Technical Paper 331

LEVEL II

MALE AND FEMALE FACTORS ON THE CADET EVALUATION BATTERY

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PERSONNEL ACCESSION AND UTILIZATION TECHNICAL AREA

U. S. Army
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Subscales used to describe item categories in the Cadet Evaluation Battery (CEB), a diagnostic measure of officer potential, were derived primarily from factor analyses of responses given by male officers between 1961 and 1963. In order to determine current male and female CEB factor structures, the battery was administered to 1,035 females and 926 males applying for enrollment into the third year (MS III) of the Reserve Officers' Training Corps (ROTC) program. Then separate factor analyses were conducted

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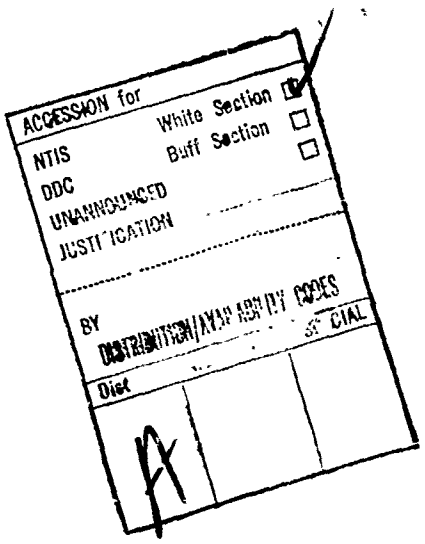
20. Abstract (continued)

on the two CEB tests, the Cadet Evaluation Test (CET) and the Cadet Evaluation Inventory (CEI), for each sex. CET male factors were found to be widely divergent from both CET female factors and the original CET subscales, while CEI male factors were found to resemble rather closely both CEI female factors and the original CEI subscales. Implications of these findings for the use and interpretation of CEB scores are discussed.



Technical Paper 331

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Officer Careers

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FOREWORD

The Personnel Accession and Utilization Technical Area of the Army Research Institute for the Behavioral and Social Sciences (ARI) is concerned with providing integrated sets of techniques to support Army personnel management systems. Early identification of officer leaders and development of officer leadership from cadet training through company and field grade assignments are of major concern in the management of the Army's manpower resources. ARI conducts research to provide scientific means of identifying individuals with good leadership potential for officer training, selecting officers for commissioning, and evaluating their performance.

The Cadet Evaluation Battery (CEB) was developed as an end product of a program undertaken to meet the need for improving the selection and assignment of personnel in accord with their capabilities to meet differing leadership requirements. The program evolved responsive to requirements and recommendations of the Army Scientific Advisory Panel (ASAP) and the Deputy Chief of Staff for Personnel (DCSPER).

The CEB is essentially a refined and reduced version of the Differential Officer Battery (DOB). Technical Research Report 1173 presented the major psychological factors derived from officer responses to tests of the experimental DOB and described the reduction of the measures used to a manageable number of experimental predictor scores. Dimensions derived from a factor analysis of actions observed at an Officer Evaluation Center (OEC) simulation, developed to test the predictive validity of the DOB, are described in Technical Research Report 1172. Research Report 1182 examines the extent to which DOB scores were associated with differential performance in the OEC exercise and success in combat and technical/administrative assignments.

The present publication is one of two which compare male and female responses to the operational CEB in 1975. The first, Technical Paper 330, compared male and female scores with one another and with scores collected from a 1971 male sample by Richard D. Doorley. This paper examines male and female factor structures.

This publication carries forth the selection and assignment program responsive to the recommendations of ASAP and DCSPER as well as to the objectives of Army Project 2Q763731A768, FY 77 Work Program.

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MALE AND FEMALE FACTORS ON THE CADET EVALUATION BATTERY

BRIEF

Requirement:

To determine current factor structures of male and female responses on the Cadet Evaluation Battery (CEB).

Procedure:

The CEB was administered to 1,035 female and 926 male applicants to the third year (MS III) of ROTC in 1975. Item p values were calculated for each sex to determine which items should be scored. Then separate factor analyses were conducted on the two CEB tests, the Cadet Evaluation Test (CET) and the Cadet Evaluation Inventory (CEI), for each sex.

Findings:

CET male factors were found to be widely divergent from both CET female factors and the original CET subscales, and CEI male factors were found to resemble rather closely CEI female factors and the original CEI subscales.

Utilization of Findings:

These findings may help determine the extent to which the CEB will be used for female ROTC applicants and the manner in which female CEB scores will be interpreted. They may also be used in structuring planned future revisions of the CEB.

MALE AND FEMALE FACTORS ON THE CADET EVALUATION BATTERY

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MALE AND FEMALE FACTORS ON THE CADET EVALUATION BATTERY

INTRODUCTION

The Reserve Officers' Training Corps (ROTC) provides the great majority of Army officers for both active and reserve duty. The quantity of officers acquired from this source is projected to increase through 1981, and it is critically important to maintain the quality as well as quantity of ROTC cadets. As of school year 1977-78, a primary quality control instrument for evaluating students entering the Army ROTC program is the Cadet Evaluation Battery (CEB).

The CEB, a self-administered test battery developed by the Army Research Institute, has been used operationally as a diagnostic measure of officer potential of ROTC cadets and applicants since 1972. The CEB consists of two primary parts: the Cadet Evaluation Test (CET) and the Cadet Evaluation Inventory (CEI). The CET provides a measure of the individual's cognitive abilities in the areas of combat leadership, technical-managerial leadership, and career potential. The CEI provides a noncognitive measure of the applicant's interests in the same three areas, as well as a measure of his/her career intent.

Most CEB subscales were constructed from an earlier test battery, the Differential Officer Battery (DOB), on the basis of responses to DOB items by a sample of about 4,000 male officers who received the battery upon entrance to active duty between 1961 and 1963. CET items were drawn exclusively from four information tests in the DOB (Helme, 1968a). These tests were factor analyzed as a unit and, of the resulting factors, the following were included in the CET because of their predictive validity, as demonstrated by correlations with leadership performance measures at an Officer Evaluation Center (Helme, 1974).

