DOCUMENT RESUME

ED 264 279 TM 850 765

AUTHOR	Prestwood, J. Stephen; And Others
TITLE	Armed Services Vocational Aptitude Battery: Development of Forms 11, 12, and 13.
INSTITUTION	Assessment Systems Corp., St. Paul, Minn.
SPONS AGENCY	Air Force Human Resources Lab., Brooks AFB, Tex. Manpower and Personnel Div.
REPORT NO	AFHRL-TR-85-16(I)
PUB DATE	Sep 85
NOTE	123p.
PUB TYPE	Reports - Research/Technical (143) -- Statistical Data (110)
EDRS PRICE	MF01/PC05 Plus Postage.
DESCRIPTORS	Ability Identification; *Aptitude Tests; *Armed Forces; Data Collection; *Equated Scores; *Item Analysis; Latent Trait Theory; Occupational Tests; Population Distribution; Postsecondary Education; Raw Scores; Scaling; Scores; Tables (Data); *Test Construction; *Test Theory; Vocational Aptitude; Young Adults
IDENTIFIERS	*Armed Services Vocational Aptitude Battery

ABSTRACT

Six new forms of Armed Services Vocational Aptitude Battery (ASVAB) were developed. These new forms were equated to a standard reference test, ASVAB 8a, using normative data based on a 1980 weighted probability sample of American youth, ages 18-23. Equating allows the services to report the distributions of examinee ability on a common metric or standard regardless of which form of the test the examinees take. It also provides consistent meanings for cutting scores used in selection and classification. The new ASVAB forms were analyzed using data collected in Recruit Training Centers (RTCs) and Military Entrance Processing Stations (MEPS). The subtests and items were analyzed using both conventional and item response theory procedures. For each form, linear and smoothed equipercentile equating tables were then developed for the 10 raw subtest scores, two raw-score composites, and 14 standard-score composites. The Joint Services Selection and Classification Working Group met in April of 1983 and selected two sets of linear equating tables for future use. For ASVAB 12a, the tables developed in the RTCs for that form were selected. For the other new forms, the tables developed in the MEPS using ASVAB 11a were selected. (The selected equating tables are appended.) (LMO)

AFHRL-TR-85-16(I)

AIR FORCE HUMAN RESOURCES LABORATORY

ED264279

ARMED SERVICES VOCATIONAL APTITUDE BATTERY: DEVELOPMENT OF FORMS 11, 12, AND 13

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September 1985

Final Report for Period October 1981 - May 1985

Approved for public release; distribution unlimited.

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This report has been reviewed and is approved for publication.

NANCY GUINN, Technical Director
Manpower and Personnel Division

DENNIS W. JARVI, Colonel, USAF
Commander

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S) AFHRL-TR-85-16(I)
6a. NAME OF PERFORMING ORGANIZATION Assessment Systems Corporation 6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION Manpower and Personnel Division
6c. ADDRESS (City, State, and ZIP Code) 2233 University Avenue, Suite 310 St. Paul, Minnesota 55114	7b. ADDRESS (City, State, and ZIP Code) Air Force Human Resources Laboratory Brooks Air Force Base, Texas 78235-5601
8a. NAME OF FUNDING/SPONSORING ORGANIZATION Air Force Human Resources Laboratory 8b. OFFICE SYMBOL (If applicable) HQ AFHRL	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER F33615-81-C-0020
8c. ADDRESS (City, State, and ZIP Code) Brooks Air Force Base, Texas 78235-5601	10. SOURCE OF FUNDING NUMBERS

PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.	WORK UNIT ACCESSION NO.
62703F	7719	18	13

11. TITLE (Include Security Classification)
Armed Services Vocational Aptitude Battery: Development of Forms 11, 12, and 13

12. PERSONAL AUTHOR(S)
Prestwood, J.S.; Vale, C.D.; Massey, R.H.; Welsh, J.R.

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Final	FROM Oct 81 TO May 85	September 1985	122

16. SUPPLEMENTARY NOTATION
Volume II of this report contains plots based on the equating tables developed for each test site. Because of the limited interest in such data, only a very few readers will find Volume II of significant value.

17. COSATI CODES

FIELD	GROUP	SUB-GROUP
05	09	

18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
conversion; equipercentile; 1980 youth population; deviation; equivalent groups; equating; smoothing

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

This report describes the development of the Armed Services Vocational Aptitude Battery (ASVAB) Forms 11, 12, and 13. The items for the new forms were supplied by the Air Force Human Resources Laboratory (AFHRL). They were administered to examinees in Recruit Training Centers (RTCs) along with items in the ASVAB 8b, a test battery parallel to the reference test used in this study, ASVAB 8a, as part of a previous research effort. Using the pretest data, eight new power subtests were constructed by matching classical item statistics for the new items to corresponding ASVAB 8b items. Comparisons of classical and item response theory (IRT) item statistics suggested that the newly developed subtests should be parallel among themselves and to ASVAB 8b.

Complete new ASVAB test batteries and ASVAB 8a were administered to examinees in RTCs using an equivalent-groups design. In addition, partial batteries of ASVAB Form 11a (judged to be the most "central" of the new forms) and ASVAB 8a were administered to examinees at Military Entrance Processing Stations (MEPS). The demographic statistics for the RTC and MEPS samples indicated that the assumptions of the equivalent-

(continued)

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION
22a. NAME OF RESPONSIBLE INDIVIDUAL Nancy A. Perrigo, Chief, STINFO Office	22b. TELEPHONE (Include Area Code) (512) 536-3877 · 22c. OFFICE SYMBOL AFHRL/TSR

DD FORM 1473, 84 MAR — 83 APR edition may be used until exhausted. All other editions are obsolete.

SECURITY CLASSIFICATION OF THIS PAGE

Unclassified

Item 19 (Concluded):

groups design were met. Summary score statistics were computed for each subtest administered in order to determine if like-named subtests were parallel. Classical item statistics and IRT parameters showed that the new subtests were more parallel among themselves than they were to the like-named ASVAB 8a subtests.

Linear and equipercentile equating tables were developed for the raw subtest scores using a 1980 weighted probability sample of American youth (males and females, ages 18-23) as the normative base. Two raw-score composites, Armed Forces Qualification Test (AFQT) and Verbal (VE), and 14 standard-score composites were also equated. Equating tables were developed for each of the six new forms administered in the RTCs and for the single form administered in the MEPS. Average linear and equipercentile tables were also developed from the RTC tables. Several statistics were used to compare the tables. These were the average bias, average absolute difference (AAD), and root mean square difference (RMSD) between table entries. Bias, AAD, and RMSD statistics weighted by the number of examinees corresponding to each entry in the table were also computed. Two linear tables were selected for operational use. For one form (ASVAB 12a), the table developed in the RTCs for that form was selected; and for the remaining five forms, the linear table developed in the MEPS (using ASVAB 11a) was selected.

Prior to October 1984, the ASVAB composites had a score scale referenced to the population of men serving during World War II (WWII). The WWII score scale was used continuously from about 1950 through 1 October 1984, when ASVAB Forms 8, 9, and 10 were replaced with ASVAB Forms 11, 12, and 13. With the implementation of ASVAB Forms 11, 12, and 13, the normative base for the ASVAB score scale was changed from the WWII mobilization population of men to the 1980 weighted probability sample of American youth. Equating of the new ASVAB forms simultaneously accomplished two basic goals. First, the scores on the new test forms were made comparable; and second, the scores were scaled in relation to the wide range of abilities characteristic of the current mobilization population.

SUMMARY

Six new forms of the Armed Services Vocational Aptitude Battery (ASVAB) were developed. The ASVAB is used in making personnel selection and classification decisions by the United States Armed Services. It is routinely updated to enhance security, to replace items that have become obsolete, and to take advantage of advances in the field of psychological measurement. The six new forms of the test were equated to a standard reference test, ASVAB 8a, using normative data based on a 1980 weighted probability sample of American youth, ages 18-23. Equating allows the services to report the distributions of examinee ability on a common metric or standard regardless of which form of the test the examinees take. It also provides consistent meanings for cutting scores used in selection and classification.

The new forms of the ASVAB were analyzed using data collected in Recruit Training Centers (RTCs) and Military Entrance Processing Stations (MEPS). The subtests and items were analyzed using both conventional and item response theory procedures. For each form, linear and smoothed equipercentile equating tables were then developed for the 10 raw subtest scores, two raw-score composites, and 14 standard-score composites. The Joint Services Selection and Classification Working Group met in April of 1983 and selected two sets of linear equating tables for future use. For ASVAB 12a, the tables developed in the RTCs for that form were selected. For the other new forms, the tables developed in the MEPS using ASVAB 11a were selected.

PREFACE

This technical report, and the test development effort it describes, were completed as part of the Omnibus Item Pool and Test Development Project (Contract F-33615-81-C-0020). This project was completed by Assessment Systems Corporation, St. Paul, Minnesota, for the Air Force Human Resources Laboratory, San Antonio, Texas.

Appreciation is expressed to Dr. Malcolm Ree of the Air Force Human Resources Laboratory and to Dr. Jerome Lehnus of the Military Entrance Processing Command for their contributions to and support of this project.

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ARMED SERVICES VOCATIONAL APTITUDE BATTERY:
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I. INTRODUCTION

The United States Armed Services have used ability test batteries in making personnel selection and classification decisions since early in this century. The instrument currently used in making these decisions is the Armed Services Vocational Aptitude Battery (ASVAB). Since 1980, the ASVAB has consisted of ten individual subtests. These subtests are General Science, Arithmetic Reasoning, Word Knowledge, Paragraph Comprehension, Numerical Operations, Coding Speed, Auto and Shop Information, Mathematics Knowledge, Mechanical Comprehension, and Electronics Information. Scores from four of the subtests--Arithmetic Reasoning, Word Knowledge, Paragraph Comprehension, and Numerical Operations--are used to compute an Armed Forces Qualification Test (AFQT) composite score. The AFQT score is used to determine whether an applicant is qualified for enlistment. Other composite scores, computed using scores from two or more of the subtests, are used to determine the qualifications of enlistees for training in different occupational specialties in the various services.

The ASVAB is routinely updated to enhance test security, to replace items that become obsolete, and to take advantage of advances in the field of psychological measurement (Ree, Mullins, Mathews, & Massey, 1982). New forms of the ASVAB are equated to a reference test in order to place scores from the new forms on a common normative scale. Equating allows the services to report and compare the distribution of abilities on a year-to-year basis using a common metric or standard. It also provides a consistent meaning for the scores used in selection and classification (Ree, Mathews, Mullins, & Massey, 1982).

This report describes the development of six new forms of the ASVAB. The new forms were developed using items supplied by the Air Force Human Resources Laboratory (AFHRL) and pretested in a previous study. The new forms were designed to parallel the existing ASVAB forms in both their content and their statistical characteristics. The data resulting from the administration of the new tests in Recruit Training Centers (RTCs) and Military Entrance Processing Stations (MEPS) were used to equate the new forms to ASVAB 8a. ASVABs 8, 9, and 10 were referenced to the population of men serving during World War II. These newly developed ASVABs--11, 12, and 13--were referenced to a 1980 weighted probability sample of American youth, males and females ages 18-23. The equating tables produced in this study were analyzed and tables for future use were suggested.

II. TEST CONSTRUCTION

Initial Item Pool

The initial item pool for the new parallel forms was developed under a previous contract. The items were written, administered to recruits at Lackland Air Force Base, Texas, and selected for additional pretesting. The additional pretesting was accomplished in RTCs using samples of both males and females. For each item pretested, the proportion correct, point-biserial correlation, biserial correlation, and estimates of the item response theory (IRT) discrimination (a), difficulty (b), and guessing (c) parameters were computed using the LOX computer program. LOX is a modification of OGIVIA (Gugel, Schmidt, & Urry, 1976) that uses OGIVIA's minimum-chi-square computational procedures for estimating the a, b, and c parameters (cf., Ree, Mullins, Mathews, & Massey, 1982).

Table 1 shows the number of items required for the new forms in each content area included in the ASVAB and the number of items pretested in each area. Six unique sets of items were required for the new forms of the subtests included in the computation of the AFQT. Only three unique sets of items were required for the new forms of the other subtests. Items in these latter sets were re-ordered to produce an additional form from each set of items. A total of six new subtests was required within each content area--six subtests with unique sets of items for the content areas included in the computation of AFQT scores and six new subtests derived from three unique sets of items for the other content areas.

Construction of Parallel Subtests

There were two primary objectives in creating the new parallel subtests. First, all of the new experimental forms should be parallel among themselves; second, the new forms should also be parallel to the reference form, ASVAB 8a. The second objective was accomplished indirectly by attempting to parallel the ASVAB 8b, which was used in the pretesting study. The ASVAB 8b was used in the pretesting study because it was the form most similar to the others with which it was developed (ASVABs 8a, 9a, 9b, 10a, and 10b). Its use will therefore ensure that the forms developed in the present study are maximally similar to the ASVAB 8, 9, and 10 forms.

Power Subtests

Procedure

Parallel forms for all non-speeded subtests except Paragraph Comprehension were developed using the conventional item statistics (i.e., the proportions of examinees endorsing the items correctly and the biserial correlations of the item scores with the total test scores). A computer algorithm matched these statistics between the reference form and the new experimental forms by mechanizing the approach suggested by Guilford (1954, pp. 442-443). Guilford suggested plotting the items with proportion correct and biserial correlation on Cartesian coordinates and selecting new items that were graphically proximate to the reference items. In the computer algorithm, proximity was evaluated using the Euclidian distance statistic (i.e., the d-squared statistic). It was computed by summing the squared differences between the two proportions correct and the two biserial correlation coefficients for each reference item paired with each experimental item.

The matching algorithm was a two-stage procedure applied within each content area individually. In the first stage of the procedure, the Euclidian distance was computed between each reference item and each of the items in the experimental pool. The experimental item that most closely matched each reference item was then identified. In the second stage of the procedure, the experimental item matching the hardest-to-match reference item was chosen to parallel that reference item in the new subtests. That item was then removed from the pool of experimental items and the two stages were repeated. Each time the stages were repeated, the best-matching experimental item remaining in the pool was identified for each of the reference items and the item matching the hardest-to-match reference item was chosen to parallel that item and was removed from the pool. The two stages were repeated until three or six new items (depending on the content area) had been paired with each of the reference items. When the quota of three or six items was reached for any reference item, that item was removed from the process.

Unlike the other power subtests, the Paragraph Comprehension subtests contained reading passages followed by one or more questions referring to that passage. This format required that the items pertaining to a single passage be considered together rather than as individual items in constructing the new forms. Additionally, the amount of reading material contained in the passages had to remain fairly constant across the six new forms and had to match the amount found in the old form as closely as possible. The new Paragraph Comprehension subtests were therefore manually constructed. An attempt was made to parallel the ASVAB 8b in average proportion correct and average biserial correlation and to match the overall number of words in the passages for the six experimental tests. Because the pretested Paragraph Comprehension items referred to passages that were longer, on the average, than those in ASVAB 8a or 8b, an attempt was also made to minimize the overall passage length in the new subtests.

Item Statistics Evaluation

The parallelism of the subtests was evaluated using two procedures. First, the means and standard deviations of the proportions correct, biserial correlations, and a, b, and c item parameters were computed.

General Science. Table 2 presents the pretest item statistics for the General Science subtests. The proportions correct were similar in mean and standard deviation across all new forms and ASVAB 8b. On the average, the three new forms had mean biserial correlations 0.060 higher than that of ASVAB 8b. The mean a parameter of ASVAB 8b was 1.337 while the mean a parameters of the new forms ranged from 1.332 to 1.422. The mean b's for the new forms were slightly lower than the mean b on ASVAB 8b. The mean c parameters for the new forms were an average of 0.067 lower than that of ASVAB 8b.

Arithmetic Reasoning. Table 3 summarizes the pretest item statistics for the Arithmetic Reasoning subtests. The mean proportions correct varied by a maximum of 0.003. The standard deviations of the proportions correct among forms were also very similar, ranging from 0.152 to 0.163. The mean biserial item-total correlations for the six new forms were all higher than that of ASVAB 8b, although the largest difference was only 0.030. With the exception of the fifth new form, the means of the a parameters for the new forms were slightly lower than the mean a parameter of ASVAB 8b. Again the difference was small (0.021). The fifth form also had somewhat higher mean b and c parameters than did the rest of the forms.

Word Knowledge. Table 4 shows pretest item statistics for the Word Knowledge subtests. The mean proportions correct were almost identical across all forms, differing by only 0.001. The mean biserial item-total correlations were an average of 0.042 higher on the new forms than on ASVAB 8b. The mean a parameters ranged from 1.364 to 1.487 across the forms. The mean b parameters were similar across the new forms. The mean b parameter for ASVAB 8b was 0.103 lower than the average for the new forms. The mean c parameters ranged from 0.188 to 0.218.

Paragraph Comprehension. Table 5 shows the pretest item statistics for the Paragraph Comprehension items. The mean proportions correct for the new forms were more variable for the Paragraph Comprehension subtests than for any other subtests. The mean proportions correct for the new forms ranged from 0.751 to 0.759 and the standard deviations of the proportions correct ranged from a low of 0.096 to a high of 0.131. The standard deviation of proportions correct for ASVAB 8b was slightly higher (0.148). The mean biserial item-total correlations for the new forms of the Paragraph

Comprehension subtest ranged from 0.595 to 0.650. The mean biserial correlation for ASVAB 8b was slightly lower (0.563). Mean a parameters ranged from 1.366 to 1.657. The mean b parameters of the new forms were from 0.134 to 0.282 units below the mean b parameter for ASVAB 8b. The mean c parameters for the six new forms ranged from 0.220 to 0.268, all substantially less than the mean c parameter for ASVAB 8b of 0.399.

Auto and Shop Information. Table 6 summarizes the pretest item statistics for the Auto and Shop Information subtests. All forms were very similar in mean proportions correct. The standard deviations of the proportions correct for two of the new forms were slightly lower than those for the other new forms and ASVAB 8b, however. The mean biserial correlations ranged from 0.598 for ASVAB 8b to 0.612 for two of the new forms. The mean a parameters were slightly lower, 0.191 on the average, for the new forms than for ASVAB 8b. The mean b parameters were similar across forms; the largest discrepancy (0.014) was between ASVAB 8b and the third new form. The mean c parameters of the new forms were, on the average, 0.038 units lower than the mean c parameter for ASVAB 8b.

Mathematics Knowledge. Table 7 shows the pretest item statistics for the Mathematics Knowledge subtests. The mean proportions correct were identical for all four forms. The standard deviations of the proportions correct were somewhat smaller for the new forms than for the ASVAB 8b. The mean biserial item-total correlations for the new forms ranged from 0.602 to 0.618 and were slightly higher than the mean for ASVAB 8b (0.566). The mean a parameters were an average of 0.101 lower for the three new forms. The mean b parameters were very similar across all forms, ranging from 0.216 to 0.305. The mean c parameters for the three new forms ranged from 0.164 to 0.186 and were somewhat lower than the mean c parameter for ASVAB 8b (0.240).

Mechanical Comprehension. Table 8 shows the pretest item statistics for the Mechanical Comprehension subtests. The mean proportions correct ranged from 0.643 to 0.650. The mean biserial correlations were also similar across forms, ranging from 0.557 to 0.582. The mean a parameters were an average of 0.071 lower for the new forms than for ASVAB 8b. The mean b parameters were similar across all forms; the largest discrepancy from ASVAB 8b was approximately 0.108 units. The mean c parameters for the new forms ranged from 0.230 to 0.243 and were slightly lower than the mean c parameter for ASVAB 8b (0.267).

Electronics Information. Table 9 summarizes the pretest item statistics for the Electronics Information subtests. The mean proportions correct were very similar across forms with the largest discrepancy being 0.003. The standard deviation of the proportions correct for ASVAB 8b was higher than those for the new forms. The mean biserial item-total correlations for the three new forms were consistently higher than that of ASVAB 8b. The mean $\underline{a}$ parameters for the new forms were, however, an average of 0.222 lower than for ASVAB 8b. The $\underline{b}$ parameters for the new forms were also somewhat lower than the mean $\underline{b}$ parameter for ASVAB 8b; the largest discrepancy (0.256) was between the second new form and ASVAB 8b. The mean $\underline{c}$ parameters for the new forms ranged from 0.274 to 0.290 and were somewhat lower than the mean $\underline{c}$ parameter for ASVAB 8b (0.356).

Summary. Tables 2 through 9 show summaries of these statistics for the non-speeded subtests. The variations among the mean proportions correct for the experimental forms within a content area were small. The largest variation (0.008) occurred in Paragraph Comprehension. This was probably due to difficulties in creating parallel forms in this content area where the length of the reading passages had to be minimized and where the items had to be considered for inclusion in sets rather than individually. The largest average deviation between the mean proportions correct for the experimental subtests and the ASVAB 8b reference form (0.003) occurred in Mechanical Comprehension. In all areas except Mechanical Comprehension, the mean biserial correlations were systematically higher for the experimental forms than for the ASVAB 8b. Average differences were small, ranging from -0.011 for Mechanical Comprehension to 0.060 for General Science. In general, these data collectively suggest that the new forms of these subtests should be parallel.

Estimated True-Score Evaluation

Additional analyses using the IRT parameters were also performed. These analyses required the computation of estimated true-score distributions. The $\underline{a}$, $\underline{b}$, and $\underline{c}$ parameters and an assumed distribution for ability were required to estimate the true-score distributions. The parameter estimates produced by LOX and a standard normal distribution of ability were used. True scores were estimated from Equation 1 at 20 points equally spaced between theta = -3.0 and theta = 3.0.

$$T(\theta) = \sum_{g=1}^{n} P_g(\theta), \tag{1}$$

where n = the number of items in the test,

$$P_g(\theta) = c_g + (1 - c_g)\,\Psi[1.7\,a_g(\theta - b_g)], \text{ and}$$

$$\Psi(x) = (1 + \exp(-x))^{-1}.$$

Means and standard deviations were computed numerically using Equations 2 and 3.

$$\overline{T} = E(T) = \int T(\theta)\,\phi(\theta)\,d\theta, \tag{2}$$

$$\text{where } \phi(\theta) = \frac{1}{\sqrt{2\pi}} \exp\left(\frac{-\theta^2}{2}\right).$$

$$\sigma_T^2 = E(T^2) - E^2(T), \tag{3}$$

$$\text{where } E(T^2) = \int T^2(\theta)\,\phi(\theta)\,d\theta.$$

The root mean square deviation (RMSD) between the estimated true-score distributions of the new subtests and both the average distributions for the new subtests and for the ASVAB 8b subtest were computed using Equation 4.

$$\text{RMSD} = \sqrt{\text{MSD}}, \tag{4}$$

$$\text{where MSD} = \int [T_1(\theta) - T_2(\theta)]^2\,\phi(\theta)\,d\theta.$$

The results of the estimated true-score evaluations are described below for each of the non-speeded subtests.

General Science. Table 10 shows the estimated true-score statistics for the three experimental General Science subtests. The means and standard deviations of the true-score distributions of the new subtests were more similar to each other than they were to the statistics for the ASVAB 8b distribution. This was due to restrictions imposed on the new subtests by the experimental item pool. The experimental items were generally less discriminating than were the ASVAB 8b items. The RMSDs also indicated that the distributions for new subtests were more similar to the average distribution of the new subtests than to the distribution of the reference subtest. The forms were probably more similar among themselves than to the reference test because they were developed from a common pool of test items.

Arithmetic Reasoning. The estimated true-score statistics for the six experimental and the ASVAB 8b Arithmetic Reasoning subtests are shown in Table 11. The means of the estimated distributions for the new subtests ranged from 18.877 to 19.033, while the mean for the ASVAB 8b distribution was slightly higher (19.158). The standard deviations were uniformly higher for distributions of estimated true scores for the experimental subtests than for ASVAB 8b. They ranged from 5.844 to 6.198 for the new subtest distributions. The standard deviation for the estimated ASVAB 8b distribution was 5.828. The RMSDs again showed that the new subtests had distributions which were more similar to the average new subtest distribution than to the ASVAB 8b distribution.

Word Knowledge. Table 12 shows the estimated true-score distribution statistics for the six experimental Word Knowledge subtests. The means of the true-score distributions for the new subtests were between 25.796 and 26.026. The mean for the distribution based on the ASVAB 8b subtest was 26.045. Again, the standard deviations of the distributions for the new subtests were uniformly higher than that for the ASVAB 8b subtest. The RMSDs indicate that the true-score distributions for the experimental subtests were more similar to the average experimental distribution than to the reference distribution.

Paragraph Comprehension. The estimated true-score statistics for the six new Paragraph Comprehension subtests are shown in Table 13. The means of the estimated distributions varied by as much as 0.531 score points for the new subtests. The mean of the estimated true-score distribution for the ASVAB 8b subtest (11.729) was higher than the highest mean for any of the new subtest distributions (11.423), while the standard deviation was lower (2.179 versus 2.568). The RMSDs between the estimated true-score distributions for the individual experimental subtests and the average experimental subtest were lower than the RMSDs between the distributions for the individual experimental subtests and the reference subtest.

Auto and Shop Information. Table 14 shows the estimated true-score statistics for the three experimental Auto and Shop Information subtests. The means of the true-score distributions for the experimental subtests were more similar to each other than they were to the mean for the ASVAB 8b distribution. The standard deviation for the ASVAB 8b subtest (5.037) fell within the range of the standard deviations for the experimental subtests. The RMSDs again indicated that the distributions for new subtests were more similar to the average distribution of the new subtests than to the distribution of the reference subtest.

Mathematics Knowledge. The estimated true-score statistics for the three experimental and the ASVAB 8b Mathematics Knowledge subtests are shown in Table 15. The means of the estimated true-score distributions for the new subtests ranged from 13.044 to 13.093, while the mean for the ASVAB 8b distribution was slightly higher (13.307). The standard deviations of the true-score distributions of the experimental subtests were higher than the standard deviation of the ASVAB 8b distribution. The RMSDs again indicated that the new subtests had distributions which were more similar to the average new subtest distribution than to the ASVAB 8b distribution.

Mechanical Comprehension. The estimated true-score statistics for the three new Mechanical Comprehension subtests are shown in Table

16. The mean of the estimated true-score distributions for experimental subtests ranged from 16.068 to 16.126. This was the only content area in which the mean of the estimated true-score distribution for the ASVAB 8b subtest was lower than the means of the new subtest distributions, but the difference (0.079) was small. The RMSDs between the estimated true-score distributions for the individual experimental subtests and the average experimental subtest were, however, still lower than the RMSDs between the distributions for the individual experimental subtests and the reference subtest.

Electronics Information. Table 17 shows the estimated true-score distribution statistics for the three experimental Electronics Information subtests. The means of the true-score distributions for the new subtests were between 13.584 and 13.732. The mean for the distribution based on the ASVAB 8b subtest was 13.898. The standard deviations of the distributions for the new subtests were uniformly higher than that for the ASVAB 8b subtest. The RMSDs indicate that the true-score distributions for the experimental subtests were more similar to the average experimental distribution than to the reference distribution.

Summary. Tables 10 through 17 show the estimated true-score statistics for each of the new non-speeded subtests. The largest difference between mean true scores among the experimental subtests within a content area (0.203) was in Paragraph Comprehension. In the other content areas, the largest difference in means among the experimental subtests averaged only 0.103. The mean true score for the reference test (ASVAB 8b) is uniformly higher than the means for the new subtests in all areas except Mechanical Comprehension. The differences are small, however. The average absolute difference between the true scores for the reference subtests and those for the corresponding experimental subtests is only 0.294.

Speeded Subtests

The Numerical Operations subtests consisted of 50 simple arithmetic computation items. Only 50 items were pretested for each of six new Numerical Operations subtests and these subtests were reproduced exactly as they appeared in pretesting.

Each Coding Speed subtest consisted of three sets of 28 items. Each set was preceded by a response key pairing words with four-digit numbers. An item stem consisted of one of the words in the key and the examinee's task was to identify the number corresponding to the word. The Coding Speed subtests were to have been reproduced in the same fashion but the pretested versions had a number of problems. First, there were only two versions with unique keys. A third version with unique keys was later provided by AFHRL. Second, the keys in the pretested subtests were not alphabetized. All keys in the current ASVAB tests were alphabetized. Third, the numbers used in the keys for all three of the Coding Speed subtests were identical within each subtest. The numbers should have been repeated only in the first and third set within each subtest, to be consistent with current ASVAB subtests. Thus, all keys were alphabetized and new numbers were inserted in the key and alternatives for the second set of items in the two pretested forms.

Construction of Parallel Batteries

Most-Central Form

The experimental design required that one of the new forms be chosen to represent the set of six new forms for administration in the MEPS. This most-central form was constructed by selecting the experimental subtests having the lowest RMSD between the estimated true-score distributions of the subtests and the average of the experimental subtests. The items within each of these subtests were ordered by their proportion-correct statistics with the easy items first. Because IRT procedures are not applicable to speeded tests, no IRT parameters were available for the Numerical Operations or Coding Speed subtests and thus true-score distribution statistics could not be computed. The Numerical Operations test with the mean number-correct score closest to the overall mean number-correct score for the six experimental forms was selected as the most-central form. Only two unique Coding Speed tests had been constructed. Because these tests were edited extensively in order to achieve content parallelism, the form designated most-central was randomly chosen from the two that were pretested.

Other Forms

Experimental subtests in Arithmetic Reasoning, Word Knowledge, Paragraph Comprehension, and Numerical Operations were assigned to the other batteries so that the mean AFQT score, estimated from proportion-correct scores, would be as equivalent as possible across batteries. The most-central form was designated by the index 1. The other forms were randomly assigned index numbers 2 through 6. Experimental subtests in the non-AFQT content areas were randomly assigned to the forms with indexes 3 and 5. The experimental subtests in the non-AFQT content areas for the forms with indexes 2, 4, and 6 were developed using the items in forms with indexes 1, 3, and 5, respectively. The subtests were developed by systematically permuting the order of the items in the forms with indexes 1, 3, and 5. The permutation reversed adjacent pairs of odd-numbered items. Even-numbered items were left in their original positions. The Coding Speed subtests required some additional changes to ensure that the same key word did not appear twice in succession or more than twice within each physically separated set of seven items on the page.

