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ABSTRACT

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AIR FORCE HUMAN RESOURCES LABORATORY

COMPARISON OF ASVAB TEST-RETEST RESULTS OF MALE AND FEMALE ENLISTEES

By

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June 1976
Final Report for period July 1974 – October 1975

AIR FORCE SYSTEMS COMMAND
BROOKS AIR FORCE BASE, TEXAS 78235

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This technical report has been reviewed and is approved.

LELAND D. BROKAW, Technical Director
Personnel Research Division

Approved for publication.

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Male and female enlistees were compared on the basis of their performance on the Armed Services Vocational Aptitude Battery. Mean Aptitude Index scores were compared for male and female enlistees on the original testing and on retest. Males scored higher on mechanical and electronics, and females scored higher on administrative and general. Both males and females tended to do poorer on retest than they had on the original test. The USAF Enlistment Attitude Survey administered shed no light on possible cause for lower scores on retest. Comparisons of test-retest correlations with expectations based on known test reliability suggests that non-standard testing conditions may prevail in operational testing.

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PREFACE

This research was conducted under Project 7719, Air Force Development of Selection, Assignment, Performance Evaluation, Retention and Utilization Devices; Task 771912, Air Force Selection and Classification Programs.

The professional and technical assistance provided during the course of this research by the Computational Science Division and the Testing Branch of the Personnel Research Division is greatly appreciated.

Data were collected and preliminary analyses and report drafting were accomplished by Iris Massey. The F ratio test for correlational differences was devised and computed by Lonnie Valentine who also prepared the final write-up of the study.

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COMPARISON OF ASVAB TEST-RETEST RESULTS OF MALE AND FEMALE ENLISTEES

I. INTRODUCTION

In 1968 the Armed Services Vocational Aptitude Battery (ASVAB) replaced the Airman Qualifying Examination (AQE) in the high school testing program. Developed jointly by the Air Force, Army, Navy, and Marine Corps, the ASVAB is a Department of Defense instrument which was developed initially to provide a single selection instrument for use in the high schools, suitable for all military services. In 1968 the ASVAB was also standardized for Air Force use as a selection and classification instrument for non-prior service applicants (Vitola & Alley, 1968), and in 1973 it replaced the AQE as the production instrument for the Air Force. The most recent forms of the ASVAB (Forms 2 & 3) contain eight subtests of 25 items each and one test of 100 items. Each is separately timed, and the nine subtests yield four aptitude composites similar to those of the AQE and an Armed Forces Qualification Test (AFQT) score which is used to replace the AFQT score for male inductees and the Armed Forces Women's Selection Test (AFWST) for Women in the Air Force (WAF) applicants.

Previous studies have compared performance of male and female enlistees on AQE (Lecznar, 1965; Tupes, 1965). McReynolds and Brokaw found, as reported in an unpublished study of WAF test performance, that there was variance between operational and experimental test performance for the same selection instrument.[1]

Vitola and Wilbourn (1971) compared operational and experimental AQE-66 mean scores for male and female enlistees. In all instances, WAF performance was significantly lower on retest. All WAF in this study qualified for enlistment at or above the 40th centile on both the Administrative and General AQE Aptitude Indexes and achieved a minimum score of 42 on the AFWST-5 or 47 on AFWST-6. On the basis of retest performance, however, a substantial number of them would not have qualified for enlistment in the Air Force. Their comparison with males demonstrated that WAF enlistees achieved higher Administrative and General Aptitude Indexes on AQE-66 and ASVAB than did the male enlistees (Vitola & Wilbourn, 1971).

II. RESEARCH PROBLEM AND APPROACH

This study explores (a) whether score differences as reported by Vitola and Wilbourn still obtain upon retest, (b) comparison of score shifts for WAF with those of male airmen, (c) determines whether there is evidence of non-standard testing, and (d) possible explanations of the score shift by analysis of responses to the USAF Enlistment Attitude Survey (EAS).