1. Practical skills. This factor tests practical knowledge of a rural-mechanical nature. Items from the following content categories are prominent in this factor: nature sports, farm facts, and mechanical information.

2. Technology operations. This factor emphasizes mechanical and physical science knowledge. Dominant content categories are mechanical information, physics, and chemistry.

3. Math and physical science. This factor tests knowledge in physics, chemistry, and mathematics.

4. History, politics, and culture. This factor tests knowledge in humanities and the social sciences. Major content categories are art, literature, and politics.

5. Tactics. Unlike the others, this scale was composed of residual content items and was not identified in the factor analysis. It tests knowledge in military tactics.

The CEI items were drawn predominantly from two self-description inventories, the Differential Inventory--A (Helme, 1968b) and Differential Inventory--B (Smith, 1968); an attitudinal inventory (Individual Understanding Test); and a questionnaire on demographic and background information (Personal Data Record). A separate factor analysis was conducted on each test, and from the resulting factors, the following subscales were developed and included in the CEI.

Differential Inventory--A

1. Decisive leadership. The essential picture given by these items is that of a confident, outgoing, energetic, "take-charge" person.

2. Combat. All items are directly concerned with combat officer duties.

3. Administrator noninterest. Item loadings on this reflected factor present a consistent dislike for managing operations through recordkeeping activities.

4. Nonesthetic interest. This reflected factor shows indifference to or dislike of esthetic and social service interest.

5. Organized sports interest. Highest loadings are for items self-descriptive in terms of excelling in sports and participating on varsity teams; participation in more highly organized team sports loads in the moderate range; and general confidence in being able to take care of one's self in physically demanding situations shows lower loadings.

6. Nature endurance. Liking for wilderness, climbing, etc., and willingness to endure rugged or lonely conditions form the core of this factor. Tolerance of strictness, night work, etc., forms a secondary constellation.

Differential Inventory--B

1. Administrative noninterest. Each of the items on this reflected subscale represents some phase of administrative work, from bookkeeping to managing stores. The scale seems clearly to represent lack of interest in and low aptitude for administrative work.

2. Scientific interest. This subscale contains items describing interest in or aptitude for scientific pursuits. Also included are items describing the examinee as having an analytic mind, as being able to quickly understand new and difficult information, and as having interest in activities such as missile testing.

3. Outdoor skills and combat leadership. This subscale consists of items that describe the examinee as having combat skills and skills or interests in outdoor activities.

4. Verbal or social leadership. Most items on this subscale describe the examinee as a leader but without reference to specific situations or activities in which leadership is exercised. This type of leadership is contrasted with combat leadership and the situation or activity-related leadership characteristic of other scales.

5. Combat engineer. This subscale represents a combination of four factors. The items seem to represent a combination of interest in actual job supervision, mechanical interest, scientific interest, and interest in the rugged outdoors. They represent planning and building fortifications, laying roads through rough country, handling heavy equipment, and the like.

6. White collar versus manual work. This subscale represents a combination of two factors. The items all seem to involve some kind of choice between outdoor manual work or supervision of manual work and administrative or paper work.

7. Aggressive physical leadership. This subscale represents a combination of two factors. The items are somewhat heterogeneous in their content but involve vigor, tough leadership of men in difficult situations, and willingness to accept some of the more difficult leadership tasks, such as giving reprimands.

Individual Understanding Test

1. Scientific orientation. This subscale contains three items reflecting an interest in complex scientific endeavors and an aptitude in mathematics.

2. Combat leader orientation. This subscale consists of four items demonstrating a willingness to lead others in combat and to take initiative.

Personal Data Record

1. Math/physical science skill-interest. This subscale reflects the degree to which respondents enjoyed mathematics and physical science subjects in school and the level of performance respondents feel they demonstrated in these subjects.

2. Urban (versus rural). Responses indicating that the individual brought up in an apartment in an urban, northeastern environment, with a library and playground available, produced high scores on this subscale.

The final CEI subscale, career intent, was not derived from the CEB. This subscale was composed of some items from the Officer Assignment Questionnaire and some additional items. Each item concerned the respondent's intention to pursue a career as an Army officer.

OBJECTIVES

The content of CEB subscales was determined on the basis of male responses given between 1961 and 1963. Since females have been entering ROTC in increasing numbers in recent years, information regarding the interpretation of female CEB scores is urgently needed. The present study addressed this need by examining the factor structure of female CEB responses. Factor analysis of male CEB responses was also conducted to determine current relevance of the CEB subscales for interpreting male scores and to provide information for a comparison of male and female factors. The degree of similarity between such factors is an important consideration in the evaluation of the suitability of the CEB for assessment and counseling of women.

METHOD

Subjects

Subjects were 1,035 females and 926 males who were applying for enrollment into the third year (MS III) of ROTC in FY 1975 (school year 1974-75). Further identifying information was unavailable, but applicants to the MS III program are, typically, college sophomores, who may or may not already be enrolled in the second year (MS II) of ROTC.

Procedure

At the time of this study, two forms of the CEB were in operational use. All subjects here received Form 1. The CET, Form 1, contains 100 items with 4-response alternatives. The CEI, Form 1, contains 125 items which have either 2-, 3-, 4-, or 5-response alternatives. Nine CEI items are not scored.

The CEB was administered to students at the local ROTC units. Units were instructed to return tests completed by all women during FY 1975 to ARI. Of a total of 291 units, 186 were identified as having sent tests for one or more students. Some test information was not accompanied by an identifiable school code, so the number of units contributing to this sample may have been somewhat higher. Also, it should be noted that among those not responding, approximately 30 schools had no females attending MS II during school year 1974-75. Many of these schools may simply have had no female applicants to MS II.

Male results were selected randomly from a complete file of all males taking the CEB in FY 1975 and also supplied to ARI.

RESULTS

For both the male and female samples, p values were calculated for each item. Items on which both males and females received a p value either greater than .80 or less than .20 were selected for exclusion from later factor analyses. The relationship between p values of most of the remaining items and their loadings on male and female factors are shown in Tables A-1 and A-2, Appendix.