Tentative Operational Designations

Experimental forms with indexes 1 through 6 were designated as ASVAB forms 11a, 11b, 12a, 12b, 13a, and 13b, respectively. Each of the six forms has unique sets of items in the Arithmetic Reasoning, Word Knowledge, Paragraph Comprehension, and Numerical Operations subtests. The pairs of forms sharing the same numeric designation share the same items in the General Science, Coding Speed, Auto and Shop Information, Mathematics Knowledge, Mechanical Comprehension, and Electronics Information subtests. The letter designations (a and b) designate alternate forms of these latter subtests.

Summary

Test items for six new versions of the ASVAB were written and pretested as part of a previous research effort. Conventional item statistics and IRT item parameter estimates were available from pretesting. Power subtests were constructed in eight content areas using these pretest data.

The parallelism among the new subtests within each content area and the parallelism of the new subtests with the comparable ASVAB 8b subtests were assessed by comparing the distributions of the classical and IRT item statistics for items included in the subtests and by comparing estimated true-score distributions for the subtests. The new subtests within each content area appeared to be quite parallel among themselves and with the comparable ASVAB 8b subtest. The pretested Coding Speed subtests were revised and a new Coding Speed subtest was developed. The pretested Numerical Operations subtests were not altered.

The experimental subtests were then assembled into six new test batteries tentatively designated as ASVABs 11a, 11b, 12a, 12b, 13a, and 13b. The battery tentatively designated as ASVAB 11a was constructed using the subtests that were most similar to the other experimental subtests within each content area. This most-central form was developed for administration in both the MEPS and the RTCs.

III. TEST ADMINISTRATION

An optimal equating design would call for the new subtests to be administered under conditions that closely mimic the operational testing environment. The subtests would be administered as complete batteries to examinees selected randomly from the target population. Considerations of time and cost made such an optimal design unfeasible, however. An alternative design was developed using two different examinee populations and a number of different configurations of the subtests.

Complete batteries of all six new forms of the ASVAB and the ASVAB 8a were administered to examinees in RTCs in order to investigate the parallelism of the six experimental forms among themselves and to the ASVAB 8a and also to develop equating tables for all forms. The forms were distributed to 11 RTCs for administration. An equivalent-groups design was employed in which each examinee was randomly assigned to take one of the seven complete batteries.

The population of applicants taking the ASVAB in the MEPS, rather than the population of recruits at the RTCs, was the target population. Rather than administering the complete battery to each examinee in the MEPS, nine partial batteries were constructed from the most-central experimental form, and nine were constructed from ASVAB 8a, the reference test. These partial batteries were constructed so that each of the individual subtests and each of the score composites used by the various armed forces for selection and placement was represented in at least one partial battery. Sixty-four MEPS located throughout the United States participated in the study. Each MEPS received an equal number of each of the 18 forms and was responsible for distributing forms to their affiliated Mobile Examining Team (MET) and Office of Personnel Management (OPM) sites. Because the batteries with different subtest configurations could not be simultaneously administered, the individual MET and OPM sites received paired experimental and reference test forms with the same configurations. In the MEPS, paired experimental and reference forms with the same subtest configurations were administered on different days of the week.

IV. TEST ANALYSES

Data Editing

Testing was accomplished during the first three months of 1983. The data analyses were preceded by data editing to ensure that the test forms were properly identified and that the data were valid.

Two editing operations were performed to prepare both the RTC and the MEPS data for analysis. The first operation verified the form number recorded by the examinee and corrected miscoded form numbers. The second operation edited the response data to eliminate suspect cases (i.e., those with too few responses, with unusual response patterns or strings, or with unusual inter-subtest score differences).

Recruit Training Center Data

Form-Number Verification

A total of 14,791 examinees were tested in the RTCs. The three-digit form numbers on the test booklets were redundantly encoded using modular arithmetic. Thus, if an examinee made an error in one column, transposed two columns, or shifted the code to the right or left on the answer sheet, some information was available for recovering the correct form number. The codes used are shown in Table 18. The first column of each form number was the same as the index; the second number was the index plus four modulo ten; and the third column was the index plus seven modulo ten.

The index corresponding to each column of the form numbers was determined. When any two of these indices matched, an examinee's record was assigned that form number. If no two indices matched, the digits present were checked for transposition and shifted position on the answer sheet. Eighty-one of the 441 cases with incorrectly coded form numbers were assigned form numbers in this fashion. The numbers of cases assigned each of the forms in this manner are shown in Table 19.

Elimination of Suspect Cases

Cases were rejected if too few items were answered in any subtest, if improbable response strings (AAAA...) or patterning (ABCABC...) occurred, if the answers recorded matched other keys substantially better than that of the form coded, or if the scores on given subtests deviated substantially from predicted scores based on all other subtests.

The number of responses was checked first. If fewer than two responses were observed in any of the subtests, the case was rejected.

If more than two responses were observed in every subtest, the overall proportion of correct responses was computed based on the number of items attempted. This proportion was used to determine whether to evaluate other criteria.

If the proportion correct was less than or equal to 0.3, the case was rescored using each of the other answer keys. If an alternate key yielded a proportion correct (based on all items attempted) greater than or equal to 0.5, the recorded form number was considered to be questionable and the case was rejected. These criteria represent an operationalization of the key verification procedure described briefly by Ree, Mathews, Mullins, and Massey (1982, p. 10).

If the proportion correct was less than or equal to 0.4, a patterning ratio was computed. The patterning ratio statistic used was a computational derivative of the chi-square test of association. An adjacency matrix was computed considering all consecutive pairs of responses (omitted items were not included). For a four-alternative item, this was a four-by-four matrix with the first response in a pair on one margin and the second response on the other. The frequency of each possible pair was accumulated for each examinee and a chi-square-like statistic was computed using the number of pairs in the response vector divided by the number of cells in the table as the expected value. Note that this differs from the expected value used for a typical chi-square. For this and other reasons, the patterning ratio statistic was not a true chi-square, although the term is used here. The chi-square statistics were pooled over all subtests and the resulting value was divided by the total chi-square degrees of freedom for the tables. The speeded test data were not included in computing the patterning ratio. The reason for this was that several high-scoring examinees marked all A's, B's, etc. at the end of the tests, when they reached the end of their time; this was a valid test-taking strategy.

Although the patterning ratio does not distribute as a chi-square, unusually high values did detect response strings such as "AAAAAAAAAAA," and patterning such as "ABCDABCDABCDABCD." A typical patterning ratio for the keys was 1.2. After considering several patterned responses and some actual data, a cutoff of 3.5 was selected. Any case evaluated which had a patterning ratio of 3.5 or greater was rejected.

Finally, all cases not previously rejected were checked for deviant subtest scores. The score on each subtest was predicted from all other subtests using multiple regression. If any two subtests had observed scores more than three standard errors below the predicted score, the examinee was rejected. Since the tests were relatively parallel, the regression equations were developed using form RTC 714 (the ASVAB 8a test form). This check for deviant subtest scores is an extension of the procedure described by Ree, Mathews, Mullins, and

Massey (1982, pp. 10-11). Their procedure regressed Arithmetic Reasoning scores on Mathematics Knowledge scores and Numerical Operations scores on Coding Speed scores; the procedure used here employed all of the data in a multiple linear regression analysis.

Results of Editing

Table 20 shows the results of the data editing for the RTC data. Of the total number of examinee response records generated in the RTCs, approximately 97 percent were included in the analyses.

Military Entrance Processing Station Data

Form-Number Verification

A total of 78,182 tests were administered in the MEPS. As in the RTCs, the three-digit form numbers on the MEPS test booklets were redundantly encoded using modular arithmetic. However, due to the larger number of form numbers and their relationships to one another when permuted, the form numbers themselves did not provide sufficient information for reliable recovery. Test form numbers along with book numbers and file indices are listed in Table 21.

The subtests within the nine pairs of tests identified by the same index were identical. The differences among the nine pairs were the combinations of subtests included in each. The subtests were combined in the various configurations shown in Table 22.

Because the nine pairs of forms required examinees to respond to different subtests, an examinee's use of different parts of the answer sheet proved to be a powerful tool for identifying miscoded form numbers. Examinees were, however, instructed to mark out the sections of the answer sheet not to be used and the optical scanner often recorded these marks as intended responses. A statistical approach was therefore required to determine which sections of the answer sheet an examinee had used for responses to test items. A likelihood function was developed to assess the information regarding form assignment that was present in these data. It was assumed that the examinee's probability of responding to an item, if he or she was supposed to, was 0.95. The probability of not responding to an item if he or she was not supposed to was also considered to be 0.95. The complementary probabilities were thus 0.05. Viewing the whole test from the item level, the likelihood of a person having taken a given test is computed using Equation 5.

As implemented in this project, the function was evaluated within each subtest and the results were multiplied together. To weight all of the subtests equally, proportions were substituted for the numbers of items. The natural log of the likelihood function shown in Equation

6 was used to keep the values within the range allowed by the computer and to simplify the computations.

$$L = \prod_{g=1}^{n} (.95)^{r_g} (.05)^{(1-r_g)}, \qquad (5)$$

where r_g = 1 if the examinee responded appropriately,

r_g = 0 if the examinee responded inappropriately, and

n = the number of items in the subtest.

$$L = \prod_{h=1}^{N} (.95)^{P_h(r_g)} (.05)^{P_h(1-r_g)}, \qquad (6)$$

where $P_h(r_g)$ = the proportion of items to which the examinee responded appropriately in subtest h,

$P_h(1-r_g)$ = the proportion of items to which the examinee responded inappropriately in subtest h, and

N = the number of subtests.

Likelihood values were computed for each of the various pairs of forms; the pair associated with the highest likelihood was selected as that most likely to have been administered. The likelihood was thus useful only in identifying a pair consisting of one experimental and one reference booklet, since both booklets included the same subtests. The tests were then scored using all 18 answer keys. If the form on which the highest score was obtained was one of the two forms identified by the likelihood analysis, cross checking continued. Otherwise, the case was rejected.

If the likelihood and high-score statistics agreed, the form number itself was checked for possible transpositions and two-digit matches. If the digits in the form number columns proved to be a transposition of a valid code or if two digits of the form number matched, the case was retained. If the likelihood and high-score statistics agreed and no transpositions or two-digit matches were found (many of the unmatched cases checked had no digits whatsoever in the form-number field), the case was accepted. A case was rejected, however, if transpositions and/or two-digit matches were found and none of them agreed with the best score and likelihood statistics.

Of the 1,586 cases that were not initially matched, 376 were rejected. The remaining 1,210 cases were accepted as valid for the forms shown in Table 23.

Elimination of Suspect Cases

The procedures used to eliminate suspect cases from the MEPS data were almost identical to those used for the RTC data. They differed only in the amount of deviation allowed in the subtest-score regression analysis. Due to the smaller number of subtests per case, examinees were rejected when one or more subtests deviated significantly below the predicted score.

Results of Editing

The results of the data editing procedures are described in Table 24 for the data collected in the MEPS. Of the examinee response records resulting from administration in the MEPS, approximately 98 percent were retained for analysis.

Summary Statistics

Demographic Statistics

Data on several demographic variables were collected in the RTCs and MEPS. These data were summarized for examinees taking each of the test forms in order to detect any sampling variation that might cast doubt upon the equivalence of the groups.

Table 25 shows the demographic characteristics of the examinee samples from the RTCs. Of the approximately 2,000 examinees taking each form, most were male and white. Males made up 83 percent of each of the examinee samples. The proportion of white examinees taking different forms ranged from 0.73 to 0.75, while the proportion of blacks ranged from 0.17 to 0.18. Of those indicating an educational level, most had at least a high school diploma. The different experimental forms were administered to approximately equal numbers of examinees at each participating RTC.

Table 26 shows the demographic characteristics of examinees tested in the MEPS. Each of the 18 test forms was administered to about 4,000 examinees. As in the RTC data, the majority of the examinees were male and white. The proportions of males and whites were more varied among the forms, however. The proportions of male examinees ranged from 0.82 to 0.84 for the individual forms, and the proportions of whites ranged from 0.65 to 0.71. Approximately 25 percent of the examinees were actually tested in the MEPS. The remainder were tested at MET and OPM sites.

Descriptive Statistics

Procedure

Summary score statistics were computed for each subtest on each experimental form. The mean, variance, skew, and kurtosis of the score distribution as well as the minimum, median, and maximum score values were computed for each subtest administered in the RTCs and for each subtest administered in the MEPS. The reliability (KR-20) and standard error of measurement of the scores were also computed for the power subtests administered in the RTCs.

RTC Results

General Science. Table 27 shows the descriptive statistics for the General Science subtests administered to the total RTC sample. The six experimental General Science subtests appeared to be parallel; the largest difference in mean raw score between any two forms was 0.209. The mean scores on the experimental tests were uniformly higher than the mean score on the reference test. The average difference between the mean score of the six experimental forms and that of the reference form was 0.121. The variances of the experimental forms were uniformly larger than the variance of the reference form. The average variance for the experimental forms was 21.401; the variance for the reference form was 17.316. Additionally, the reliabilities of the experimental forms were uniformly higher than that of the reference form.

Arithmetic Reasoning. Table 28 shows the descriptive score statistics for the Arithmetic Reasoning subtests administered to the RTC sample. The largest difference in mean raw scores between any two experimental subtests was 0.381. On the average, the mean scores of the six experimental forms differed from the mean score of the reference form by 1.029 score points, however. This was probably because the new forms were explicitly developed to parallel ASVAB 8b while ASVAB 8a was used as the reference test in the RTCs and MEPS. The mean ASVAB 8b Arithmetic Reasoning score is 0.70 points higher than the mean ASVAB 8a score (Ree, Mullins, Mathews, & Massey, 1982). The variances of the Arithmetic Reasoning scores on the experimental test ranged from 35.411 to 41.750. The variance of the reference form was 40.789. The reliabilities ranged from 0.859 to 0.881.

Word Knowledge. Table 29 shows the summary score statistics for the Word Knowledge subtests administered to the RTC sample. The largest mean difference between any two experimental tests was less than one half of a score point (0.444). The average of the mean scores of the experimental forms was 0.714 lower than the mean score of the reference form. This difference was probably due to the difference (1.2 points) between the ASVAB 8a and 8b (Ree, Mullins, Mathews, &

Massey, 1982). The variances and the reliabilities of the experimental forms were consistently higher than those of the reference form. The smallest variance of an experimental form was 37.014, while the variance of the reference form was 31.144. The smallest reliability of an experimental form was 0.881 while the reliability of the reference form was 0.864.

Paragraph Comprehension. Table 30 shows the subtest summary statistics for the fifteen-item Paragraph Comprehension subtests administered in the RTCs. The mean scores for the six experimental subtests were rather variable, the largest difference being nearly one raw score point. The average difference between the mean score on the six experimental forms and the mean score on the reference form was very small (0.002), however. The variances of the experimental forms ranged from 8.329 to 9.972. The variance of the reference form was only 8.130. The reliabilities of the experimental forms were uniformly higher than those of the reference form.

Numerical Operations. Table 31 shows the summary statistics for the Numerical Operations subtests administered to the total RTC sample. The experimental subtests differed among themselves by as much as 3.484 score points. The standard deviations of forms 158 and 603 differed by approximately one half of a score point (0.413). The average of the mean scores for the experimental forms was 35.305 while the mean of the reference form was 36.333.

Coding Speed. Table 32 shows the summary score statistics for the Coding Speed subtests administered to the RTC sample. The mean Coding Speed scores for the six experimental forms and the reference form were all within a single score point. The variances of the experimental forms varied from 190.771 to 206.625 while the variance of the reference form was 195.842.

Auto and Shop Information. Table 33 shows the descriptive statistics for the Auto and Shop Information subtests administered in the RTCs. The largest mean score difference between any two experimental forms was 0.906. The average difference between the mean score of the six experimental forms and that of the reference form was only 0.068, however. The variances of the experimental forms, ranging from 27.554 to 29.373, were uniformly larger than the variance of the reference form (25.217). The reliabilities of the experimental forms were also uniformly higher than that of the reference form.

Mathematics Knowledge. Table 34 shows the descriptive score statistics for the Mathematics Knowledge subtests administered to the total RTC sample. The largest mean score difference between any two experimental subtests was 0.463. On the average, the mean scores of the experimental forms differed from the mean score of the reference form by 0.170 score points. Again, the variances and reliabilities of the experimental forms were consistently larger than the variance and reliability of the reference form, respectively.

Mechanical Comprehension. Table 35 shows the summary statistics for the Mechanical Comprehension subtests administered to the total RTC sample. The largest mean difference between any two experimental tests was approximately one half of a score point (0.573). The mean scores for the experimental forms were consistently higher than the mean for the reference form. On the average, the mean scores of the experimental forms differed from the mean score of the reference form by 0.621. Both the variances and the reliabilities of the experimental forms were, in general, uniformly lower than those of the reference form.

Electronics Information. Table 36 shows the summary statistics for the Electronics Information subtests administered to the total RTC sample. The mean scores for all six subtests were within one score point (0,715) of each other and the average difference between the mean scores on the experimental forms and the mean score on the reference form was very small (0.003). The variances and reliabilities of the experimental forms were consistently higher than those of the reference form, ranging from 15.419 to 16.480 and from 0.767 to 0.784, respectively. The variance of the reference form was 14.699 and the reliability was 0.760.

AFQT Composite. Table 37 shows the summary statistics for the AFQT composite scores for the seven forms administered in the RTCs. The mean scores for all of the forms except RTC 370 were very similar. The mean AFQT score for RTC 370 was almost two score points (1.936) lower than the average for the other experimental forms. The score variances for the experimental forms were uniformly larger than that for the reference test but the differences were small.

Summary. Tables 27 through 36 show the summary score statistics for the forms administered to the total RTC sample. The largest difference between two experimental subtests within a content area (3.484) occurred between the Numerical Operations subtests in RTC 269 and RTC 370. In all other content areas, the largest difference in mean scores for the experimental forms was less than one score point. The absolute difference between the mean score on the experimental subtests and the mean score on the comparable reference subtest averaged 0.388 across all of the forms.

Table 37 shows the summary statistics for the AFQT scores for all of the forms administered in the RTCs. All of the forms had similar AFQT score distributions except for RTC 370. The mean score for RTC 370 was approximately two score points lower than the average for the other experimental forms.

MEPS Results

Table 38 shows the summary score statistics for the subtests administered in the MEPS. The mean score differences between the new experimental subtests and the like-named reference subtests were generally small--less than one score point for all subtests except Arithmetic Reasoning. The difference in the mean Arithmetic Reasoning scores (1.270) was similar to the discrepancy observed between the same subtests administered in the RTCs (1.109) and was probably due to differences between the ASVAB 8a and the ASVAB 8b subtests. The next largest differences occurred for the Mechanical Comprehension (0.966) and Word Knowledge (0.903) subtests. The difference between the Word Knowledge subtests can also be accounted for by the difference between ASVAB 8a and 8b. The differences between the Mechanical Comprehension subtests might have been due to the improved quality of the ASVAB 8a illustrations used in this study.

The MEPS experimental subtests were identical to those in RTC 158 while the MEPS reference subtests were identical to those in RTC 714. The MEPS experimental form had uniformly lower mean scores that RTC 158, the differences ranging from 0.099 for the 15-item Paragraph Comprehension subtest to 2.508 for the 50-item Numerical Operations subtest. The differences between the MEPS reference form and RTC 714 were similar, ranging from 0.023 for Paragraph Comprehension to 2.639 for Numerical Operations.

Item Analyses

Conventional

Procedure

Conventional item statistics were computed for each item. These statistics included the proportion of examinees responding correctly to the item, the biserial correlation between the item response and the total subtest score, and the point-biserial correlation between the item response and the total subtest score. For each subtest, the statistics were computed using the RTC data and random samples of 5,000 examinees selected from the MEPS booklets containing the subtest.

Results

General Science. Table 39 summarizes the classical item statistics for the General Science subtests. The six new forms were very similar in difficulty, the mean proportions correct ranging from 0.680 to 0.688. All were slightly easier than ASVAB 8a which had a mean difficulty of 0.679. The mean proportion correct on the MEPS form (0.647) was slightly lower than the mean on the same form administered in the RTCs (RTC 158). The mean biserial item-total correlations for the new forms ranged from 0.598 to 0.628 and were all higher than the corresponding biserial obtained for ASVAB 8a (0.549). In the MEPS, the mean biserial correlation was 0.631.

Arithmetic Reasoning. Table 40 shows the classical item statistics for the Arithmetic Reasoning subtests. Average proportions correct for the six new forms ranged from 0.633 to 0.646. All of these proportions correct were slightly higher than that of the ASVAB 8a (0.607). The mean biserial item-total correlations for the new forms ranged from 0.593 to 0.629 in the RTCs and were roughly comparable to that for ASVAB 8a (0.611). RTC 158 had a slightly lower mean proportion correct and a slightly higher mean biserial correlation when administered in the MEPS.

Word Knowledge. Table 41 presents the classical item statistics for the Word Knowledge subtests. Mean proportions correct for the new forms ranged from 0.759 to 0.772. These values were all slightly lower than the mean proportion correct of 0.785 for the ASVAB 8a. The mean proportion correct in the MEPS form 158 was again lower than that for the same forms administered in the RTCs. The mean biserial item-total correlations for the new forms ranged from 0.687 to 0.717 and were slightly higher than the mean for ASVAB 8a (0.667). Identical mean biserial correlations of 0.705 were obtained for the MEPS form and RTC 158.

Paragraph Comprehension. Table 42 summarizes the classical item statistics for the Paragraph Comprehension items. Mean proportions correct across the six new forms ranged from 0.710 to 0.776. These values were roughly comparable to the mean proportion correct of 0.745 obtained for ASVAB 8a. The mean proportion correct for RTC 158 was slightly higher than for the same form administered in the MEPS. Mean biserial item-total correlations ranged from 0.664 to 0.725 for the new forms. These were somewhat higher than the mean correlation of 0.648 obtained for ASVAB 8a.

Numerical Operations. Table 43 shows the classical item statistics for the Numerical Operations subtests. Mean proportions correct for the new forms ranged from 0.671 to 0.741 while that for ASVAB 8a was 0.727. Although biserial and point-biserial item-total correlations are presented in Table 43, they should be interpreted cautiously because Numerical Operations is a speeded subtest.

Coding Speed. Table 44 presents the classical item statistics for the Coding Speed subtests. The mean proportions correct for the forms administered in the RTCs ranged from 0.560 to 0.571. The mean for the form administered in the MEPS (0.532) was lower. Since the Coding Speed subtests were speeded, the biserial and point-biserial item-total correlation reported in Table 44 should be interpreted with caution.

Auto and Shop Information. Table 45 shows the classical item statistics for the Auto and Shop Information subtests. The proportions correct ranged from 0.632 for RTC 370 to 0.668 for RTC 592. ASVAB 8a had a mean proportion correct of 0.653. The mean proportion correct for RTC 158 was 0.028 higher than the mean proportion correct for the same items administered in the MEPS. The biserial item-total correlations ranged from 0.610 to 0.622 in the six new forms and were higher than that for ASVAB 8a (0.577). The mean biserial correlation for RTC 158 was slightly lower than the correlation for the MEPS version.

Mathematics Knowledge. Table 46 summarizes the classical item statistics for the Mathematics Knowledge subtests. The mean proportions correct ranged from 0.513 for RTC 481 to 0.532 for RTC 269. ASVAB 8a had a mean proportion correct of 0.531. The proportion correct for the MEPS form was 0.507. The mean biserial item-total correlations for the new forms ranged from 0.597 to 0.661 and were all higher than that for ASVAB 8a (0.590).

Mechanical Comprehension. Table 47 presents the classical item statistics for the Mechanical Comprehension subtests. The mean proportions correct of the new forms ranged from 0.606 to 0.629 and were higher than the mean for ASVAB 8a which was 0.593. RTC 158 had a slightly higher mean proportion correct than the MEPS form. The mean biserial item-total correlations ranged from 0.552 to 0.577 for the new forms. These means were roughly comparable to the mean of 0.573 for ASVAB 8a.

Electronics Information. Table 48 shows the classical item statistics for the Electronics Information subtests. Mean proportions correct for the new forms ranged from 0.605 to 0.640. These values centered roughly around the mean for ASVAB 8a (0.625). The mean biserial item-total correlations for the new forms ranged from 0.571 to 0.586 and were slightly higher than the ASVAB 8a mean of 0.567. The mean proportions correct and biserial correlations for the MEPS form were approximately equal to those for the same form administered in the RTCs.

Summary. Tables 39 through 48 summarize the conventional item analysis data. The mean proportions correct for the experimental subtests were all within 0.060 of the mean proportion correct for the like-named reference subtest. The mean biserial item-total correlations were uniformly higher than that of the like-named reference subtest in all of the areas except Arithmetic Reasoning, Coding Speed, and Mechanical Comprehension. On the basis of these data, the experimental subtests appear to be highly parallel in all content areas.

Of the 1,392 items analyzed, only one had a negative biserial correlation between responses to the keyed alternative for that item and the total subtest score. An analysis of this item in the Auto and Shop Information content area revealed that the key was correctly assigned, the distractors were completely wrong, and no ambiguity was apparent in the illustration that accompanied the item.

Item Response Theory Calibration Analyses

Procedure

IRT parameters were computed using the program ASCAL. ASCAL is a conditional maximum-likelihood/modal-Bayesian item calibration program for the three-parameter logistic item response model (cf., Birnbaum, 1968). The basic model and algorithms are similar to those presented by Wood, Wingersky, and Lord (1976). The algorithms used in ASCAL differed from those described by Wood, et al. (1976) in the ways described below.

Bayesian prior probabilities were applied to the ability estimates and to the *a* and *c* parameters. A standard normal distribution was used to specify the prior probability distribution of examinee ability. For the *a* parameter, a Beta distribution was used with both shape parameters equal to 3.0 and endpoints equal to 0.3 and 2.6. For the *c* parameter, a Beta distribution was used with shape parameters equal to 5.0 and endpoints equal to -0.05 and (2/k)+0.05 where k is the number of alternatives.

The ability estimates were unbounded. The *a* parameter was bounded between 0.40 and 2.50, the *b* parameter was bounded between -3.00 and 3.00, and the *c* parameter was bounded between 0.00 and (2/k).

The estimation process began with the computation of standardized number-correct scores for the examinees and conventional proportions correct and item-total biserial correlations for the items. These statistics were then transformed into IRT *a* and *b* parameters using Jensema's transformations (Jensema, 1976). Guessing (*c*) parameters of 1/k were assigned to the items in this initial stage.

These initial parameter estimates were then used to estimate abilities, and examinees were grouped into 20 fractiles, each containing approximately five percent of the examinees. The fractile means were computed and standardized (i.e., the mean of the means was set to zero and the variance of the means was set to one). Item parameters were then estimated using the fractile means and frequencies as input data.

The ability and item-parameter estimation process was repeated until the parameter estimates converged or until ten iterations were performed.

Results

Tables 49 through 56 summarize the output of the IRT calibration analyses. Each of the tables shows the mean, standard deviation, minimum value, and maximum value for the a, b, and c item parameters for each of the seven forms administered in the RTCs and for the MEPS experimental form. Overall, the most-central experimental form had slightly higher a and b parameters when administered in the MEPS than when administered in the RTCs. The only exceptions to this appear in Table 50 for the Arithmetic Reasoning subtest and in Table 55 for the Mechanical Comprehension subtest. In these cases, the mean difficulty values were lower for the MEPS sample. All of the mean difficulty values were negative with the exceptions of the mean values shown in Table 54 for the Mathematics Knowledge subtests (where all of the mean difficulties were positive) and of the mean difficulties shown in Table 56 for the Electronics Information subtests for form RTC 603 administered in the RTCs and the experimental form administered in the MEPS. The largest differences in mean difficulty among the six experimental forms administered in the RTCs occurred in the Paragraph Comprehension (0.259), Auto and Shop Information (0.230), and Electronics Information (0.272) subtests.

The largest discrepancy in average discrimination between any two forms was observed in the Electronics Information content area (0.282). The content area with the highest average discrimination over the six experimental forms was Word Knowledge (1.322) and the content area with the lowest average discrimination over the six experimental forms was Mechanical Comprehension (0.953).

Intercorrelations of Raw Subtest Scores

The incorrelations of raw subtest scores were computed for each of the test batteries administered in the RTCs. The intercorrelations are shown in Tables 57 through 60. The largest difference in the correlation of the same two subtests in different forms occurred between RTC 370 and three other forms (RTC 158, RTC 592, and RTC 603). The correlation of the Word Knowledge and Electronics subtests in RTC 370 was 0.48 while the correlation of those two subtests in each of the other three forms was somewhat higher (0.59). The largest difference in the correlation of two subtests in an experimental form and the same two subtests in the reference form (RTC 714) also involved the correlation of the Word Knowledge and Electronics Information subtests in RTC 370. Generally, the patterns of the intercorrelations were very similar for the new forms and for the reference form.

Equating Tables

Table Development

Equating the new ASVAB forms simultaneously accomplishes two goals. First, through the equating process, scores on new test forms differing in items but not in content are made comparable; and second, all scores based on the new forms are related to a sample with a wide range of abilities characteristic of the anticipated mobilization population. Prior to October 1984, the ASVAB composites had a score scale referenced to the population of men serving during World War (WW) II. The military services used the WW II score scale continuously from about 1950 through 1 Oct 1984, when ASVAB forms 8, 9, and 10 were replaced with ASVABs 11, 12, and 13. With the implementation of ASVABs 11, 12, and 13, the normative base for the ASVAB score scale was changed from the WW II mobilization population of men to a weighted probability sample of American youth, ages 18-23 (males and females) who were administered ASVAB 8ax in 1980. The rationale for and actual development of the 1980 score scale are described in Maier and Sims (1982). Other issues regarding the speeded ASVAB subtests and the development of the final operational conversion tables are described in Ree, Welsh, Wegner, and Earles (in press).

Two types of equatings were used and compared in this effort: linear and equipercentile. The linear transformation equates tests by setting raw scores with common standard or z-scores on the two tests equal. Thus, a raw score on one test is equivalent to the raw score on the other test that shares a common z-score (Angoff, 1971, pp. 568-573).