An experimental attitude and background scale EAS was administered to approximately 400 male basic airmen and 400 WAF basic airmen. This was administered immediately following retest on ASVAB. It was hypothesized that factors covered in the EAS would be found to correlate with score-shifts between test and retest (e.g., could score shifts be associated with such factors as disillusionment with training or second thoughts about a military tour?). The survey was item analyzed with score shift [i.e., (AFQT) - (AFQT retest); (Mechanical) - (Mechanical retest); etc.] as the criteria, to answer some of these questions. Means, standard deviations, and intercorrelations of operationally derived test scores, retest scores, and difference scores (test minus retest) were computed for the AFQT and for all four aptitude indexes (AI). T-tests were computed for mean differences between test and retest.

The t-test mean comparisons examined questions about shifts in average test performance, and the item analyses of the EAS sought evidence of situational factors associated with larger test to retest score

[1] McReynolds, J., & Brokaw, L.D. *Effectiveness of the operational administration of WAF selection tests.* Unpublished technical memorandum, May 1955. (Available from Personnel Research Division, Air Force Human Resources Laboratory, Lackland Air Force Base, Texas 78236.)

shifts. Analyses were also conducted to determine whether uncorrelated variance between test and retest performance was different from that expected on the basis of known test reliability. In this regard, it is recognized that mean differences may obtain as a result of such factors as regression toward the mean or practice effects; however, one would expect correlation between test and retest performance to approximate test reliability. The method employed for this comparison is briefly described in Appendix B. Briefly, what was involved was comparison of the variance of a difference score (test-retest score) with the variance that would have been predicted for this difference from information on score reliability. This comparison was through the F ratio; a significant F indicates that the obtained score difference (or "error") variance differs in some significant manner from what would have been expected if all testing had been accomplished under proper conditions and if neither session were unduly influenced by extraneous factors.

III. RESULTS AND DISCUSSION

Means and standard deviations of both operationally derived and retest scores for the male and female samples separately are presented in Table 1. Means and standard deviations of the difference scores (test score-retest score), for males and females separately, and the t-test for the test-retest mean difference are given in Table 2.

Examination of Table 2 shows that, in all cases, male scores were lower on retest than on the original testing, with the difference in the General Composite significant at the .01 level of confidence. Females scored higher, though insignificantly, on the Administrative Composite retest and significantly lower on the other four retests–at the .01 level on AFQT, Mechanical, General, and Electronics.

Comparison of performance of males and females (Table 1), on both test and retest, shows that males scored higher on Mechanical and Electronics while females scored higher on Administrative and General, which is consistent with the results previously reported (Vitola & Wilbourn, 1971). Mean AFQT was slightly higher for females than for males.

Intercorrelations of test, retest, and difference scores for males and females are presented in Tables 3 and 4, respectively. Correlations between test scores and their corresponding retest score range from .47 (General) to .82 (Mechanical) for males and from .45 (General) to .65 (Electronics) for females.

Aptitude composite reliabilities, estimated by formula (Wherry & Gaylord, 1943) from individual test intercorrelations and test-retest reliabilities published in the 1973–74 ASVAB Counselor's Manual, are AFQT .92, Mechanical .91, Administrative .88, General .90, and Electronics .92. These reliabilities (adjusted for range restriction by test standard deviations in this study), along with separate test-retest correlations for males and females in this study, are summarized in Table 5. It is apparent that these test-retest correlations are quite discrepant from what would be expected from known composite reliabilities.

Estimates of the variance of a difference score (test-retest) that would have been obtained for each of the five composite scores for the two sexes separately if the expected reliabilities in Table 5 had obtained in these samples were computed. These estimates were compared with the obtained variances via the F ratio (see Appendix B for an explanation of the procedure). These comparisons are summarized in Table 6. All F ratios are significant beyond the .01 level of confidence except for that for the Mechanical AI for male subjects; it is significant at the .05 level.

These outcomes show that test-retest correlations are significantly lower than would be expected from known composite reliabilities and suggest non-standard testing, or score processing, or both. Presumably, these non-standard conditions obtained in operational testing; all retesting was accomplished under carefully controlled experimental conditions.

Item analysis of the EAS does not lend much insight into reasons for score shifts. Blacks tended to do better on the original testing while Whites scored higher on retest. The EAS is presented in Appendix A. Table 7 shows responses significant at the .01 and .05 level for each criterion. Negative significance levels indicate negative correlation with the criterion. Of 3120 relationships investigated, only 233 (or approximately 7%) showed significance at the .05 level or above, indicating that perhaps these were chance relationships.

