X2C	C-141 MAINTENANCE	9304-9412	149	0.59	NO	7
16	2A5X1A OR 457X2C	C-141 MAINTENANCE	9412-9509	96	0.48		7
17	2A5X1B OR 457X2A	C-130 MAINTENANCE	9309-9411	252	0.48	NO	8
18	2A5X1B OR 457X2A	C-130 MAINTENANCE	9412-9509	239	0.36		8
20	2A5X1C OR 457X2B	C-5 MAINTENANCE	9309-9405	85	0.47	NO	9
21	2A5X1C OR 457X2B	C-5 MAINTENANCE	9406-9509	155	0.45		9
23	2A5X1D OR 457X2E	C-17 MAINTENANCE	9312-9509	232	0.44	N/A	10
28	2A5X1G OR 457X0C	B-52 MAINTENANCE	9312-9409	99	0.36	NO	11
29	2A5X1G OR 457X0C	B-52 MAINTENANCE	9406-9509	147	0.59		12
32	2A5X1H OR 457X0D	KC-10 MAINTENANCE	9409-9509	175	0.45	N/A	13

Note: "YES" in the last column indicates the correlations differed at the $p<.05$ (two-tailed) significance level. FSG = Final School Grade. *Groups with less than 100 cases were dropped from subsequent analyses.

Appendix A
Initial Criterion Groups and Test Results

SAMPLE	AFSCS	DESCRIPTION	TECH SCHOOL CLASS DATES	N	MECH, FSG CORR	SIGNIFICANT DIFFERENCE	GROUP FOR ANALYSIS
33	2A5X2 OR 457X1	HELICOPTER MAINTENANCE	9003-9405	49	0.56	NO	14
34	2A5X2 OR 457X1	HELICOPTER MAINTENANCE	9406-9509	79	0.38		14
35	2A6X1B OR 454X0B	PROPULSION TURBO	9003-9305	357	0.44	NO	15
36	2A6X1B OR 454X0B	PROPULSION TURBO	9306-9509	287	0.34		15
37	2A6X1A OR 454X0A	PROPULSION JET ENGINE	9006-9303	1207	0.21	YES	17
38	2A6X1A OR 454X0A	PROPULSION JET ENGINE	9309-9509	755	0.37		18
41	2A6X2 OR 454X1	AEROSPACE GRND EQPMT MAINT	9003-9303	1425	0.34	NO	19
42	2A6X2 OR 454X1	AEROSPACE GRND EQPMT MAINT	9304-9509	1296	0.35		19
44	2A6X3 OR 454X2	EGRESS MAINTENANCE	9006-9306	102	0.36	NO	20
45	2A6X3 OR 454X2	EGRESS MAINTENANCE	9307-9509	209	0.15		20
46	2A6X4 OR 454X3	FUEL SYSTEMS MAINTENANCE	9006-9206	306	0.34	NO	21
47	2A6X4 OR 454X3	FUEL SYSTEMS MAINTENANCE	9206-9503	560	0.40		21
48	2A6X4 OR 454X3	FUEL SYSTEMS MAINTENANCE	9504-9509	159	0.36		21
49	2A6X5 OR 454X4	PNEUDRAULIC SYSTEMS	9006-9209	857	0.12	YES	22
50	2A6X5 OR 454X4	PNEUDRAULIC SYSTEMS	9306-9509	534	0.38		23
52	2A6X6	AIRCRAFT ELECT & ENVIRON SYS	9403-9509	724	0.28	N/A	24
53	454X5	STRATEGIC ELECT& ENVIRON SYS	9006-9306	391	0.26	NO	25
55	452X5	TACTICAL ELECT & ENVIRON SYS	9006-9304	317	0.19	NO	26
56	452X5	TACTICAL ELECT & ENVIRON SYS	9304-9406	54	0.06		26
57	454X6	AIRLIFT ELECT & ENVIRON SYS	9009-9306	536	0.12	YES	27
58	454X6	AIRLIFT ELECT & ENVIRON SYS	9304 AND LATER	35	0.48		DROPPED*

Note: "YES" in the last column indicates the correlations differed at the $p<.05$ (two-tailed) significance level. FSG = Final School Grade. *Groups with less than 100 cases were dropped from subsequent analyses.