The equipercentile transformation equates tests by setting raw scores on the two tests equal if they have the same percentile rank in the samples on which equating is done (Angoff, 1971, pp. 568-573). While linear equating, by the nature of the transformation, always produces a smooth equating line, the equipercentile procedure occasionally produces a jagged or irregular equating curve. Therefore, equipercentile equating transformations are usually smoothed. Smoothing of equipercentile equating in this study was accomplished by using cubic polynomial regression. In this procedure the new test score was treated as the independent variable and the old test score was treated as the dependent variable. The first, second, and third powers of the independent variable (i.e., the new test score) were entered as independent variables into a multiple regression equation to predict the old test scores. Since only the first three powers were used, the curve resulting from this transformation was smoother than the raw data entered into the development of the regression equation.

In this specific implementation of the method, the upper and lower one thousandth of the scores were eliminated before smoothing was attempted. Having eliminated those scores the cubic regression equation was developed and applied. Monotonicity was forced in the resulting equating table because it is possible for the cubic regression to produce a non-monotonic equating curve. This was done by starting near the middle of each equating curve and, going up toward higher scores, refusing to allow the score level to fall. Similarly, when going down from the middle toward lower scores, the score level was not allowed to rise.

A final problem encountered in equipercentile equating is that it is difficult to develop an equating curve at the tails of the score distribution where the data are sparse. For example, if no scores are observed below a raw score of 5 on a given test, it is impossible, using the definitional form of the equipercentile procedure, to equate scores below 5. In this effort, scores beyond the distribution of available data were equated in the following manner: The upper and lower scores that could be equated usir, the equipercentile procedures were determined as were scores one third of the range down from the top score and one third of the range up from the bottom score. Linear extrapolations were made using these points. In the case of scores below the distribution, an extrapolation was made using the line drawn from the low score through the score a third of the way up in the range. For the high scores, a line was drawn from the highest observed score through the score one third of the way down.

Ten raw scores, two raw-score composites, and 14 standard-score composites were equated using linear and equipercentile procedures. The raw-score composites were simple sums of the raw subtest scores. Thus, for the purpose of equating, the two raw-score composites were first computed directly from the raw subtest scores and were then equated in the same manner as any other raw test score. Table 61 shows the transformations used to compute standard scores from raw scores. The normative metric for the new tests was established on a sample of the 1980 American youth population. Maier and Sims (1982) calculated the subtest means and standard deviations of males and females, ages 18-23, in the Profile of American Youth Study (Office of the Assistant Secretary of Defense, 1982) who took ASVAB 8ax (a test identical to ASVAB 8a). This sample was weighted to be nationally representative of American youth ages 18-23. The means and standard deviations of this weighted sample (Maier and Sims, appendices C5-C14) were then used to develop the transformation formulas for calculating the subtest standard scores on the new tests. Normative information on ASVAB 8a was thus used to establish the standard score scale for ASVABs 11, 12, and 13. The standard-score composites were computed from standardized raw scores in a manner described in detail below. The sums of the equated standard scores were then, in turn, equated. Table 62 shows the composition of the composites that were equated.

Recruit Training Center Data

The ten subtest scores and two raw-score composites were equated in the RTCs using the linear and equipercentile procedures described above. One linear and one equipercentile table were developed for each of the 12 composite scores on each of the six test forms. In addition to each of these individual tables, an average table was developed by simply taking the mean of the entries in each of the six individual tables for the new forms.

Standard-score equating tables were developed by applying the standardizing transformations shown in Table 61 to the raw-score equating entries in each of the seven tables (six individual and one average table). Note that standard scores were computed only for the ten subtest scores and the verbal (VE) composite. No standard scores were computed for the AFQT composite because it uses a raw-score to percentile-equivalent conversion.

Final equating tables for the raw scores were developed by rounding the standardized scores to the nearest whole number. Note that this rounding was done after the standardized scores had been converted. It was not done to the raw-score equating tables.

Individual-form and average tables were constructed for composite scores using both linear and equipercentile procedures. The composite scores were calculated by applying the like-named subtest standardized equating tables to the raw subtest scores. For example, to construct the linear, individual-form composite equating tables for RTC 158, the composite scores were computed by summing the standardized equated scores based on the final linear equating table for the RTC 158 subtests. To construct the equipercentile average composite equating tables, the composite scores were computed by summing the standardized equated scores based on the final average equipercentile equating table for the subtests. Thus, for each of the 14 composites, 14 equating tables were developed using the RTC data. Six individual and one average table were developed using the linear procedure, and six individual and one average table were developed using the equipercentile procedure.

Military Entrance Processing Station Data

The most-central experimental form (RTC 158) was equated in the MEPS. Equating procedures identical to those used in the RTCs were applied to these data.

To accomplish the raw-score equating, data from all of the experimental or 8a forms administered in the MEPS were pooled so that for each subtest, all examinees who took that subtest were used. Using these pooled samples, linear and equipercentile raw-score equating tables were developed for the ten subtest scores and the two raw-score composites. Since only one test was equated, there was no need to compute an average table. Two sets of composite scores were then computed for each military composite using the appropriate standard-score equating table and the pooled sample of all examinees available for that composite. Using this sample, composite equating tables were developed in the same manner as was done for the RTC data.

Table Evaluation

Procedure

Several different types of equating tables were developed and compared to answer three questions:

1. Should individual tables be used for each test or would a single table be satisfactory?

2. If a single table can be used, should it be the average RTC table or the MEPS table for the most-central form?

3. Should linear or equipercentile tables be used?

Because there is no way to empirically evaluate the accuracy of equating, relative information on the equating tables was used in conjunction with operational considerations in comparing the equating table differences.

Equating Table Comparisons. Equating tables were compared using three sets of weighted and unweighted statistics. Bias was computed as the average of the differences between corresponding entries in two equating tables. The absolute average deviation (AAD) was computed as the average of the absolute differences between corresponding entries in the two tables. The root mean square deviation (RMSD) was computed as the square root of the average of the square differences between corresponding entries in the two tables. These statistics were computed first by equally weighting all of the entries in the tables and again by weighting the entries by the numbers of examinees taking one of the two tests.

The six individual tables computed using the RTC data were compared to the average of these tables. This comparison was done to determine if an average table could be substituted for the six individual tables. The examinee frequencies for each of the individual tables were used in computing the weighted statistics.

The ASVAB 8a table was compared to the average RTC table. This comparison demonstrated how different the new tests were from the operational form. The total sample of RTC examinees was used to provide weights for the weighted statistics.

The MEPS table was compared to the most-central form individual table, the average RTC table, and the ASVAB 8a table. These comparisons were done to determine how the MEPS table differed from the RTC tables. The MEPS sample provided the frequencies for the weighted statistics in all three of these comparisons.

Plots of Equating Transformations. The linear, unsmoothed equipercentile, and smoothed equipercentile equating tables were plotted on the same axes for each subtest and raw-score composite. The plots were produced separately for the individual RTC, average RTC, and MEPS equating tables. Plots were also developed to compare the linear and smoothed equating tables developed for the MEPS form to the RTC 158, average RTC, and RTC 370 equating tables.

AFQT Crossover Analyses. AFQT crossover analyses, as computed by Ree, Mathews, Mullins, and Massey (1982), were used to investigate the similarity between mental category classifications made using the various AFQT equating tables produced in this study. The crossover analyses were performed on pairs of tables and showed the proportion of examinees whose mental category classification would have been different depending on which of the pair of tables was used.

Results

Equating Table Comparisons. Table 63 shows the deviation measures for subtests and raw-score composites resulting from linear equating. The first six sets of measures show the deviations of the tables for the individual forms from the average RTC table. The average bias for the subtests and raw-score composites was smallest for the deviation between RTC 158, the most-central form, and the average RTC table. The AAD and RMS were, however, smallest when the RTC 603 table was compared to the average table. The weighted AAD and weighted RMS statistics were also smallest for RTC 603. The weighted bias was smallest for RTC 481. When the new forms were compared to the average table, these deviations were uniformly highest for RTC 370. The largest deviations for the AFQT scores were found when the RTC 370 table was compared to the average RTC table. The absolute value of bias, for instance, was 55 percent higher than the next highest value for an individual AFQT table compared to the average AFQT table.

The average deviation of the form 8a table from the average RTC table was larger than the deviations between the single-form tables and the average RTC table, again suggesting that the new subtests were more parallel among themselves than they were parallel to ASVAB 8a. The unweighted deviation statistics for the AFQT composite were much higher than the weighted statistics, suggesting that the difference in the tables was more pronounced in the extreme scores. The deviations of the MEPS table from the tables for the most-central RTC form and the average RTC form were similar in magnitude to the deviations between the tables for the individual RTC forms and the average table.

Table 64 shows the deviation measures for the subtests and raw-score composites resulting from equipercentile equating. When the average deviations were compared for tables based on the six individual forms and the average RTC form, the average deviations for RTC 370 were generally larger. The exception was the bias index, which was greatest for the deviations of the RTC 592 table. The unweighted deviation measures from comparing the individual AFQT tables and the average AFQT table were higher for equipercentile equating than for linear equating. The weighted deviations for the AFQT composite were remarkably similar for both the linear and equipercentile table comparisons. The average weighted deviation statistics comparing the 8a table and the average RTC table were about the same as for the linear equating, while the unweighted statistics were higher for the linear tables.

The unweighted deviation measures for the AFQT composite were smaller for the comparison of the MEPS table with the average form than for the comparison of the MEPS table with the same form administered in the RTCs. Just the opposite was true for the weighted deviation statistics. The unweighted deviation statistics for the AFQT composite were smaller for the MEPS versus 8a equipercentile-table comparison than for the same linear-table comparison. The weighted statistics were very similar for that comparison regardless of whether the equipercentile or linear table was used.

Table 65 shows the deviation measures for the standard-score composites resulting from the linear equating procedure. As might be expected because the subtests were equated prior to forming the composites, the average bias indices were lower than for the individual subtests. The average deviations between the tables based on the individual forms and the average RTC table were more uniform across the forms than the average deviations of the subtests.

Table 66 shows the deviation measures for the equipercentile equating tables for the standard-score composites. The average deviations were generally higher than those observed for the linear equating tables. The average bias between the RTC 370 table and the average RTC table (-1.423) was much higher than the same figure for the linear tables. The difference was due primarily to the large biases for three composites--ARSC, AROF, and MCCO. These large biases do not show up in the analyses of the linear tables.

Plots of Equating Transformations. The linear, unsmoothed equipercentile, and smoothed equipercentile tables for the individual subtests and for the raw-score composites were plotted. The plots are included in Volume II of this report (for limited distribution to interested readers). The plots demonstrate that the smoothing procedure functioned well in both smoothing the table entries and in matching the actual data quite closely throughout the middle and upper ranges of the score distributions. For the two raw-score composites and a few subtests where no examinees had actually received some of the scores, the smoothed and unsmoothed tables were sometimes relatively different but these differences were expected in these situations.

As expected, the differences between the linear and the smoothed equipercentile tables are most apparent at the extremes of the score distributions. This is especially true at the lower end of the score distributions for the Word Knowledge subtests and for the two raw-score composites.

Plots comparing the MEPS tables with the RTC 158, average RTC, and RTC 370 tables are also included in Volume II. The linear tables for the MEPS form and for RTC 158 were quite similar. The smoothed tables for these forms were also similar, especially in the middle and upper score ranges. The linear and smoothed equipercentile transformations from the MEPS tables and the average RTC tables were slightly less similar. A relatively large and constant difference was found for the linear MEPS and RTC 370 equating tables for the Numerical Operations subtest. A similar difference was found in the middle and upper score ranges for the smoothed equipercentile tables for this subtest.

AFQT Crossover Analyses. Table 67 summarizes the results of the AFQT crossover analyses. It shows the proportion of examinees classified in different mental ability categories on the AFQT due to the application of different equating tables. When the linear equating table based on RTC 158 was used, for instance, four percent of the examinees were classified into categories differently than when the RTC average table was used. For the linear tables, the differential classifications ranged from none (when the RTC 481 table was compared to the average RTC table) to 0.053 (when the RTC 370 table was compared to the average table). For the equipercentile equating table comparisons, the proportions of differental classifications fell within that range with one exception. Almost ten percent of the examinees were classified differently depending on whether the table based on RTC 370 or the RTC average table was used.

If the linear tables were used operationally, the largest classification difference expected between using the individual tables for the six new forms or the average RTC table would be 5.3 percent. If the equipercentile tables were to be used, the largest expected difference would be 9.9 percent. That is, 9.9 percent of the examinees taking test 12a (experimental form RTC 370) would be misclassified if the average RTC equipercentile table was used. The differential classifications for the other forms were small in comparison, the largest being 3.4 percent for form 13a (RTC 592).

Summary

Data collected in the RTCs and MEPS were edited to ensure that the examinees correctly encoded the form numbers on their experimental answer sheets. The editing procedures also ensured that the examinees responded to a minimum number of items, did not pattern their responses in a fixed manner, and did not perform in a significantly different manner from subtest to subtest.

The distributions of demographic variables for the different experimental test booklets were checked to verify the assumption that equivalent groups of examinees took the different tests. The distributions of subtest scores for the different forms were then analyzed. The score distributions for the different forms indicated that the new forms of the subtests were generally parallel among themselves and parallel with ASVAB 8a. The distribution of AFQT scores for RTC 370 (ASVAB 12a), however, was relatively different from the distributions of AFQT scores for the other experimental forms and the reference form.

The distributions of classical item statistics and IRT item parameter estimates for the subtests within each content area were compared. These distributions were similar for the various forms of the new subtests. The largest differences in mean proportions correct among subtests within a content area (0.056) occurred in Numerical Operations. The mean biserial item-total correlations were typically higher for the new forms than for the comparable reference form. The largest differences between the mean IRT discrimination parameters for the new subtests within an area (0.282) was noted in Electronics Information. The largest such difference between mean difficulty parameters (0.259) was found in Paragraph Comprehension.

Equating tables were developed for each of the forms administered in the RTCs and for the form administered in the MEPS. An average table for the forms administered in the RTCs was also developed. The tables were compared by computing the bias, average absolute deviation, and root mean square deviation across all possible scores. The equating transformations were then plotted and inspected visually. Finally, the tables for the AFQT composite were compared by looking at the proportions of differential ability classifications made when different equating tables were used.

The table comparisons showed that RTC 370 (ASVAB 12a) was least parallel to the other experimental forms and to the reference form. The lack of parallelism appeared to be due primarily to the Numerical Operations subtest included in that form. The MEPS tables were quite similar to those for RTC 158 (ASVAB 11a, the same form administered in the RTCs).

V. SELECTION OF EQUATING TABLES

The Joint Services Selection and Classification (JSSC) Working Group met in April of 1983 to consider the data presented in this document. The Working Group concluded that ASVABs 11a, 11b, 12b, 13a, and 13b were sufficiently parallel to be represented by a single equating table. The table chosen for this purpose was the table constructed for the experimental subtests and composites administered in the MEPS. This table, rather than the average RTC table which was specifically constructed to represent all of the forms, was chosen because it was very similar to the average RTC form and was based on a large, unrestricted sample of examinees in the operational population. Figure 1 shows the linear AFQT transformations from the MEPS equating tables and the average RTC equating tables. Figure 2 shows the smoothed equipercentile AFQT transformations from the same tables. These figures demonstrate the similarity of the MEPS and average RTC tables for the AFQT composite.

Based on the deviation statistics for linear equating in Table 63, ASVAB 12a (RTC 370) was considered to be less parallel than the other forms. The difference was particularly large for the AFQT composite, although the AFQT mental ability category crossover statistics for linear equating shown in Table 67 showed little evidence of non-parallelism--only slightly more than that for the average-table versus individual-table comparisons for ASVABs 8, 9, and 10 (Ree, Mathews, Mullins, & Massey, 1982). Figures 3 and 4 show the linear and smoothed equipercentile AFQT transformations from the MEPS equating tables and from the RTC 370 (ASVAB 12a) equating tables. Because these transformations are quite different, the Working Group determined that the most appropriate tables for future use with form 12a were the tables developed for RTC 370.

The Working Group also concluded that the linear equating tables would be used because the linear and equipercentile comparisons showed little difference between the two methods, and because the linear tables were less likely to be spuriously affected by sample-specific error. The raw-score and composite-score linear equating tables developed for the experimental form administered in the MEPS are shown in Appendix A. Appendix A also contains the raw-score and composite-score linear equating tables for RTC 370, the form tentatively designated 12a.

The standard score transformations used in this study (Table 61) were established using a 1980 American youth population (McWilliams, 1980; Maier & Sims, 1982; Ree, Valentine, & Earles, 1983). In 1983, Sims and Maier reported discrepant score patterns for the ASVAB speeded subtests when the 1980 sample was compared with samples of military examinees. Subsequent research by Earles, Giuliano, Ree, and Valentine (1983) showed that the use of a non-standard answer sheet in testing the 1980 youth population caused the differences in performance which

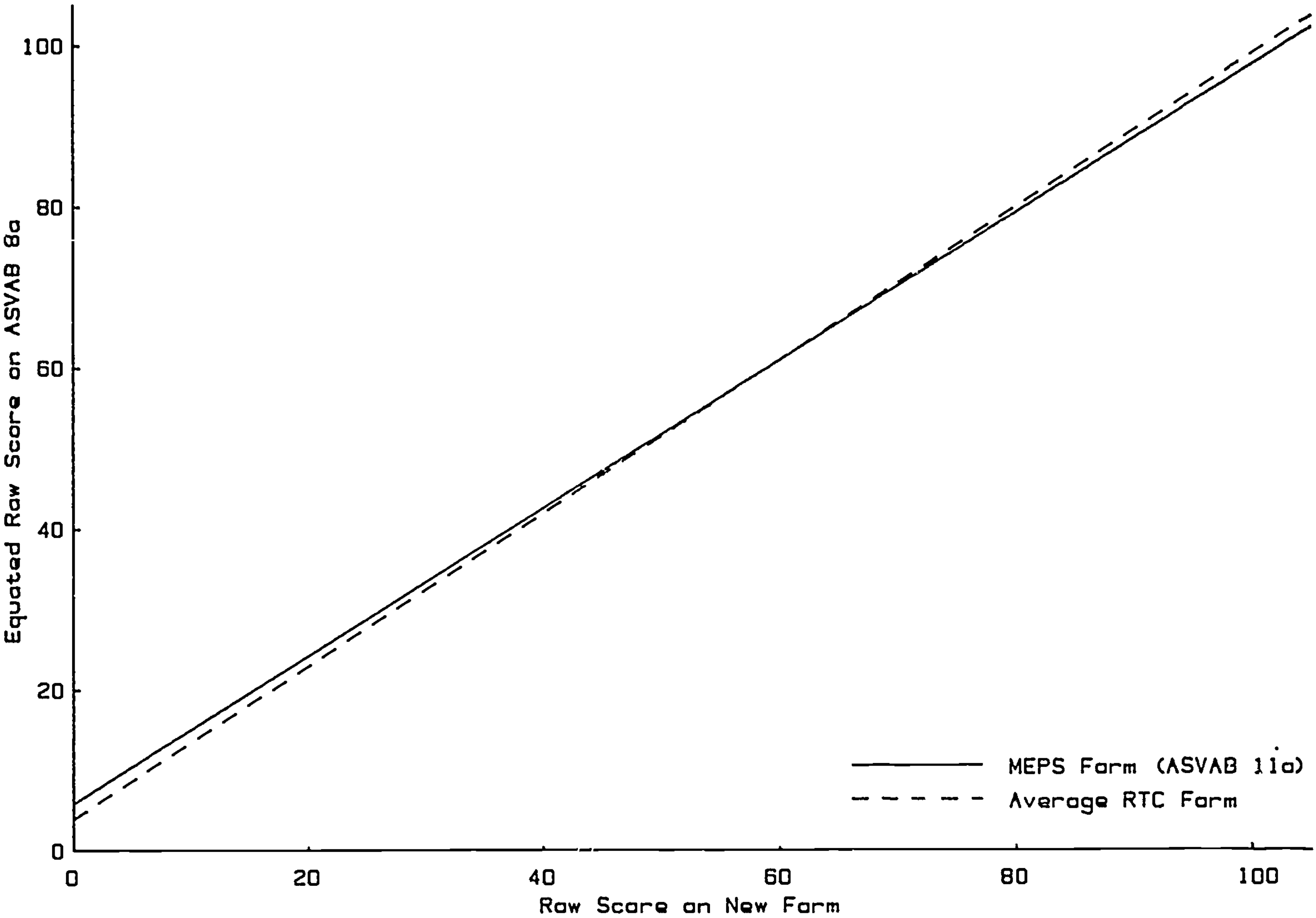

Figure 1. Linear Equating Transformations for Raw AFQT Composite Scores.

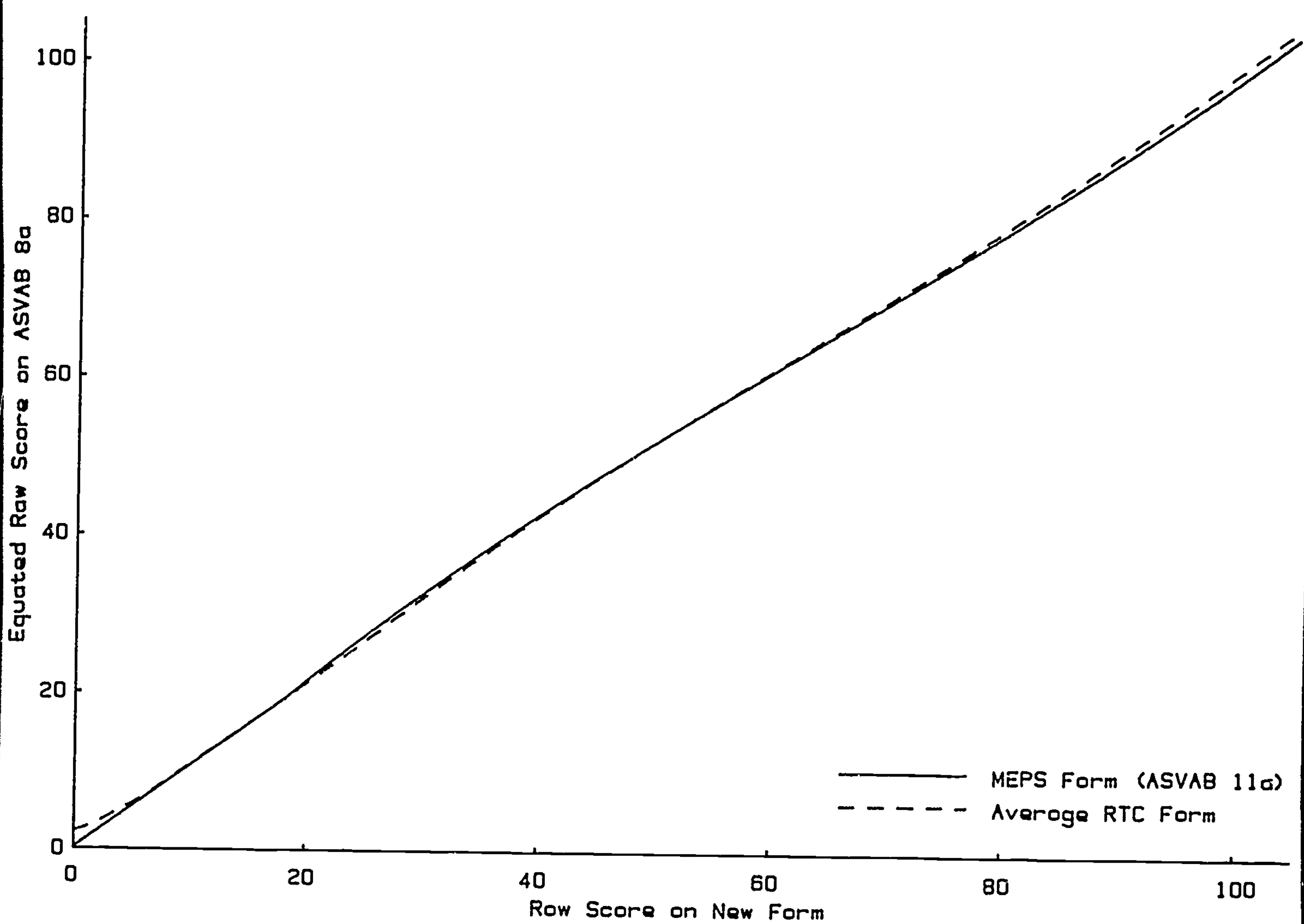

Figure 2. Smoothed Equipercentile Equating Transformations for Row AFQT Composite Scores.

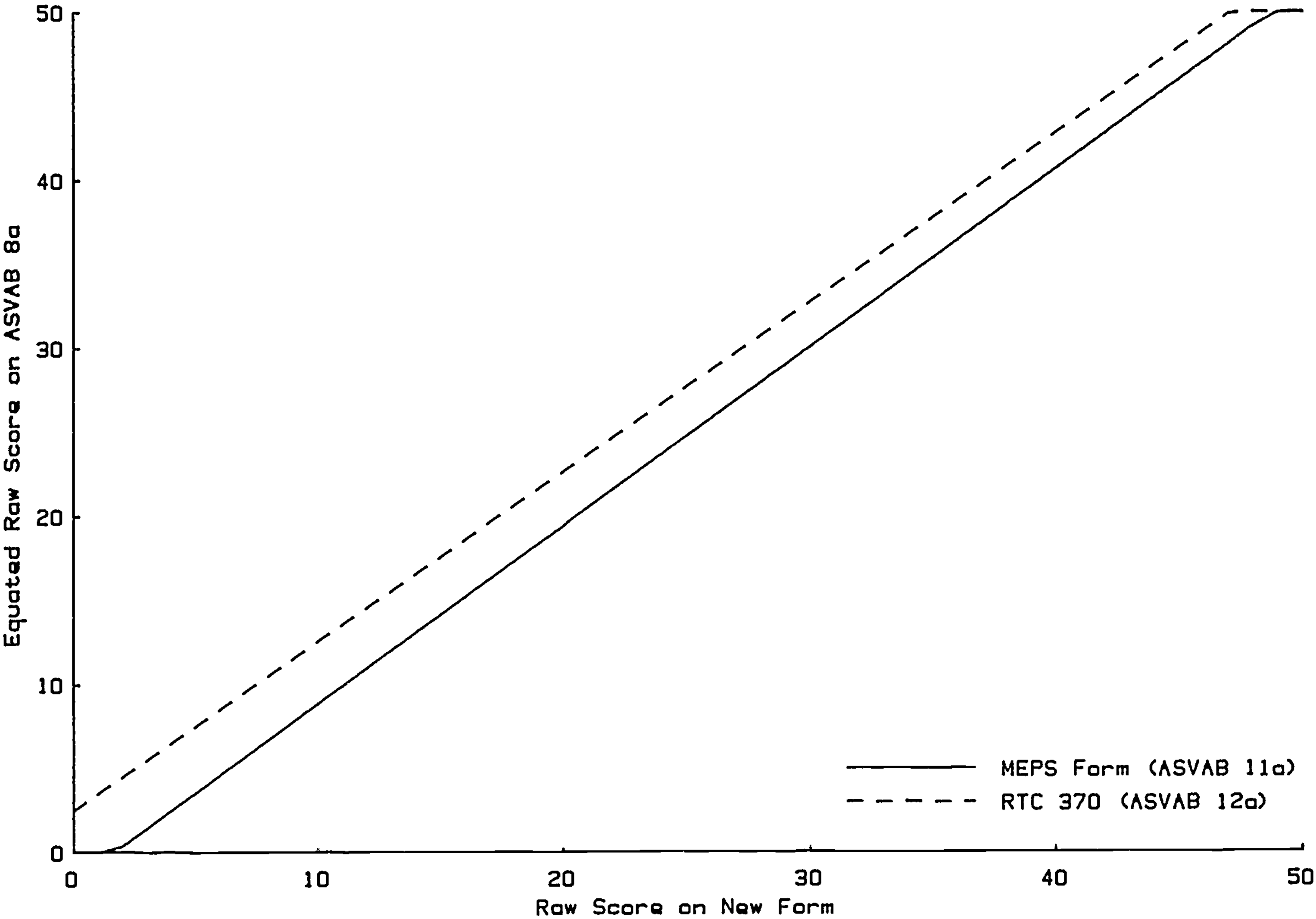

Figure 3. Linear Equating Transformations for Raw Numerical Operations Scores.