IV. CONCLUSIONS

The following general conclusions can be drawn from this study:

1. Males scored higher on Mechanical and Electronics while females scored higher on Administrative and General.

2. Both males and females scored higher on the original than on the retest with one exception—females scored slightly, though insignificantly, higher on the Administrative retest than on the original.

3. Item analysis of the Enlistment Attitude Survey did not provide insight into reasons for the score shift. There is no apparent explanation for decreased scores on retest or for low test-retest correlations except the possibility of failure to adhere rigidly to test times on one administration or the possibility of help on the test.

4. The data strongly suggest that non-standard operational testing may be a wide-spread and serious problem which requires correction.

Table 1. **Means and Standard Deviations for Operational and Retest Composite Percentile Scores for Male and Female Basic Airmen**

Scores	Male Basic Airmen (N = 413)		Female Basic Airmen (N = 417)	
	Mean	SD	Mean	SD
Operational				
AFQT	57.56	17.08	59.79	17.74
Mechanical	56.90	21.18	30.05	16.76
Administrative	51.90	19.12	67.59	17.27
General	64.40	16.43	68.88	14.97
Electronics	62.25	16.61	56.01	18.20
Retest				
AFQT	56.13	20.89	56.87	22.27
Mechanical	56.02	23.01	24.81	14.74
Administrative	51.57	21.13	68.45	22.67
General	60.02	20.72	62.96	21.27
Electronics	61.03	19.76	49.94	21.07

Table 2. **Means, Standard Deviations, and t-Tests of Test-Retest Difference Scores for Male and Females**

(N = 400 Males and 400 Females)

Test Minus Retest	Males			Females		
	Mean	SD	t-test[a]	Mean	SD	t-test[a]
AFQT	1.42	16.81	1.67	2.92	17 50	3.33**
Mechanical	.88	13.25	1.33	5.24	16.07	6.51**
Administrative	.33	18.89	.35	− .87	19.73	− .88
General	4.46	19.49	4.57**	5.92	19.79	5.98**
Electronics	1.22	14.38	1.69	6.06	16.63	7.28**

[a] $$t = \frac{\overline{X}_d}{\sqrt{\frac{N(SD_d^2)}{N(N-1)}}}$$

where: $\overline{X}_d$ = Mean of difference scores, and SD_d^2 = Variance of difference scores

*Significant at .05 level.

**Significant at .01 level.

Table 3. **Intercorrelations of Operational and Retest Variables for Male Basic Airmen**
(N = 413)

ASVAB Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Operational															
1. AFQT	1.00	.33	..36	.63	.77	.24	.02	.05	.01	.10	.62	.29	.28	.49	.57
2. Mechanical	.33	1.00	.16	.25	.54	– .19	.17	.00	– .13	– .12	.42	.82	.15	.32	.54
3. Administrative	.36	.16	1.00	.55	.31	– .04	.10	.38	.08	– .01	.33	.09	.56	.35	.27
4. General	.63	.25	.55	1.00	.51	.09	.23	.18	.34	.11	.45	.09	.34	.47	.35
5. Electronics	.77	.54	.31	.51	1.00	– .02	.04	.00	– .05	.19	.64	.47	.28	.45	.70
Test–Retest															
6. AFQT	.24	– .19	– .04	.09	– .02	1.00	.12	.20	.65	.70	– .61	– .24	– .22	– .55	– .52
7. Mechanical	.02	.17	.10	.23	.04	.12	1.00	.07	.23	.25	– .08	– .42	.03	– .03	– .15
8. Administrative	.05	.00	.38	.18	.00	.20	.07	1.00	.33	.13	– .12	– .04	– .55	– .18	– .10
9. General	.01	– .13	.08	.34	– .05	.65	.23	.33	1.00	.46	– .52	– .26	– .22	– .67	– .37
10. Electronics	.10	– .12	– .01	.11	.19	.70	.25	.13	.46	1.00	– .48	– .26	– .12	– .34	– .57
Retest															
11. AFQT	.62	.42	.33	.45	.64	– .61	– .08	– .12	– .52	– .48	1.00	.43	.41	.84	.89
12. Mechanical	.29	.82	.09	.09	.47	– .24	– .42	– .04	– .26	– .26	.43	1.00	.12	.31	.59
13. Administrative	.28	.15	.56	.34	.28	– .22	.03	– .55	– .22	– .12	.41	.12	1.00	.48	.33
14. General	.49	.32	.35	.47	.45	– .55	– .03	– .18	– .67	– .34	.84	.31	.48	1.00	.63
15. Electronics	.57	.54	.27	.35	.70	– .52	– .15	– .10	– .37	– .57	.89	.59	.33	.63	1.00