Appendix A
Initial Criterion Groups and Test Results

SAMPLE	AFSCS	DESCRIPTION	TECH SCHOOL CLASS DATES	N	MECH, FSG CORR	SIGNIFICANT DIFFERENCE	GROUP FOR ANALYSIS
59	2A7X1 OR 458X0	AIRCRAFT METALS	9006-9304	165	0.36	NO	28
60	2A7X1 OR 458X0	AIRCRAFT METALS	9304-9509	98	0.51		28
61	2A7X3 OR 458X2	AIRCRAFT STRUCTURAL MAINT	9003-9301	1217	0.25	NO	29
62	2A7X3 OR 458X2	AIRCRAFT STRUCTURAL MAINT	9302-9501	266	0.26		29
63	2A7X3 OR 458X2	AIRCRAFT STRUCTURAL MAINT	9502-9509	182	0.33		29
64	2A7X4 OR 458X3	FABRICATION & PARACHUTE	9006-9308	307	0.14	NO	30
65	2A7X4 OR 458X3	FABRICATION & PARACHUTE	9309-9509	73	0.20		30
67	2E6X1 OR 361X0	COMMUNICATIONS-ANTENNA	9012-9509	201	0.11	N/A	31
69	2E6X2 OR 361X1	COMMUNICATIONS-CABLE	9006-9509	606	0.31	N/A	32
71	2F0X1 OR 631X0	FUELS	9003-9204	1749	0.07	YES(73)	33
72	2F0X1 OR 631X0	FUELS	9205-9409	384	0.15	YES(73)	33
73	2F0X1 OR 631X0	FUELS	9409-9509	464	0.29	YES(71,72)	34
74	2M0X2A OF 411X1A	MISSILE MAINTENANCE	9006-9303	457	0.18	N/A	35
77	2T3X1 OR 472X0	SPECIAL PURP VEHICLE	9006-9304	294	0.37	NO	36
78	2T3X1 OR 472X0	SPECIAL PURP VEHICLE	9306-9509	433	0.41		36
80	2T3X2A OR 472X1A	FIRE TRUCK MAINTENANCE	9006-9306	114	0.09	N/A	37
82	2T3X2B OR 472X1B	REFUELER MAINTENANCE	9006-9306	149	0.23	N/A	38
84	2T4X1 OR 472X2	GENERAL PURP VEHICLE	9006-9305	634	0.36	NO	39
85	2T4X1 OR 472X2	GENERAL PURP VEHICLE	9306-9509	178	0.48		39

Note: "YES" in the last column indicates the correlations differed at the $p<.05$ (two-tailed) significance level.
FSG = Final School Grade.

Appendix A
Initial Criterion Groups and Test Results

SAMPLE	AFSCS	DESCRIPTION	TECH SCHOOL CLASS DATES	N	MECH, FSG CORR	SIGNIFICANT DIFFERENCE	GROUP FOR ANALYSIS
88	2T2X1 OR 605X5	AIR TRANSPORT EQPMT MAINT	9003-9305	1851	0.18	NO	40
89	2T2X1 OR 605X5	AIR TRANSPORT EQPMT MAINT	9306-9509	1044	0.24		40
91	2W0X1A OR 465X0	MUNITIONS-CAS	9312-9509	411	0.19	N/A	42
93	2W0X1B OR 461X0	MUNITIONS-PRODUCTION	9003-9303	2106	0.35	NO	43
94	2W0X1B OR 461X0	MUNITIONS-PRODUCTION	9404-9509	1019	0.38		43
96	2W1X1C 462X0C	A-10 ARMAMENT	9006-9403	166	0.35	N/A	44
99	2W1X1E OR 462X0E	F-15 ARMAMENT	9009-9403	663	0.34	NO	45
100	2W1X1E OR 462X0E	F-15 ARMAMENT	9503-9509	293	0.29		45
103	2W1X1F OR 462X0F	F-16 ARMAMENT	9006-9403	905	0.38	NO	47
104	2W1X1F OR 462X0F	F-16 ARMAMENT	9404-9509	289	0.35		47
107	2W1X1H OR 462XOH	F-111 ARMAMENT	9006-9312	189	0.25	N/A	48
109	2W1X1K OR 462XOK	B-52 ARMAMENT	9103-9403	204	0.27	N/A	49
113	2W1X1L OR 462XOL	B-1 ARMAMENT	9009-9312	107	0.49	N/A	50
116	2W1X1Z OR 462X0Z	HC-130 ARMAMENT	9006-9403	108	0.28	N/A	51
118	2W2X1 OR 463X0	NUCLEAR WEAPONS	9006-9403	473	0.19	N/A	52
120	3E0X2 OR 542X2	ELECT POWER PRODUCTION	9009-9404	597	0.36	NO	53
121	3E0X2 OR 542X2	ELECT POWER PRODUCTION	9405-9509	187	0.26		53