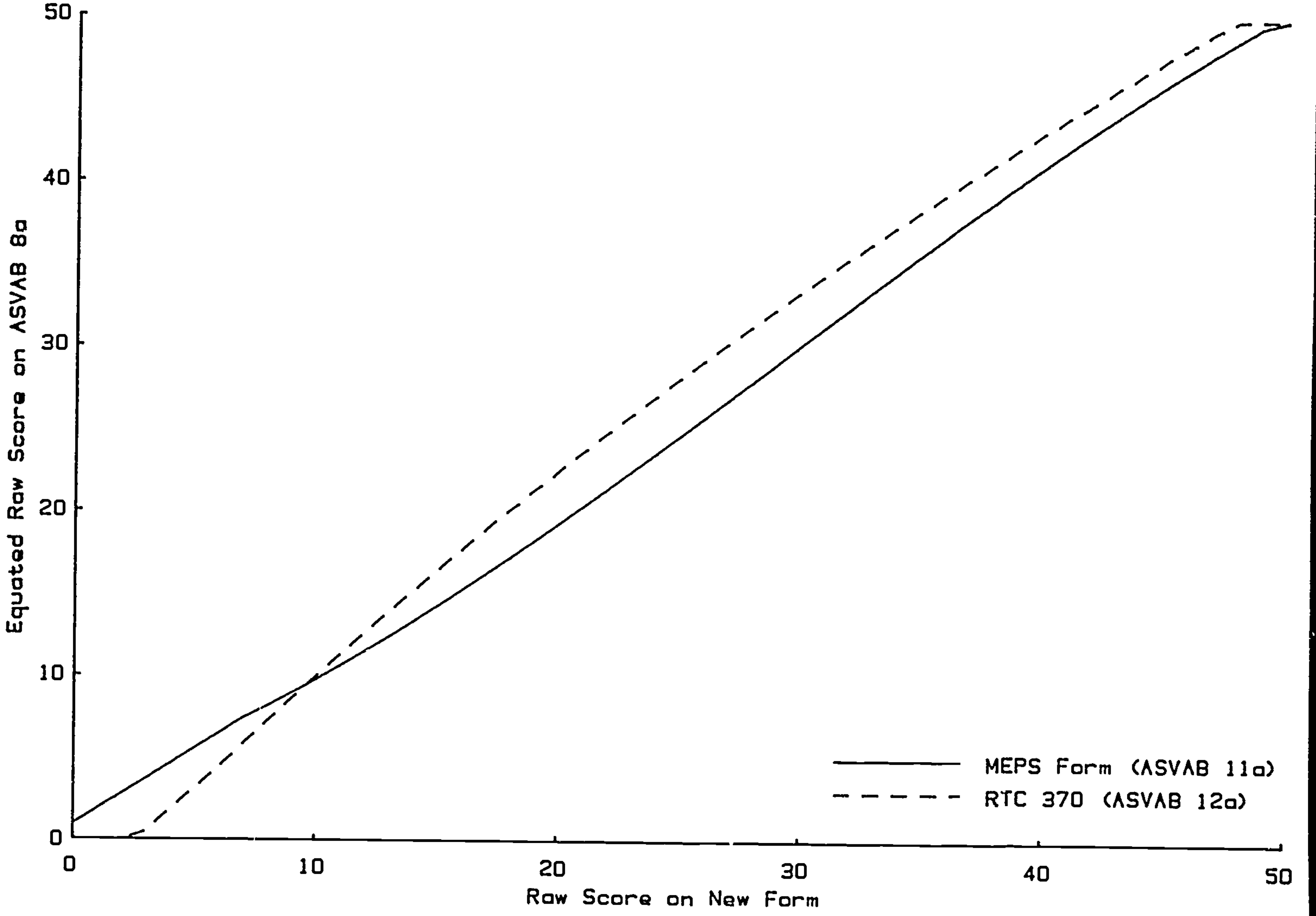

Figure 4. Smoothed Equipercentile Equating Transformations for Raw Numerical Operations Scores.

were observed. A further study was undertaken to adjust the data obtained from the 1980 youth population to account for the differences due to answer sheets (Wegner & Ree, 1985). Wegner and Ree's corrections to the 1980 youth population norms for the two speeded subtests resulted in the need to adjust the equating tables developed in this study for these two subtests. The complete adjusted operational tables were developed in a separate study (Ree, Welsh, Wegner, & Earles, in press). The corrected equating tables for the Numerical Operations and Coding Speed subtests are shown in Appendix B of this report for the sake of completeness. Appendix B also shows the percentile equivalents based on the adjusted 1980 youth population norms for raw AFQT scores.

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Table 1

Item Pool Requirements and Number of Items Pretested

Content Area	Number of Unique Sets	Number of Items in Subtest	Number Required	Number Pretested
General Science (GS)	3	25	75	105
Arithmetic Reasoning (AR)	6	30	180	240
Word Knowledge (WK)	6	35	210	318
Paragraph Comprehension (PC)	6	15	90	150
Numerical Operations (NO)	6	50	300	300
Coding Speed (CS)	3	84	252	168[a]
Auto and Shop Information (AS)	3	25	75	105
Mathematics Knowledge (MK)	3	25	75	105
Mechanical Comprehension (MC)	3	25	75	105
Electronics Information (EI)	3	20	60	105

[a]An additional 84 Coding Speed items were later added to the pool.

Table 2

Pretest Item Statistics for the General Science Subtests

Form	Proportion Correct		Biserial		a		b		c	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
New Form 1	0.685	0.180	0.591	0.100	1.422	0.407	-0.264	1.011	0.266	0.079
New Form 2	0.685	0.196	0.586	0.099	1.382	0.437	-0.331	1.097	0.275	0.078
New Form 3	0.683	0.181	0.594	0.090	1.332	0.322	-0.260	0.908	0.259	0.069
ASVAB 8b	0.686	0.198	0.530	0.116	1.337	0.415	-0.203	1.204	0.334	0.089

Table 3

Pretest Item Statistics for the Arithmetic Reasoning Subtests

Form	Proportion Correct		Biserial		a		b		c	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
New Form 1	0.642	0.157	0.610	0.086	1.364	0.332	-0.122	0.816	0.220	0.065
New Form 2	0.641	0.152	0.605	0.076	1.330	0.298	-0.107	0.782	0.222	0.066
New Form 3	0.644	0.160	0.611	0.083	1.354	0.335	-0.134	0.826	0.221	0.062
New Form 4	0.641	0.163	0.606	0.082	1.427	0.454	-0.133	0.833	0.212	0.063
New Form 5	0.642	0.158	0.595	0.088	1.459	0.347	-0.021	0.842	0.257	0.060
New Form 6	0.642	0.160	0.595	0.088	1.407	0.390	-0.117	0.857	0.218	0.066
ASVAB 8b	0.642	0.159	0.581	0.099	1.438	0.420	-0.139	0.962	0.248	0.055

Table 4

Pretest Item Statistics for the Word Knowledge Subtests

Form	Proportion Correct		Biserial		a		b		c	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
New Form 1	0.755	0.161	0.658	0.101	1.434	0.440	-0.713	0.923	0.190	0.088
New Form 2	0.754	0.167	0.650	0.129	1.404	0.469	-0.669	0.956	0.206	0.094
New Form 3	0.755	0.164	0.661	0.112	1.364	0.354	-0.681	0.941	0.188	0.094
New Form 4	0.754	0.161	0.663	0.096	1.412	0.287	-0.642	0.923	0.203	0.087
New Form 5	0.755	0.160	0.667	0.100	1.487	0.424	-0.622	0.892	0.218	0.088
New Form 6	0.755	0.161	0.663	0.096	1.398	0.386	-0.707	0.935	0.195	0.080
ASVAB 8b	0.755	0.162	0.618	0.130	1.413	0.616	-0.775	1.090	0.212	0.083

Table 5

Pretest Item Statistics for the Paragraph Comprehension Subtests

Form	Proportion Correct		Biserial		a		b		c	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
New Form 1	0.759	0.131	0.625	0.130	1.523	0.492	-0.689	0.735	0.261	0.088
New Form 2	0.751	0.111	0.619	0.108	1.385	0.466	-0.633	0.668	0.233	0.067
New Form 3	0.758	0.096	0.599	0.084	1.161	0.408	-0.541	0.428	0.220	0.093
New Form 4	0.754	0.108	0.650	0.108	1.657	0.604	-0.551	0.645	0.249	0.068
New Form 5	0.755	0.099	0.626	0.112	1.366	0.415	-0.569	0.551	0.237	0.078
New Form 6	0.756	0.126	0.595	0.124	1.470	0.709	-0.634	0.756	0.268	0.113
ASVAB 8b	0.753	0.148	0.563	0.115	1.472	0.435	-0.407	0.860	0.399	0.100

Table 6

Pretest Item Statistics for the Auto and Shop Information Subtests

Form	Proportion Correct		Biserial		a		b		c	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
New Form 1	0.702	0.115	0.602	0.107	1.278	0.404	-0.402	0.628	0.217	0.078
New Form 2	0.702	0.117	0.612	0.110	1.274	0.352	-0.414	0.689	0.200	0.078
New Form 3	0.702	0.135	0.602	0.107	1.327	0.466	-0.420	0.769	0.217	0.069
ASVAB 8b	0.703	0.127	0.598	0.147	1.484	0.713	-0.406	0.721	0.249	0.081

Table 7

Pretest Item Statistics for the Mathematics Knowledge Subtests

Form	Proportion Correct		Biserial		a		b		c	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
New Form 1	0.532	0.153	0.602	0.123	1.428	0.641	0.305	0.681	0.186	0.088
New Form 2	0.532	0.155	0.618	0.133	1.444	0.481	0.290	0.721	0.164	0.080
New Form 3	0.532	0.169	0.602	0.106	1.351	0.430	0.216	0.767	0.167	0.086
ASVAB 8b	0.532	0.185	0.566	0.120	1.509	0.570	0.291	1.072	0.240	0.093

Table 8

Pretest Item Statistics for the Mechanical Comprehension Subtests

Form	Proportion Correct		Biserial		a		b		c	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
New Form 1	0.644	0.138	0.570	0.100	1.272	0.318	-0.074	0.809	0.243	0.073
New Form 2	0.650	0.133	0.582	0.115	1.318	0.464	-0.115	0.767	0.230	0.066
New Form 3	0.645	0.142	0.557	0.092	1.176	0.283	-0.065	0.790	0.234	0.065
ASVAB 8b	0.643	0.127	0.581	0.103	1.326	0.312	-0.007	0.754	0.267	0.080

Table 9

Pretest Item Statistics for the Electronics Information Subtests

Form	Proportion Correct		Biserial		a		b		c	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
New Form 1	0.678	0.149	0.556	0.116	1.303	0.484	-0.218	0.859	0.284	0.081
New Form 2	0.675	0.146	0.556	0.080	1.268	0.290	-0.268	0.811	0.274	0.077
New Form-3	0.676	0.152	0.546	0.115	1.237	0.354	-0.129	0.864	0.290	0.095
ASVAB 8b	0.678	0.181	0.494	0.160	1.491	0.761	-0.002	1.129	0.356	0.111

Table 10

Estimated True-Score Statistics for the General Science Subtests

	New Form 1	New Form 2	New Form 3	Form 8b
Mean of Estimated True-Score Distribution	17.088	17.020	17.046	17.885
SD of Estimated True-Score Distribution	4.362	4.150	4.488	3.555
RMSD of Experimental Form from ASVAB 8b True-Score Distribution	1.332	1.392	1.511	
RMSD of Experimental Form from Mean Exp. Form True-Score Distribution	0.175	0.284	0.309	

Table 11

Estimated True-Score Statistics for the Arithmetic Reasoning Subtests

	New Form 1	2	3	4	5	6	Form 8b
Mean of Estimated True-Score Distribution	19.014	18.935	19.012	18.877	18.959	19.033	19.158
SD of Estimated True-Score Distribution	6.116	6.198	6.168	6.140	5.844	5.919	5.828
RMSD of Experimental Form from ASVAB 8b True-Score Distribution	1.072	1.266	0.871	0.950	1.522	0.668	
RMSD of Experimental Form from Mean Exp. Form True-Score Distribution	0.209	0.307	0.295	0.228	0.511	0.367	

Table 12

Estimated True-Score Statistics for the Word Knowledge Subtests

	New Form 1	2	3	4	5	6	Form 8b
Mean of Estimated True-Score Distribution	25.959	25.870	26.026	25.913	25.796	25.980	26.045
SD of Estimated True-Score Distribution	6.390	6.091	6.279	6.360	6.439	6.383	6.068
RMSD of Experimental Form from ASVAB 8b True-Score Distribution	1.128	1.363	0.818	1.567	1.049	1.866	
RMSD of Experimental Form from Mean Exp. Form True-Score Distribution	0.252	0.356	0.429	0.321	0.363	0.510	

Table 13

Estimated True-Score Statistics for the Paragraph Comprehension Subtests

	New Form						Form
	1	2	3	4	5	6	8b
Mean of Estimated True-Score Distribution	11.423	11.283	10.892	11.218	11.254	11.359	11.729
SD of Estimated True-Score Distribution	2.842	2.933	2.899	3.038	3.206	2.568	2.179
RMSD of Experimental Form from ASVAB 8b True-Score Distribution	0.831	0.950	1.198	1.141	1.092	1.050	
RMSD of Experimental Form from Mean Exp. Form True-Score Distribution	0.243	0.168	0.369	0.211	0.201	0.466	

Table 14

Estimated True-Score Statistics for the Auto and Shop Information Subtests

	New Form			Form
	1	2	3	8b
Mean of Estimated True-Score Distribution	17.430	17.423	17.437	17.688
SD of Estimated True-Score Distribution	5.224	5.224	4.994	5.037
RMSD of Experimental Form from ASVAB 8b True-Score Distribution	0.726	0.791	0.658	
RMSD of Experimental Form from Mean Exp. Form True-Score Distribution	0.127	0.150	0.203	

Table 15

Estimated True-Score Statistics for the Mathematics Knowledge Subtests

	New Form 1	2	3	Form 8b
Mean of Estimated True-Score Distribution	13.093	13.044	13.083	13.307
SD of Estimated True-Score Distribution	5.530	5.659	5.397	4.860
RMSD of Experimental Form from ASVAB 8b True-Score Distribution	1.059	1.151	0.838	
RMSD of Experimental Form from Mean Exp. Form True-Score Distribution	0.171	0.196	0.216	

Table 16

Estimated True-Score Statistics for the Mechanical Comprehension Subtests

	New Form 1	2	3	Form 8b
Mean of Estimated True-Score Distribution	16.107	16.126	16.068	16.021
SD of Estimated True-Score Distribution	4.931	5.054	4.774	5.043
RMSD of Experimental Form from ASVAB 8b True-Score Distribution	0.618	0.676	0.891	
RMSD of Experimental Form from Mean Exp. Form True-Score Distribution	0.146	0.210	0.261	

Table 17

Estimated True-Score Statistics for the Electronics Information Subtests

	New Form 1	2	3	Form 8b
Mean of Estimated True-Score Distribution	13.669	13.732	13.584	13.698
SD of Estimated True-Score Distribution	3.647	3.644	3.547	2.735
RMSD of Experimental Form from ASVAB 8b True-Score Distribution	1.170	1.076	1.166	
RMSD of Experimental Form from Mean Exp. Form True-Score Distribution	0.108	0.177	0.186	

Table 18

Form Numbers Assigned to Booklets Used in the RTCs

Index	Form Number	ASVAB Version
1	158	11a
2	269	11b
3	370	12a
4	481	12b
5	592	13a
6	603	13b
7	714	8a

Table 19

RTC Form Numbers Recovered During Data Editing

Test Form	N Cases Recovered
158	10
269	8
370	19
481	10
592	9
603	16
714(8a)	9
Total	81

Table 20

Results of Data Editing in the RTCs

Category	N Cases	Percent of Total
Good Cases	14,325	96.85
Form-number problems	360	2.43
Too few responses	62	.42
Key mismatches	10	.07
Patterned responses	17	.11
Deviant scores	17	.11
Total	14,791	99.99

Note. Total percentage does not equal 100.00 due to rounding.

Table 21

Form Numbers Assigned to Booklets Used in the MEPS

Index	Experimental Form	Reference Form (8a)
1	123	147
2	234	258
3	345	369
4	456	470
5	567	581
6	678	692
7	789	703
8	890	814
9	901	925

Table 22

Subtests Included in Experimental Booklets Administered in the MEPS

	Subtest									
Index	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI
1	X	X						X		X
2	X		X	X	X		X		X	
3	X		X	X				X	X	
4	X						X	X	X	X
5		X	X	X	X	X	X			
6		X	X	X	X	X				
7		X			X		X		X	X
8		X				X	X		X	X
9		X				X		X	X	

Table 23

MEPS Form Numbers Recovered During Data Editing

Test Form	N Cases Recovered
123	100
147	61
234	56
258	71
345	76
369	64
456	87
470	52
567	38
581	15
678	74
692	42
789	87
703	75
890	81
814	70
901	76
925	85
Total	1210

Table 24

Results of Data Editing in the MEPS

Category	N Cases	Percent of Total
Good Cases	76,545	97.91
Form-number problems	376	.48
Too few responses	416	.53
Key mismatches	179	.23
Patterned responses	107	.14
Deviant scores	559	.71
Total	78,182	100.00

Table 25

Demographic Summary for RTC Samples

Characteristic	RTC Form Number 158	269	370	481	592	603	714
Sex							
Male	1708	1710	1688	1703	1696	1687	1683
Female	344	349	344	346	346	342	341
Omit/Miscoded	3	5	8	7	8	4	3
Population Group							
American Indian	21	15	20	22	21	20	18
Spanish American	82	102	77	87	84	103	97
Asian	16	27	30	18	11	27	12
Black	376	379	372	359	361	357	348
White	1516	1507	1504	1535	1531	1484	1511
Other	31	17	27	21	25	33	32
Omit/Miscoded	11	17	10	14	17	9	9
Education Level							
8 or less	0	3	4	6	5	6	4
9	33	38	20	47	36	33	26
10	68	61	74	69	57	64	71
11	55	57	69	70	64	65	56
12	296	287	257	257	287	257	282
GED	117	102	117	83	112	105	101
HS	700	707	739	696	690	685	715
13+	309	311	319	312	297	324	318
Omit/Miscoded	477	498	441	516	502	494	454
Testing Site							
Air Force							
Lackland AFB	336	334	328	323	313	306	302
Army							
Ft. Bliss	68	68	65	63	64	64	64
Ft. Dix	124	147	147	140	153	133	141
Ft. Jackson	360	361	356	355	355	359	346
Ft. Knox	158	153	155	154	157	155	156
Ft. Leonard Wood	116	120	132	140	129	135	141
Ft. McClellan	57	58	58	56	56	56	56
Ft. Sill	64	68	68	64	65	67	66
Marine							
Paris Island	140	138	120	137	134	141	142
San Diego	130	129	130	134	133	126	123
Navy							
Great Lakes	179	176	175	178	176	171	175
Orlando	140	137	138	137	138	138	135
San Diego	145	144	143	147	143	147	149
Omit/Miscoded	38	31	25	28	34	35	31
Total Examinees	2055	2064	2040	2056	2050	2033	2027

Table 26

Demographic Summary for MEPS Samples

Characteristic	Index 1	2	3	4	5	6	7	8	9
Experimental Subtests									
Sex									
Male	3720	3783	3591	3523	3410	3557	3582	3763	3738
Female	686	712	687	729	690	699	663	710	752
Omit/Miscoded	25	25	26	26	27	30	20	23	20
Population Group									
American Indian	31	46	39	34	32	24	18	34	51
Spanish American	213	291	197	204	196	209	174	256	163
Asian	18	41	27	46	40	45	47	61	32
Black	1040	1005	955	1082	935	1113	1074	1025	1219
White	2994	3069	2977	2818	2831	2825	2877	3021	2972
Other	60	44	64	62	47	42	56	56	45
Omit/Miscoded	75	24	45	32	46	28	19	43	28
Testing Site									
MEPS	890	963	942	1056	1042	1074	975	1337	1587
MET	1203	1194	950	1061	1094	1010	1282	1016	1002
OPM	2298	2266	2262	2089	1888	2055	1898	1888	1795
Omit/Miscoded	40	97	150	72	103	147	110	255	126
Total Examinees	4431	4520	4304	4278	4127	4286	4265	4496	4510
Reference Subtests									
Sex									
Male	3513	3533	3438	3393	3302	3404	3470	3572	3496
Female	638	699	704	696	659	646	634	677	665
Omit/Miscoded	22	22	12	28	14	23	28	18	22
Population Group									
American Indian	27	36	34	31	29	22	24	28	50
Spanish American	196	238	151	209	182	179	172	236	179
Asian	30	33	39	49	29	39	45	67	34
Black	949	971	964	1042	847	963	971	1028	1125
White	2870	2899	2878	2694	2808	2786	2849	2825	2717
Other	51	50	56	58	38	52	47	59	48
Omit/Miscoded	50	27	32	34	42	32	24	24	30
Testing Site									
MEPS	805	933	915	977	922	882	906	1203	1423
MET	1154	1154	900	1053	1073	1012	1244	1016	948
OPM	2179	2071	2205	2007	1903	2030	1863	1784	1691
Omit/Miscoded	35	96	134	80	77	149	119	264	121
Total Examinees	4173	4254	4154	4117	3975	4073	4132	4267	4183

Table 27

Summary Score Statistics for General Science Subtests Administered in the RTCs

Statistic	RTC Form Number 158	269	370	481	592	603	714(8a)
N Items	25	25	25	25	25	25	25
Mean	17.146	16.993	17.051	17.135	17.202	17.110	16.985
Variance	21.433	22.102	19.801	20.209	21.479	23.384	17.316
Skew	-0.420	-0.403	-0.196	-0.317	-0.390	-0.391	-0.259
Kurtosis	-0.360	-0.408	-0.634	-0.520	-0.378	-0.534	-0.358
Minimum	3.000	1.000	3.000	3.000	1.000	3.000	2.000
Maximum	25.000	25.000	25.000	25.000	25.000	25.000	25.000
Median	17.000	17.000	17.000	17.000	18.000	17.000	17.000
SD	4.630	4.701	4.450	4.495	4.634	4.836	4.161
KR-20	0.824	0.825	0.808	0.812	0.820	0.836	0.769
SEM	1.942	1.967	1.950	1.949	1.966	1.958	2.000
N Examinees	2055	2064	2040	2056	2050	2033	2027

Table 28

Summary Score Statistics for Arithmetic Reasoning Subtests Administered in the RTCs

Statistic	RTC Form Number 158	269	370	481	592	603	714(8a)
N Items	30	30	30	30	30	30	30
Mean	19.306	18.987	19.194	19.250	19.368	19.253	18.197
Variance	41.750	41.534	38.333	40.496	35.411	37.074	40.789
Skew	-0.224	-0.110	-0.171	-0.202	-0.090	-0.208	0.019
Kurtosis	-0.894	-0.908	-0.876	-0.809	-0.843	-0.706	-0.949
Minimum	3.000	1.000	3.000	1.000	5.000	2.000	2.000
Maximum	30.000	30.000	30.000	30.000	30.000	30.000	30.000
Median	20.000	19.000	19.000	19.000	19.000	19.000	18.000
SD	6.461	6.445	6.191	6.364	5.951	6.089	6.387
KR-20	0.881	0.878	0.871	0.877	0.859	0.863	0.877
SEM	2.229	2.251	2.224	2.232	2.234	2.254	2.240
N Examinees	2055	2064	2040	2056	2050	2033	2027

Table 29

Summary Score Statistics for Word Knowledge Subtests Administered in the RTCs

Statistic	RTC Form Number						
	158	269	370	481	592	603	714(8a)
N Items	35	35	35	35	35	35	35
Mean	26.824	26.887	26.582	26.760	26.591	27.026	27.492
Variance	40.389	37.014	38.422	40.807	38.705	39.323	31.144
Skew	-0.805	-0.834	-0.785	-0.858	-0.727	-0.811	-0.954
Kurtosis	0.051	0.298	0.044	0.283	-0.116	0.204	0.748
Minimum	5.000	2.000	5.000	1.000	5.000	2.000	4.000
Maximum	35.000	35.000	35.000	35.000	35.000	35.000	35.000
Median	28.000	28.000	28.000	28.000	28.000	28.000	29.000
SD	6.355	6.084	6.199	6.388	6.221	6.271	5.581
KR-20	0.892	0.881	0.885	0.893	0.885	0.890	0.864
SEM	2.089	2.099	2.102	2.090	2.110	2.080	2.058
N Examinees	2055	2064	2040	2056	2050	2033	2027

Table 30

Summary Score Statistics for Paragraph Comprehension Subtests Administered in the RTCs

Statistic	RTC Form Number						
	158	269	370	481	592	603	714(8a)
N Items	15	15	15	15	15	15	15
Mean	11.115	10.920	10.646	11.642	11.342	11.356	11.168
Variance	9.599	9.599	9.972	8.329	8.355	9.536	8.130
Skew	-0.752	-0.778	-0.496	-1.148	-0.884	-1.000	-1.018
Kurtosis	-0.102	0.118	-0.508	1.145	0.416	0.506	0.704
Minimum	1.000	0.000	1.000	0.000	0.000	0.000	0.000
Maximum	15.000	15.000	15.000	15.000	15.000	15.000	15.000
Median	12.000	11.000	11.000	12.000	12.000	12.000	12.000
SD	3.098	3.098	3.158	2.886	2.890	3.088	2.851
KR-20	0.780	0.773	0.773	0.765	0.754	0.780	0.722
SEM	1.453	1.476	1.505	1.399	1.434	1.448	1.503
N Examinees	2055	2064	2040	2056	2050	2033	2027

Table 31

Summary Score Statistics for Numerical Operations Subtests Administered in the RTCs

Statistic	RTC Form Number 158	269	370	481	592	603	714(8a)
N Items	50	50	50	50	50	50	50
Mean	35.923	37.040	33.556	34.567	35.617	35.125	36.333
Variance	80.965	86.401	82.129	84.851	83.849	88.569	83.604
Skew	-0.286	-0.458	-0.128	-0.219	-0.182	-0.278	-0.359
Kurtosis	-0.417	-0.316	-0.470	-0.433	-0.560	-0.390	-0.396
Minimum	1.000	2.000	1.000	1.000	3.000	2.000	1.000
Maximum	50.000	50.000	50.000	50.000	50.000	50.000	50.000
Median	36.000	37.000	33.000	34.000	35.000	35.000	36.000
SD	8.998	9.295	9.063	9.211	9.157	9.411	9.144
N Examinees	2055	2064	2040	2056	2050	2033	2027

Table 32

Summary Score Statistics for Coding Speed Subtests Administered in the RTCs

Statistic	RTC Form Number 158	269	370	481	592	603	714(8a)
N Items	84	84	84	84	84	84	84
Mean	47.047	47.558	47.093	47.267	47.539	47.947	47.283
Variance	200.407	206.625	203.124	202.712	190.771	203.163	195.842
Skew	-0.065	0.025	-0.046	0.011	-0.059	-0.024	-0.171
Kurtosis	0.035	0.035	-0.073	0.048	0.039	-0.005	0.024
Minimum	3.000	3.000	4.000	5.000	3.000	4.000	5.000
Maximum	84.000	84.000	84.000	84.000	84.000	84.000	84.000
Median	47.000	47.000	47.000	47.000	48.000	48.000	48.000
SD	14.157	14.374	14.252	14.238	13.812	14.254	13.994
N Examinees	2055	2064	2040	2056	2050	2033	2027

Table 33

Summary Score Statistics for Auto and Shop Information Subtests Administered in the RTCs

Statistic	RTC Form Numbers 158	269	370	481	592	603	714(8a)
N Items	25	25	25	25	25	25	25
Mean	16.546	16.337	15.800	15.888	16.706	16.323	16.335
Variance	28.176	28.169	29.373	29.097	28.070	27.554	25.217
Skew	-0.406	-0.351	-0.369	-0.376	-0.292	-0.244	-0.299
Kurtosis	-0.703	-0.792	-0.832	-0.814	-0.969	-0.967	-0.784
Minimum	1.000	2.000	0.000	2.000	2.000	3.000	1.000
Maximum	25.000	25.000	25.000	25.000	25.000	25.000	25.000
Median	17.000	17.000	16.000	17.000	17.000	17.000	17.000
SD	5.308	5.307	5.420	5.394	5.298	5.249	5.022
KR-20	0.850	0.847	0.854	0.854	0.851	0.844	0.824
SEM	2.056	2.076	2.071	2.061	2.045	2.073	2.107
N Examinees	2055	2064	2040	2056	2050	2033	2027

Table 34

Summary Score Statistics for Mathematics Knowledge Subtests Administered in the RTCs

Statistic	RTC Form Number 158	269	370	481	592	603	714(8a)
N Items	25	25	25	25	25	25	25
Mean	13.225	13.291	12.965	12.828	13.261	13.077	13.278
Variance	31.084	31.802	35.005	37.418	29.919	31.014	28.545
Skew	0.252	0.241	0.202	0.243	0.328	0.319	0.333
Kurtosis	-0.857	-0.855	-0.950	-1.000	-0.821	-0.811	-0.760
Minimum	1.000	1.000	0.000	0.000	1.000	1.000	1.000
Maximum	25.000	25.000	25.000	25.000	25.000	25.000	25.000
Median	13.000	13.000	12.000	12.000	13.000	12.000	12.000
SD	5.575	5.639	5.917	6.117	5.470	5.569	5.343
KR-20	0.854	0.859	0.874	0.884	0.847	0.855	0.842
SEM	2.130	2.118	2.100	2.083	2.140	2.121	2.124
N Examinees	2055	2064	2040	2056	2050	2033	2027

Table 35

Summary Score Statistics for Mechanical Comprehension Subtests in the RTCs

Statistic	RTC Form Number						
	158	269	370	481	592	603	714(8a)
N Items	25	25	25	25	25	25	25
Mean	15.584	15.733	15.291	15.160	15.653	15.200	14.816
Variance	24.184	24.621	26.060	25.394	23.764	23.069	26.601
Skew	-0.289	-0.266	-0.170	-0.193	-0.290	-0.262	-0.142
Kurtosis	-0.702	-0.732	-0.755	-0.805	-0.595	-0.582	-0.804
Minimum	1.000	3.000	0.000	2.000	1.000	0.000	0.000
Maximum	25.000	25.000	25.000	25.000	25.000	25.000	25.000
Median	16.000	16.000	16.000	15.000	16.000	15.000	15.000
SD	4.918	4.962	5.105	5.039	4.875	4.803	5.158
KR-20	0.814	0.820	0.827	0.821	0.813	0.801	0.826
SEM	2.121	2.105	2.123	2.132	2.108	2.143	2.151
N Examinees	2055	2064	2040	2056	2050	2033	2027

Table 36

Summary Score Statistics for Electronics Information Subtests Administered in the RTCs

Statistic	RTC Form Number						
	158	269	370	481	592	603	714(8a)
N Items	20	20	20	20	20	20	20
Mean	12.095	12.337	12.793	12.810	12.608	12.401	12.504
Variance	16.480	16.427	16.262	15.884	15.419	15.669	14.699
Skew	-0.109	-0.179	-0.203	-0.175	-0.277	-0.275	-0.309
Kurtosis	-0.757	-0.794	-0.674	-0.726	-0.615	-0.576	-0.556
Minimum	0.000	1.000	1.000	1.000	2.000	1.000	1.000
Maximum	20.000	20.000	20.000	20.000	20.000	20.000	20.000
Median	12.000	13.000	13.000	13.000	13.000	13.000	13.000
SD	4.060	4.053	4.033	3.985	3.927	3.958	3.834
KR-20	0.783	0.784	0.777	0.773	0.767	0.770	0.760
SEM	1.891	1.884	1.904	1.899	1.895	1.898	1.878
N Examinees	2055	2064	2040	2056	2050	2033	2027

Table 37

Summary Score Statistics for the AFQT Composite in the RTCs

Statistic	RTC Form Number 158	269	370	481	592	603	714(8a)
N Items	105	105	105	105	105	105	105
Mean	75.441	75.554	73.457	75.179	75.353	75.437	75.257
Variance	246.998	242.248	235.042	241.587	226.893	244.801	216.263
Skew	-0.450	-0.492	-0.371	-0.595	-0.439	-0.596	-0.436
Kurtosis	-0.242	0.071	-0.290	0.325	-0.064	0.211	-0.050
Minimum	21.000	10.000	21.000	13.000	20.000	9.000	21.000
Maximum	105.000	105.000	105.000	105.000	105.000	105.000	105.000
Median	77.000	77.000	74.000	77.000	76.000	77.000	76.000
SD	15.716	15.564	15.331	15.543	15.063	15.646	14.706
N Examinees	2055	2064	2040	2056	2050	2033	2027

Table 38

Summary Score Statistics for Forms Administered in the MEPS

Statistic	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	AFQT
					Experimental Forms (RTC 158)						
Mean	16.179	18.904	25.328	11.016	33.415	44.711	15.860	12.681	15.475	11.703	72.256
Variance	25.784	47.852	50.100	9.575	75.914	172.595	31.575	34.933	24.883	16.981	310.003
Skew	-0.248	-0.158	-0.573	-0.583	-0.076	-0.041	-0.278	0.404	-0.217	0.052	-0.394
Kurtosis	-0.686	-1.022	-0.473	-0.422	-0.214	0.243	-0.903	-0.831	-0.755	-0.817	-0.417
Minimum	1.000	1.000	0.000	0.000	3.000	2.000	0.000	0.000	1.000	1.000	11.000
Maximum	25.000	30.000	35.000	15.000	50.000	84.000	25.000	25.000	25.000	20.000	105.000
Median	16.000	19.000	26.000	11.000	33.000	45.000	16.000	12.000	16.000	12.000	74.000
SD	5.078	6.918	7.078	3.094	8.713	13.138	5.619	5.910	4.988	4.121	17.607
N Examinees	17533	26115	17237	17237	17198	17419	21686	17523	26373	17470	8413
					Reference Forms (RTC 714/8a)						
Mean	15.978	17.634	26.231	11.145	33.694	44.884	15.577	12.963	14.509	12.099	72.168
Variance	19.763	42.944	40.210	7.510	85.420	180.931	27.265	29.804	25.257	14.727	261.044
Skew	-0.103	0.105	-0.762	-0.868	-0.112	-0.199	-0.145	0.421	-0.015	-0.197	-0.380
Kurtosis	-0.562	-0.955	0.112	0.390	-0.486	0.339	-0.925	-0.712	-0.872	-0.631	-0.222
Minimum	2.000	1.000	3.000	0.000	3.000	0.000	0.000	0.000	1.000	0.000	13.000
Maximum	25.000	30.000	35.000	15.000	50.000	84.000	25.000	25.000	25.000	20.000	105.000
Median	16.000	17.000	27.000	12.000	33.000	46.000	16.000	12.000	15.000	12.000	73.000
SD	4.446	6.553	6.341	2.740	9.242	13.451	5.222	5.459	5.026	3.838	16.157
N Examinees	16698	24803	16456	16456	16434	16498	20745	16627	25107	16689	8048

Table 39

Classical Item Statistics for General Science Subtests

Mean	RTC Form Number 158	269	370	481	592	603	714(8a)	MEPS Form
Difficulty	0.686	0.680	0.682	0.685	0.688	0.684	0.679	0.647
Biserial	0.618	0.614	0.598	0.607	0.610	0.628	0.549	0.631
Point-Biserial	0.438	0.440	0.418	0.423	0.436	0.451	0.391	0.462

Note. The MEPS data presented here are averaged over all of the MEPS booklets containing this subtest. The subtest is identical to that used in RTC 158.