Table 4. **Intercorrelations of Operational and Retest Variables for Female Basic Airmen**
(N = 417)

ASVAB Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Operational															
1. AFQT	1.00	.39	.33	.62	.73	.20	.09	− .05	− .09	.06	.64	.35	.30	.52	.59
2. Mechanical	.39	1.00	.24	.40	.54	− .02	.60	.00	.06	.13	.32	.49	.18	.23	.37
3. Administrative	.33	.24	1.00	.49	.28	− .04	.09	.26	.04	− .02	.29	.17	.54	.31	.26
4. General	.62	.40	.49	1.00	.53	.05	.20	.12	.28	.09	.46	.23	.27	.45	.39
5. Electronics	.73	.54	.28	.53	1.00	− .04	.12	− .01	− .07	.27	.62	.48	.23	.44	.65
Test–Retest															
6. AFQT	.20	− .02	− .04	.05	− .04	1.00	.27	.27	.66	.66	− .63	− .31	− .27	− .58	− .56
7. Mechanical	.09	.60	.09	.20	.12	.27	1.00	.14	.29	.35	− .14	− .41	− .05	− .13	− .17
8. Administrative	− .05	.00	.26	.12	− .01	.27	.14	1.00	.40	.28	− .26	− .15	− .68	− .29	− .23
9. General	− .09	.06	.04	.28	− .07	.66	.29	.40	1.00	.49	− .59	− .25	− .32	− .74	− .44
10. Electronics	.06	.13	− .02	.09	.27	.66	.35	.28	.49	1.00	− .48	− .24	− .26	− .39	− .56
Retest															
11. AFQT	.64	.32	.29	.46	.62	− .63	− .14	− .26	− .59	− .48	1.00	.52	.45	.87	.91
12. Mechanicsl	.35	.49	.17	.23	.48	− .31	− .41	− .15	− .25	− .24	.52	1.00	.26	.40	.60
13. Administrative	.30	.18	.54	.27	.23	− .27	− .05	− .68	− .32	− .26	.45	.26	1.00	.49	.40
14. General	.52	.23	.31	.45	.44	− .58	− .13	− .29	− .74	− .39	.87	.40	.49	1.00	.69
15. Electronics	.59	.37	.26	.39	.65	− .56	− .17	− .23	− .44	− .56	.91	.60	.40	.69	1.00

Table 5. **Comparison of Obtained Test-Retest Correlations with Expected Correlations**

Composite	Males		Females	
	Expected[a] rtt	Obtained rtt	Expected[a] rtt	Obtained rtt
AFQT	.82	.62	.83	.64
Mechanical	.86	.82	.80	.49
Administrative	.78	.56	.75	.54
General	.77	.47	.74	.45
Electronics	.81	.70	.84	.65

[a]Based on composite reliability corrected to restricted range.

Table 6. **Variance of Difference Scores (Test-Retest) Compared with Estimated Difference Score Variance**

Composite	Males (N = 400)			Females (N = 400)		
	Estimated Variance	Obtained Variance	F	Estimated Variance	Obtained Variance	F
AFQT	142.96	282.58	1.98	154.84	306.25	1.98
Mechanical	139.81	175.56	1.26*	102.89	258.24	2.51
Administrative	181.80	356.83	1.96	224.92	389.27	1.73
General	175.00	379.86	2.17	205.26	391.64	1.91
Electronics	134.64	206.78	1.54	130.95	276.56	2.11

*This F is significant at the .05 level; all others are significant at the .01 level with 399 and 399 degrees of freedom.