With the elimination of 6 CET and 8 CEI items on the basis of p values, as well as the 9 CEI items which are not scored, 94 CET and 108 CEI items remained. For males and females separately, tetrachoric correlation coefficients were obtained for the matrix of 94 CET items and the matrix of 108 CEI items. A separate principal components factor analysis was then conducted for each of the four combinations of sex and test (CET-male; CEI-male; CET-female; CEI-female) on the basis of these coefficients. For each analysis, axes were then rotated, using the varimax procedure, until no new meaningful factors were found to emerge.

The resulting factors for the CET are shown in Table 1; those for the CEI are shown in Table 2. Factors are listed in rank order according to the percentage of variance accounted for by each. Items loading .30 or above on each male factor are shown in Tables A-1 and A-2, Appendix; items loading .30 or above on each female factor are shown in Tables A-3 and A-4, Appendix.

On the cognitive analyses, seven factors, accounting for 44.81% of the variance, were obtained for males; and six, accounting for 20.67% of the variance, were obtained for females. For both sexes, a general knowledge factor accounted for the greatest percentage of total variance. The male and female general knowledge factors cut across a wide variety of subjects, including mathematics, physical sciences, technology operations, history, politics, culture, and practical skills. However, the two general knowledge factors contained different items, with only a moderate degree of overlap.

Table 1

CET Factors Obtained from Analyses on 1975 Sample Data

Factor	% Variance	Cumulative %	Title
		Males	
1	9.68	9.68	General knowledge
2	8.34	18.02	Environmental awareness
3	5.99	24.01	Physical science information
4	5.72	29.73	Practical skills
5	5.14	34.87	Tactical knowledge
6	5.02	39.89	Math/physical science applications
7	4.92	44.81	Technical knowledge
		Females	
1	7.29	7.29	General knowledge
2	3.60	10.89	Math/physical science knowledge
3	3.41	14.30	Practical skills
4	3.04	17.34	Combat tactical knowledge
5	1.85	19.19	History, politics, and culture
6	1.48	20.67	Electrical knowledge

Several female factors bore a moderate degree of similarity to certain male factors. Surprisingly, the female factors tended to resemble the original subscales in content more than did the male factors. A female practical skills factor that was obtained was based almost exclusively on items from the original practical skills subscale. A male practical skills factor was also obtained, but this factor included items from the tactics and tactical operations subscales as well as from the practical skills subscale. Although nature sports and farm facts were important elements of both the original subscale and the female factor, the male factor had almost no items in these areas.

A cognitive mathematics and physical science factor for females was composed almost entirely of items from the mathematics/physical science subscale and included both information and application items. Two male factors were rather loosely tied to the same original subscale. One, math/physical science applications, included a number of tactical operations and tactics items as well as several from the math/physical science subscale. Item content was focused primarily on ability to apply basic scientific and mathematical principles. The other male factor, physical

science information, included relatively esoteric items of factual information, primarily in the field of physical science but also in such areas as tactics, practical skills, and history.

Table 2

CEI Factors Obtained from Analyses on 1975 Sample Data

Factor	% Variance	Cumulative %	Title
		Males	
1	11.29	11.29	Assertive rural leader
2	5.70	16.99	Administrative noninterest
3	5.50	22.49	Combat
4	5.14	27.63	Career Intent
5	4.48	32.11	Administrator noninterest
6	4.45	36.56	Verbal/social leader
7	3.90	40.46	Combat engineer
8	3.55	44.01	Physical science interest
9	2.31	46.32	Mathematics interest
10	2.03	48.35	Nature endurance
11	1.88	50.23	Field work preference
12	1.81	52.04	Urban background
		Females	
1	9.37	9.37	Combat
2	7.15	16.52	Verbal/social leader
3	5.92	22.44	Administrative noninterest
4	4.61	27.05	Outdoor activities preferred to indoor
5	4.17	31.22	Career Intent
6	4.01	35.23	Mathematics/physical science interest
7	3.57	38.80	Combat engineer
8	2.73	41.53	Work-oriented decisive leader
9	2.25	43.78	Physical orientation
10	2.17	45.95	Urban vs. rural background

The original tactics subscale served as the basis for both the male and the female tactical knowledge factor. Both factors included tactical items covering orienteering and military information. However, the male factor also included items on mathematics, whereas the female factor did not.

History, politics, and culture remained a factor in the female CET factor analysis, with all four items on this factor derived from the original subscale. No comparable male factor appeared.

None of the other CET factors was particularly similar to the original subscales. Neither did any of the remaining factors obtained for one sex have a strong resemblance to any of the factors obtained for the other sex. One male factor, designated "environmental awareness," involved awareness and understanding of one's physical environment and a knowledge of international geography and history. Another male factor was labeled "technical knowledge." This factor dealt with knowledge in such subjects as technology, tactics, science, and computer operations. Finally, one female factor contained two items testing electrical knowledge.

Qualities represented in the decisive leader subscale were also predominant in the new female decisive leader factor and constituted a major portion of the assertive rural leader male factor. Although only four of the nine items in the female factor were from the original subscale, virtually all items were consistent with the adjectives "confident, outgoing, energetic," and "take-charge" used to describe that subscale. Only 6 of 36 items on the male factor were from the original scale, although many more were consistent with the above qualities. Equally important in the male factor, however, were item responses showing a Southern or Western rural rather than a Northeastern urban background.

Finally, two factors were obtained, one for males and one for females, which bore little resemblance to any of the original subscales. These factors, although conceptually similar to one another, shared no common items. The male factor, "field work preference," included items showing a preference for field assignments over headquarters or other indoor assignments and a confidence in one's ability to handle combat situations in the field. On the female factor, "outdoor activities preferred to indoor," items reflecting disinterest with routine white collar jobs such as librarian or cashier received high loadings, and items expressing interest in outdoor activities were also included.

CONCLUSIONS

Conclusions to be drawn from this study must be qualified on the basis of certain sampling considerations. Random sampling from the complete file of male CEB test responses provided reasonable assurance of the representativeness of the male sample, but somewhat less confidence

is justified concerning the representativeness of the female sample. A fairly large proportion of schools provided female data, as requested, but the reliance on voluntary cooperation of schools necessarily raised the possibility of response bias in the sampling procedures. Although it seems unlikely that factors determining the responsiveness of a given school would significantly relate to the factor structure of students' responses on the CEB, one must nevertheless cautiously interpret the results for females in this study.