Table 40

Classical Item Statistics for Arithmetic Reasoning Subtests

Mean	RTC Form Number 158	269	370	481	592	603	714(8a)	MEPS Form
Difficulty	0.644	0.633	0.640	0.642	0.646	0.642	0.607	0.630
Biserial	0.629	0.614	0.608	0.626	0.593	0.598	0.611	0.656
Point-Biserial	0.472	0.465	0.455	0.467	0.440	0.447	0.461	0.498

Note. The MEPS data presented here are averaged over all of the MEPS booklets containing this subtest. The subtest is identical to that used in RTC 158.

Table 41

Classical Item Statistics for Word Knowledge Subtests

Mean	RTC Form Number							MEPS
	158	269	370	481	592	603	714(8a)	Form
Difficulty	0.766	0.768	0.759	0.765	0.760	0.772	0.785	0.724
Biserial	0.705	0.697	0.694	0.717	0.687	0.707	0.667	0.705
Point-Biserial	0.464	0.452	0.455	0.471	0.452	0.460	0.425	0.488

Note. The MEPS data presented here are averaged over all of the MEPS booklets containing this subtest. The subtest is identical to that used in RTC 158.

Table 42

Classical Item Statistics for Paragraph Comprehension Subtests

Mean	RTC Form Number							MEPS
	158	269	370	481	592	603	714(8a)	Form
Difficulty	0.741	0.728	0.710	0.776	0.756	0.757	0.745	0.735
Biserial	0.695	0.684	0.664	0.725	0.695	0.725	0.648	0.685
Point-Biserial	0.491	0.488	0.484	0.491	0.478	0.503	0.457	0.485

Note. The MEPS data presented here are averaged over all of the MEPS booklets containing this subtest. The subtest is identical to that used in RTC 158.

Table 43

Classical Item Statistics for Numerical Operations Subtests

Mean	RTC Form Number 158	269	370	481	592	603	714(8a)	MEPS Form
Difficulty	0.718	0.741	0.671	0.691	0.712	0.702	0.727	0.668
Biserial	0.711	0.741	0.698	0.709	0.704	0.759	0.687	0.733
Point-Biserial	0.461	0.475	0.461	0.466	0.458	0.488	0.456	0.465

Note. The MEPS data presented here are averaged over all of the MEPS booklets containing this subtest. The subtest is identical to that used in RTC 158.

Table 44

Classical Item Statistics for Coding Speed Subtests

Mean	RTC Form Number 158	269	370	481	592	603	714(8a)	MEPS Form
Difficulty	0.560	0.566	0.561	0.563	0.566	0.571	0.563	0.532
Biserial	0.769	0.775	0.739	0.770	0.772	0.766	0.778	0.786
Point-Biserial	0.470	0.478	0.463	0.473	0.464	0.472	0.472	0.456

Note. The MEPS data presented here are averaged over all of the MEPS booklets containing this subtest. The subtest is identical to that used in RTC 158.

Table 45

Classical Item Statistics for Auto and Shop Information Subtests

Mean	RTC Form Number 158	269	370	481	592	603	714(8a)	MEPS Form
Difficulty	0.662	0.653	0.632	0.636	0.668	0.653	0.653	0.634
Biserial	0.620	0.614	0.619	0.621	0.622	0.610	0.577	0.634
Point-Biserial	0.466	0.464	0.470	0.469	0.466	0.459	0.437	0.484

Note. The MEPS data presented here are averaged over all of the MEPS booklets containing this subtest. The subtest is identical to that used in RTC 158.

Table 46

Classical Item Statistics for Mathematics Knowledge Subtests

Mean	RTC Form Number 158	269	370	481	592	603	714(8a)	MEPS Form
Difficulty	0.529	0.532	0.519	0.513	0.530	0.523	0.531	0.507
Biserial	0.607	0.615	0.644	0.661	0.597	0.611	0.590	0.631
Point-Biserial	0.469	0.475	0.498	0.513	0.461	0.471	0.453	0.492

Note. The MEPS data presented here are averaged over all of the MEPS booklets containing this subtest. The subtest is identical to that used in RTC 158.

Table 47

Classical Item Statistics for Mechanical Comprehension Subtests

Mean	RTC Form Number							MEPS
	158	269	370	481	592	603	714(8a)	Form
Difficulty	0.623	0.629	0.612	0.606	0.626	0.608	0.593	0.619
Biserial	0.564	0.573	0.577	0.571	0.567	0.552	0.573	0.569
Point-Biserial	0.427	0.432	0.439	0.434	0.427	0.418	0.439	0.432

Note. The MEPS data presented here are averaged over all of the MEPS booklets containing this subtest. The subtest is identical to that used in RTC 158.

Table 48

Classical Item Statistics for Electronics Information Subtests

Mean	RTC Form Number							MEPS
	158	269	370	481	592	603	714(8a)	Form
Difficulty	0.605	0.617	0.640	0.640	0.630	0.620	0.625	0.585
Biserial	0.584	0.586	0.575	0.571	0.574	0.577	0.567	0.581
Point-Biserial	0.442	0.442	0.436	0.432	0.430	0.433	0.424	0.443

Note. The MEPS data presented here are averaged over all of the MEPS booklets containing this subtest. The subtest is identical to that used in RTC 158.

Table 49

IRT Summary Statistics for General Science Subtests

Parameter	RTC Form 158	269	370	481	592	603	714(8a)	MEPS Form
a								
Mean	1.147	1.223	1.222	1.161	1.204	1.220	1.043	1.345
SD	0.457	0.523	0.564	0.473	0.505	0.449	0.565	0.504
Minimum	0.684	0.672	0.577	0.448	0.580	0.647	0.464	0.804
Maximum	2.486	2.434	2.481	2.284	2.414	2.444	2.500	2.500
b								
Mean	-0.496	-0.413	-0.543	-0.571	-0.470	-0.439	-0.496	-0.238
SD	1.022	0.964	1.126	1.157	0.945	0.906	1.038	0.907
Minimum	-2.061	-1.912	-2.918	-3.000	-1.732	-1.747	-2.171	-1.559
Maximum	1.377	1.378	1.162	1.077	1.122	1.056	1.269	1.346
c								
Mean	0.200	0.208	0.202	0.209	0.218	0.214	0.217	0.208
SD	0.056	0.074	0.041	0.048	0.065	0.070	0.054	0.107
Minimum	0.090	0.060	0.120	0.080	0.090	0.100	0.100	0.030
Maximum	0.350	0.340	0.320	0.350	0.400	0.400	0.330	0.400

Note. The MEPS data presented here are based on a sample of 5,000 examinees taking the experimental subtests. The subtests are identical to those used in RTC 158.

Table 50

IRT Summary Statistics for Arithmetic Reasoning Subtests

Parameter	RTC Form 158	269	370	481	592	603	714(8a)	MEPS Form
a								
Mean	1.125	1.174	1.092	1.179	1.125	1.221	1.208	1.243
SD	0.440	0.468	0.429	0.411	0.420	0.506	0.432	0.472
Minimum	0.519	0.451	0.504	0.547	0.611	0.455	0.425	0.578
Maximum	2.454	2.435	2.110	2.382	2.359	2.406	2.370	2.476
b								
Mean	-0.321	-0.276	-0.386	-0.265	-0.320	-0.272	-0.223	-0.246
SD	0.802	0.886	0.912	0.801	0.919	0.853	1.012	0.733
Minimum	-2.262	-3.000	-2.384	-1.872	-2.305	-1.996	-3.000	-2.254
Maximum	0.906	1.040	1.016	1.385	0.940	1.401	1.121	0.860
c								
Mean	0.189	0.199	0.181	0.196	0.203	0.201	0.186	0.188
SD	0.055	0.074	0.052	0.069	0.074	0.074	0.075	0.092
Minimum	0.050	0.030	0.090	0.060	0.030	0.050	0.030	0.040
Maximum	0.300	0.320	0.280	0.370	0.330	0.360	0.340	0.430

Note. The MEPS data presented here are based on a sample of 5,000 examinees taking the experimental subtests. The subtests are identical to those used in RTC 158.

Table 51

IRT Summary Statistics for Word Knowledge Subtests

Parameter	RTC Form 158	269	370	481	592	603	714(8a)	MEPS Form
a								
Mean	1.244	1.332	1.372	1.341	1.302	1.340	1.240	1.409
SD	0.413	0.462	0.470	0.403	0.420	0.521	0.566	0.468
Minimum	0.644	0.566	0.688	0.435	0.680	0.517	0.552	0.714
Maximum	2.444	2.465	2.500	2.425	2.132	2.484	2.473	2.500
b								
Mean	-0.817	-0.780	-0.844	-0.757	-0.757	-0.867	-1.090	-0.474
SD	1.023	1.093	1.097	1.063	1.141	1.152	1.206	0.904
Minimum	-2.770	-3.000	-2.834	-3.000	-3.000	-3.000	-3.000	-2.530
Maximum	1.161	1.293	1.203	1.150	1.524	0.994	1.031	1.322
c								
Mean	0.237	0.259	0.236	0.243	0.249	0.246	0.245	0.243
SD	0.045	0.071	0.056	0.060	0.054	0.050	0.064	0.074
Minimum	0.150	0.120	0.130	0.140	0.170	0.190	0.140	0.090
Maximum	0.310	0.400	0.370	0.380	0.350	0.370	0.400	0.470

Note. The MEPS data presented here are based on a sample of 5,000 examinees taking the experimental subtests. The subtests are identical to those used in RTC 158.

Table 52

IRT Summary Statistics for Paragraph Comprehension Subtests

Parameter	RTC Form 158	269	370	481	592	603	714(8a)	MEPS Form
a								
Mean	1.271	1.182	1.191	1.252	1.379	1.458	1.150	1.331
SD	0.714	0.592	0.654	0.668	0.780	0.736	0.605	0.706
Minimum	0.588	0.538	0.545	0.426	0.508	0.619	0.554	0.405
Maximum	2.467	2.344	2.500	2.500	2.500	2.500	2.500	2.500
b								
Mean	-0.743	-0.672	-0.607	-0.837	-0.700	-0.578	-0.627	-0.607
SD	1.011	0.841	0.818	0.789	0.936	0.821	0.919	1.065
Minimum	-2.878	-2.230	-1.804	-1.998	-1.821	-1.845	-2.315	-2.565
Maximum	0.757	0.979	0.926	1.090	0.966	0.952	1.344	0.897
c								
Mean	0.204	0.217	0.227	0.229	0.249	0.247	0.249	0.257
SD	0.067	0.066	0.075	0.056	0.090	0.080	0.074	0.109
Minimum	0.100	0.090	0.090	0.150	0.090	0.170	0.200	0.000
Maximum	0.400	0.370	0.350	0.380	0.400	0.400	0.400	0.440

Note. The MEPS data presented here are based on a sample of 5,000 examinees taking the experimental subtests. The subtests are identical to those used in RTC 158.

Table 53

IRT Summary Statistics for Auto and Shop Information Subtests

Parameter	RTC Form 158	269	370	481	592	603	714(8a)	MEPS Form
a								
Mean	1.162	1.124	1.172	1.219	1.111	1.169	1.044	1.126
SD	0.615	0.617	0.520	0.547	0.545	0.572	0.569	0.488
Minimum	0.422	0.400	0.541	0.578	0.497	0.516	0.400	0.472
Maximum	2.475	2.469	2.446	2.276	2.461	2.414	2.441	2.500
b								
Mean	-0.342	-0.287	-0.155	-0.173	-0.385	-0.277	-0.311	-0.221
SD	0.683	0.672	0.698	0.733	0.702	0.760	0.708	0.614
Minimum	-1.390	-1.335	-1.177	-1.576	-1.756	-1.402	-1.725	-1.208
Maximum	1.345	1.386	2.067	2.153	0.789	1.007	1.176	1.280
c								
Mean	0.192	0.195	0.208	0.195	0.195	0.204	0.216	0.192
SD	0.077	0.082	0.051	0.067	0.064	0.071	0.074	0.092
Minimum	0.040	0.030	0.070	0.030	0.090	0.060	0.040	0.000
Maximum	0.370	0.380	0.300	0.350	0.360	0.380	0.360	0.340

Note. The MEPS data presented here are based on a sample of 5,000 examinees taking the experimental subtests. The subtests are identical to those used in RTC 158.

Table 54

IRT Summary Statistics for Mathematics Knowledge Subtests

Parameter	RTC Form 158	RTC Form 269	RTC Form 370	RTC Form 481	RTC Form 592	RTC Form 603	RTC Form 714(8a)	MEPS Form
a								
Mean	1.256	1.250	1.285	1.332	1.161	1.177	1.221	1.321
SD	0.519	0.497	0.387	0.395	0.563	0.475	0.519	0.501
Minimum	0.498	0.614	0.620	0.747	0.482	0.592	0.426	0.633
Maximum	2.364	2.402	2.096	2.306	2.457	2.420	2.351	2.480
b								
Mean	0.211	0.156	0.250	0.263	0.179	0.217	0.137	0.256
SD	0.841	0.824	0.738	0.741	0.796	0.782	0.972	0.711
Minimum	-1.499	-1.313	-0.888	-0.802	-1.566	-1.400	-1.750	-1.025
Maximum	1.775	1.664	1.705	1.769	1.577	1.593	1.932	1.710
c								
Mean	0.154	0.143	0.156	0.146	0.157	0.153	0.162	0.150
SD	0.092	0.081	0.092	0.075	0.072	0.074	0.079	0.105
Minimum	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.000
Maximum	0.310	0.310	0.330	0.300	0.320	0.330	0.290	0.320

Note. The MEPS data presented here are based on a sample of 5,000 examinees taking the experimental subtests. The subtests are identical to those used in RTC 158.

Table 55

IRT Summary Statistics for Mechanical Comprehension Subtests

Parameter	RTC Form 158	269	370	481	592	603	714(8a)	MEPS Form
a								
Mean	0.902	0.974	0.973	0.946	0.968	0.956	0.976	0.983
SD	0.405	0.441	0.412	0.32[illegible]	0.357	0.367	0.311	0.486
Minimum	0.528	0.554	0.512	0.483	0.466	0.490	0.579	0.590
Maximum	2.451	2.397	2.396	1.689	2.403	2.440	1.661	2.470
b								
Mean	-0.219	-0.235	-0.187	-0.142	-0.182	-0.055	-0.061	-0.179
SD	0.763	0.763	0.813	0.784	0.837	0.843	0.806	0.737
Minimum	-1.842	-1.904	-1.805	-1.697	-1.624	-1.447	-2.029	-1.951
Maximum	1.576	1.450	1.221	1.466	1.180	1.315	1.275	1.692
c								
Mean	0.197	0.206	0.193	0.189	0.207	0.210	0.186	0.215
SD	0.034	0.045	0.058	0.041	0.065	0.063	0.082	0.064
Minimum	0.120	0.130	0.070	0.080	0.070	0.080	0.020	0.050
Maximum	0.290	0.370	0.360	0.280	0.380	0.330	0.320	0.310

Note. The MEPS data presented here are based on a sample of 5,000 examinees taking the experimental subtests. The subtests are identical to those used in RTC 158.

Table 56

IRT Summary Statistics for Electronics Information Subtests

Parameter	RTC Form 158	269	370	481	592	603	714(8a)	MEPS Form
a								
Mean	1.184	1.124	1.101	0.988	1.150	1.270	1.067	1.212
SD	0.535	0.484	0.550	0.392	0.542	0.510	0.537	0.510
Minimum	0.572	0.542	0.488	0.507	0.583	0.617	0.465	0.604
Maximum	2.481	2.261	2.478	1.962	2.481	2.429	2.500	2.418
b								
Mean	-0.070	-0.065	-0.247	-0.268	-0.105	0.004	-0.134	0.067
SD	0.959	1.083	0.780	0.767	0.859	0.867	1.046	0.914
Minimum	-1.569	-1.429	-1.633	-1.609	-1.716	-1.502	-1.959	-1.379
Maximum	1.975	2.900	0.900	1.013	1.696	1.888	2.729	1.950
c								
Mean	0.189	0.196	0.214	0.207	0.214	0.228	0.195	0.208
SD	0.077	0.079	0.069	0.062	0.076	0.091	0.059	0.121
Minimum	0.050	0.020	0.050	0.080	0.040	0.000	0.070	0.000
Maximum	0.400	0.400	0.330	0.330	0.370	0.370	0.290	0.460

Note. The MEPS data presented here are based on a sample of 5,000 examinees taking the experimental subtests. The subtests are identical to those used in RTC 158.

Table 57

Intercorrelations of Raw Subtest Scores for RTC 158 and RTC 269

	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI
GS	--	55	75	62	14	18	47	56	59	63
AR	58	--	53	61	38	33	38	73	61	47
WK	75	58	--	68	17	23	39	48	52	55
PC	59	54	67	--	32	35	32	52	54	47
NO	14	34	19	33	--	61	-03	37	16	05
CS	16	28	24	39	61	--	00	30	17	08
AS	49	41	43	29	-03	00	--	30	61	65
MK	59	73	53	49	34	27	31	--	55	45
MC	61	64	57	49	16	18	64	56	--	66
EI	65	52	59	46	09	12	66	51	69	--

Note. Intercorrelations for RTC 158 are shown above the diagonal while intercorrelations for RTC 269 are shown below the diagonal. Decimal points are omitted.

Table 58

Intercorrelations of Raw Subtest Scores for RTC 370 and RTC 481

	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI
GS	--	53	70	56	14	15	53	58	62	63
AR	55	--	51	55	43	33	39	74	58	45
WK	75	51	--	63	17	23	40	47	50	48
PC	60	56	67	--	32	37	31	49	45	43
NO	15	41	20	31	--	54	-01	36	17	09
CS	14	31	23	33	58	--	04	29	21	13
AS	54	42	41	39	00	00	--	30	63	68
MK	59	74	53	51	35	28	35	--	57	48
MC	62	60	52	54	18	19	64	57	--	67
EI	64	51	52	50	11	09	69	53	67	--

Note. Intercorrelations for RTC 370 are shown above the diagonal while intercorrelations for RTC 481 are shown below the diagonal. Decimal points are omitted.

Table 59

Intercorrelations of Raw Subtest Scores for RTC 592 and RTC 603

	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI
GS	--	55	73	59	10	12	47	57	60	66
AR	56	--	57	58	35	33	36	70	62	52
WK	74	57	--	68	18	23	36	53	53	59
PC	62	61	69	--	29	36	30	49	51	50
NO	15	38	22	30	--	61	-06	33	16	08
CS	14	31	22	31	61	--	-05	30	18	11
AS	48	36	39	31	-03	-02	--	29	60	61
MK	56	70	54	50	36	28	27	--	55	51
MC	59	58	53	51	17	18	58	52	--	63
EI	66	51	59	52	11	14	64	49	65	--

Note. Intercorrelations for RTC 592 are shown above the diagonal while intercorrelations for RTC 603 are shown below the diagonal. Decimal points are omitted.

Table 60

Intercorrelations of Raw Subtest Scores for RTC 714 (ASVAB 8a)

	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI
GS	--									
AR	56	--								
WK	68	56	--							
PC	53	55	63	--						
NO	11	33	18	27	--					
CS	14	31	21	33	56	--				
AS	55	41	44	34	-02	05	--			
MK	53	72	49	49	35	33	30	--		
MC	60	58	49	45	12	19	65	49	--	
EI	67	54	60	47	06	13	66	47	66	--

Note. Decimal points are omitted.

Table 61

Standardizing Transformations

Subtest	Transformation
General Science	[(10/5.010) (Score - 15.950)] + 50
Arithmetic Reasoning	[(10/7.373) (Score - 18.009)] + 50
Word Knowledge	[(10/7.710) (Score - 26.270)] + 50
Paragraph Comprehension	[(10/3.355) (Score - 11.011)] + 50
Numerical Operations	[(10/10.985) (Score - 34.498)] + 50
Coding Speed	[(10/16.247) (Score - 46.254)] + 50
Auto and Shop Information	[(10/5.550) (Score - 14.317)] + 50
Mathematics Knowledge	[(10/6.393) (Score - 13.578)] + 50
Mechanical Comprehension	[(10/5.349) (Score - 14.165)] + 50
Electronics Information	[(10/4.236) (Score - 11.569)] + 50
Verbal Composite (VE)	[(10/10.595) (Score - 37.281)] + 50

Table 62

Composites Equated

Composite	Label	Composition
Raw Score		
Verbal	VE	WK + PC
Armed Forces Qualification Test	AFQT	AR + WK + PC + .5(NO)
Standard Score		
Army		
General	ARGT	AR + VE
General Maintenance	ARGM	GS + AS + MK + EI
Electronics	AREL	GS + AR + MK + EI
Clerical	ARCL	NO + CS + VE
Motor Maintenance	ARMM	NO + AS + MC + EI
Surveillance	ARSC	NO + CS + AS + VE
Combat	ARCO	AR + CS + AS + MC
Field Artillery	ARFA	AR + CS + MK + MC
Operators and Food	AROF	NO + AS + MC + VE
Skilled Technical	ARST	GS + MK + MC + VE
Marine Corps		
General		same as ARGT
General Maintenance		same as ARGM
Electronics		same as AREL
Clerical		same as ARCL
Motor Maintenance	MCMM	AR + AS + MC + EI
Combat	MCCO	NO + AS + VE
Field Artillery	MCFA	AR + AS + VE
Air Force		
Mechanical	AFM	GS + 2(AS) + MC
Administrative		same as ARCL
General		same as ARGT
Electronics		same as AREL

Table 63

Raw-Score Deviation Analyses for Linear Equating Tables

	Subtest or Composite												
	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	AFQT	Average
Deviation of RTC 158 Table from Average RTC Table													
Bias	-0.056	0.041	0.122	0.311	-0.726	0.214	-0.497	-0.188	-0.291	1.003	0.207	-0.019	0.010
AAD	0.056	0.315	0.190	0.360	0.735	0.214	0.497	0.262	0.291	1.003	0.255	0.387	0.380
RMS	0.062	0.374	0.228	0.427	0.790	0.216	0.499	0.318	0.310	1.022	0.313	0.447	0.486
Wt-Bias	-0.072	-0.108	-0.052	0.185	-0.519	0.220	-0.470	-0.163	-0.284	0.936	0.007	-0.355	-0.056
Wt-AAD	0.072	0.270	0.111	0.186	0.539	0.220	0.470	0.212	0.284	0.936	0.119	0.372	0.316
Wt-RMS	0.074	0.320	0.129	0.256	0.580	0.220	0.471	0.251	0.291	0.945	0.146	0.423	0.412
Deviation of RTC 269 Table from Average RTC Table													
Bias	0.342	0.443	-0.415	0.847	-1.394	-0.045	-0.141	-0.274	-0.524	0.454	-0.010	-0.335	-0.088
AAD	0.346	0.463	0.435	0.847	1.394	0.177	0.141	0.274	0.524	0.454	0.130	0.335	0.460
RMS	0.413	0.567	0.524	0.897	1.415	0.206	0.150	0.303	0.539	0.486	0.151	0.375	0.607
Wt-Bias	0.204	0.334	-0.124	0.732	-1.471	-0.090	-0.115	-0.260	-0.574	0.388	0.119	-0.463	-0.110
Wt-AAD	0.207	0.356	0.172	0.732	1.471	0.121	0.115	0.260	0.574	0.388	0.133	0.463	0.416
Wt-RMS	0.250	0.434	0.232	0.753	1.490	0.149	0.120	0.278	0.574	0.405	0.150	0.471	0.573
Deviation of RTC 370 Table from Average RTC Table													
Bias	-0.215	0.003	0.134	1.743	1.385	0.207	0.891	0.242	0.386	-0.595	0.551	1.340	0.506
AAD	0.475	0.087	0.142	1.743	1.385	0.207	0.891	0.382	0.445	0.595	0.551	1.340	0.687
RMS	0.561	0.105	0.169	1.809	1.421	0.220	0.916	0.460	0.555	0.604	0.560	1.366	0.894
Wt-Bias	0.100	0.048	0.224	1.469	1.484	0.192	0.797	0.217	0.286	-0.643	0.606	1.529	0.526
Wt-AAD	0.269	0.073	0.224	1.469	1.484	0.192	0.797	0.319	0.335	0.643	0.606	1.529	0.662
Wt-RMS	0.323	0.088	0.231	1.521	1.515	0.197	0.811	0.378	0.416	0.647	0.607	1.535	0.863
Deviation of RTC 481 Table from Average RTC Table													
Bias	-0.284	0.045	0.249	-1.676	0.660	0.099	0.718	0.450	0.573	-0.707	-0.370	-0.010	-0.021
AAD	0.388	0.180	0.291	1.676	0.660	0.099	0.718	0.719	0.573	0.707	0.370	0.111	0.541
RMS	0.471	0.212	0.355	1.795	0.671	0.116	0.734	0.865	0.628	0.710	0.375	0.128	0.731
Wt-Bias	-0.052	-0.030	0.022	-1.284	0.647	0.086	0.648	0.418	0.542	-0.681	-0.384	-0.107	-0.015
Wt-AAD	0.189	0.141	0.124	1.284	0.647	0.086	0.648	0.624	0.542	0.681	0.384	0.112	0.455
Wt-RMS	0.231	0.168	0.158	1.348	0.655	0.093	0.657	0.733	0.570	0.682	0.385	0.125	0.598
Deviation of RTC 592 Table from Average RTC Table													
Bias	-0.148	-0.385	0.164	-0.889	-0.303	-0.165	-0.782	-0.264	-0.450	-0.337	-0.147	-0.864	-0.381
AAD	0.148	0.536	0.164	0.901	0.314	0.357	0.782	0.453	0.450	0.352	0.195	0.960	0.468
RMS	0.153	0.663	0.175	1.079	0.322	0.421	0.785	0.542	0.504	0.428	0.239	1.174	0.627
Wt-Bias	-0.173	-0.194	0.216	-0.449	-0.240	-0.080	-0.741	-0.216	-0.418	-0.224	0.012	-0.272	-0.232
Wt-AAD	0.173	0.373	0.216	0.472	0.271	0.186	0.741	0.350	0.418	0.232	0.096	0.373	0.325
Wt-RMS	0.174	0.451	0.218	0.605	0.277	0.236	0.742	0.407	0.442	0.282	0.116	0.476	0.410

Table 63 (Concluded)