Table 7. **Items of Enlistment Attitude Survey Significant for Each Criterion**

Item Response	Criteria*									
	Female					Male				
	1	2	3	4	5	1	2	3	4	5
1-B		−05								
C		05								
E				−01						
2-A			05		05					
3-A										05
D										−05
E						−05				
4-B					05					
D						01				
6-B			05	05	05					
D	−05	−05	−05	−05						−01
7-A			05							
C						−05				
E					−05					
8-D		05				01				
E						−05				
9-E					−05					
10-A		−01				−01				
B		01				01				
C								−05		
11-C			01							
12-B	−05									
C			−05							
D		05	01		05		02			
E		05								
13-A		01								
D	−01	−01	−01	−01	−01	−01			−01	−05
E	01	01	01	01	01	01			01	01
14-D						−01			−05	−05
15-A				01	01					
D		−05								
E			−05							
H		−05								
I		05								
J								−05		
16-A				05					05	
D					−05					
F	−05				−05	01			05	
17-A				05						
B					−05					
18-A						01				
D	−01			−05						
19-C	01		05		01	05		05		
D						−05	−01			
E								05		
G					05					
I							05			

Table 7 *(Continued)*

Item Response	Criteria* Female 1	2	3	4	5	Male 1	2	3	4	5
20-A	−01	−05	−01	01	−01		05			
C			01	05						
D					05					
E	01					05				
21-B	01			05						
D					−05					
E					05					
F			01		05					
23-A					−01					
B						05				
D						−01				
24-A		−05								
B									−05	
E	05									
25-C										−05
D			05							
26-B		05								
C									05	
E			05							
27-A				05				−05		
E						01			05	05
28-B			05							
C								−05		
D					−05					
29-A						05	−05			
F									−05	−05
30-C									05	
F					−05					
31-A	01		05		01					
B		−05								05
D	−05									
32-A						01				01
B	−01		−05	−01						−05
C	05									
D	05		05	05					05	
F						01			01	01
33-A						01				
C						−01				
E	01			01	01					
34-A						05				
D								−01		
35-A						05				
B							05			
C			−01	−05						
D	01			05						
E		05		05						
36-B				−01						
C									−05	
D	05			05						

Table 7 *(Continued)*

Item Response	Criteria* Female 1	2	3	4	5	Male 1	2	3	4	5
37-A						05				05
C			--05							
D	05			05						
E			05							
38-A	−05									
C						−05				--01
D	05			05						
E				05						
39-C										−05
D	05					−05				
40-E			05							05
41-C						−05				−01
42-B			05							
D					−05	05				01
E		05		01					01	
F		01								
H								−05		
J	−05									−05
43-C			05							
F						05				
H								−05		
44-C		−05					05			
D		05								
I								05		
45-A									−05	
C			−05							
D					01					
46-C						05				
D						−05				
E				−01	−05					
47-D	01	01		05	01					
49-D		01			05				05	
50-B						−05				
51-C	−05				−05					
52-B					05					
53-B						−05				
D		05	05	01						
54-D					−05					
E					−05					
55-C						05				
D		05			05			05		
E								−05		

Note. — Negative numbers indicate negative correlations −05 and 01 indicate level of significan - blank spaces indicate no significance.

*Criterion # 1 = (AFQT) – (AFQT Retest)
2 = (Mech) – (Mech Retest)
3 = (Admin) – (Admin Retest)
4 = (Gen) – (Gen Retest)
5 = (Elect) – (Elect Retest)

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APPENDIX A: USAF ENLISTMENT ATTITUDE INVENTORY

Listed below are some reasons why people join the military service. Please indicate on your answer sheet the extent to which you agree or disagree that the reason given is why you joined the Air Force. There are no "right" or "wrong" answers–we only want to know how you honestly feel. Use the following scale.

A–Strongly Agree
B–Agree
C–Undecided
D–Disagree
E–Strongly Disagree

For example: If you strongly agree with statement 1, you would mark response "A" to statement 1 on your answer sheet.

I DECIDED TO JOIN THE MILITARY BECAUSE:

1. I think a military hitch is a good thing for everybody.
2. I believe it is everyone's patriotic duty to serve his country in the military forces during war or otherwise.
3. Good civilian jobs were not readily available.
4. The military offers a chance to travel and see the world.
5. I wanted to get away from responsibilities back home.
6. I just wanted a change.
7. The military is a good place to meet a future husband/wife.
8. I had problems at home and the military provided a way out.
9. The military does not discriminate against a person because of sex, ethnic groups, or religious affiliation.
10. The military provides good educational opportunities.
11. I wanted to be independent from my parents.