Note: "YES" in the last column indicates the correlations differed at the $p<.05$ (two-tailed) significance level.
FSG = Final School Grade.

Appendix A
Initial Criterion Groups and Test Results

SAMPLE	AFSCS	DESCRIPTION	TECH SCHOOL CLASS DATES	N	MECH, FSG CORR	SIGNIFICANT DIFFERENCE	GROUP FOR ANALYSIS
122	3E1X1	HEATING, VENT, AND AIR COND	9006-9405	67	0.45	NO	54
123	3E1X1	HEATING, VENT, AND AIR COND	9406-9509	252	0.41		54
125	545X2	REFRIGERATION AND AIR COND	9006-9405	234	0.38		54
126	3E2X1	PAVEMENTS & CONSTRUCTION	9405-9509	291	0.43	NO	55
127	551X1	MASONRY	9006-9405	711	0.47		55
128	551X0	PAVEMENT MAINTENANCE	9006-9405	262	0.42		55
129	3E3X1	CIVIL ENGINEERING STRUCTURAL	9006-9404	63	0.30	NO	56
130	3E3X1	CIVIL ENGINEERING STRUCTURAL	9405-9506	218	0.28		56
131	552X0	CARPENTRY	9006-9404	509	0.27		56
132	3E4X1	UTILITIES SYSTEMS	9312-9405	47	0.30	NO	57
133	3E4X1	UTILITIES SYSTEMS	9405-9509	211	0.34		57
134	552X2	METALS FABRICATION	9003-9212	233	0.34	N/A	58
135	566X1	ENVIRONMENTAL WATER	9003-9403	410	0.28	N/A	59
136	552X5	PLUMBING	9006-9303	291	0.34	NO	60
137	3E4X2 OR 566X2	LIQUID FUEL SYSTEMS	9006-9406	156	0.30	N/A	61
139	3E8X1 OR 464X0	EXPLOSIVE ORDINANCE DISPOSAL	9003-9509	336	0.20	N/A	62
140	391X1 OR 753X0	SP COMBAT ARMS MAINTENANCE	9312-9512	134	0.09	N/A	63

Note: "YES" in the last column indicates the correlations differed at the $p<.05$ (two-tailed) significance level.
FSG = Final School Grade.

Appendix B

Number of Applicants and Maintenance Trainees at Each Score Level

STANDARDIZED SCORE	RAW SCORE	FREQUENCY IN TRAINEE SAMPLE	FREQUENCY IN APPLICANT SAMPLE	PERCENTAGE OF APPLICANTS	CUMULATIVE PERCENTAGE OF APPLICANTS	AVERAGE NUMBER OF APPLICANTS PER YEAR
10	150	0	256	0.2	1.9	85.33
10	151	0	286	0.2	2.2	95.33
11	152	1	328	0.3	2.4	109.33
11	153	1	334	0.3	2.7	111.33
12	154	1	406	0.3	3.1	135.33
12	155	2	374	0.3	3.4	124.67
13	156	1	441	0.4	3.8	147.00
13	157	0	461	0.4	4.2	153.67
14	158	2	504	0.4	4.6	168.00
15	159	2	440	0.4	5.0	146.67
15	160	0	617	0.5	5.5	205.67
16	161	3	548	0.5	6.0	182.67
17	162	8	715	0.6	6.6	238.33
18	163	2	569	0.5	7.1	189.67
18	164	5	836	0.7	7.8	278.67
19	165	3	708	0.6	8.4	236.00
20	166	9	857	0.7	9.1	285.67
21	167	4	680	0.6	9.7	226.67
21	168	10	937	0.8	10.5	312.33
22	169	0	760	0.6	11.1	253.33
23	170	10	1017	0.9	12.0	339.00
24	171	6	845	0.7	12.7	281.67
25	172	16	1189	1.0	13.8	396.33
26	173	7	906	0.8	14.5	302.00

Note: Average number of applicants per year is based on 1993-1995 data for 117.063 persons.