Raw-Score Deviation Analyses for Linear Equating Tables

	Subtest or Composite												
	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	AFQT	Average
Deviation of RTC 603 Table from Average RTC Table													
Bias	0.361	-0.147	-0.254	-0.335	0.377	-0.309	-0.189	0.033	0.306	0.183	-0.231	-0.111	-0.026
AAD	0.581	0.267	0.254	0.335	0.388	0.309	0.220	0.235	0.400	0.195	0.232	0.287	0.309
RMS	0.699	0.329	0.256	0.387	0.472	0.319	0.270	0.272	0.495	0.237	0.275	0.337	0.384
Wt-Bias	-0.007	-0.034	-0.285	-0.489	0.196	-0.327	-0.090	0.054	0.460	0.243	-0.367	-0.352	-0.083
Wt-AAD	0.319	0.179	0.285	0.489	0.209	0.327	0.129	0.169	0.472	0.243	0.367	0.357	0.296
Wt-RMS	0.386	0.219	0.286	0.510	0.260	0.330	0.162	0.207	0.538	0.262	0.378	0.388	0.346
Deviation of 8a from Average RTC Table (RTC frequencies used for weights)													
Bias	-0.601	1.439	-1.982	-0.529	-0.934	0.033	-0.509	-0.318	1.282	-0.238	-1.617	-1.310	-0.440
AAD	1.306	1.439	2.000	0.760	0.939	0.173	0.771	0.686	1.282	0.548	1.678	1.643	1.102
RMS	1.534	1.484	2.365	0.932	0.955	0.202	0.931	0.811	1.408	0.646	2.050	2.007	1.418
Wt-Bias	0.243	1.399	-0.924	0.039	-0.869	0.077	-0.118	-0.257	1.162	0.010	-0.672	-0.190	-0.008
Wt-AAD	0.789	1.399	0.967	0.450	0.882	0.111	0.471	0.534	1.162	0.332	0.797	0.632	0.710
Wt-RMS	0.950	1.412	1.270	0.552	0.904	0.138	0.567	0.625	1.226	0.398	1.070	0.793	0.904
Deviation of MEPS Experimental Table from 8a													
Bias	0.443	-1.432	1.993	1.405	-0.154	0.064	-0.082	0.462	-1.765	1.211	1.893	1.540	0.465
AAD	1.586	1.432	2.000	1.643	0.610	0.301	0.830	0.845	1.765	1.282	1.954	2.456	1.392
RMS	1.832	1.578	2.356	2.002	0.729	0.353	0.960	1.008	1.803	1.560	2.368	2.955	1.780
Wt-Bias	-0.401	-1.723	1.171	0.382	0.212	0.105	-0.510	0.442	-1.807	0.935	0.973	-0.088	-0.026
Wt-AAD	1.105	1.723	1.189	0.889	0.392	0.175	0.743	0.722	1.807	0.975	1.100	1.204	1.002
Wt-RMS	1.324	1.793	1.511	1.121	0.493	0.217	0.879	0.832	1.808	1.149	1.437	1.454	1.259
Deviation of MEPS Experimental Table from Average RTC Table													
Bias	-0.158	0.007	0.010	0.876	-1.088	0.097	-0.591	0.145	-0.484	0.973	0.276	0.231	0.025
AAD	0.344	0.716	0.040	0.914	1.129	0.474	0.591	0.170	0.524	0.973	0.278	0.883	0.586
RMS	0.407	0.836	0.049	1.097	1.359	0.549	0.617	0.208	0.655	1.045	0.332	1.028	0.782
Wt-Bias	-0.342	-0.315	0.045	0.394	-0.691	0.160	-0.670	0.141	-0.647	0.866	0.146	-0.417	-0.111
Wt-AAD	0.366	0.653	0.048	0.478	0.742	0.270	0.670	0.158	0.650	0.866	0.148	0.597	0.471
Wt-RMS	0.426	0.774	0.055	0.632	0.869	0.335	0.683	0.183	0.723	0.904	0.191	0.712	0.608
Deviation of MEPS Experimental Table from Same-Form RTC Table													
Bias	-0.102	-0.035	-0.112	0.564	-0.361	-0.117	-0.094	0.332	-0.193	-0.030	0.069	0.250	0.014
AAD	0.312	0.405	0.222	0.604	0.510	0.454	0.203	0.430	0.449	0.164	0.072	0.513	0.362
RMS	0.364	0.476	0.264	0.737	0.639	0.529	0.246	0.525	0.551	0.190	0.089	0.609	0.476
Wt-Bias	-0.274	-0.226	0.069	0.202	-0.107	-0.057	-0.196	0.322	-0.362	-0.083	0.112	-0.108	-0.059
Wt-AAD	0.307	0.374	0.152	0.288	0.268	0.226	0.219	0.392	0.442	0.123	0.112	0.282	0.265
Wt-RMS	0.362	0.447	0.177	0.378	0.341	0.288	0.259	0.454	0.528	0.152	0.118	0.337	0.342

Table 64

Raw-Score Deviation Analyses for Equipercentile Equating Tables

	Subtest or Composite												
	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	AFQT	Average
Deviation of RTC 158 Table from Average RTC Table													
Bias	0.389	-0.003	0.055	0.151	-0.647	0.347	-0.223	-0.140	-0.254	0.708	0.144	-0.862	-0.028
AAD	0.507	0.325	0.141	0.315	0.647	0.347	0.472	0.228	0.290	0.723	0.199	0.862	0.421
RMS	0.785	0.366	0.169	0.370	0.743	0.383	0.512	0.263	0.315	0.820	0.250	1.208	0.594
Wt-Bias	-0.050	-0.145	-0.042	0.205	-0.544	0.233	-0.467	-0.163	-0.287	0.930	0.029	-0.341	-0.054
Wt-AAD	0.158	0.348	0.133	0.279	0.544	0.233	0.484	0.236	0.308	0.931	0.123	0.341	0.343
Wt-RMS	0.229	0.386	0.148	0.329	0.629	0.247	0.505	0.274	0.327	0.967	0.151	0.412	0.443
Deviation of RTC 269 Table from Average RTC Table													
Bias	0.396	0.303	-0.239	0.716	-0.961	-0.215	0.026	-0.208	-0.608	0.292	0.122	0.246	-0.011
AAD	0.430	0.360	0.262	0.716	1.002	0.252	0.207	0.209	0.613	0.371	0.168	0.901	0.458
RMS	0.557	0.398	0.325	0.768	1.309	0.343	0.282	0.244	0.676	0.408	0.237	1.160	0.656
Wt-Bias	0.214	0.309	-0.123	0.712	-1.530	-0.094	-0.103	-0.247	-0.583	0.387	0.113	-0.464	-0.118
Wt-AAD	0.215	0.377	0.178	0.712	1.532	0.144	0.127	0.248	0.585	0.389	0.142	0.485	0.428
Wt-RMS	0.328	0.416	0.241	0.744	1.680	0.220	0.153	0.276	0.607	0.421	0.164	0.513	0.626
Deviation of RTC 370 Table from Average RTC Table													
Bias	-0.764	-0.042	-0.001	1.060	0.991	0.231	0.926	0.271	0.275	-0.405	0.123	-0.564	0.175
AAD	1.038	0.139	0.295	1.281	1.116	0.231	0.926	0.381	0.420	0.626	0.618	2.314	0.782
RMS	1.465	0.213	0.395	1.528	1.326	0.237	0.982	0.486	0.448	0.665	0.736	2.868	1.194
Wt-Bias	0.096	0.052	0.213	1.492	1.596	0.206	0.817	0.227	0.275	-0.653	0.601	1.557	0.540
Wt-AAD	0.411	0.073	0.228	1.543	1.598	0.206	0.817	0.340	0.380	0.665	0.633	1.616	0.709
Wt-RMS	0.538	0.126	0.241	1.729	1.676	0.210	0.846	0.434	0.408	0.679	0.668	1.657	0.954
Deviation of RTC 481 Table from Average RTC Table													
Bias	-0.429	0.185	0.381	-1.123	0.696	-0.042	0.864	0.417	0.315	-0.787	0.065	1.343	0.157
AAD	0.517	0.309	0.443	1.271	0.696	0.197	0.864	0.676	0.492	0.787	0.555	1.545	0.696
RMS	0.751	0.436	0.635	1.505	0.750	0.239	0.952	0.809	0.563	0.838	0.694	2.282	1.013
Wt-Bias	-0.032	-0.036	0.032	-1.310	0.655	0.115	0.675	0.423	0.531	-0.680	-0.388	-0.121	-0.011
Wt-AAD	0.159	0.145	0.166	1.354	0.655	0.169	0.675	0.668	0.535	0.687	0.469	0.351	0.502
Wt-RMS	0.237	0.184	0.265	1.549	0.675	0.191	0.712	0.791	0.588	[illegible]	0.528	0.513	0.680
Deviation of RTC 592 Table from Average RTC Table													
Bias	-0.042	-0.477	-0.051	-0.706	-0.556	-0.072	-1.139	-0.334	-0.147	-0.165	-0.353	-0.924	-0.414
AAD	0.232	0.601	0.309	0.711	0.556	0.311	1.139	0.472	0.477	0.251	0.410	0.967	0.536
RMS	0.271	0.774	0.390	0.908	0.752	0.341	1.366	0.644	0.576	0.271	0.711	1.221	0.765
Wt-Bias	-0.168	-0.145	0.214	-0.419	-0.257	-0.072	-0.757	-0.205	-0.412	-0.211	0.013	-0.244	-0.222
Wt-AAD	0.182	0.325	0.254	0.432	0.257	0.215	0.757	0.336	0.428	0.261	0.100	0.333	0.323
Wt-RMS	0.190	0.432	0.285	0.648	0.313	0.256	0.802	0.442	0.491	0.278	0.195	0.500	0.441

Table 64 (Concluded)

Raw-Score Deviation Analyses for Equipercentile Equating Tables

	Subtest or Composite												
	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	AFQT	Average
Deviation of RTC 603 Table from Average RTC Table													
Bias	0.450	0.034	-0.145	-0.098	0.478	-0.248	-0.452	-0.006	0.419	0.358	-0.101	0.760	0.121
AAD	0.680	0.220	0.299	0.456	0.480	0.280	0.528	0.273	0.427	0.358	0.340	1.147	0.457
RMS	0.843	0.250	0.345	0.528	0.662	0.316	0.774	0.301	0.545	0.441	0.397	1.514	0.667
Wt-Bias	-0.013	-0.009	-0.289	-0.434	0.196	-0.389	-0.093	0.044	0.475	0.242	-0.348	-0.365	-0.082
Wt-AAD	0.362	0.184	0.295	0.497	0.200	0.390	0.205	0.240	0.482	0.242	0.360	0.524	0.332
Wt-RMS	0.442	0.207	0.308	0.558	0.315	0.401	0.295	0.272	0.582	0.277	0.367	0.592	0.405
Deviation of 8a from Average RTC Table (PTC frequencies used for weights)													
Bias	-0.407	0.997	-1.194	-0.135	-0.611	0.309	-0.358	-0.240	1.030	0.115	-0.953	-0.892	-0.197
AAD	1.100	1.089	1.233	0.424	0.847	0.367	0.605	0.572	1.059	0.391	1.055	1.212	0.830
RMS	1.206	1.257	1.566	0.510	0.928	0.595	0.696	0.649	1.173	0.466	1.308	1.431	1.050
Wt-Bias	0.250	1.396	-0.918	0.055	-0.950	0.161	-0.103	-0.246	1.162	0.014	-0.667	-0.142	0.001
Wt-AAD	0.921	1.396	0.995	0.510	0.955	0.180	0.498	0.563	1.171	0.351	0.887	0.806	0.769
Wt-RMS	1.029	1.489	1.310	0.605	1.005	0.350	0.588	0.644	1.254	0.410	1.115	0.997	0.967
Deviation of MEPS Experimental Table from 8a													
Bias	0.431	-1.133	1.282	0.540	0.169	-0.259	0.014	0.341	-1.223	0.506	1.006	0.624	0.191
AAD	1.552	1.463	1.347	0.917	0.546	0.452	0.973	0.737	1.366	0.924	1.254	1.456	1.082
RMS	1.715	1.741	1.655	1.099	0.616	0.569	1.063	0.822	1.561	1.067	1.550	1.664	1.328
Wt-Bias	-0.409	-1.725	1.162	0.335	0.307	0.021	-0.517	0.439	-1.815	0.918	0.968	-0.093	-0.034
Wt-AAD	1.257	1.765	1.302	1.095	0.528	0.271	0.894	0.752	1.816	1.108	1.322	1.292	1.117
Wt-RMS	1.408	1.984	1.575	1.221	0.609	0.333	0.982	0.845	1.891	1.221	1.558	1.466	1.344
Deviation of MEPS Experimental Table from Average RTC Table													
Bias	0.024	-0.135	0.087	0.385	-0.445	0.049	-0.345	0.101	-0.193	0.620	0.052	-0.268	-0.006
AAD	0.573	0.733	0.128	0.575	0.874	0.561	0.648	0.197	0.726	0.682	0.318	0.472	0.541
RMS	0.662	0.808	0.164	0.671	1.102	0.712	0.704	0.213	0.809	0.804	0.396	0.608	0.687
Wt-Bias	-0.367	-0.420	0.065	0.374	-0.701	0.152	-0.668	0.128	-0.659	0.867	0.164	-0.444	-0.126
Wt-AAD	0.470	0.769	0.134	0.580	0.762	0.247	0.708	0.196	0.730	0.888	0.312	0.494	0.524
Wt-RMS	0.503	0.855	0.154	0.666	0.988	0.330	0.752	0.209	0.786	0.958	0.348	0.586	0.655
Deviation of MEPS Experimental Table from Same-Form RTC Table													
Bias	-0.365	-0.132	0.033	0.234	0.202	-0.297	-0.122	0.241	0.061	-0.087	-0.091	0.594	0.023
AAD	0.365	0.421	0.169	0.296	0.585	0.586	0.196	0.418	0.680	0.134	0.313	0.836	0.417
RMS	0.409	0.468	0.204	0.348	0.792	0.843	0.237	0.460	0.834	0.200	0.452	1.167	0.609
Wt-Bias	-0.353	-0.316	0.074	0.155	-0.073	-0.070	-0.214	0.315	-0.377	-0.074	0.110	-0.106	-0.078
Wt-AAD	0.353	0.440	0.192	0.289	0.349	0.177	0.248	0.443	0.498	0.127	0.221	0.275	0.301
Wt-RMS	0.376	0.499	0.214	0.333	0.416	0.343	0.279	0.487	0.565	0.178	0.255	0.377	0.375

Table 65

Composite-Score Deviation Analyses for Linear Equating Tables

	Standard Score Composite														
	ARGT	ARGM	AREL	ARCL	ARMM	ARSC	ARCO	ARFA	AROF	ARST	MCMM	MCCO	MCFA	AFM	Average
Deviation of RTC 158 Table from Average RTC Table															
Bias	-0.075	-0.193	-0.170	-0.069	-0.049	-0.089	-0.034	-0.069	-0.040	-0.106	-0.040	-0.111	-0.102	-0.104	-0.089
AAD	0.131	0.616	0.406	0.263	0.243	0.250	0.782	0.864	0.576	0.319	0.440	0.120	0.145	0.306	0.390
RMS	0.158	0.722	0.483	0.305	0.285	0.294	0.905	0.996	0.665	0.373	0.509	0.159	0.180	0.363	0.526
Wt-Bias	-0.081	-0.115	-0.141	-0.093	-0.075	-0.112	-0.096	-0.089	-0.107	-0.127	-0.086	-0.102	-0.111	-0.138	-0.105
Wt-AAD	0.086	0.244	0.187	0.119	0.109	0.125	0.309	0.339	0.219	0.161	0.207	0.102	0.112	0.177	0.178
Wt-RMS	0.100	0.299	0.228	0.143	0.131	0.144	0.372	0.411	0.262	0.193	0.247	0.102	0.123	0.209	0.232
Deviation of RTC 269 Table from Average RTC Table															
Bias	-0.018	-0.080	-0.128	0.030	-0.045	0.042	-0.155	-0.204	0.014	-0.105	-0.076	0.050	0.003	-0.125	-0.057
AAD	0.132	0.156	0.354	0.297	0.532	0.378	0.444	0.217	0.781	0.523	0.820	0.296	0.382	0.425	0.410
RMS	0.153	0.192	0.416	0.343	0.614	0.437	0.521	0.255	0.901	0.606	0.947	0.344	0.442	0.497	0.527
Wt-Bias	-0.025	-0.090	-0.148	0.004	-0.115	0.004	-0.185	-0.200	-0.080	-0.141	-0.170	0.016	-0.036	-0.182	-0.096
Wt-AAD	0.057	0.095	0.181	0.099	0.222	0.112	0.225	0.200	0.275	0.231	0.389	0.089	0.151	0.243	0.184
Wt-RMS	0.068	0.112	0.223	0.124	0.267	0.142	0.269	0.201	0.335	0.280	0.464	0.114	0.183	0.287	0.242
Deviation of RTC 370 Table from Average RTC Table															
Bias	-0.045	-0.068	-0.089	0.013	0.130	0.003	-0.087	-0.075	-0.012	-0.140	-0.071	0.012	-0.116	-0.156	-0.050
AAD	0.256	0.135	0.476	0.702	0.630	0.079	0.865	0.608	0.093	0.196	0.170	0.110	0.197	0.707	0.373
RMS	0.299	0.170	0.556	0.811	0.730	0.146	1.000	0.704	0.150	0.239	0.217	0.169	0.251	0.821	0.536
Wt-Bias	-0.033	-0.076	-0.055	0.064	0.048	0.017	-0.158	-0.088	-0.014	-0.128	-0.080	0.034	-0.092	-0.266	-0.059
Wt-AAD	0.100	0.080	0.190	0.235	0.234	0.023	0.354	0.242	0.030	0.129	0.094	0.041	0.096	0.388	0.160
Wt-RMS	0.122	0.095	0.226	0.290	0.287	0.027	0.426	0.297	0.036	0.149	0.112	0.048	0.118	0.461	0.236
Deviation of RTC 481 Table from Average RTC Table															
Bias	-0.019	0.087	-0.016	-0.030	0.106	0.012	-0.044	0.002	0.076	-0.023	0.022	0.087	0.005	-0.015	0.018
AAD	0.188	1.291	0.500	0.290	1.126	0.526	0.798	0.321	1.096	0.587	0.868	0.849	0.560	1.295	0.735
RMS	0.221	1.486	0.577	0.339	1.296	0.607	0.923	0.370	1.263	0.678	1.002	0.978	0.648	1.495	0.941
Wt-Bias	-0.010	-0.067	-0.045	-0.011	-0.050	-0.045	-0.108	-0.002	-0.058	-0.062	-0.077	-0.030	-0.055	-0.229	-0.061
Wt-AAD	0.070	0.518	0.204	0.092	0.423	0.163	0.316	0.122	0.376	0.233	0.390	0.265	0.223	0.626	0.287
Wt-RMS	0.086	0.621	0.248	0.116	0.509	0.205	0.382	0.148	0.458	0.282	0.464	0.331	0.268	0.738	0.394
Deviation of RTC 592 Table from Average RTC Table															
Bias	0.016	-0.050	-0.003	-0.005	-0.255	-0.106	-0.194	-0.114	-0.168	-0.065	-0.193	-0.101	-0.030	-0.205	-0.105
AAD	0.249	0.496	0.014	0.191	0.649	0.706	0.205	0.523	0.283	0.325	0.212	0.722	0.198	0.209	0.356
RMS	0.289	0.578	0.085	0.220	0.771	0.821	0.260	0.608	0.359	0.377	0.275	0.838	0.245	0.265	0.490
Wt-Bias	0.003	0.015	0.001	-0.023	-0.160	-0.019	-0.187	-0.124	-0.128	-0.086	-0.175	0.009	-0.003	-0.178	-0.075
Wt-AAD	0.102	0.187	0.001	0.067	0.245	0.198	0.187	0.222	0.132	0.143	0.175	0.213	0.068	0.178	0.151
Wt-RMS	0.123	0.226	0.001	0.084	0.309	0.253	0.189	0.272	0.161	0.173	0.181	0.265	0.083	0.182	0.197

Table 65 (Concluded)

Composite-Score Deviation Analyses for Linear Equating Tables

	Standard Score Composite														
	ARGT	ARGM	AREL	ARCL	ARMM	ARSC	ARCO	ARPA	AROF	ARST	MCMM	MCCO	MCPA	AFM	Average
Deviation of RTC 603 Table from Average RTC Table															
Bias	0.017	0.082	0.129	0.040	-0.262	0.002	-0.330	-0.064	-0.233	-0.075	-0.303	0.020	-0.018	-0.427	-0.101
AAD	0.336	0.501	0.145	0.226	0.306	0.030	0.630	0.504	0.239	0.173	0.478	0.191	0.090	0.572	0.316
RMS	0.388	0.585	0.175	0.263	0.393	0.118	0.764	0.604	0.263	0.205	0.588	0.226	0.121	0.704	0.441
Wt-Bias	0.000	0.148	0.138	0.019	-0.223	0.010	-0.267	-0.047	-0.225	-0.063	-0.249	0.001	-0.020	-0.336	-0.080
Wt-AAD	0.136	0.225	0.138	0.075	0.223	0.010	0.294	0.178	0.225	0.079	0.263	0.057	0.035	0.344	0.163
Wt-RMS	0.165	0.271	0.141	0.096	0.242	0.010	0.363	0.218	0.225	0.098	0.321	0.071	0.042	0.416	0.225
Deviation of 8a from Average RTC Table (RTC frequencies used for weights)															
Bias	0.032	0.130	0.103	-0.058	-0.018	0.062	0.058	-0.019	-0.023	-0.037	0.086	0.057	0.118	0.216	0.051
AAD	0.053	0.147	0.117	0.516	0.029	0.428	0.936	0.073	0.087	1.025	0.589	0.285	0.575	1.170	0.431
RMS	0.081	0.185	0.151	0.600	0.137	0.496	1.081	0.183	0.148	1.184	0.682	0.332	0.668	1.358	0.664
Wt-Bias	0.031	0.127	0.103	-0.021	-0.009	0.018	-0.017	-0.013	-0.023	0.032	0.024	0.025	0.059	0.032	0.026
Wt-AAD	0.031	0.127	0.103	0.166	0.009	0.126	0.347	0.020	0.032	0.393	0.255	0.087	0.218	0.515	0.173
Wt-RMS	0.036	0.133	0.109	0.210	0.009	0.161	0.423	0.024	0.038	0.476	0.307	0.111	0.270	0.619	0.277
Deviation of MEPS Experimental Table from 8a															
Bias	0.094	-0.847	0.054	0.241	0.760	0.384	-0.290	-0.267	0.257	-0.537	0.215	0.078	-0.035	-0.705	-0.043
AAD	0.749	1.341	0.704	0.384	0.760	0.384	0.706	1.640	0.287	1.125	0.685	0.078	0.937	1.507	0.806
RMS	0.866	1.619	0.813	0.462	0.813	0.413	0.832	1.900	0.352	1.333	0.800	0.081	1.082	1.789	1.079
Wt-Bias	0.106	-0.817	0.051	0.254	0.751	0.383	-0.303	-0.206	0.269	-0.549	0.177	0.079	-0.077	-0.592	-0.034
Wt-AAD	0.327	0.858	0.300	0.257	0.751	0.383	0.359	0.632	0.269	0.633	0.318	0.079	0.388	0.789	0.453
Wt-RMS	0.399	1.012	0.355	0.295	0.759	0.386	0.429	0.772	0.284	0.758	0.390	0.080	0.464	0.989	0.592
Deviation of MEPS Experimental Table from Average RTC Table															
Bias	0.126	-0.717	0.157	0.183	0.742	0.446	-0.232	-0.286	0.234	-0.575	0.302	0.135	0.084	-0.489	0.008
AAD	0.778	1.231	0.769	0.221	0.744	0.640	1.610	1.570	0.263	0.575	1.262	0.283	1.503	0.493	0.853
RMS	0.898	1.472	0.890	0.275	0.795	0.776	1.857	1.813	0.320	0.576	1.460	0.336	1.727	0.583	1.128
Wt-Bias	0.139	-0.683	0.158	0.174	0.742	0.447	-0.246	-0.222	0.252	-0.574	0.239	0.133	0.023	-0.461	0.009
Wt-AAD	0.349	0.739	0.351	0.175	0.742	0.448	0.658	0.618	0.252	0.574	0.584	0.141	0.621	0.461	0.480
Wt-RMS	0.428	0.879	0.418	0.189	0.751	0.503	0.787	0.756	0.259	0.575	0.709	0.175	0.749	0.482	0.592
Deviation of MEPS Experimental Table from Same-Form RTC Table															
Bias	0.201	-0.525	0.327	0.252	0.791	0.535	-0.199	-0.218	0.274	-0.468	0.341	0.246	0.186	-0.385	0.097
AAD	0.679	0.648	1.171	0.467	0.791	0.544	0.842	0.712	0.749	0.475	0.854	0.330	1.406	0.606	0.734
RMS	0.792	0.799	1.363	0.557	0.791	0.651	0.978	0.831	0.878	0.568	1.004	0.404	1.623	0.737	0.909
Wt-Bias	0.212	-0.518	0.324	0.236	0.792	0.533	-0.213	-0.192	0.309	-0.465	0.295	0.236	0.125	-0.349	0.095
Wt-AAD	0.321	0.518	0.553	0.260	0.792	0.533	0.359	0.299	0.374	0.465	0.420	0.236	0.573	0.375	0.434
Wt-RMS	0.402	0.580	0.663	0.303	0.792	0.548	0.431	0.370	0.443	0.485	0.519	0.263	0.700	0.463	0.518

Table 66

Composite-Score Deviation Analyses for Equipercentile Equating Tables

	Standard Score Composite														
	ARGT	ARGM	AREL	ARCL	ARMM	ARSC	ARCO	ARFA	AROF	ARST	MCMM	MCCO	MCFA	AFM	Average
Deviation of RTC 158 Table from Average RTC Table															
Bias	0.180	-0.606	0.097	-1.014	-1.760	-1.472	-0.993	0.100	-1.528	0.129	-0.337	-1.414	0.011	-0.928	-0.681
AAD	0.246	1.335	1.135	1.059	1.768	1.580	1.037	1.065	1.538	0.637	1.170	1.506	0.165	1.007	1.039
RMS	0.367	1.964	1.525	1.733	3.047	3.007	1.832	1.397	2.374	0.839	1.538	2.419	0.266	1.332	1.878
Wt-Bias	-0.053	-0.050	-0.106	-0.047	-0.404	0.073	-0.143	-0.335	-0.252	-0.269	-0.343	0.024	0.022	-0.053	-0.138
Wt-AAD	0.094	0.122	0.216	0.171	0.404	0.212	0.189	0.366	0.266	0.305	0.367	0.214	0.025	0.261	0.230
Wt-RMS	0.118	0.238	0.272	0.277	0.529	0.350	0.290	0.384	0.410	0.324	0.434	0.356	0.039	0.356	0.335
Deviation of RTC 269 Table from Average RTC Table															
Bias	-0.576	0.210	-0.138	1.206	-0.658	1.892	-0.094	0.135	-0.191	-0.376	-0.264	0.688	-0.303	0.164	0.121
AAD	0.582	0.371	0.365	1.581	0.668	3.708	1.664	0.280	1.557	0.427	0.291	1.699	0.842	0.255	1.021
RMS	0.771	0.550	0.485	2.914	1.007	5.951	2.249	0.415	2.067	0.689	0.396	2.497	1.170	0.335	2.136
Wt-Bias	-0.127	0.041	-0.021	-0.173	-0.078	-0.141	-0.066	-0.116	-0.138	-0.085	-0.112	-0.177	-0.115	0.075	-0.088
Wt-AAD	0.143	0.052	0.197	0.293	0.108	0.401	0.270	0.188	0.243	0.165	0.163	0.258	0.129	0.204	0.201
Wt-RMS	0.206	0.085	0.219	0.540	0.196	0.814	0.344	0.216	0.352	0.199	0.200	0.418	0.213	0.228	0.352
Deviation of RTC 370 Table from Average RTC Table															
Bias	-0.347	-1.089	-0.285	-1.520	-1.575	-3.679	-0.314	-0.131	-3.079	-2.029	-0.196	-3.327	-0.889	-1.462	-1.423
AAD	0.374	1.177	0.359	1.590	1.685	3.851	1.112	0.655	3.221	2.172	0.201	3.542	0.971	2.142	1.647
RMS	0.633	1.951	0.450	2.385	2.569	5.815	1.518	0.820	5.105	2.999	0.285	4.580	1.441	3.522	2.977
Wt-Bias	0.002	-0.015	-0.048	-0.016	-0.230	0.098	-0.023	-0.047	-0.079	-0.019	-0.088	0.151	0.063	0.201	-0.004
Wt-AAD	0.071	0.250	0.191	0.263	0.465	0.522	0.350	0.296	0.508	0.438	0.089	0.677	0.182	0.505	0.343
Wt-RMS	0.126	0.312	0.225	0.452	0.573	0.832	0.396	0.332	0.805	0.620	0.104	0.927	0.242	0.678	0.540
Deviation of RTC 481 Table from Average RTC Table															
Bias	0.169	-0.298	-0.075	-0.883	-0.369	-0.348	0.253	-1.086	0.261	0.461	0.046	-0.017	0.499	0.330	-0.076
AAD	0.810	0.687	0.347	0.893	0.636	0.561	0.738	2.043	1.765	1.633	0.213	0.770	1.534	0.394	0.930
RMS	1.157	0.879	0.417	1.163	0.721	0.776	1.037	3.090	2.184	2.162	0.253	0.996	2.154	0.511	1.483
Wt-Bias	-0.122	0.025	-0.003	-0.123	-0.161	-0.195	-0.154	-0.124	-0.214	-0.093	-0.156	-0.197	-0.118	0.057	-0.113
Wt-AAD	0.173	0.477	0.225	0.160	0.473	0.264	0.191	0.302	0.445	0.353	0.215	0.521	0.248	0.198	0.303
Wt-RMS	0.249	0.549	0.251	0.262	0.532	0.314	0.225	0.425	0.590	0.524	0.242	0.598	0.387	0.260	0.411
Deviation of RTC 592 Table from Average RTC Table															
Bias	0.104	-0.107	-0.088	0.183	0.630	0.788	0.103	0.727	0.636	1.025	-0.306	0.206	-0.488	-1.545	0.133
AAD	0.421	1.238	1.281	0.793	1.254	1.001	1.713	1.011	0.964	1.367	1.156	0.514	0.543	1.703	1.068
RMS	0.499	1.638	1.708	0.936	1.613	1.415	2.197	1.289	1.192	1.752	1.402	0.733	0.658	2.907	1.551
Wt-Bias	0.009	-0.163	-0.093	-0.090	-0.385	-0.096	-0.320	-0.359	-0.340	-0.382	-0.341	-0.015	-0.031	-0.263	-0.205
Wt-AAD	0.173	0.247	0.330	0.465	0.704	0.244	0.428	0.433	0.429	0.568	0.422	0.233	0.192	0.267	0.367
Wt-RMS	0.211	0.294	0.379	0.540	0.832	0.291	0.474	0.471	0.491	0.631	0.479	0.274	0.236	0.564	0.471

