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VALIDATION OF MALE OFFICER CANDIDATE SCHOOL SELECTION INSTRUMENTS.

P5 4:17-94

PRS Report 819

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Personnel Research Section Personnel Research and Procedures Branch, AGO



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VALIDATION OF MALE OFFICER CANDIDATE SCHOOL SELECTION INSTRUMENTS. I VALIDATION AGAINST GRADUATION,

BRIEF

STATEMENT OF PROBLEM:

To be admitted to male Officer Candidate School, applicants must meet the requirements of age, education, and citizenship, and (1) obtain minimum scores of 110 on the AGCT (Army General Classification Test) and 115 on the OCT (Officer Candidate Test) and (2) be finally selected on the basis of their scores on a composite of the OCB, OCI, and OCE (Biographical Information Blank, Officer Candidate Applicant Interview, and Evaluation Report, respectively). The OCB, OCI, and OCE are products of preliminary research and were adopted as interim instruments. The question now: How valid are these interim selection instruments? Specifically, what is the relation of scores on the AGCT, OCT, OCB, OCI, and OCE to graduation or .ttrition from Officer Candidate School?

RESULTS:

1. There was little relation between scores on the selection instruments and graduation-attrition (most of the correlations were below .30). The size of these correlations varied greatly from class to class.

2. The percentage graduating from the different classes varied from 37% to 60%. The rate of attrition was much greater during the first month of school than during the succeeding months.

3. Much of the attrition was due to administrative irregularities in the selection processing and not related to candidates' performances at OCS.

CONCLUSIONS:

1. The validity of selection devices could not be determined because of (a) the large amount of attrition due to administrative irregularities, and (b) variations in evaluation procedures from class to class.

2. A separate study is being made of the individual measures employed by the school in determining fitness for graduation. Present indications are that evaluations by fellow candidates is the most promising of the various school measures.

WORK SUMMARY:

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Graduation-attrition records were obtained for the first seven male OCS classes to go through Fort Riley, Kansas after OCS was transferred there in June 1947. These records were compared with the scores these candidates made on the selection instruments.

PRS Report 819 PJ 4118-04 PERRU AGB/aes/asg 30 September 1949

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VALIDATION OF MALE OFFICER CANDIDATE SCHOOL SELECTION INSTRUMENTS. I VALIDATION AGAINST GRADUATION.

BACKGROUND

This study originated with the development of solection instruments under PR-4076, Procedures for Selection of Enlisted Men for Officer Training. Under this program, scoring and weighting of instruments were determined using as a criterion associate ratings among enlisted men who were eligible for OCS but were not actual candidates. The instruments were adopted for use as interim selection procedures as a result of these experimental studies.

Under PR-4103, Development and Adaptation of Materials to Implement a War Department Circular Governing Procurement of Officers, no analyses of OCS performance data were made because an insufficient number of cases had been accumulated. With the establishment of PR-4118, WAC OCS, the male OCS projects were transferred to this program which was expanded to include selection for wale OCS.

PROBLEM

The general problem concerned the determination of the validity of the selection instruments against criteria of performance at OCS.

In order to determine what specific measures of performance were utilized at OCS and their usefulness for the validation study, a visit was made to OCS, Fort Riley, March 1948.

It was found that the rate of attrition was high and was a serious problem at OCS. It was, therefore, necessary to determine the degree to which the selection instruments could predict attrition cases. This prediction problem was complicated by several conditions which did not involve the selection instruments.

A. A heavy proportion of attrition cases occurred before the end of the first month. Many of these cases were in the form of voluntary resignation.

B. Many cases of attrition were the result of administrative errors in screening, such as the admission of candidates who were over or under age, lacked necessary education, had court-martial records, or did not pass physical examinations at OCS. In addition, many applicants from the Air Force resigned on arrival at OCS when they learned they would not become eligible for Air Force "commissions.

^{1/}See Memorandum to: Chief, PRS, from A.G. Bayroff, Subject: Visit to Fort Riley and Fort Benning for OCS Validation Study, dated 19 April 1948, PJ 4103-10.

Scores for each candidate on the evaluation measures, both academic and performance, used at OCS were reported to the Personnel Research Section immediately after each graduation. For Phase I, of this study, only the data on attrition and graduation were utilized. Effectiveness of the instruments in predicting other aspects of OCS success are being studied in other phases of the program.

The specific problem of Phase I was to determine the degree to which the selection instruments could predict graduation, attrition before the end of the first month, and attrition after the end of the first month. $=^{-1}$

POPULATIONS

The populations consisted of the successive classes at OCS, Fort Riley, beginning with the first class at Fort Riley, after OCS was transferred from Fort Benning in June 1947. The early classes were less than capacity and one class (No. 2) was cancelled because of insufficient size. The classes were numbered successively as follows: 15, 16, 1, 3, 4, 5, and 6.