Appendix B
Number of Applicants and Maintenance Trainees at Each Score Level

STANDARDIZED SCORE	RAW SCORE	FREQUENCY IN TRAINEE SAMPLE	FREQUENCY IN APPLICANT SAMPLE	PERCENTAGE OF APPLICANTS	CUMULATIVE PERCENTAGE OF APPLICANTS	AVERAGE NUMBER OF APPLICANTS PER YEAR
26	174	14	1233	1.1	15.6	411.00
27	175	4	960	0.8	16.4	320.00
28	176	30	1279	1.1	17.5	426.33
29	177	6	949	0.8	18.3	316.33
30	178	29	1373	1.2	19.5	457.67
31	179	18	1082	0.9	20.4	360.67
32	180	27	1325	1.1	21.5	441.67
33	181	13	1182	1.0	22.5	394.00
34	182	27	1310	1.1	23.7	436.67
35	183	13	1213	1.0	24.7	404.33
36	184	49	1363	1.2	25.9	454.33
37	185	24	1346	1.1	27.0	448.67
38	186	30	1314	1.1	28.1	438.00
39	187	26	1344	1.1	29.3	448.00
40	188	48	1347	1.2	30.4	449.00
40	189	29	1392	1.2	31.6	464.00
41	190	51	1319	1.1	32.8	439.67
42	191	27	1402	1.2	33.9	467.33
43	192	46	1224	1.0	35.0	408.00
44	193	170	1547	1.3	36.3	515.67
45	194	330	1262	1.1	37.4	420.67
46	195	270	1523	1.3	38.7	507.67
47	196	329	1290	1.1	39.8	430.00

Note: Average number of applicants per year is based on 1993-1995 data for 117,063 persons.

Appendix B
Number of Applicants and Maintenance Trainees at Each Score Level

STANDARDIZED SCORE	RAW SCORE	FREQUENCY IN TRAINEE SAMPLE	FREQUENCY IN APPLICANT SAMPLE	PERCENTAGE OF APPLICANTS	CUMULATIVE PERCENTAGE OF APPLICANTS	AVERAGE NUMBER OF APPLICANTS PER YEAR
48	197	241	1603	1.4	41.2	534.33
49	198	396	1249	1.1	42.2	416.33
50	199	309	1623	1.4	43.6	541.00
51	200	846	1307	1.1	44.7	435.67
52	201	605	1582	1.4	46.1	527.33
53	202	854	1248	1.1	47.2	416.00
54	203	666	1626	1.4	48.5	542.00
55	204	797	1283	1.1	49.6	427.67
56	205	756	1540	1.3	51.0	513.33
57	206	870	1222	1.0	52.0	407.33
58	207	755	1637	1.4	53.4	545.67
59	208	807	1260	1.1	54.5	420.00
60	209	820	1555	1.3	55.8	518.33
60	210	810	1145	1.0	56.8	381.67
61	211	899	1636	1.4	58.2	545.33
62	212	851	1171	1.0	59.2	390.33
63	213	861	1567	1.3	60.5	522.33
64	214	821	1137	1.0	61.5	379.00
65	215	940	1558	1.3	62.8	519.33
66	216	824	1133	1.0	63.8	377.67
67	217	922	1592	1.4	65.1	530.67
68	218	777	1096	0.9	66.1	365.33
68	219	944	1528	1.3	67.4	509.33

Note: Average number of applicants per year is based on 1993-1995 data for 117,063 persons.