Table 66 (Concluded)

Composite-Score Deviation Analyses for Equipercentile Equating Tables

	Standard Score Composite														
	ARGT	ARGM	AREL	ARCL	ARMM	ARSC	ARCO	ARFA	AROF	ABST	MCMM	MCCO	MCFA	AFM	Average
Deviation of RTC 603 Table from Average RTC Table															
Bias	0.172	1.599	1.323	[illegible].410	2.261	1.557	1.004	1.070	1.411	0.991	0.290	1.595	0.192	0.525	1.100
AAD	0.791	1.629	1.323	1.568	2.637	1.622	1.885	1.333	1.706	1.640	0.669	1.747	0.696	0.835	1.434
RMS	1.016	2.212	1.714	2.021	4.019	2.227	2.902	2.060	2.186	2.508	0.902	2.155	0.958	1.207	2.165
Wt-Bias	-0.075	0.226	0.273	-0.148	-0.301	-0.014	-0.231	-0.151	-0.379	-0.182	-0.306	-0.112	-0.056	-0.149	-0.115
Wt-AAD	0.273	0.305	0.273	0.403	0.627	0.258	0.626	0.491	0.589	0.490	0.429	0.430	0.167	0.419	0.413
Wt-RMS	0.310	0.456	0.388	0.542	0.768	0.454	0.736	0.559	0.657	0.598	0.505	0.566	0.194	0.480	0.537
Deviation of 8a from Average RTC Table (RTC frequencies used for weights)															
Bias	-0.239	-0.942	-0.841	-0.772	-0.972	-0.528	-0.086	-0.435	-0.925	-0.086	-0.396	-0.482	-0.256	-0.955	-0.565
AAD	0.601	1.302	1.811	1.009	1.139	0.829	1.167	2.432	1.016	0.757	0.949	1.146	0.839	1.158	1.154
RMS	0.947	2.178	2.753	1.528	1.999	1.386	1.552	3.298	1.239	0.832	1.336	1.466	1.221	1.509	1.787
Wt-Bias	0.009	0.107	0.148	0.071	-0.118	0.092	-0.231	-0.258	-0.046	-0.049	-0.163	0.204	0.000	0.086	-0.011
Wt-AAD	0.135	0.232	0.317	0.423	0.132	0.219	0.319	0.345	0.335	0.586	0.252	0.412	0.262	0.372	0.310
Wt-RMS	0.178	0.330	0.420	0.537	0.250	0.270	0.377	0.497	0.434	0.667	0.306	0.462	0.303	0.440	0.410
Deviation of MEPS Experimental Table from 8a															
Bias	0.356	-1.673	-0.697	-0.023	-0.814	-0.592	1.002	-0.287	1.360	-0.183	-0.458	-0.012	0.608	-0.1[illegible]	-0.110
AAD	0.555	2.265	0.986	1.116	1.442	2.042	1.934	1.168	1.384	0.495	0.819	0.370	1.558	0.638	1.198
RMS	0.771	3.241	1.108	1.385	1.942	2.826	2.965	1.282	2.038	0.583	0.914	0.516	2.170	0.806	1.840
Wt-Bias	-0.070	-0.842	-0.070	0.283	0.707	0.414	-0.250	-0.071	0.255	-0.349	0.083	-0.035	-0.215	-0.439	-0.043
Wt-AAD	0.368	0.850	0.659	0.357	0.820	0.515	0.433	0.703	0.313	0.606	0.595	0.046	0.505	0.717	0.535
Wt-RMS	0.436	0.986	0.749	0.414	0.884	0.589	0.546	0.818	0.454	0.694	0.661	0.079	0.627	0.851	0.668
Deviation of MEPS Experimental Table from Average RTC Table															
Bias	0.117	-2.615	-1.538	-0.795	-1.786	-1.120	0.916	-0.721	0.435	-0.269	-0.854	-0.494	0.352	-1.077	-0.675
AAD	0.519	3.442	2.096	1.017	2.294	1.568	1.366	1.854	0.808	0.750	1.299	1.430	0.947	1.177	1.469
RMS	0.581	5.309	3.358	1.240	3.001	2.358	1.897	2.435	1.136	0.894	1.897	1.861	1.133	1.400	2.358
Wt-Bias	-0.059	-0.754	0.059	0.201	0.572	0. 28	-0.446	-0.342	0.115	-0.477	-0.063	0.075	-0.184	-0.349	-0.087
Wt-AAD	0.436	0.768	0.881	0.444	0.789	0.584	0.635	0.736	0.601	0.488	0.771	0.441	0.670	0.568	0.629
Wt-RMS	0.493	1.126	0.984	0.501	0.880	0.652	0.707	0.874	0.673	0.509	0.857	0.515	0.760	0.739	0.757
Deviation of MEPS Experimental Table from Same Form RTC Table															
Bias	-0.063	-2.009	-1.635	0.219	-0.026	0.352	1.909	-0.822	1.963	-0.398	-0.517	0.919	0.341	-0.149	0.006
AAD	0.614	2.161	2.102	1.010	1.507	2.742	2.261	2.727	2.163	1.174	1.015	2.324	1.093	0.387	1.663
RMS	0.757	3.475	2.705	1.373	1.829	3.806	3.662	3.764	3.381	1.577	1.150	3.479	1.305	0.500	2.626
Wt-Bias	-0.011	-0.681	0.166	0.263	0.990	0.384	-0.296	-0.018	0.381	-0.229	0.261	0.103	-0.209	-0.268	0.060
Wt-AAD	0.471	0.681	0.969	0.412	1.033	0.501	0.641	0.745	0.773	0.284	0.696	0.463	0.672	0.493	0.631
Wt-RMS	0.531	0.883	1.081	0.496	1.073	0.706	0.809	0.854	0.958	0.367	0.777	0.726	0.764	0.583	0.784

Table 67

Percent Crossovers for AFQT Category Boundaries

Comparison	Equating Method	
	Linear	Equipercentile
RTC 158 vs RTC Average	0.040	0.002
RTC 269 vs RTC Average	0.051	0.025
RTC 370 vs RTC Average	0.053	0.099
RTC 481 vs RTC Average	0.000	0.012
RTC 592 vs RTC Average	0.020	0.034
RTC 603 vs RTC Average	0.044	0.000
MEPS vs RTC Average	0.032	0.007
RTC 158 vs MEPS	0.002	0.014

APPENDIX A

EQUATING TABLES SELECTED FOR OPERATIONAL USE BY THE JOINT SERVICES SELECTION AND CLASSIFICATION WORKING GROUP IN 1983

Tables A-1 and A-3 apply to ASVABs 11a, 11b, 12b, 13a, and 13b.
Tables A-2 and A-4 apply to ASVAB 12a.

Table A-1

Raw-Score Linear Equating Tables for the Experimental Form Administered in the MEPS

Raw Score	Equated Subtest or Composite Score											
	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	AFQT
0	22	26	21	21	20	22	26	31	24	26	20	6
1	24	26	22	24	20	22	27	32	24	28	21	7
2	25	28	23	27	20	22	29	34	25	30	21	8
3	27	29	24	29	20	23	31	35	27	32	22	9
4	29	30	25	32	21	24	32	36	29	34	23	10
5	31	32	26	35	22	24	34	38	31	37	24	10
6	32	33	27	37	23	25	36	39	33	39	25	11
7	34	34	29	40	24	25	37	41	35	41	26	12
8	36	35	30	42	25	26	39	42	37	43	26	13
9	38	37	31	45	26	27	41	44	38	45	27	14
10	39	38	32	48	27	27	42	45	40	48	28	15
11	41	39	33	50	28	28	44	47	42	50	29	16
12	43	41	34	53	29	29	46	48	44	52	30	17
13	45	42	36	56	30	29	47	49	46	54	31	18
14	46	43	37	58	31	30	49	51	48	56	31	19
15	48	44	38	61	31	30	51	52	50	58	32	20
16	50	46	39		32	31	53	54	52	61	33	21
17	51	47	40		33	32	54	55	54	63	34	21
18	53	48	41		34	32	56	57	55	65	35	22
19	55	50	43		35	33	58	58	57	67	36	23
20	57	51	44		36	34	59	60	59	69	36	24
21	58	52	45		37	34	61	61	61		37	25
22	60	53	46		38	35	63	63	63		38	26
23	62	55	47		39	35	64	64	65		39	27
24	64	56	48		40	36	66	65	67		40	28
25	65	57	50		41	37	68	67	69		41	29
26		59	51		42	37					41	30
27		60	52		43	38					42	31
28		61	53		44	39					43	32
29		62	54		45	39					44	32
30		64	55		46	40					45	33
31			57		47	41					46	34
32			58		48	41					46	35
33			59		49	42					47	36
34			60		50	42					48	37
35			61		51	43					49	38
36					52	44					50	39
37					53	44					51	40
38					54	45					51	41
39					55	46					52	42
40					56	46					53	43
41					57	47					54	43
42					58	47					55	44
43					59	48					56	45
44					59	49					56	46

Table A-1 (Continued)

Raw-Score Linear Equating Tables for the Experimental Form Administered in the MEPS

Raw Score	Equated Subtest or Composite Score											
	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	AFQT
45					60	49					57	47
46					61	50					58	48
47					62	51					59	49
48					63	51					60	50
49					64	52					61	51
50					64	52					61	52
51						53						53
52						54						54
53						54						54
54						55						55
55						56						56
56						56						57
57						57						58
58						58						59
59						58						60
60						59						61
61						59						62
62						60						63
63						61						64
64						61						65
65						62						66
66						63						66
67						63						67
68						64						68
69						64						69
70						65						70
71						66						71
72						66						72
73						67						73
74						68						74
75						68						75
76						69						76
77						70						77
78						70						77
79						71						78
80						71						79
81						72						80
82						73						81
83						73						82
84						73						83
85												84
86												85
87												86
88												87
89												88

Table A-1 (Concluded)

Raw-Score Linear Equating Tables for the Experimental Form Administered in the MEPS

Raw Score	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	AFQT
	Equated Subtest or Composite Score											
90												88
91												89
92												90
93												91
94												92
95												93
96												94
97												95
98												96
99												97
100												98
101												99
102												99
103												100
104												101
105												102

Table A-2

Raw-Score Linear Equating Tables for Experimental Form RTC 370

Raw Score	Equated Subtest or Composite Score											
	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	AFQT
0	20	26	21	22	21	22	27	31	24	23	20	5
1	22	26	22	25	22	23	29	33	24	26	21	6
2	24	26	23	27	23	23	31	34	26	28	21	7
3	26	28	24	30	24	24	32	35	28	30	22	8
4	28	29	25	33	25	25	34	37	30	32	23	9
5	30	30	26	35	25	25	36	38	32	35	24	10
6	31	32	28	38	26	26	37	40	34	37	25	11
7	33	33	29	41	27	26	39	41	36	39	26	12
8	35	35	30	43	28	27	41	43	37	41	26	12
9	37	36	31	46	29	28	42	44	39	44	27	13
10	39	37	32	49	30	28	44	45	41	46	28	14
11	41	39	33	51	31	29	46	47	43	48	29	15
12	43	40	35	54	32	29	47	48	45	50	30	16
13	45	42	36	57	33	30	49	50	47	53	31	17
14	46	43	37	59	34	31	51	51	49	55	32	18
15	48	44	38	62	35	31	52	52	51	57	32	19
16	50	46	39		36	32	54	54	53	59	33	20
17	52	47	40		36	32	56	55	54	62	34	21
18	54	49	42		37	33	57	57	56	64	35	22
19	56	50	43		38	34	59	58	58	66	36	23
20	58	51	44		39	34	61	59	60	68	37	24
21	59	53	45		40	35	62	61	62		38	25
22	61	54	46		41	35	64	62	64		38	26
23	63	56	47		42	36	66	64	66		39	27
24	65	57	49		43	37	67	65	68		40	28
25	67	58	50		44	37	69	67	70		41	29
26		60	51		45	38					42	30
27		61	52		46	38					43	31
28		63	53		47	39					43	32
29		64	54		47	40					44	33
30		65	56		48	40					45	34
31			57		49	41					46	35
32			58		50	42					47	35
33			59		51	42					48	36
34			60		52	43					49	37
35			61		53	43					49	38
36					54	44					50	39
37					55	45					51	40
38					56	45					52	41
39					57	46					53	42
40					58	46					54	43
41					59	47					55	44
42					59	48					55	45
43					60	48					56	46
44					61	49					57	47

Table A-2 (Continued)

Raw-Score Linear Equating Tables for Experimental Form RTC 370

Raw Score	Equated Subtest or Composite Score											
	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	AFQT
45					62	49					58	48
46					63	50					59	49
47					64	51					60	50
48					64	51					60	51
49					64	52					61	52
50					64	52					62	53
51						53						54
52						54						55
53						54						56
54						55						57
55						55						58
56						56						59
57						57						59
58						57						60
59						58						61
60						58						62
61						59						63
62						60						64
63						60						65
64						61						66
65						61						67
66						62						68
67						63						69
68						63						70
69						64						71
70						64						72
71						65						73
72						66						74
73						66						75
74						67						76
75						67						77
76						68						78
77						69						79
78						69						80
79						70						81
80						71						82
81						71						82
82						72						83
83						72						84
84						73						85
85												86
86												87
87												88
88												89
89												90

Table A-2 (Concluded)

Raw-Score Linear Equating Tables for Experimental Form RTC 370

Raw Score	Equated Subtest or Composite Score											
	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	AFQT
90												91
91												92
92												93
93												94
94												95
95												96
96												97
97												98
98												99
99												100
100												101
101												102
102												103
103												104
104												105
105												105

Table A-3

Composite-Score Linear Equating Tables for the Experimental Form Administered in the MEPS

Standard Score Sum	Equated Composite Score													
	ARGT	ARGM	AREL	ARCL	ARHM	ARSC	ARCO	ARFA	AROF	ARST	MCHM	MCCO	MCFA	AFM
40	42													
41	43													
42	44													
43	44													
44	45													
45	46													
46	47													
47	48													
48	49													
49	50													
50	51													
51	52													
52	53													
53	54													
54	55													
55	56													
56	57													
57	58													
58	59													
59	60													
60	61			61								60	62	
61	62			62								61	63	
62	63			63								62	64	
63	64			64								63	65	
64	65			65								64	66	
65	66			66								65	67	
66	67			67								66	68	
67	68			68								67	69	
68	69			69								68	70	
69	70			70								69	71	
70	71			71								70	72	
71	72			72								71	73	
72	73			73								72	74	
73	74			74								73	75	
74	75			75								74	76	
75	76			76								75	77	
76	77			77								76	77	
77	78			78								77	78	
78	79			79								78	79	
79	80			80								79	80	
80	81	80	81	81	81	81	81	83	80	82	82	80	81	80
81	82	80	82	82	82	82	82	84	81	83	83	81	82	80
82	83	80	83	83	83	83	83	85	82	84	84	82	83	80
83	84	80	84	84	84	84	84	86	83	85	85	83	84	80
84	84	81	85	85	85	85	85	87	84	85	86	84	85	80
85	85	82	86	86	86	86	86	88	85	86	86	85	86	81
86	86	83	87	87	87	87	87	89	86	87	87	86	87	82
87	87	84	88	88	88	88	88	90	87	88	88	87	88	84
88	88	85	89	89	89	89	89	91	88	89	89	88	89	85
89	89	86	90	90	90	90	90	92	89	90	90	89	90	86
90	90	87	91	91	91	91	91	93	90	91	91	90	91	87
91	91	88	92	92	92	92	92	94	91	92	92	91	92	88
92	92	89	93	93	93	93	93	95	92	93	93	92	93	89
93	93	90	94	94	94	94	94	96	93	94	94	93	94	90
94	94	91	95	95	95	95	95	97	94	95	95	94	95	91

Table A-3 (Continued)

Composite-Score Linear Equating Tables for the Experimental Form Administered in the MEPS

Standard Score Sum	Equated Composite Score													
	ARGT	ARGM	AREL	ARCL	ARMM	ARSC	ARCO	ARFA	AROF	ARST	HCMM	HCCO	HCFA	AFM
95	95	92	96	96	96	96	96	98	95	96	96	95	96	92
96	96	93	97	97	97	97	97	99	96	97	97	96	97	93
97	97	94	98	98	98	98	98	100	97	98	98	97	98	94
98	98	95	99	99	99	99	99	100	98	99	99	98	99	95
99	99	96	100	100	100	100	100	101	99	100	100	99	100	96
100	100	97	101	101	101	101	101	102	100	101	101	100	101	97
101	101	98	102	102	102	102	102	103	101	102	102	101	102	98
102	102	99	103	103	103	103	103	104	102	103	103	102	103	99
103	103	100	104	104	104	104	104	105	103	104	104	103	104	100
104	104	101	105	105	105	105	105	106	104	105	105	104	105	101
105	105	102	106	106	106	106	106	107	105	106	106	105	106	102
106	106	103	107	107	107	107	107	108	106	107	107	106	107	103
107	107	104	108	108	108	108	108	109	107	108	108	107	108	104
108	108	105	109	109	109	109	109	110	108	109	109	108	.09	105
109	109	106	110	110	110	110	110	111	109	110	110	109	110	106
110	110	107	111	111	111	111	111	112	110	111	111	110	111	107
111	111	108	112	112	112	112	112	113	111	112	112	111	112	108
112	112	109	113	113	113	113	113	114	112	113	113	112	113	109
113	113	110	114	114	114	114	114	115	113	114	114	113	114	110
114	114	111	115	115	115	115	115	116	114	115	115	114	115	111
115	115	112	116	116	116	116	116	117	115	116	116	115	116	112
116	116	113	117	116	117	117	117	118	116	117	117	116	117	113
117	117	114	118	117	118	118	118	119	117	118	118	117	118	114
118	118	115	119	118	119	119	119	120	118	119	119	118	119	115
119	119	116	120	119	120	120	120	121	119	120	120	119	120	116
120	120	118	121	120	121	121	121	122	120	121	121	120	121	117
121	121	119	122	121	122	122	122	123	121	122	122	121	122	118
122	122	120	123	122	123	123	123	124	122	123	123	122	123	119
123	123	121	124	123	124	124	124	125	123	124	124	123	124	120
124	124	122	125	124	125	125	125	126	124	125	125	124	125	121
125	124	123	126	125	126	126	126	127	125	126	126	125	125	122
126	125	124	127	126	127	127	127	128	126	127	127	126	126	123
127	126	125	128	127	128	128	128	129	127	128	128	127	127	124
128	127	126	129	128	129	129	129	130	128	129	129	128	128	126
129	128	127	130	129	130	130	130	131	129	130	130	129	129	127
130	129	128	131	130	131	131	130	132	130	131	131	130	130	128
131	130	129	132	131	132	132	131	133	131	132	132	131	131	129
132	131	130	133	132	133	133	132	134	132	133	133	132	132	130
133	132	131	134	133	134	134	133	135	133	134	134	133	133	131
134	133	132	135	134	135	135	134	136	134	135	135	134	134	132
135	134	133	136	135	136	136	135	136	135	136	136	135	135	133
136	135	134	137	136	137	137	136	137	136	137	137	136	136	134
137	136	135	138	137	138	138	137	138	137	138	138	137	137	135
138	137	136	139	138	139	139	138	139	138	139	139	138	138	136
139	138	137	140	139	140	140	139	140	139	140	140	139	139	137
140	139	138	141	140	141	141	140	141	140	141	141	140	140	138
141	140	139	142	141	142	142	141	142	141	141	142	141	141	139
142	141	140	143	142	143	143	142	143	142	142	143	142	142	140
143	142	141	144	143	144	144	143	144	143	143	144	143	143	141
144	143	142	145	144	145	145	144	145	144	144	145	144	144	142
145	144	143	146	145	146	146	145	146	145	145	146	145	145	143
146	145	144	147	146	147	147	146	147	146	146	147	146	146	144
147	146	145	148	147	148	147	147	148	147	147	148	147	147	145
148	147	146	149	148	149	148	148	149	148	148	149	148	148	146
149	148	147	150	149	150	149	149	150	149	149	150	149	149	147

Table A-3 (Continued)

Composite-Score Linear Equating Tables for the Experimental Form Administered in the MEPS

Standard Score Sum	Equated Composite Score													
	ARGT	ARGM	AREL	ARCL	ARHM	ARSC	ARCO	ARFA	AROF	ARST	HCMM	HCCO	HCFA	AFH
150	149	148	151	150	151	150	150	151	150	150	151	150	150	148
151	150	149	152	151	152	151	151	152	151	151	152	151	151	149
152	151	150	153	152	153	152	152	153	152	152	153	152	152	150
153	152	151	154	153	154	153	153	154	153	153	154	153	153	151
154	153	152	155	154	155	154	154	155	154	154	155	154	154	152
155	154	153	156	155	156	155	155	156	155	155	156	155	155	153
156	155	154	157	156	157	156	156	157	156	156	157	156	156	154
157	156	155	158	157	158	157	157	158	157	157	158	157	157	155
158	157	156	159	158	159	158	158	159	158	158	159	158	158	156
159	158	157	160	159	160	159	159	160	159	159	160	159	159	157
160	159	158	161	160	161	160	160	161	160	160	161	160	160	158
161		159	162	161	162	161	161	162	161	161	162	161	161	159
162		160	162	162	163	162	162	163	162	162	163	162	162	160
163		161	163	163	164	163	163	164	163	163	164	163	163	161
164		162	164	164	165	164	164	165	164	164	165	164	164	162
165		163	165	165	166	165	165	166	165	165	166	165	165	163
166		164	166	166	167	166	166	167	166	166	167	166	166	164
167		165	167	167	168	167	167	168	167	167	168	167	167	165
168		166	168	168	169	168	168	169	168	168	169	168	168	166
169		168	169	169	170	169	169	170	169	169	170	169	169	168
170		169	170	170	171	170	170	171	170	170	171	170	170	169
171		170	171	171	172	171	171	172	171	171	172	171	171	170
172		171	172	172	173	172	172	172	172	172	173	172	172	171
173		172	173	173	174	173	173	173	173	173	174	173	172	172
174		173	174	174	175	174	174	174	174	174	175	174	173	173
175		174	175	175	176	175	175	175	175	175	175	175	174	174
176		175	176	176	177	176	176	176	176	176	176	176	175	175
177		176	177	177	178	177	177	177	177	177	177	177	176	176
178		177	178	178	179	178	178	178	178	178	178	178	177	177
179		178	179	179	180	179	179	179	179	179	179	179	178	178
180		179	180	180	181	180	180	180	180	180	180	180	179	179
181		180	181	181	182	181	181	181	181	181	181	181	180	180
182		181	182	182	183	182	182	182	182	182	182	182	181	181
183		182	183	183	184	183	183	183	183	183	183	183	182	182
184		183	184	184	185	184	184	184	184	184	184	184	183	183
185		184	185	185	186	185	185	185	185	185	185	185	184	184
186		185	186	186	187	186	186	186	186	186	186	186	185	185
187		186	187	187	188	187	187	187	187	187	187	187	186	186
188		187	188	188	189	188	188	188	188	188	188	188	187	187
189		188	189	189	190	189	189	189	189	189	189	189	188	188
190		189	190	190	191	190	190	190	190	190	190	190	189	189
191		190	191	191	192	191	191	191	191	191	191	191	190	190
192		191	192	192	193	192	192	192	192	192	192	192	191	191
193		192	193	193	194	193	193	193	193	193	193	193	192	192
194		193	194	194	195	194	194	194	194	194	194	194	193	193
195		194	195	195	196	195	195	195	195	195	195	195	194	194
196		195	196	196	197	196	196	196	196	196	196	196	195	195
197		196	197	197	198	197	197	197	197	197	197	197	196	196
198		197	198	198	199	198	198	198	198	197	198	198	197	197
199		198	199	199	200	199	199	199	199	198	199	199	198	198
200		199	200	200	201	200	200	200	200	199	200	200	199	199
201		200	201	201	202	201	201	201	201	200	201	201	200	200
202		201	202	202	203	202	202	202	202	201	202	202	201	201
203		202	203	203	204	203	203	203	203	202	203	203	202	202
204		203	204	204	205	204	204	204	204	203	204	204	203	203

Table A-3 (Continued)

Composite-Score Linear Equating Tables for the Experimental Form Administered in the MEPS

Standard Score Sum	Equated Composite Score													
	ARGT	ARGM	AREL	ARCL	ARMM	ARSC	ARCO	ARFA	AROF	ARST	HCMM	HCCO	HCFA	AFM
205		204	205	205	206	205	205	205	205	204	205	205	204	204
206		205	206	206	207	206	206	206	206	205	206	206	205	205
207		206	207	207	208	207	207	207	207	206	207	207	206	206
208		207	208	208	209	208	208	208	208	207	208	208	207	207
209		208	209	209	210	209	209	208	209	208	209	209	208	208
210		209	210	210	211	210	210	209	210	209	210	210	209	210
211		210	211	211	212	211	211	210	211	210	211	211	210	211
212		211	212	212	213	212	212	211	212	211	212	212	211	212
213		212	213	213	214	213	213	212	213	212	213	213	212	213
214		213	214	214	215	214	214	213	214	213	214	214	213	214
215		214	215	215	216	215	215	214	215	214	215	215	214	215
216		215	216	216	217	216	216	215	216	215	216	216	215	216
217		216	217	217	218	217	217	216	217	216	217	217	216	217
218		217	218	218	219	218	218	217	218	217	216	218	217	218
219		219	219	219	220	219	218	218	219	218	219	219	218	219
220		220	220	220	221	220	219	219	220	219	220	220	219	220
221		221	221	221	222	221	220	220	221	220	221	221	219	221
222		222	222	222	223	222	221	221	222	221	222	222	220	222
223		223	223	223	224	223	222	222	223	222	223	223	221	223
224		224	224	224	225	224	223	223	224	223	224	224	222	224
225		225	225	225	226	225	224	224	225	224	225	225	223	225
226		226	226	226	227	226	225	225	226	225	226	226	224	226
227		227	227	227	228	227	226	226	227	226	227	227	225	227
228		228	228	228	229	228	227	227	228	227	228	228	226	228
229		229	229	229	230	229	228	228	229	228	229	229	227	229
230		230	230	230	231	230	229	229	230	229	230	230	228	230
231		231	231	231	232	231	230	230	231	230	231	231	229	231
232		232	232	232	233	232	231	231	232	231	232	232	230	232
233		233	233	233	234	233	232	232	233	232	233	233	231	233
234		234	234	234	235	234	233	233	234	233	234	234	232	234
235		235	235	235	236	235	234	234	235	234	235	235	233	235
236		236	236	236	237	236	235	235	236	235	236	236	234	236
237		237	237	237	238	237	236	236	237	236	237	237	235	237
238		238	238	238	239	238	237	237	238	237	238	238	236	238
239		239	239	239	240	239	238	238	239	238	239	239	237	239
240		240	240	240	241	240	239	239	240	239	240	240	238	240
241		241	241		242	241	240	240	241	240	241			241
242		242	242		263	242	241	241	242	241	242			242
243		243	243		244	243	242	242	243	242	243			243
244		244	244		245	244	243	243	244	243	244			244
245		245	245		246	245	244	244	245	244	245			245
246		246	246		247	246	245	244	246	245	246			246
247		247	247		248	247	246	245	247	246	247			247
248		248	247		249	248	247	246	248	247	248			248
249		249	248		250	249	248	247	249	248	249			249
250		250	249		251	250	249	248	250	249	250			250
251		251	250		252	251	250	249	251	250	251			252
252		252	251		253	252	251	250	252	251	252			253
253		253	252		254	253	252	251	253	252	253			254
254		254	253		255	254	253	252	254	253	254			255
255		255	254		256	255	254	253	255	253	255			256
256		256	255		257	256	255	254	256	254	256			257
257		257	256		258	257	256	255	257	255	257			258
258		258	257		259	258	257	256	258	256	258			259
259		259	258		260	259	258	257	259	257	259			260

Table A-3 (Continued)

Composite-Score Linear Equating Tables for the Experimental Form Administered in the MEPS