To the extent that the samples were representative, this study has revealed major differences between male and female cognitive factors. Neither the new male or female factors correspond very closely to the original CET subscales. Clearly, interpretations of CET scores must now consider the new factor structures and the sex of each testee. Because the new male factors do not suggest categories as clearly definable as the original subscales, and because many of the female responses cannot be structured into factors at all, the difficulty of interpreting CET responses has increased. Thus, it appears that development of new test items that can ease this difficulty are advisable. At present, a number of obsolete CET items are being replaced, and a more comprehensive revision is planned for the near future.

Until major revisions of the CET have been completed, one major concern is how operational use of the existing CET affects females. Given the fact that male subjects were used for the development and standardization of the CET, the differences found between male and female factors raise the possibility that the test might unfairly favor males. Fortunately, there is evidence that such is not the case. Mohr and Rumsey (1978) found that, on the technical-managerial cognitive scale, used for selection of individuals into the ROTC MS III program, females received significantly higher scores than did males.

An examination of CEI findings shows that male and female differences on this test were relatively minor. Also, although some of the original subscales were combined to form new male and female factors, some were obtained as factors only for one sex, and a few of the new factors were not closely related to any of the original subscales, the resemblance between the subscales and the male and female factors generally was quite high. Although these results do not necessarily establish the factors as equally appropriate for either sex, they do indicate that the original subscales will continue to provide a useful framework for the interpretation of male and female CEI responses in the near future.

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APPENDIX

INFORMATION FOR INTERPRETING TABLES IN APPENDIX

1. Column headings used in Tables A-1, A-2:
   a. Item No. = Number identifying item in CET or CEI booklet.
   b. Scale:Subscale = Abbreviations identifying the CEB scale and subscale from which the item was derived.
   c. % Corr Female = Percentage of females from the 1975 sample responding with a keyed alternative to the item.
   d. % Corr Male = Percentage of males from the 1975 sample responding with a keyed alternative to the item.
   e. % Corr Orig = Percentage of males from the 1971 sample responding with a keyed alternative to the item.
   f. Fem Fact = That factor on which the item loaded highest in the analysis of 1975 female responses (if loading was .30 or higher).
   g. Fem Fac Ld = Absolute value of highest factor loading in the analysis of 1975 female responses (if value was .30 or greater).
   h. Male Fac Ld = Signed value of loading on male factor being considered (only items loading .30 or higher are included).

2. Interpretation of abbreviations used in Tables A-1 and A-3:
   a. Scale abbreviations under "Scale:Subscale":
      CL = Combat Leadership: Cognitive
      TM = Technical-Managerial Leadership: Cognitive
      CP = Career Potential: Cognitive
   b. Subscale abbreviations under "Scale:Subscale":
      T = Tactics
      PS = Practical skills
      HPC = History, politics and culture
      MPS = Math/physical science
      TO = Technology operations
   c. Factor abbreviations under "Fem Fact":
      GK = General knowledge
      MPS = Math/physical science knowledge
      PS = Practical skills
      TK = Combat tactical knowledge
      HPC = History, politics and culture
      EK = Electrical knowledge

Table A-1
ITEM RESPONSE DATA;
ITEMS CLASSIFIED BY FACTORS FOUND
IN ANALYSIS OF 1975 MALE CET DATA

Item No.	Scale: Subscale	% Corr Female (n = 1035)	% Corr Male (n = 926)	% Corr Orig (n = 637)	Fem Fact	Fem Fac Ld	Male Fac Ld
			I. General knowledge				
53	TM:MPS	31	48	64	-	-	.80
4	TM:HPC	59	59	66	GK	.35	-.70
3	TM:HPC	69	75	83	GK	.43	-.68
98	CP:TO	23	31	43	-	-	.67
56	TM:MPS	30	36	57	MPS	.43	.66
50	CL:PS	51	42	87	PS	.36	.65
63	TM:HPC	50	38	50	GK	.42	.61
62	TM:HPC	44	25	36	GK	.46	.58
57	CP:TO	27	23	42	-	-	.55
70	CL:PS	45	39	65	GK	.36	-.55
75	TM:MPS	47	35	52	-	-	.53
97	CP:TO	27	37	41	-	-	-.53
52	CL:PS	48	56	60	-	-	.52
54	TM:MPS	55	46	65	-	-	-.52
66	CL:T	76	60	63	-	-	.52
69	CL:PS	30	39	51	-	-	-.47
95	TM:MPS	25	24	33	-	-	.45
49	CL:PS	48	34	56	-	-	.43
72	CL:PS	27	37	49	PS	.38	-.42
6	CL:T	47	45	67	-	-	.38
2	TM:HPC	59	46	76	GK,HPC	.34	.36
18	CP:TO	84	63	86	GK	.62	.36
22	TM:HPC	57	67	74	GK	.35	.35
1	TM:HPC	40	30	45	HPC	.39	-.34
51	CL:PS	48	56	60	-	-	.34
82	TM:HPC	41	37	38	-	-	.34
59	CP:TO	44	48	48	-	-	.30
			II. Environmental awareness (reflected)				
91	CL:PS	20	27	33	-	-	.72
44	TM:HPC	46	46	49	HPC	.31	.69
45	CL:T	47	49	46	TK	.32	.69
47	CL:T	55	55	55	-	-	.69
64	TM:HPC	24	19	42	-	-	.66
41	TM:HPC	62	64	72	GK	.36	.64
48	CL:T	56	41	51	-	-	.64
82	TM:HPC	41	37	38	-	-	.59
43	TM:HPC	25	27	42	-	-	.53
18	CP:TO	84	63	86	GK	.62	.51

Table A-1 (continued)