- - - - - - - - - - - - - - - - - -

12. What is your present marital status:
    A) Single
    B) Married
    C) Divorced
    D) Separated
    E) Widowed
13. Which of the following racial/ethnic groups best describes you:
    A) Oriental-American
    B) Mexican-American
    C) Puerto Rican
    D) Caucasian
    E) Black
    F) Other
14. What language(s) do your parents speak in their home?
    A) English only
    B) Spanish only
    C) Both English and Spanish
    D) A foreign language other than Spanish
    E) English and one or more foreign languages other than Spanish
15. What was the population of the community in which you lived most or your life?
    A) Over 1 million
    B) 500,000 – 1,000,000
    C) 250,000 – 500,000
    D) 100,000 – 250,000
    E) 50,000 – 100,000
    F) 25,000 – 50,000
    G) 10,000 – 25,000
    H) 5,000 – 10,000
    I) 1,000 – 5,000
    J) Less than 1,000

16. What was the average annual income of the major wage earner of your family prior to your entering the Air Force?

A) $3,000 or less
B) $3,001 to $6,000
C) $6,001 to $10,000
D) $10,001 to $20,000
E) $20,001 to $50,000
F) Over $50,000

17. If you were employed full time at any time before enlisting in the Air Force, what was your approximate monthly take-home pay?

A) $200 or less
B) $201 to $300
C) $301 to $400
D) $401 to $500
E) More than $500
F) Not applicable (never held a full-time job)

18. Altogether, what is the total amount of full-time employment that you had before enlisting in the Air Force?

A) Less than 1 month
B) At least 1 month, but less than 6 months
C) At least 6 months, but less than 1 year
D) At least 1 year, but less than 2 years
E) Two years or more
F) Not applicable (never held a full-time job)

19. What was the last year of education that you completed?

A) 9th grade or less
B) 10th grade
C) 11th grade
D) 12th grade
E) 13—one year of college
F) 14—two years of college
G) 15—three years of college
H) 16—four years of college but no degree
I) Bachelor's degree
J) Master's degree
K) Doctorate, M.D., or equivalent

20. Which of the following best describes your high school class standing (i.e., academic average)?

A) Upper quarter
B) Next to the upper quarter
C) Next to the lower quarter
D) Lower quarter
E) Not applicable (never completed high school)

21. What is the highest educational level that you hope to achieve while in the Air Force?

A) One of three years of high school credit
B) High school diploma
C) One of three years of college credit
D) Bachelor's degree
E) Master's degree or above
F) Do not intend to pursue any additional education

22. All things considered, do you feel that the present Air Force pay scale will be adequate to meet your needs? (Include your estimation of benefits and privileges.)

A) Yes
B) No

23. Do you feel that your full potential will be recognized and used by the Air Force?

A) Not at all
B) Only partially
C) Fully
D) Uncertain

24. How do you feel your overall rate of promotion in the Air Force will compare with advancement that you may have obtained in a civilian occupation?

A) Considerably better
B) Slightly better
C) Equal
D) Slightly worse
E) Considerably worse

25. What percent of your total Air Force technical training do you feel will be helpful in a civilian job?

A) Only 25%
B) Only 50%
C) Only 75%
D) 100%
E) Uncertain

26. If you were permitted to leave the Air Force to obtain a civilian job upon completion of your basic training, how long (approximately) do you feel it would take to obtain a civilian job that would be comparable to your previous full-time employment?

A) Less than 1 month
B) At least 1 month, but less than 3 months
C) At least 3 months, but less than 6 months
D) At least 6 months, but less than 1 year
E) Over a year
F) Not applicable (never held a full-time job)

27. If you were permitted to leave the Air Force to obtain a civilian job upon completion of your basic training, how do you feel your monthly take-home pay (approximately) would compare with your pre-service take-home pay?

A) Over $100 less
B) $50 to $100 less
C) Equal to former salary
D) $50 to $100 more
E) Over $100 more
F) Not applicable (never held a full-time job)

28. How satisfied or dissatisfied are you with your decision to enlist in the Air Force?

A) Extremely satisfied
B) Fairly satisfied
C) Somewhat dissatisfied
D) Extremely dissatisfied
E) Uncertain at this time

29. Which one of the following categories best describes the ease or difficulty that you may have experienced in adjusting to the physical requirements of a military training routine?