Appendix B

Number of Applicants and Maintenance Trainees at Each Score Level

STANDARDIZED SCORE	RAW SCORE	FREQUENCY IN TRAINEE SAMPLE	FREQUENCY IN APPLICANT SAMPLE	PERCENTAGE OF APPLICANTS	CUMULATIVE PERCENTAGE OF APPLICANTS	AVERAGE NUMBER OF APPLICANTS PER YEAR
69	220	732	1003	0.9	68.2	334.33
70	221	1009	1538	1.3	69.6	512.67
71	222	726	1056	0.9	70.5	352.00
72	223	1024	1426	1.2	71.7	475.33
72	224	731	1101	0.9	72.6	367.00
73	225	1072	1376	1.2	73.8	458.67
74	226	655	1041	0.9	74.7	347.00
74	227	1037	1398	1.2	75.9	466.00
75	228	664	984	0.8	76.7	328.00
76	229	936	1346	1.1	77.9	448.67
77	230	628	1053	0.9	78.8	351.00
78	231	973	1237	1.1	79.8	412.33
78	232	614	921	0.8	80.6	307.00
79	233	985	1156	1.0	81.6	385.33
80	234	632	926	0.8	82.4	308.67
81	235	958	1092	0.9	83.3	364.00
81	236	567	885	0.8	84.1	295.00
82	237	1012	1029	0.9	85.0	343.00
83	238	559	875	0.7	85.7	291.67
83	239	960	1070	0.9	86.6	356.67
84	240	504	772	0.7	87.3	193.00
85	241	848	955	0.8	88.1	318.33
86	242	490	789	0.7	88.8	263.00
86	243	798	870	0.7	89.5	290.00

Note: Average number of applicants per year is based on 1993-1995 data for 117,063 persons.

Appendix B
Number of Applicants and Maintenance Trainees at Each Score Level

STANDARDIZED SCORE	RAW SCORE	FREQUENCY IN TRAINEE SAMPLE	FREQUENCY IN APPLICANT SAMPLE	PERCENTAGE OF APPLICANTS	CUMULATIVE PERCENTAGE OF APPLICANTS	AVERAGE NUMBER OF APPLICANTS PER YEAR
87	244	41	731	0.6	90.1	243.67
88	245	710	796	0.7	90.8	265.33
88	246	344	675	0.6	91.4	225.00
89	247	711	779	0.7	92.1	259.67
89	248	377	677	0.6	92.6	225.67
90	249	648	643	0.5	93.2	214.33
91	250	365	644	0.6	93.7	214.67
91	251	599	638	0.5	94.3	212.67
92	252	354	590	0.5	94.8	196.67
92	253	513	569	0.5	95.3	189.67
93	254	321	546	0.5	95.7	182.00
93	255	457	480	0.4	96.1	160.00
94	256	281	573	0.5	96.6	191.00
94	257	383	405	0.3	97.0	135.00
95	258	245	476	0.4	97.4	158.67
96	259	288	321	0.3	97.7	107.00
96	260	260	408	0.3	98.0	136.00
96	261	240	265	0.2	98.2	88.33
97	262	187	335	0.3	98.5	111.67
97	263	156	271	0.2	98.8	90.33
98	264	130	291	0.2	99.0	97.00
98	265	136	183	0.2	99.2	61.00
98	266	127	238	0.2	99.4	79.33
99	267	68	126	0.1	99.5	42.00
99	268	105	174	0.1	99.6	58.00
99	269	129	106	0.1	99.7	35.33
99	270	62	118	0.1	99.8	39.33

Note: Average number of applicants per year is based on 1993-1995 data for 117,063 persons.

Appendix C
Logistic Regression Results

Logistic regression analyses tested the usefulness of MECH scores for predicting success or failure in training. For those AFSs for which minimum scores for MECH and another ASVAB composite score are required, additional analyses using both scores as independent variables were conducted.

Significant chi-square statistics for the overall model and the beta weight for MECH, and non-significant goodness of fit statistics provide evidence that MECH scores explain variance in the pass/fail criterion. It is also necessary to examine the effectiveness of the model in supporting the decision-maker's objective. The objective here is to identify trainees who are likely to fail. Since, none of the models shown on the next few pages predicted any failures, the results provide little support for the use of MECH scores to screen applicants for these occupations.