Item No.	Scale: Subscale	% Corr Female (n = 1035)	% Corr Male (n = 926)	% Corr Orig (n = 637)	Fem Fact	Fem Fac Ld	Male Fac Ld
90	CL:PS	10	36	13	EK	.56	.50
89	CL:PS	42	38	41	-	-	.47
67	CL:T	24	32	34	-	-	.45
98	CP:TO	23	31	43			.45
79	CP:TO	65	60	60	TK	.53	.41
12	CL:PS	49	75	79	-	-	.40
95	TM:MPS	25	24	33	-	-	.38
32	CL:PS	55	69	72	PS	.38	.37
77	CP:TO	60	48	48	-	-	.37
63	TM:HPC	50	38	50	GK	.42	.36
75	TM:MPS	47	35	52	-	-	.34
73	TM:MPS	44	33	56	GK	.32	.33
		III. Physical science information (reflected)					
96	TM:MPS	31	25	28	-	-	.71
88	CL:T	18	22	25	MPS	.35	.68
86	CL:T	47	37	52	-	-	.67
74	TM:MPS	34	30	48	MPS	.38	.65
49	CL:PS	48	34	56	-	-	.63
81	TM:HPC	26	40	42	-	-	.59
93	TM:MPS	32	34	43	MPS	.31	.59
71	CL:PS	29	35	42	-	-	.58
92	CL:PS	15	22	26	-	-	.56
39	CP:TO	38	40	59	-	-	.45
95	TM:MPS	25	24	33	-	-	.41
35	TM:MPS	81	58	93	GK	.48	.37
42	TM:HPC	82	57	78	GK	.41	.36
40	CP:TO	53	39	59	GK	.48	.33
45	CL:T	47	49	46	TK	.32	.31
85	CL:T	15	25	28	-	-	.30
		IV. Practical skills					
9	CL:PS	63	64	93	PS	.37	.80
7	CL:T	63	76	76	-	-	.78
8	CL:T	53	60	64	-	-	.76
10	CL:PS	43	84	82	TK	.33	.72
11	CL:PS	84	59	89	GK	.62	.70
6	CL:T	47	45	67	-	-	.68
19	CP:TO	30	32	49	-	-	.44
18	CP:TO	84	63	86	GK	.62	.36
23	TM:HPC	57	46	72	-	-	.33
41	TM:HPC	62	64	72	GK	.36	.32
12	CL:PS	49	75	79	-	-	.31
21	TM:HPC	75	70	79	GK	.62	.31

Table A-1 (continued)

Item No.	Scale: Subscale	% Corr Female (n = 1035)	% Corr Male (n = 926)	% Corr Orig (n = 637)	Fem Fact	Fem Fac Ld	Male Fac Ld
			V. Tactical knowledge				
25	CL:T	26	36	54	-	-	.71
26	CL:T	39	61	64	TK	.37	.70
15	TM:MPS	71	74	81	GK	.55	.66
28	CL:T	50	48	72	TK	.35	.66
29	CL:PS	63	71	68	GK	.61	.63
24	TM:HPC	74	63	76	GK	.31	.60
27	CL:T	47	41	44	-	-	.54
13	TM:MPS	86	58	92	MPS	.42	.42
59	CP:TO	44	48	48	-	-	.41
70	CL:PS	45	39	65	PS	.38	.38
87	CL:T	38	31	29	-	-	.35
73	TM:MPS	44	33	56	GK	.32	.34
77	CP:TO	60	48	48	-	-	.34
			VI. Math/physical science applications				
36	TM:MPS	61	45	51	MPS	.50	.76
38	CP:TO	38	37	56	-	-	.72
33	TM:MPS	57	43	72	MPS	.36	.67
46	CL:T	39	26	55	TK	.34	.59
37	CP:TO	49	47	63	-	-	.56
40	CP:TO	53	39	59	GK	.48	.55
35	TM:MPS	81	58	93	GK	.48	.54
34	TM:MPS	43	35	62	MPS	.58	.40
99	CP:TO	29	25	43	MPS	.42	-.40
55	TM:MPS	46	48	58	MPS	.35	-.38
95	TM:MPS	25	24	33	-	-	-.35
89	CL:PS	42	38	41	-	-	-.34
66	CL:T	76	60	63	-	-	-.33
85	CL:T	15	25	28	-	-	.33
43	TM:HPC	25	27	42	-	-	-.30
			VII Technical knowledge				
68	CL:T	19	38	48	-	-	.71
58	CP:TO	40	33	47	-	-	.68
5	CL:T	48	46	68	GK	.35	.59
16	TM:MPS	78	71	82	MPS	.32	.56
60	CP:TO	9	32	33	EK	.42	.53
54	TM:MPS	55	46	62	-	-	.50
21	TM:HPC	75	70	79	GK	.62	.40
4	TM:HPC	59	59	66	GK	.35	.37
97	CP:TO	27	37	41	-	-	.37
3	TM:HPC	69	75	83	GK	.43	.32
72	CL:PS	27	37	49	PS	.38	.32
20	CP:TO	68	79	78	GK	.57	.30

Table A-1 (continued)

Item No.	Scale: Subscale	% Corr Female (n = 1035)	% Corr Male (n = 926)	% Corr Orig (n = 637)	Fem Fact	Fem Fac Ld	Male Fac Ld
65	CL:T	28	34	45	TK	.35	.30
69	CL:PS	30	39	51	-	-	.30
71	CL:PS	29	35	42	-	-	-.30
92	CL:PS	15	22	26	-	-	-.30

Interpretation of Abbreviations

used in Tables A-2 and A-4

1. Scale abbreviations under "Scale:Subscale":
   - CL = Combat Leadership: Non-cognitive
   - TM = Technical-Managerial Leadership: Non-cognitive
   - CP = Career Potential: Non-cognitive
   - CI = Career Intent

2. Subscale abbreviations under "Scale:Subscale":
   - NE = Nature endurance
   - CE = Combat engineer
   - CLO = Combat leader orientation
   - APL = Aggressive physical leader
   - NA = Non-aesthetic leader
   - OS = Organized sports
   - OSCL = Outdoor skills and combat leader
   - DL = Decisive leader
   - VSL = Verbal/social leader
   - RU = Rural vs. urban
   - SI = Scientific interest
   - SO = Scientific orientation
   - MPS = Math/physical science interest
   - ANI = Administrator non-interest
   - NI = Administrative non-interest
   - C = Combat
   - MWC = Manual vs. white collar interest