Standard Score Sum	AROT	ARGM	ARRL	ARCL	ARMM	ARSC	ARCO	ARPA	AROF	ARST	HCMM	HCCO	HCPA	AFM
							Equated Composite Score							
260		260	259		261	260	259	258	260	258	260			261
261		261	260		262	261	260	259	261	259	261			262
262		262	261		263	262	261	260	262	260	262			263
263		263	262		264	263	262	261	263	261	263			264
264		264	263		264	264	263	262	264	262	264			265
265		265	264		265	265	264	263	265	263	264			266
266		266	265		266	266	265	264	266	264	265			267
267		267	266		267	267	266	265	267	265	266			268
268		269	267		268	268	267	266	268	266	267			269
269		270	268		269	269	268	267	270	267	268			270
270		271	269		270	270	269	268	271	268	269			271
271		272	270		271	271	270	269	272	269	270			272
272		273	271		272	272	271	270	273	270	271			273
273		274	272		273	273	272	271	274	271	272			274
274		275	273		274	274	273	272	275	272	273			275
275		276	274		275	275	274	273	276	273	274			276
276		277	275		276	276	275	274	277	274	275			277
277		278	276		277	277	276	275	278	275	276			278
278		279	277		278	278	277	276	279	276	277			279
279		280	278		279	279	278	277	280	277	278			280
280		281	279		280	280	279	278	281	278	279			281
281		282	280		281	281	280	279	282	279	280			282
282		283	281		282	282	281	280	283	280	281			283
283		284	282		283	283	282	280	284	281	282			284
284		285	283		284	284	283	281	285	282	283			285
285		286	284		285	285	284	282	286	283	284			286
286		287	285		286	286	285	283	287	284	285			287
287		288	286		287	287	286	284	288	285	286			288
288		289	287		288	288	287	285	289	286	287			289
289		290	288		289	289	288	286	290	287	288			290
290		291	289		290	290	289	287	291	288	289			291
291		292	290		291	291	290	288	292	289	290			292
292		293	291		292	292	291	289	293	290	291			294
293		294	292		293	293	292	290	294	291	292			295
294		295	293		294	294	293	291	295	292	293			296
295		296	294		295	295	294	292	296	293	294			297
296		297	295		296	296	295	293	297	294	295			298
297		298	296		297	297	296	294	298	295	296			299
298		299	297		298	298	297	295	299	296	297			300
299		300	298		299	299	298	296	300	297	298			301
300		301	299		300	300	299	297	301	298	299			302
301		302	300		301	301	300	298	302	299	300			303
302		303	301		302	302	301	299	303	300	301			304
303		304	302		303	303	302	300	304	301	302			305
304		305	303		304	304	303	301	305	302	303			306
305		306	304		305	305	304	302	306	303	304			307
306		307	305		306	306	305	303	307	304	305			308
307		308	306		307	307	306	304	308	305	306			309
308		309	307		308	308	306	305	309	306	307			310
309		310	308		309	309	307	306	310	307	308			311
310		311	309		310	310	308	307	311	308	309			312
311		312	310		311	311	309	308	312	309	310			313
312		313	311		312	312	310	309	313	309	311			314
313		314	312		313	313	311	310	314	310	312			315
314		315	313		314	314	312	311	315	311	313			316

Table A-3 (Concluded)

Composite-Score Linear Equating Tables for the Experimental Form Administered in the MEPS

Standard Score Sum	Equated Composite Score													
	ARGT	ARGM	AREL	ARCL	ARMM	ARSC	ARCO	ARFA	AROF	ARST	MCMM	MCCO	MCFA	AFM
315		316	314		315	315	313	312	316	312	314			317
316		317	315		316	316	314	313	317	313	315			318
317		319	316		317	317	315	314	318	314	316			319
318		320	317		318	318	316	315	319	315	317			320
319		320	318		319	319	317	316	320	316	318			320
320		320	319		320	320	318	316	320	317	319			320

Table A-4

Composite-Score Linear Equating Tables for Experimental Form RTC 370

Standard Score Sum	Equated Composite Score													
	ARGT	ARGM	ARSL	ARCL	ARMM	ARSC	ARCO	ARFA	AROF	ARST	MCMM	MCCO	MCFA	AFM
40	40													
41	40													
42	41													
43	42													
44	43													
45	44													
46	45													
47	46													
48	47													
49	48													
50	49													
51	50													
52	51													
53	52													
54	53													
55	54													
56	55													
57	57													
58	58													
59	59													
60	60			60								60	60	
61	61			61								60	60	
62	62			62								61	60	
63	63			63								62	61	
64	64			64								63	62	
65	65			65								64	63	
66	66			66								65	64	
67	67			67								66	65	
68	68			68								67	66	
69	69			69								68	67	
70	70			70								69	68	
71	71			71								70	69	
72	72			72								71	70	
73	73			73								72	71	
74	74			74								73	72	
75	75			75								74	73	
76	76			76								75	75	
77	77			77								76	76	
78	78			78								77	77	
79	79			79								78	78	
80	80	80	80	80	81	80	80	81	80	82	80	79	79	80
81	81	81	80	81	82	80	81	82	81	83	80	80	80	80
82	82	82	81	82	83	81	82	83	82	84	81	81	81	81
83	83	83	82	83	84	82	83	84	83	85	82	82	82	82
84	84	84	83	84	85	83	84	85	84	86	83	83	83	83
85	85	85	84	85	86	84	85	86	85	87	84	84	84	84
86	86	86	85	86	87	85	86	87	86	88	85	85	85	85
87	87	87	86	87	88	86	87	88	87	89	86	86	86	86
88	88	88	87	88	89	87	88	89	88	89	87	87	87	87
89	89	89	88	89	90	88	89	90	89	90	88	88	88	88
90	90	90	89	90	91	89	90	91	90	91	89	89	89	89
91	91	91	90	91	92	90	91	92	91	92	90	90	90	90
92	92	92	91	92	93	91	92	93	92	93	91	91	91	91
93	93	93	92	93	94	92	93	94	93	94	92	92	92	92
94	94	94	93	94	95	93	94	95	94	95	93	93	93	93

Table A-4 (Continued)

Composite-Score Linear Equating Tables for Experimental Form RTC 370

Standard Score Sum	Equated Composite Score													
	ARGT	ARGM	AREL	ARCL	ARMM	ARSC	ARCO	ARFA	AROF	ARST	HCMM	HCCO	HCFA	AFM
95	95	95	94	95	96	94	95	96	95	96	94	94	94	94
96	96	96	95	96	97	95	96	97	96	97	95	95	95	95
97	97	97	96	97	98	96	97	98	97	98	96	97	96	96
98	98	98	97	98	99	97	98	99	98	99	97	98	97	97
99	99	99	98	99	100	98	99	100	99	100	98	99	98	98
100	100	100	99	100	101	99	100	101	100	[illegible]	99	100	99	99
101	101	101	100	101	102	100	101	102	101	[illegible]	100	101	100	100
102	102	102	101	102	103	101	102	103	102	[illegible]	101	102	101	101
103	103	103	102	103	104	102	103	104	103	104	102	103	102	102
104	104	104	103	104	105	103	104	105	104	105	103	104	103	103
105	105	105	104	105	106	104	105	106	105	106	104	105	104	104
106	106	106	105	106	107	105	106	107	106	107	105	106	105	105
107	107	107	106	107	108	106	107	108	107	108	106	107	106	106
108	108	108	107	108	109	107	108	109	108	109	107	108	107	107
109	109	109	108	109	110	108	109	110	109	110	108	109	108	108
110	110	110	109	110	111	109	110	111	110	111	109	110	109	109
111	111	111	110	111	112	110	111	112	111	112	110	111	110	110
112	112	112	111	112	113	111	112	113	112	113	111	112	111	111
113	113	113	112	113	114	112	113	114	113	114	112	113	112	112
114	114	114	113	114	115	113	114	115	114	115	113	114	113	113
115	115	115	114	115	116	114	115	116	115	116	114	115	114	114
116	116	116	115	116	117	115	116	117	116	117	115	116	115	115
117	117	117	116	117	118	116	117	118	117	118	116	117	116	116
118	118	118	117	118	119	117	118	119	118	119	117	118	117	117
119	119	119	118	119	120	118	119	120	119	120	118	119	118	118
120	120	120	119	120	121	119	120	121	120	121	119	120	119	119
121	121	121	120	121	122	120	121	122	121	122	120	121	120	120
122	122	122	121	122	123	121	122	123	122	123	121	122	121	121
123	123	123	122	123	124	122	123	124	123	124	122	123	122	122
124	124	124	123	124	125	123	124	125	124	125	123	124	123	123
125	125	125	124	125	126	124	125	126	125	126	124	125	124	124
126	126	126	125	126	127	125	126	127	126	127	125	126	125	125
127	127	127	126	127	128	126	127	128	127	128	126	127	126	126
128	128	128	127	128	129	127	128	129	128	129	127	128	127	127
129	129	129	128	129	130	128	129	130	129	130	128	129	128	128
130	130	130	129	130	131	129	130	131	130	131	129	130	129	129
131	131	131	130	131	132	130	131	132	131	132	130	131	130	130
132	132	132	131	132	133	131	132	133	132	133	131	132	131	131
133	133	133	132	133	134	132	133	134	133	134	132	133	132	132
134	134	134	133	134	135	133	134	135	134	135	133	134	133	133
135	135	135	134	135	136	134	135	136	135	136	134	135	135	134
136	136	136	135	136	137	135	136	137	136	137	135	136	136	135
137	137	137	136	137	138	136	137	138	137	138	136	137	137	136
138	138	138	137	138	139	137	138	139	138	139	137	138	138	137
139	139	139	138	139	140	138	139	140	139	140	138	139	139	138
140	140	140	139	140	141	139	140	141	140	141	139	140	140	139
141	141	141	140	141	142	140	141	142	141	142	140	141	141	140
142	142	142	141	142	143	141	142	143	142	143	141	142	142	141
143	143	143	142	143	144	142	143	144	143	144	142	143	143	142
144	144	144	143	144	145	143	144	145	144	145	143	144	144	143
145	145	145	144	145	146	144	145	146	145	146	144	145	145	144
146	146	146	145	146	147	145	146	147	146	147	145	146	146	145
147	147	147	146	147	148	146	147	148	147	148	146	147	147	146
148	148	148	147	148	149	148	148	149	148	149	147	148	148	147
149	149	149	148	149	150	149	149	150	149	150	148	149	149	148

Table A-4 (Continued)

Composite-Score Linear Equating Tables for Experimental Form RTC 370

Standard Score Sum	Equated Composite Score													
	AROT	ARGM	AREL	ARCL	ARHM	ARSC	ARCO	ARFA	AROF	ARST	HCHM	HCCO	HCFA	AFM
150	150	150	149	150	151	150	150	151	150	151	149	150	150	149
151	151	151	150	151	152	151	151	151	151	152	150	151	151	150
152	152	152	151	152	153	152	152	152	152	153	151	152	152	151
153	153	153	152	153	154	153	153	153	153	154	152	153	153	152
154	154	154	153	154	155	154	154	154	154	155	153	154	154	153
155	155	155	154	155	156	155	155	155	155	156	154	155	155	154
156	156	156	155	156	157	156	156	156	156	157	156	156	156	155
157	157	157	156	157	158	157	157	157	157	158	157	157	157	156
158	158	158	157	158	159	158	158	158	158	158	158	158	158	157
159	159	159	158	159	160	159	159	159	159	159	159	159	159	158
160	160	160	159	160	161	160	160	160	160	160	160	160	160	159
161		161	160	161	162	161	161	161	161	161	161	161	161	160
162		162	161	162	163	162	162	162	162	162	162	162	162	161
163		163	162	163	164	163	163	163	163	163	163	163	163	162
164		164	163	164	165	164	164	164	164	164	164	164	164	163
165		165	164	165	166	165	165	165	165	165	165	165	165	164
166		166	166	166	167	166	166	166	166	166	166	166	166	165
167		167	167	167	167	167	167	167	167	167	167	167	167	166
168		168	168	168	168	168	168	168	168	168	168	168	168	167
169		169	169	169	169	169	169	169	169	169	169	169	169	168
170		170	170	170	170	170	170	170	170	170	170	170	170	169
171		171	171	171	171	171	171	171	171	171	171	171	171	170
172		172	172	172	172	172	172	172	172	172	172	172	172	171
173		173	173	173	173	173	173	173	173	173	173	173	173	172
174		174	174	174	174	174	174	174	174	174	174	174	174	173
175		175	175	175	175	175	175	175	175	175	175	175	175	174
176		176	176	176	176	176	176	176	176	176	176	176	176	175
177		177	177	177	177	177	177	177	177	177	177	177	177	176
178		178	178	178	178	178	178	178	178	178	178	178	178	177
179		179	179	179	179	179	179	179	179	179	179	179	179	178
180		180	180	180	180	180	180	180	180	180	180	180	180	179
181		181	181	181	181	181	181	181	181	181	181	181	181	180
182		182	182	182	182	182	182	182	182	182	182	182	182	181
183		183	183	183	183	183	183	183	183	183	183	183	183	182
184		184	184	184	184	184	184	184	184	184	184	184	184	183
185		185	185	185	185	185	185	185	185	185	185	185	185	185
186		186	186	186	186	186	186	186	186	186	186	186	186	186
187		187	187	187	187	187	187	187	187	187	187	187	187	187
188		188	188	188	188	188	188	188	188	188	188	188	188	188
189		189	189	189	189	189	189	189	189	189	189	189	189	189
190		190	190	190	190	190	190	190	190	190	190	190	190	190
191		191	191	191	191	191	191	191	191	191	191	191	191	191
192		192	192	192	192	192	192	192	192	192	192	192	192	192
193		193	193	193	193	193	193	193	193	193	193	193	193	193
194		194	194	194	194	194	194	194	194	194	194	194	195	194
195		195	195	195	195	195	195	195	195	195	195	195	196	195
196		196	196	196	196	196	196	196	196	196	196	196	197	196
197		197	197	197	197	197	197	197	197	197	197	197	198	197
198		198	198	198	198	198	198	198	198	198	198	198	199	198
199		199	199	199	199	199	199	199	199	199	199	199	200	199
200		200	200	200	200	200	200	200	200	200	200	200	201	200
201		201	201	201	201	201	201	201	201	201	201	201	202	201
202		202	202	202	202	202	202	202	202	202	202	202	203	202
203		203	203	203	203	203	203	203	203	203	203	203	204	203
204		204	204	204	204	204	204	204	204	204	204	204	205	204

Table A-4 (Continued)

Composite-Score Linear Equating Tables for Experimental Form ETC 370

Standard Score Sum	Equated Composite Score													
	ARGT	ARGH	AREL	ARCL	ARMM	ARSC	ARCO	ARFA	AROF	ARST	HCHM	HCCO	HCFA	AFM
205		205	205	205	205	205	205	205	205	205	205	205	206	205
206		206	206	206	206	206	206	206	206	206	206	206	207	206
207		207	207	207	207	207	207	207	207	207	207	207	208	207
208		208	208	208	208	208	208	208	208	208	208	208	209	208
209		209	209	209	209	209	209	209	209	209	209	209	210	209
210		210	210	210	210	210	210	210	210	210	210	210	211	210
211		211	211	211	211	211	211	211	211	211	211	211	212	211
212		212	212	212	212	212	212	212	212	212	212	212	213	212
213		213	213	213	213	213	213	213	213	213	213	213	214	213
214		214	214	214	214	214	214	214	214	214	214	214	215	214
215		215	215	215	215	215	215	215	215	215	215	216	216	215
216		216	216	216	216	216	216	216	216	216	216	217	217	216
217		217	217	217	217	217	217	217	217	217	217	218	218	217
218		218	218	218	218	218	218	218	218	218	218	219	219	218
219		219	219	219	219	219	219	219	219	219	219	220	230	219
220		220	220	220	220	220	220	220	220	220	220	221	221	220
221		221	221	221	221	221	221	221	221	221	221	222	222	221
222		222	222	222	222	222	222	222	222	222	222	223	223	222
223		223	223	223	223	223	223	223	223	223	223	224	224	223
224		224	224	224	224	224	224	224	224	224	224	225	225	224
225		225	225	225	225	225	225	225	225	225	225	226	226	225
226		226	226	226	226	226	226	226	226	226	226	227	227	226
227		227	227	227	227	227	227	227	227	227	227	228	228	227
228		228	228	228	228	228	228	228	228	227	228	229	229	228
229		229	229	229	229	229	229	229	229	228	229	230	230	229
230		230	230	230	230	230	230	230	230	229	230	231	231	230
231		231	231	231	231	231	231	231	231	230	231	232	232	231
232		232	232	232	232	232	232	232	232	231	232	233	233	232
233		233	233	233	233	233	233	233	233	232	233	234	234	233
234		234	234	234	234	234	234	234	234	233	234	235	235	234
235		235	235	235	235	235	235	235	235	234	235	236	236	235
236		236	236	236	236	236	236	236	236	235	236	237	237	236
237		237	237	237	237	237	237	237	237	236	237	238	238	237
238		238	238	238	238	238	238	238	238	237	238	239	239	238
239		239	239	239	239	239	239	239	239	238	239	240	240	239
240		240	240	240	240	240	240	239	240	239	240	240	240	240
241		241	241		241	241	241	240	241	240	241			241
242		242	242		242	242	242	241	242	241	242			242
243		243	243		243	243	243	242	243	242	243			243
244		244	244		244	244	244	243	244	243	244			244
245		245	245		245	245	245	244	245	244	245			245
246		246	246		246	246	246	245	246	245	246			246
247		247	247		247	247	247	246	247	246	247			247
248		248	248		248	248	248	247	248	247	248			248
249		249	249		249	249	249	248	249	248	249			249
250		250	250		250	250	250	249	250	249	250			250
251		251	251		251	251	251	250	251	250	251			251
252		252	252		252	252	252	251	252	251	252			252
253		253	253		253	253	253	252	253	252	253			253
254		254	254		254	254	254	253	254	253	254			254
255		255	255		255	255	255	254	255	254	255			255
256		256	256		256	256	256	255	256	255	256			256
257		257	257		257	257	257	256	257	256	257			257
258		258	258		258	258	258	257	258	257	258			258
259		259	259		259	259	259	258	259	258	259			259

Table A-4 (Continued)

Composite-Score Linear Equating Tables for Experimental Form RTC 370

Standard Score Sum	Equated Composite Score													
	ARGT	ARGM	AREL	ARCL	ARMM	ARSC	ARCO	ARFA	AROF	ARST	MCMM	MCCO	MCFA	AFM
260		260	260		260	260	260	259	260	259	260			260
261		261	261		260	261	261	260	261	260	261			261
262		262	262		261	262	262	261	262	261	262			262
263		263	263		262	263	263	262	263	262	263			263
264		264	264		263	264	264	263	264	263	264			264
265		265	265		264	265	265	264	265	264	265			265
266		266	266		265	266	266	265	266	265	266			266
267		267	267		266	267	267	266	267	266	267			267
268		268	268		267	269	268	267	268	267	268			268
269		269	269		268	270	269	268	269	268	269			269
270		270	270		269	271	270	269	270	269	270			270
271		271	271		270	272	271	270	271	270	271			271
272		272	272		271	273	272	271	272	271	272			272
273		273	273		272	274	273	272	273	272	273			273
274		274	274		273	275	274	273	274	273	274			274
275		275	275		274	276	275	274	275	274	275			275
276		276	276		275	277	276	275	276	275	276			276
277		277	277		276	278	277	276	277	276	277			277
278		278	279		277	279	278	277	278	277	278			278
279		279	280		278	280	279	278	279	278	279			279
280		280	281		279	281	280	279	280	279	280			280
281		281	282		280	282	281	280	281	280	281			281
282		282	283		281	283	282	281	282	281	282			282
283		283	284		282	284	283	282	283	282	283			283
284		284	285		283	285	284	283	284	283	284			284
285		285	286		284	286	285	284	285	284	285			285
286		286	287		285	287	286	285	286	285	286			286
287		287	288		286	288	287	286	287	286	288			287
288		288	289		287	289	288	287	288	287	289			288
289		289	290		288	290	289	288	289	288	290			289
290		290	291		289	291	290	289	290	289	291			290
291		291	292		290	292	291	290	291	290	292			291
292		292	293		291	293	292	291	292	291	293			292
293		293	294		292	294	293	292	293	292	294			293
294		294	295		293	295	294	293	294	293	295			294
295		295	296		294	296	295	294	295	294	296			295
296		296	297		295	297	296	295	296	295	297			296
297		297	298		296	298	297	296	297	296	298			297
298		298	299		297	299	298	297	298	297	299			298
299		299	300		298	300	299	298	299	297	300			299
300		300	301		299	301	300	299	300	298	301			300
301		301	302		300	302	301	300	301	299	302			301
302		302	303		301	303	302	301	302	300	303			302
303		303	304		302	304	303	302	303	301	304			303
304		304	305		303	305	304	303	304	302	305			304
305		305	306		304	306	305	304	305	303	306			305
306		306	307		305	307	306	305	306	304	307			306
307		307	308		306	308	307	306	307	305	308			307
308		308	309		307	309	308	307	308	306	309			308
309		309	310		308	310	309	308	309	307	310			309
310		310	311		309	311	310	309	310	308	311			310
311		311	312		310	312	311	310	311	309	312			312
312		312	313		311	313	312	311	312	310	313			313
313		313	314		312	314	313	312	313	311	314			314
314		314	315		313	315	314	313	314	312	315			315

Table A-4 (Concluded)

Composite-Score Linear Equating Tables for Experimental Form RTC 370

Standard Score Sum	Equated Composite Score													
	ARGT	ARGM	AREL	ARCL	ARMM	ARSC	ARCO	ARFA	AROF	ARST	MCMM	MCCO	MCFA	AFM
315		315	316		314	316	315	314	315	313	316			316
316		316	317		315	317	316	315	316	314	317			317
317		317	318		316	318	317	316	317	315	318			318
318		318	319		317	319	318	317	318	316	319			319
319		319	320		318	320	319	318	319	317	320			320
320		320	320		319	320	320	319	320	318	320			320

APPENDIX B

EQUATING TABLES FOR NUMERICAL OPERATIONS AND CODING SPEED AND PERCENTILE EQUIVALENTS FOR RAW AFQT COMPOSITE SCORES ADJUSTED FOR THE REVISED 1980 YOUTH POPULATION NORMS

Table B-1

Corrected Raw Score Linear Equating Tables for ASVABS 11a, 11b, 12b, 13a, and 13b

Raw Score	Equated Subtest Score NO	Equated Subtest Score CS	Raw Score	Equated Subtest Score NO	Equated Subtest Score CS
0	20	21	43	56	47
1	20	22	44	57	48
2	20	22	45	58	49
3	20	23	46	59	49
4	20	24	47	60	50
5	20	24	48	61	50
6	20	25	49	62	51
7	21	25	50	63	52
8	22	26	51		52
9	23	27	52		53
10	24	27	53		53
11	25	28	54		54
12	26	28	55		55
13	27	29	56		55
14	28	30	57		56
15	29	30	58		56
16	30	31	59		57
17	31	31	60		58
18	32	32	61		58
19	33	33	62		59
20	34	33	63		60
21	35	34	64		60
22	36	35	65		61
23	36	35	66		61
24	37	36	67		62
25	38	36	68		63
26	39	37	69		63
27	40	38	70		64
28	41	38	71		64
29	42	39	72		65
30	43	39	73		66
31	44	40	74		66
32	45	41	75		67
33	46	41	76		67
34	47	42	77		68
35	48	42	78		69
36	49	43	79		69
37	50	44	80		70
38	51	44	81		71
39	52	45	82		71
40	53	45	83		72
41	54	46	84		72
42	55	47			

Table B-2

Corrected Raw Score Linear Equating Tables for ASVAB 12a

Raw Score	Equated Subtest Score NO	Equated Subtest Score CS	Raw Score	Equated Subtest Score NO	Equated Subtest Score CS
0	20	22	43	58	47
1	20	22	44	59	48
2	20	23	45	60	49
3	21	24	46	61	49
4	22	25	47	62	50
5	22	25	48	63	50
6	23	26	49	64	51
7	24	26	50	65	52
8	25	27	51		52
9	26	27	52		53
10	27	28	53		53
11	28	29	54		54
12	29	29	55		54
13	30	30	56		55
14	31	30	57		56
15	32	31	58		56
16	33	32	59		57
17	34	32	60		57
18	35	33	61		58
19	36	33	62		59
20	37	34	63		59
21	37	35	64		60
22	38	35	65		60
23	39	36	66		61
24	40	36	67		61
25	41	37	68		62
26	42	37	69		63
27	43	38	70		63
28	44	39	71		64
29	45	39	72		64
30	46	40	73		65
31	47	40	74		66
32	48	41	75		66
33	49	42	76		67
34	50	42	77		67
35	51	43	78		68
36	51	43	79		68
37	52	44	80		69
38	53	44	81		70
39	54	45	82		70
40	55	46	83		71
41	56	46	84		71
42	57	47			

Table B-3

Percentile Equivalents (P.) on the 1980 Youth Population Metric for Raw AFQT Scores from ASVABs 11a, 11b, 12b, 13a, and 13b

Raw AFQT Score	P.	Raw AFQT Score	P.	Raw AFQT Score	P.	Raw AFQT Score	P.	Raw AFQT Score	P.
0.0	1	21.5	2	43.0	12	64.5	30	86.0	64
0.5	1	22.0	2	43.5	12	65.0	31	86.5	65
1.0	1	22.5	2	44.0	13	65.6	32	87.0	66
1.5	1	23.0	2	44.5	13	66.0	32	87.5	67
2.0	1	23.5	3	45.0	13	66.5	33	88.0	68
2.5	1	24.0	3	45.5	14	67.0	34	88.5	69
3.0	1	24.5	3	46.0	14	67.5	34	89.0	70
3.5	1	25.0	3	46.5	14	68.0	35	89.5	71
4.0	1	25.5	3	47.0	15	68.5	36	90.0	72
4.5	1	26.0	3	47.5	15	69.0	36	90.5	73
5.0	1	26.5	4	48.0	15	69.5	37	91.0	74
5.5	1	27.0	4	48.5	16	70.0	38	91.5	75
6.0	1	27.5	4	49.0	16	70.5	38	92.0	76
6.5	1	28.0	4	49.5	16	71.0	39	92.5	77
7.0	1	28.5	4	50.0	17	71.5	40	93.0	78
7.5	1	29.0	5	50.5	17	72.0	41	93.5	79
8.0	1	29.5	5	51.0	18	72.5	41	94.0	80
8.5	1	30.0	5	51.5	18	73.0	42	94.5	81
9.0	1	30.5	5	52.0	18	73.5	43	95.0	81
9.5	1	31.0	5	52.5	19	74.0	44	95.5	82
10.0	1	31.5	6	53.0	19	74.5	44	96.0	83
10.5	1	32.0	6	53.5	20	75.0	45	96.5	84
11.0	1	32.5	6	54.0	20	75.5	46	97.0	85
11.5	1	33.0	6	54.5	21	76.0	47	97.5	86
12.0	1	33.5	7	55.0	21	76.5	47	98.0	87
12.5	1	34.0	7	55.5	21	77.0	48	98.5	87
13.0	1	34.5	7	56.0	22	77.5	49	99.0	88
13.5	1	35.0	7	56.5	22	78.0	49	99.5	89
14.0	1	35.5	7	57.0	23	78.5	50	100.0	90
14.5	1	36.0	8	57.5	23	79.0	51	100.5	91
15.0	1	36.5	8	58.0	24	79.5	52	101.0	92
15.5	1	37.0	8	58.5	24	80.0	53	101.5	93
16.0	1	37.5	9	59.0	25	80.5	53	102.0	93
16.5	1	38.0	9	59.5	25	81.0	54	102.5	94
17.0	1	38.5	9	60.0	26	81.5	55	103.0	95
17.5	1	39.0	10	60.5	26	82.0	56	103.5	96
18.0	1	39.5	10	61.0	27	82.5	57	104.0	97
18.5	1	40.0	10	61.5	27	83.0	58	104.5	97
19.0	2	40.5	11	62.0	27	83.5	59	105.0	98
19.5	2	41.0	11	62.5	28	84.0	60		
20.0	2	41.5	11	63.0	28	84.5	61		
20.5	2	42.0	11	63.5	29	85.0	62		
21.0	2	42.5	12	64.0	30	85.5	63		

Table B-4

Percentile Equivalents (P.) on the 1980 Youth Population Metric for Raw AFQT Scores from ASVAB 12a

Raw AFQT Score	P.	Raw AFQT Score	P.	Raw AFQT Score	P.	Raw AFQT Score	P.	Raw AFQT Score	P.
0.0	1	21.5	2	43.0	13	64.5	32	86.0	70
0.5	1	22.0	2	43.5	13	65.0	33	86.5	71
1.0	1	22.5	2	44.0	13	65.5	34	87.0	72
1.5	1	23.0	2	44.5	14	66.0	35	87.5	73
2.0	1	23.5	3	45.0	14	66.5	36	88.0	74
2.5	1	24.0	3	45.5	14	67.0	36	88.5	75
3.0	1	24.5	3	46.0	15	67.5	37	89.0	76
3.5	1	25.0	3	46.5	15	68.0	38	89.5	77
4.0	1	25.5	3	47.0	15	68.5	38	90.0	78
4.5	1	26.0	3	47.5	16	69.0	39	90.5	79
5.0	1	26.5	4	48.0	16	69.5	40	91.0	80
5.5	1	27.0	4	48.5	16	70.0	41	91.5	80
6.0	1	27.5	4	49.0	17	70.5	42	92.0	81
6.5	1	28.0	4	49.5	17	71.0	42	92.5	82
7.0	1	28.5	4	50.0	18	71.5	43	93.0	83
7.5	1	29.0	5	50.5	18	72.0	44	93.5	84
8.0	1	29.5	5	51.0	18	72.5	45	94.0	85
8.5	1	30.0	5	51.5	19	73.0	45	94.5	86
9.0	1	30.5	5	52.0	19	73.5	46	95.0	87
9.5	1	31.0	6	52.5	20	74.0	47	95.5	88
10.0	1	31.5	6	53.0	20	74.5	47	96.0	89
10.5	1	32.0	6	53.5	21	75.0	48	96.5	90
11.0	1	32.5	6	54.0	21	75.5	49	97.0	90
11.5	1	33.0	6	54.5	22	76.0	50	97.5	91
12.0	1	33.5	7	55.0	22	76.5	50	98.0	92
12.5	1	34.0	7	55.5	23	77.0	51	98.5	93
13.0	1	34.5	7	56.0	23	77.5	52	99.0	94
13.5	1	35.0	7	56.5	24	78.0	53	99.5	95
14.0	1	35.5	8	57.0	24	78.5	54	100.0	96
14.5	1	36.0	8	57.5	25	79.0	55	100.5	96
15.0	1	36.5	8	58.0	25	79.5	56	101.0	97
15.5	1	37.0	9	58.5	26	80.0	57	101.5	98
16.0	1	37.5	9	59.0	26	80.5	58	102.0	98
16.5	1	38.0	9	59.5	27	81.0	59	102.5	99
17.0	1	38.5	10	60.0	27	81.5	60	103.0	99
17.5	1	39.0	10	60.5	28	82.0	61	103.5	99
18.0	1	39.5	10	61.0	28	82.5	63	104.0	99
18.5	1	40.0	11	61.5	29	83.0	64	104.5	99
19.0	1	40.5	11	62.0	29	83.5	65	105.0	99
19.5	1	41.0	11	62.5	30	84.0	66		
20.0	2	41.5	12	63.0	31	84.5	67		
20.5	2	42.0	12	63.5	31	85.0	68		
21.0	2	42.5	12	64.0	32	85.5	69		

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