Appendix C
LOGISTIC REGRESSION RESULTS FOR MECH SCORE AS A PREDICTOR OF TRAINING SUCCESS/FAILURE

AFS	TECH SCHOOL CLASS DATES	N	LOG LIKELIHOOD	MODEL CHI-SQ	GOODNESS OF FIT	BETA	R	ACTUAL NUMBER FAILED	ACTUAL NUMBER PASSED	PCT CASES CLASSIFIED CORRECTLY
2A3X3A	9006-9409	1554	539.45	12.90**	1527.22	.04**	.14	67	1487	95.70
2A3X3A	9412-9509	402	69.99	0.60	396.43	.03	.00	7	395	98.30
2A3X3B	9003-9509	1965	618.30	18.66**	1968.82**	.04**	.16	75	1890	96.20
2A3X3C	9006-9509	439	71.75	0.08	439.34	.01	.00	7	432	98.40
2A3X3E	9012-9509	256	45.86	3.40	261.32	.08	.12	5	251	98.10
2A5X1A	9306-9509	272	86.74	5.39	248.03	.06	.16	11	261	96.00
2A5X1B	9309-9509	508	81.92	0.37	510.43	.02	.00	8	500	98.40
2A5X1C	9309-9509	252	21.16	2.17	173.01	.10	.00	2	250	99.20
2A5X1D	9312-9509	233	12.49	0.41	190.29	.06	.00	1	232	99.60
2A5X1F	9312-9409	101	19.33	0.32	99.16	.03	.00	2	99	98.00
2A5X1F	9406-9509	155	36.92	0.40	158.32	.02	.00	4	151	97.40
2A5X1H	9409-9509	175						0	175	
2A5X2	9309-9509	142						0	142	
2A6X1A	9006-9303	1239	273.87	23.30**	1093.12	.06**	.25	32	1207	97.40
2A6X1A	9309-9509	774	60.16	0.23	773.17	.01	.00	5	769	99.40
2A6X1B	9003-9509	662	152.42	12.87**	573.28	.07**	.25	18	644	97.30
2A6X2	9003-9509	2893	1250.86	53.66**	2813.76**	.04**	.19	172	2721	94.10
2A6X3	9006-9509	315						0	315	
2A6X4	9006-9509	1033	81.99	1.87	1162.05**	.04	.00	7	1026	99.30
2A6X5	9006-9209	870	68.60	3.08	733.01	.07	.08	6	864	99.30
2A6X5	9306-9509	537	34.03	3.08	586.65	.10	.08	3	534	99.40

NOTES: *p<.05, **p<.01. Logistic regression models with acceptable fit statistics are highlighted.

Appendix C

LOGISTIC REGRESSION RESULTS FOR MECH SCORE AS A PREDICTOR OF TRAINING SUCCESS/FAILURE

AFS	TECH SCHOOL CLASS DATES	N	LOG LIKELIHOOD	MODEL CHI-SQ	GOODNESS OF FIT	BETA	R	ACTUAL NUMBER FAILED	ACTUAL NUMBER PASSED	PCT CASES CLASSIFIED CORRECTLY
2A6X6	9403-9509	745	181.60	9.69**	811.99**	.05**	.19	21	754	97.20
2A7X1	9006-9509	314	65.54	1.55	316.86	.03	.00	7	307	97.80
2A7X3	9003-9509	1682	178.41	2.40	1689.54	.03	.04	16	1666	99.10
2A7X4	9006-9509	383	35.03	0.04	383.51	-.01	.00	3	380	99.20
2E6X1	9012-9509	210	73.55	0.76	208.20	.02	.00	9	201	95.70
2E6X2	9006-9509	631	204.71	5.71**	617.16	.04*	.13	25	606	96.00
2F0X1	9003-9409	2166	178.24	0.84	2140.13**	.02	.00	15	2151	99.30
2F0X1	9409-9509	468	45.03	1.03	424.94	.05	.00	4	464	99.20
2M0X1	9006-9303	466	25.83	0.47	415.17	.04	.00	2	464	99.60
2T2X1	9003-9509	2955	482.50	0.02	2954.92**	.00	.00	47	2908	98.40
2T3X1	9006-9509	805	342.77	26.50**	812.92	.06**	.24	49	756	93.90
2T3X2A	9006-9306	121	51.93	1.56	115.19	.04	.00	7	114	94.10
2T3X2B	9006-9306	157	55.38	1.85	145.39	.04	.00	7	150	95.50
2T4X1	9006-9509	841	148.44	2.09	833.47	.03	.00	15	826	98.20
2W0X1A	9312-9509	415	45.10	0.00	414.77	.00	.00	4	411	99.00
2W0X1B	9003-9509	3149	272.00	0.12	3144.46**	.00	.00	23	3126	99.30
2W1X1C	9006-9403	171	38.99	6.18*	119.79	.07*	.27	5	166	97.10
2W1X1E	9009-9509	974	162.22	0.99	977.83	.02	.00	16	958	98.40
2W1X1F	9006-9509	1217	221.61	6.51*	1206.12	.03**	.15	23	1194	98.10
2W1X1H	9006-9312	198	68.64	4.58*	181.02	.04*	.19	9	189	95.50