3. Factor abbreviations under "Fem Fact":
   - C = Combat
   - VSL = Verbal/social leader
   - NI = Administrative non-interest
   - OI = Outdoor activities preferred to indoor
   - CI = Career intent
   - MPS = Math/physical science interest
   - CE = Combat engineer
   - WDL = Work-oriented decisive leader
   - PO = Physical orientation
   - U = Urban vs. rural background

Table A-2
Item Response Data;
Items Classified by Factors Found
in Analysis of 1975 Male CEI Data

Item No.	Scale: Subscale	% Corr Female (n = 1035)	% Corr Male (n = 926)	% Corr Orig (n = 637)	Fem Fact	Fem Fac Ld	Male Fac Ld
		I. Assertive rural leader (reflected)					
68	TM:DL	73	56	67	VSL	.36	.80
4	TM:RU	23	44	14	U	.54	-.73
108	TM:VSL	86	72	81	VSL	.59	.71
3	TM:RU	11	30	6	-	-	-.70
116	TM:RU	89	70	86	U	.48	.70
115	TM:RU	77	60	75	U	.41	.69
77	CL:APL	74	58	67	VSL	.37	.67
119	TM:DL	76	62	71	WDL	.41	.67
71	TM:VSL	80	66	71	VSL	.31	.65
72	CL:APL	78	71	78	VSL	.32	.62
63	TM:DL	73	71	77	VSL	.54	.61
89	CL:APL	46	56	55	C	.38	.59
105	CL:OSCL	58	69	76	CE	.37	.58
80	TM:SI	66	57	56	WDL	.42	.58
69	TM:DL	36	54	35	VSL	.48	-.57
76	TM:VSL	78	64	73	VSL	.54	.56
67	CL:OS	80	74	81	OI	.33	.52
118	CP:MWC	43	54	57	C	.41	.51
107	CL:OSCL	12	53	22	C	.49	-.50
121	TM:DL	75	76	76	VSL	.51	.45
124	CL:NE	75	77	84	C	.31	.45
94	CL:CE	40	63	57	C	.53	.44
20	CL:CLO	58	68	62	C	.48	.43
56	CP:C	33	49	55	C	.81	.43
60	CP:ANI	62	66	75	NI	.57	.43
84	CL:CE	19	62	51	CE	.60	-.42
7	CI:CI	69	61	38	CI	.86	.41
74	TM:SI	38	39	44	MPS	.42	.38
83	CL:OSCL	47	67	45	C	.57	-.38
2	TM:RU	49	47	55	-	-	.37
18	CL:CLO	50	61	39	VSL	.52	-.37
24	CL:OS	46	53	47	PO	.37	.37
1	TM:RU	65	66	54	U	.53	-.34
91	CL:CE	38	60	52	CE	.56	-.34
81	CL:OSCL	63	83	83	WDL	.41	.33
64	TM:DL	53	53	48	-	-	.32

Table A-2 (continued)

Item No.	Scale: Subscale	% Corr Female (n = 1035)	% Corr Male (n = 926)	% Corr Orig (n = 637)	Fem Fact	Fem Fac Ld	Male Fac Ld
		II. Administrative non-interest (reflected)					
99	CP:NI	50	46	57	NI	.67	.71
106	CP:NI	24	32	38	NI	.69	.71
97	CP:NI	59	65	64	NI	.60	.65
88	CP:NI	58	62	67	NI	.71	.64
93	CP:NI	47	50	62	NI	.73	.63
60	CP:ANI	62	66	75	NI	.57	.62
85	CP:NI	36	40	50	NI	.61	.61
103	CP:NI	45	40	57	NI	.69	.60
104	CP:NI	26	55	58	NI	.44	.58
49	CP:ANI	34	23	38	NI	.39	.44
105	CL:OSCL	58	69	76	C	.52	.39
118	CP:MWC	43	54	57	C	.41	.39
52	CP:ANI	15	70	77	NI	.44	.37
45	CP:ANI	41	55	53	OI	.47	.36
113	CP:MWC	46	42	45	-	-	.35
56	CP:C	33	49	55	C	.81	.33
120	CP:MWC	55	58	46	NI	.38	.32
		III. Combat (reflected)					
58	CP:C	22	58	52	C	.79	.79
54	CP:C	23	48	52	C	.80	.73
51	CP:C	24	61	47	C	.72	.71
59	CP:C	24	51	45	C	.76	.69
56	CP:C	33	49	55	C	.81	.63
102	CL:OSCL	23	74	68	C	.68	.63
53	CP:C	51	66	57	C	.69	.54
78	CL:OSCL	35	57	59	C	.64	.49
94	CL:CE	40	63	57	C	.53	.48
20	CL:CLO	58	68	62	C	.48	.43
111	CP:MWC	33	52	46	C	.55	.34
41	CP:C	59	75	75	C	.44	.33
108	TM:VSL	86	72	81	VSL	.59	.33
101	CL:OSCL	16	49	24	C	.68	.32

Table A-2 (continued)