A) Very difficult
B) Moderately difficult
C) Slightly difficult
D) Fairly easy
E) Quite easy
F) Very easy

30. Which one of the following categories best describes the ease or difficulty that you may have experienced in adjusting to the academic requirements of military training?

A) Very difficult
B) Moderately difficult
C) Slightly difficult
D) Fairly easy
E) Quite easy
F) Very easy

31. In civilian life, how many hours of sleep did you usually need each night to feel rested and relaxed the next day?

A) Less than 6 hours
B) 6 to 7 hours
C) 7 to 8 hours
D) 8 to 9 hours
E) 9 to 10 hours
F) Over 10 hours

32. How many hours of sleep have you averaged each night while you have been in basic training?

A) Less than 6 hours
B) 6 to 7 hours
C) 7 to 8 hours
D) 8 to 9 hours
E) 9 to 10 hours
F) Over 10 hours

People differ in what they expect to experience in basic training. They also differ in what they expect of their later Air Force assignments. These varied expectations may be due to differences in the accuracy with which the Air Force was respresented through the advertising media or by an Air Force recruiter. Using the scale shown below, rate items 33 to 41 by indicating how accurately or inaccurately each item was represented to you prior to enlistment through the advertising media or by an Air Force recruiter.

A–Extremely inaccurate
B–Somewhat inaccurate
C–Mostly accurate
D–Extremely accurate
E–Uncertain at this point in time

For Example: If the physical demands and pressures of basic training were extremely inaccurately represented to you prior to enlistment, mark response "A" to item 33 on your answer sheet. If the information was extremely accurate, mark response "D". If you are uncertain about any particular area, mark response "E".

33. The physical demands and pressures of basic training.

34. The emphasis on military bearing (correct military dress, appearance, and personal conduct) by military superiors.

35. The military discipline exercised by military superiors for infractions of military rules.

36. The disadvantages of the Air Force as well as the advantages.

37. The concern of the Air Force for the personal welfare of the individual.

38. The rules governing the assignment of individuals to Air Force career specialties.

39. The rules governing the assignment of individuals to bases of choice within the framework of overall Air Force requirements.

40. The amount of salary to expect at specified intervals of service.

41. The type of promotion system used by the Air Force to promote the best qualified individuals.

Each individual has his own particular reason for entering the Air Force. In fact, more than one reason can usually be given. Based on the list shown below, you are asked to pick the first, second, and third most important reason for your entering the Air Force.

For Example: If Patriotism is the primary reason for your entering the Air Force, mark response "B" on your answer sheet for item 42. Indicate your second and third reasons for entering the Air Force in the space provided on your answer sheet for items 43 and 44.

A–Because a military hitch is good for me and others like me.
B–Patriotism.
C–Opportunity for a better job.
D–Opportunity for travel and excitement.
E–Opportunity to get away from responsibilities back home.
F–Opportunity to do something different for a change.
G–Opportunity to meet a future husband/wife.
H–Opportunity to avoid problems at home.
I–Opportunity to avoid discrimination based on sex, religion, or ethnic group.
J–Opportunity for educational advancement.
K–Opportunity to achieve maturity and independence.

42. Which of the above items do you consider as the most important reason for your entering the Air Force?

A B C D E F G H I J K

43. Which of the above items do you consider as the second-most important reason for your entering the Air Force?

A B C D E F G H I J K

44. Which of the above items do you consider as your third reason for entering the Air Force?

A B C D E F G H I J K

Listed below are some attitudes that people have after joining the Air Force. Please indicate on your answer sheet the extent to which you agree or disagree with the attitudes given. There are no "right" or "wrong" answers–we only want to know how you honestly feel at this point in your training. Use the following scale:

A–Strongly disagree
B–Disagree
C–Undecided
D–Agree
E–Strongly Agree

For Example: If you strongly agree with statement 45, you would mark response "E" to statement 45 on your answer sheet.