NOTES: *p<.05, **p<.01. Logistic regression models with acceptable fit statistics are highlighted.

Appendix C

LOGISTIC REGRESSION RESULTS FOR MECH SCORE AS A PREDICTOR OF TRAINING SUCCESS/FAILURE

AFS	TECH SCHOOL CLASS DATES	N	LOG LIKELIHOOD	MODEL CHI-SQ	GOODNESS OF FIT	BETA	R	ACTUAL NUMBER FAILED	ACTUAL NUMBER PASSED	PCT CASES CLASSIFIED CORRECTLY
2W1X1L	9009-9312	107	17.25	2.7	56.93	.07	.11	2	105	98.20
2W1X1Z	9006-9403	110	19.67	0.33	101.37	.03	.00	2	108	98.20
2W2X1	9006-9403	475	25.86	0.01	473.68	.01	.00	2	473	99.60
2WIX1K	9103-9403	211	61.17	0.28	209.79	.01	.00	7	204	96.70
3E0X2	9009-9509	802	160.12	12.16**	742.47	.09**	.22	18	784	97.80
3E1X1	9006-9509	591	208.41	17.02**	558.70	.04**	.25	28	563	95.30
3E2X1	9003-9506	1338	141.94	4.42*	1316.98	.04*	.12	13	1325	99.00
3E3X1	9006-9506	805	144.91	4.29*	788.31	.05*	.11	15	790	98.10
3E4X1	9312-9509	265	41.49	0.00	264.99	.00	.00	4	261	98.50
3E8X1	9003-9509	492	612.78	1.87	491.77	.01	.00	156	336	68.30
3F4X2	9006-9406	161	44.50	0.06	160.97	.01	.00	5	156	96.90
3P1X1	9312-9509	136	20.79	0.06	134.39	-.01	.00	2	134	98.50
452X5	9009-9406	402	180.89	6.40*	404.12	.04*	.15	25	377	93.80
454X5	9006-9306	577	264.93	9.92**	558.96	.04**	.16	37	540	93.60
454X6	9009-9306	420	167.12	11.21**	401.65	.05**	.22	23	397	94.50
552X0	9003-9212	235	22.94	0.11	240.22	.02	.00	2	233	99.20
552X5	9006-9303	297	50.63	0.13	296.99	.01	.00	5	292	98.30
566X1	9003-9403	434	173.16	0.92	434.96	.02	.00	22	412	94.90

NOTES: *p<.05, **p<.01. Logistic regression models with acceptable fit statistics are highlighted.