Item No.	Scale: Subscale	% Corr Female (n = 1035)	% Corr Male (n = 926)	% Corr Orig (n = 637)	Fem Fact	Fem Fac Ld	Male Fac Ld
			IV. Career intent (reflected)				
10	CI:CI	74	85	64	CI	.76	.83
9	CI:CI	79	85	66	CI	.72	.82
8	CI:CI	76	76	48	CI	.81	.80
11	CI:CI	61	69	35	CI	.74	.75
7	CI:CI	69	61	38	CI	.86	.72
12	CI:CI	50	66	24	CI	.61	.69
21	CL:NE	65	75	59	PO	.31	.39
20	CL:CLO	58	68	62	C	.48	.36
14	CL:CLO	79	74	79	C	.34	.31
25	CL:NE	90	74	62	WDL	.42	.31
			V. Administrator non-interest				
46	CL:NA	39	58	68	OI	.57	.80
48	CL:NA	33	44	62	OI	.51	.76
42	CP:ANI	34	44	42	OI	.46	.71
57	CP:ANI	25	34	33	-	-	.60
50	CP:ANI	42	38	46	NI	.52	.60
45	CP:ANI	41	55	53	OI	.47	.58
47	CL:NA	29	54	62	VSL	.35	.55
43	CL:NA	37	61	61	CE	.36	.43
111	CP:MWC	3[illegible]	52	46	C	.55	.37
49	CP:ANI	34	23	38	NI	.39	.33
70	CL:OS	46	44	42	PO	.37	.33
109	CL:APL	75	74	60	-	-	.33
			VI. Verbal/social leader				
82	CL:APL	69	83	70	VSL	.78	.71
114	TM:VSL	55	62	48	VSL	.75	.68
73	TM:VSL	58	32	43	VSL	.73	.65
5	TM:DL	30	46	26	VSL	.58	.61
18	CL:CLO	50	61	39	VSL	.52	.54
110	TM:VSL	63	54	42	VSL	.53	.53
75	TM:VSL	74	77	64	VSL	.55	.51
69	TM:DL	36	54	35	VSL	.48	.48
122	TM:DL	39	44	33	VSL	.42	.35
76	TM:VSL	78	64	73	VSL	.54	.34
23	TM:DL	50	67	52	WDL	.40	.33

Table A-2 (continued)

Item No.	Scale: Subscale	% Corr Female (n = 1035)	% Corr Male (n = 926)	% Corr Orig (n = 637)	Fem Fact	Fem Fac Ld	Male Fac Ld
			VII. Combat engineer				
86	CL:CE	25	61	48	CE	.56	.68
92	CL:CE	23	54	49	CE	.53	.64
84	CL:CE	19	62	51	CE	.60	.62
90	CL:CE	16	59	45	C	.53	.60
100	CL:CE	18	44	43	CE	.53	.57
91	CL:CE	38	60	52	CE	.56	.54
112	CL:OSCL	50	81	73	OI	.37	.45
83	CL:OSCL	47	67	45	C	.57	.42
95	CL:CE	35	40	42	CE	.45	.37
98	TM:SI	53	63	56	MPS,VSL- >	.34	.34
			VIII. Physical science interest				
28	TM:MPS	39	40	40	MPS	.65	.79
33	TM:MPS	24	27	25	MPS	.68	.76
27	TM:MPS	22	27	36	MPS	.49	.60
30	TM:MPS	5	26	29	-	-	.50
17	TM:SO	51	57	55	MPS	.83	.42
29	TM:MPS	54	62	51	MPS	.79	.42
87	TM:SI	34	52	50	C	.48	.42
63	TM:DL	73	71	77	VSL	.54	.38
74	TM:SI	38	39	44	MPS	.42	.37
15	TM:SO	63	81	52	MPS	.37	.36
34	TM:MPS	42	49	43	MPS	.78	.35
			IX. Mathematics interest				
34	TM:MPS	42	49	43	MPS	.78	.68
29	TM:MPS	54	62	51	MPS	.79	.67
17	TM:SO	51	57	55	MPS	.83	.62
70	CL:OS	46	44	42	OI	.32	.35

Table A-2 (continued)

Item No.	Scale: Subscale	% Corr Female (n = 1035)	% Corr Male (n = 926)	% Corr Orig (n = 637)	Fem Fact	Fem Fac Ld	Male Fac Ld
			X. Nature endurance				
22	CL:NE	57	57	45	WDL	.41	.46
23	TM:DL	50	67	52	WDL	.40	.44
123	CL:NE	67	82	75	C	.42	.39
21	CL:NE	65	75	59	PO	.31	.38
81	CL:OSCL	63	83	83	WDL	.41	.34
24	CL:OS	46	53	47	PO	.37	.33
25	CL:NE	90	74	62	WDL	.42	.31
			XI. Field work preference				
111	CP:MWC	33	52	46	C	.55	.52
96	CL:OSCL	38	67	53	C	.42	.49
64	TM:DL	53	53	48	-	-	.34
80	TM:SI	66	57	56	WDL	.42	-.33
40	CL:NA	53	62	69	VSL	.37	.31
			XII. Urban background				
1	TM:RU	65	66	54	U	.53	.47
78	CL:OSCL	35	57	59	C	.64	-.43
101	CL:OSCL	16	49	24	-	-	-.38
4	TM:RU	23	44	14	U	.54	.37

Table A-3

FACTOR LOADINGS:
ANALYSIS OF 1975 FEMALE CET DATA
(LOADINGS ≥ .30 ONLY)

Item No.[1]	Scale: Subscale[2]	Fem Fac Ld[3]	Item No.	Scale: Subscale	Fem Fac Ld
		I. General knowledge			
18	CP:TO	.62	36	TM:MPS	.37
11	CL:PS	.62	41	TM:HPC	.36
21	TM:HPC	.62	70	CL:PS	.36
29	CL:PS	.61	79	CP:TO	.36
20	CP:TO	.57	4	TM:HPC	.35
15	TM:MPS	.55	5	CL:T	.35
35	TM:MPS	.48	22	TM:HPC	.35
40	CP:TO	.48	74	TM:MPS	.35
62	TM:HPC	.46	2	TM:HPC	.34
14	TM:MPS	.46	73	TM:MPS	.32
3	TM:HPC	.43	78	CP:TO	.32
63	TM:HPC	.42	24	TM:HPC	.31
42	TM:HPC	.41	33	TM:MPS	.30
		II. Math/physical science knowledge			
34	TM:MPS	.58	33	TM:MPS	.36
36	TM:MPS	.50	55	TM:MPS	.35
14	TM:MPS	.43	88	CL:T	.35
56	TM:MPS	.43	70	CL:PS	.33
13	TM:MPS	.42	16	TM:MPS	.32
99	CP:TO	.42	35	TM:MPS	.31
15	TM:MPS	.39	93	TM:MPS	.31
74	TM:MPS	.38			

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1 Number identifying item in CET.