SINCE JOINING THE AIR FORCE, I HAVE DISCOVERED THAT:

45. A military hitch does not always work out for the good of the enlistee.
46. Patriotism cannot be judged by one's willingness to serve in the military forces during war or otherwise.
47. Any civilian job would be better than having to serve 4 years as an enlisted person.
48. My chances for world travel are not as great as I had hoped.
49. I realize now that my true allegiance lies with my responsibilities back home.
50. Enlistment in the Air Force is not the change I had in mind.
51. The military setting offers no better opportunity for meeting a husband/wife than does civilian life.
52. The problems encountered in military life are just as many as those at home.
53. Discrimination against women, religious groups, or ethnic groups is more prevalent in the military than I had realized.
54. The educational opportunities in the military are not as great as I had hoped.
55. I find it as impossible to be independent in the military as I did in my parents' home.

APPENDIX B: METHODS FOR EVALUATION OF TEST-RETEST CORRELATIONS

Methods appearing in the statistical literature for comparison of an obtained correlation coefficient with a hypothesized population value generally consist of some variation of a procedure which converts both the obtained correlation and its hypothesized value to a Fischer's z coefficient, divides the difference in these z's by the standard error for a z with N equal to that on which the obtained correlation is based, and evaluation of the resultant z score against the normal curve. Generally, the user is cautioned that this test works well when magnitude of the correlational values is moderate and N is large; however, as the correlational values approach +1 or −1, the test becomes increasingly inadequate. Thus, when dealing with reliability coefficients, one would judge these methods to be inappropriate.

As an alternative procedure, test-retest correlation obtained in this study were compared with known composite reliabilities via an F ratio constructed from an estimate of variance for a difference score (operational score-retest score) and the obtained variance of the difference score.

It is noted that difference scores tend toward normal distribution even when the distributions of the two variables on which they are based are non-normal. Moreover, variance of a difference score is a function of variance of the variables from which it is constructed and the correlation between them (or their covariance); the variance of the difference score is unaffected by the means of the basic input variables.

For this study, procedure followed in construction of the F ratios was:

(1) Known reliability of the composite, based on a mobilization population sample, was corrected to an estimate of reliability for the sample at hand via the equation

$$R_{12} = \frac{r_{12}\left(\frac{\epsilon_1}{\sigma_1}\right)}{\sqrt{1 - r_{12}^2 + r_{12}^2\left(\frac{\epsilon_1^2}{\sigma_1^2}\right)}}$$

where

R_{12} = known reliability. In this case, the known reliability was based on test-retest reliability of individual composite components (subtests) for a mobilization population sample and the known intercorrelations among the subtests in the mobilization population.

r_{12} = estimated reliability for the present, range-restricted sample,

ϵ_1 = the composite's standard deviation in the mobilization population, and

σ_1 = the composite's obtained standard deviation in the present sample.

(2) An estimate of variance for the difference score (operational score-retest score) was obtained via the equation

$$\sigma^2 (w_1 x_1 + w_2 x_2) = w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2r_{12} w_1 w_2 \sigma_1 \sigma_2$$

where

$\sigma^2 (w_1 x_1 + w_2 x_2)$ = estimated variance of the difference score,

w_1 = +1; the weight assigned to the operational score in computing the difference score,

w_2 = −1; the weight assigned to the retest score is computing the difference score,

σ_1^2 = the samples variance on the operational score,

σ_2^2 = the samples variance on the retest score, and

r_{12} = the previously estimated reliability for the sample.

(3) For each case in the sample, the difference score (operational score-retest score) was derived, and the variance of this set of difference scores was computed.

(4) For each composite,

$$F = \frac{\sigma_1^2}{\sigma_2^2}$$

was computed where

σ_1^2 = the larger variance; in this case, this was always the variance of the difference score computed directly from the sample and

σ_2^2 = the smaller variance; in this case, this was always the estimated variance of the difference score (based on known reliability).

(5) The F ratios were evaluated with df_1 and df_2 each equal to $N - 1$, or 399.

The null hypothesis tested in this manner is that the variance of sample difference scores (operational score-retest score) and an estimate of this variance based on known reliability of the test are from the same population. Acceptance of this hypothesis implies that test-retest correlation in the sample is essentially equal to test reliability since, in execution of the significance test, the difference score variance estimate is established on test variance and retest variance from the sample and the known reliability adjusted to take account of range restriction in the sample. Difference score variance is a function of these three components; the only component allowed to differ in the sample difference score variance computation and variance estimation is the correlation between test and retest.

Thus, rejection of the null hypothesis indicates that test-retest correlation differs significantly from known reliability and suggests that non-standard conditions prevailed during data collection.

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