Appendix C.
Logistic Regression Results for AFSs Using Two Scores

MECHANICAL AND/OR ELECTRICAL ASVAB SCORES

AFS	DESCRIPTION	N	LOG LIKELIHOOD	MODEL CHI-SQ	GOODNESS OF FIT	MECH BETA	MECH R	ELEC BETA	ELEC R	ACTUAL NUMBER FAILED	ACTUAL NUMBER PASSED	PCT CASES CLASSIFIED CORRECTLY
2A6X2	AGE MAINTENANCE	2893	1183.56	120.97 **	2691.48 **	0.16 *	0.05	0.06 **	0.22	172	2731	94.1
2A6X6	ELECT & ENVIR SYS	745	179.16	12.14 **	825.45 *	0.03	0.06	0.04	0.05	21	724	97.2
2M0X1	MISSILE MAINTENANCE	466	25.16	0.64	397.70	0.03	0.00	0.02	0.00	2	464	99.3
2W1X1C	A-10 ARMAMENT	171	38.84	6.33 *	119.32	0.06	0.17	0.02	0.00	5	166	97.1
2W1X1E	F-15 ARMAMENT	974	151.69	11.53 **	1061.40 *	-0.01	0.00	0.07 **	0.22	16	958	98.4
2W1X1F	F-16 ARMAMENT	1217	211.30	16.82 **	1592.23 **	0.01	0.00	0.06 **	0.19	23	1194	98.1
2W1X1H	F-111 ARMAMENT	198	60.59	12.63 **	160.14	0.01	0.00	0.09 **	0.26	9	189	96.7
2W1X1L	B-1 ARMAMENT	109	17.23	2.72	56.33 **	0.06	0.00	0.01	0.00	2	107	98.2
2W1X1Z	HC-130 ARMAMENT	110	17.12	2.87	60.66	0.00	0.00	0.10	0.00	2	108	98.2
2W2X1	NUCLEAR WEAPONS	475	24.87	1.00	369.92	-0.03	0.00	0.05	0.00	2	473	99.6
3E0X2	ELEC POWER PRODUCTION	802	146.97	25.31 **	702.67	0.05	0.09	0.08 **	0.23	18	784	97.8
3E1X1	HEATING, VENT, & A/C	591	204.31	21.12 **	542.36	0.03 *	0.14	0.04 *	0.09	28	563	95.3

MECHANICAL AND/OR GENERAL ASVAB SCORES

AFS	DESCRIPTION	N	LOG LIKELIHOOD	MODEL CHI-SQ	GOODNESS OF FIT	MECH BETA	MECH R	GEN BETA	GEN R	ACTUAL NUMBER FAILED	ACTUAL NUMBER PASSED	PCT CASES CLASSIFIED CORRECTLY
2F0X1	FUELS	2166	174.48	4.59	2083.29	0.01	0.00	0.04	0.08	15	2151	99.3
2W0X1A	MUNITIONS CAS	415	34.36	10.74 **	224.01	-0.02	0.00	0.12 **	0.34	4	411	99.4
2W0X1B	MUNITIONS PRODUCTION	3149	250.89	21.22 **	3867.37 **	-0.01	0.00	0.07 **	0.24	23	3126	99.3
3E8X1	EXPL ORD DISPOSAL	492	564.89	49.76 **	488.40	0.00	0.00	0.05 **	0.26	112	308	91.7

MECHANICAL AND/0R ADMINISTRATIVE ASVAB SCORES

AFS	DESCRIPTION	N	LOG LIKELIHOOD	MODEL CHI-SQ	GOODNESS OF FIT	MECH BETA	MECH R	ADMIN BETA	ADMIN R	ACTUAL NUMBER FAILED	ACTUAL NUMBER PASSED	PCT CASES CLASSIFIED CORRECTLY
2T2X1	AIR TRANS EQPMT MAINT	2955	472.36	10.15 **	2900.53	0.00	0.00	0.03 **	0.12	47	2908	98.4

NOTES: *p<.05, **p<.01. Logistic regression models with acceptable fit statistics are highlighted.

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THE EFFECTS OF LOWER ARMED SERVICES VOCATIONAL APTITUDE BATTERY (ASVAB) MECHANICAL SCORE REQUIREMENTS ON THE NUMBER OF APPLICANTS ELIGIBLE FOR TRAINING IN MAINTENANCE OCCUPATIONS AND THE PERCENTAGE OF TRAINING FAILURES

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This study investigated the impact of lowering the minimum Armed Services Vocational Aptitude Battery (ASVAB) Mechanical composite (MECH) scores required for recruits to enter maintenance career fields. The sample included (N=48,009) Air Force technical school trainees who attended school between 1990 and 1995. A contingency table showing the relationship between predictor scores and success/failure in technical school and logistic regression analyses suggested that required scores should be raised for five Air Force Specialties (AFSs) and should remain at the present level for four others. No linear relationship was apparent between test scores and technical school grades or pass/fail criteria for two AFSs. Results provided little evidence that reducing minimum MECH score requirements slightly will increase the rate of technical school failures. The need to collect technical school grades for unsuccessful trainees was identified.

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