2 Abbreviations identifying the CET scale and subscale from which the item was derived.

3 Signed value of loading in the analysis of responses of females in the 1975 sample.

Table A-3 (continued)

Item No.	Scale: Subscale	Fem Fac Ld	Item No.	Scale: Subscale	Fem Fac Ld
		III. Practical skills			
10	CL:PS	.46	72	CL:PS	.38
99	CP:TO	.39	9	CL:PS	.37
11	CL:PS	.38	50	CL:PS	.36
32	CL:PS	.38	29	CL:PS	.34
70	CL:PS	.38			
		IV. Tactical knowledge			
79	CP:TO	.53	46	CL:T	.34
26	CL:T	.37	10	CL:PS	.33
28	CL:T	.35	5	CL:T	.32
65	CL:T	.35	45	CL:T	.32
29	CL:PS	.34			
		V. History, politics and culture			
1	TM:HPC	.39	2	TM:HPC	.34
62	TM:HPC	.36	44	TM:HPC	.31
		VI. Electrical knowledge			
90	CL:PS	.56	60	CP:TO	.42

Table A-4
FACTOR LOADINGS:
ANALYSIS OF 1975 FEMALE CEI DATA
(LOADINGS ≥ .30 ONLY)

Item No.[1]	Scale: Subscale[2]	Fem Fac Ld[3]	Item No.	Scale: Subscale	Fem Fac Ld
		I. Combat (reflected)			
56	CP:C	.81	107	CL:OSCL	.49
54	CP:C	.80	20	CL:CLO	.48
58	CP:C	.79	87	TM:SI	.48
59	CP:C	.76	92	CL:CE	.47
51	CP:C	.72	41	CP:C	.44
53	CP:C	.69	123	CL:NE	.42
102	CL:OSCL	.68	96	CL:OSCL	.42
78	CL:OSCL	.64	118	CP:MWC	.41
83	CL:OSCL	.57	86	CL:CE	.39
111	CP:MWC	.55	89	CL:APL	.38
90	CL:CE	.53	14	CL:CLO	.34
94	CL:CE	.53	84	CL:CE	.32
105	CL:OSCL	.52	81	CL:OSCL	.31
100	CL:CE	.49	124	CL:NE	.31
		II. Verbal/social leader			
82	CL:APL	.78	122	TM:DL	.42
114	TM:VSL	.75	20	CL:CLO	.40
73	TM:VSL	.73	23	TM:DL	.37
108	TM:VSL	.59	40	CL:NA	-.37
5	TM:DL	.58	77	CL:APL	.37
75	TM:VSL	.55	68	TM:DL	.36
76	TM:VSL	.54	47	CL:NA	-.35
63	TM:DL	.54	80	TM:SI	.35
110	TM:VSL	.53	98	TM:SI	.34
18	CL:CLO	.52	59	CP:C	.34
121	TM:DL	.51	72	CL:APL	.32
69	TM:DL	.48	14	CL:CLO	.31
79	TM:VSL	.44	71	TM:VSL	.31

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1 Number identifying item in CEI.

2 Abbreviation identifying the CEI scale and subscale from which the item was derived.

3 Signed value of loading in the analysis of responses of females in the 1975 sample.

Table A-4 (continued)

Item No.	Scale: Subscale	Fem Fac Ld	Item No.	Scale: Subscale	Fem Fac Ld
	III. Administrative non-interest (reflected)				
93	CP:NI	.73	50	CP:ANI	.52
88	CP:NI	.71	45	CP:ANI	.46
103	CP:NI	.69	52	CP:ANI	.44
106	CP:NI	.69	104	CP:NI	.44
99	CP:NI	.67	49	CP:ANI	.39
85	CP:NI	.61	120	CP:MWC	.38
97	CP:NI	.60	42	CP:ANI	.38
60	CP:ANI	.57	111	CP:MWC	.37
	IV. Outdoor activities preferred to indoor				
46	CL:NA	.57	81	CL:OSCL	.35
48	CL:NA	.51	120	CP:MWC	.34
45	CP:ANI	.47	73	TM:VSL	.34
42	CP:ANI	.46	105	CL:OSCL	.33
123	CL:NE	.40	67	CL:OS	.33
86	CL:CE	.40	71	TM:VSL	.32
88	CP:NI	.37	118	CP:MWC	.32
5	TM:DL	.37	9	CI:CI	.32
112	CL:OSCL	.37	50	CP:ANI	.31
60	CP:ANI	.35	84	CL:CE	.30
	V. Career intent				
7	CI:CI	.86	11	CI:CI	.74
8	CI:CI	.81	9	CI:CI	.72
10	CI:CI	.76	12	CI:CI	.61
	VI. Math/physical science interest				
17	TM:SO	.83	27	TM:MPS	.49
29	TM:MPS	.79	74	TM:SI	.42
34	TM:MPS	.78	15	TM:SO	.37
33	TM:MPS	.68	98	TM:SI	.34
28	TM:MPS	.65	49	CP:ANI	-.30

Table A-4 (continued)

Item No.	Scale: Subscale	Fem Fac Ld	Item No.	Scale: Subscale	Fem Fac Ld
		VII. Combat engineer (reflected)			
84	CL:CE	.60	74	TM:SI	.40
86	CL:CE	.56	46	CL:NA	-.37
91	CL:CE	.56	105	CL:OSCL	.37
92	CL:CE	.53	43	CL:NA	-.36
100	CL:CE	.53	48	CL:NA	-.35
95	CL:CE	.45	94	CL:CE	.34
90	CL:CE	.41	19	TM:SO	.33
		VIII. Work-oriented decisive leader (reflected)			
80	TM:SI	.42	81	CL:OSCL	.41
63	TM:DL	.42	119	TM:DL	.41
25	CL:NE	.42	23	TM:DL	.40
121	TM:DL	.41	108	TM:VSL	.40
22	CL:NE	.41			
		IX. Physical orientation (reflected)			
39	CL:OS	.43	50	CP:ANI	-.32
24	CL:OS	.37	96	CL:OSCL	.32
70	CL:OS	.37	45	CP:ANI	-.31
42	CP:ANI	-.37	21	CL:NE	.31
		X. Urban versus rural background (reflected)			
4	TM:RU	.54	48	CL:NA	-.35
1	TM:RU	.53	104	CP:NI	-.31
116	TM:RU	.48	46	CL:NA	-.31
115	TM:RU	.41			

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