A. Initial analysis was made of the first five classes (Classes No. 15 through 4).

B. Further analysis was made of the fifth, sixth, and seventh classes. An analysis of one additional class was made separately as a further check.

The populations of each class were treated separately. These populations were not consolidated because:

A. The number of applicants for the first four classes was considerably smaller than that for the later classes. The number of applicants selected showed a similar trend (Table 1, Page 4).

B. The cutting score on the selection instruments was much lower for the first four classes than for the later classes. The cutting score for the later classes was near the mean of the applicant population distribution (Table 1, Page 4).

C. The grading and evaluation procedures at OCS varied considerably from class to class as a result of the attempts by OCS to develop a more adequate system for evaluating the candidates.

D. Administrative irregularities in processing of applicants were pronounced.

- 3 -

^{2/ &}quot;Before the end of the first month" as used in this report refers to those cases that occurred prior to the first monthly reports. Candidates that were attrited at any time after the first monthly report were considered as "attrition after the end of the first month."

TABLE	1
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	CLASS						
	15	16	1	3	4	5	6
Highest Applicant	248	204	221	211	217	210	216
Lowest Applicant	10	24	46	47	39	39	56
Mean Applicant	144.7	146.7	150.2	146.2	148.4	148.1	144.5
Cutting Score	99	98	91	108	148	135	141
Number of Applicants	108	142	150	135	367	334	423
Number Selected [*]	98	135	143	122	1 9 9	228	222
Mean of Selected Applicants	164.7	158.8	156.6	157.7	171.3	162.3	165.5

COMPOSITE PREDICTOR SCORES

*The number selected differs from the number actually enrolled (Table 2) because of time required for return to ZI from overseas, sickness, and other administrative reasons.

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The number of graduates in Classes No. 15 through 6 was approximately onshalf of total enrollment (Table 2, Page 6). These data were selected from the consolidated report by the Ground General School on the OCS (AOC) classes, on file in PERRU, "Analysis of AOC Classes, Class No. 15 through No. 7." They differ slightly from the reports transmitted by OCS on each class shortly after graduation in that the individual class reports included pending cases, whereas the consolidated report treats these cases according to final disposition. In addition, minor discrepancies existed between the consolidated report referred to and the separate reports on the individual classes.

Candidates came from all Armies and Oversea Commands. The only quota was the number of applicants above the cutting score for that class from that Army or Command. Most of the candidates were from military status. The number of civilian candidates, i.e., those who were not in the Army at the time of application regardless of whether they had previous military service, was relatively small.

INSTRUMENT'S

In selecting applicants for OCS, the following instruments were used as successive screens:

A. Army General Classification Test. $\frac{3}{}$ Applicants with scores below 110 were eliminated.

B. Officer Candidate Test OCT-1, WD AGO PRT-66, and OCT-2, WD AGO PRT-6[°] A minimum score of 115 was required.

The following instruments were used as a composite for further screening:

A. Biographical Information Blank OCB-3, WD AGO PRT-735, was an editorial revision to substitute non-scoring civilian items for non-scoring military items of OCB-2, WD AGO PRT-648. This change was intended to make the OCB more appropriate to applicants who had no previous military service.

B. Officer Candidate Applicant Interview OCI-4, WD AGO PRT-737, was a revision of OCI-3, WD AGO PRT-653, for use by civilian applicants as well as military.^{2/}

²/The classes covered in this study were selected before the introduction of Aptitude Areas. Aptitude Area I is now used in place of AGCT.

4/Refer to PRS Report 754, Report on Revision of OCS Interview and Biographical Information Blank, The Adjutant General's Office, Personnel Research Section, 25 March 1948.

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		C	LA	. S S	5		•		
	15	16	l	3	4	5	6	TOTAL	PERCENT
Original Strength**	85	117	137	118	194	208	196	1055	100.0
Students Turned Back	7	10	13	8	8	14	10	70	-
Turnbacks Received		3	9	15	7	11	15	60	-
Turnbacks from Gradu- ated Classes to Present Classes								10	1.0
Number Commissioned***	41	56	54	72	105	107	127	562	53.5
Percent Commissioned	48.2	47.9	39.4	61.1	53.8	51.4	64.8		53.5
Relieved	21	22	25	16	53	84	54	275	26.1
Resignations	16	32	54	37	36	14	20	209	19.8
Adjusted Percent Commissioned**	48.2	46.7	37.0	54.0	52. 0	48.9	60.2		51.2

ANALYSIS OF GRADUATED AOC CLASSES*

* From Chart "A" of Analysis of AOC Classes, Class No. 15 through Class No. 7, The Ground General School, Ft. Riley, Kansas.

** As computed in Personnel Research Section for purposes of analysis, the percent commissioned was based on total strength: original strength plus turnbacks received minus students turned back.

*** Slight differences between the number commissioned and the number graduated are a result of cases reported as pending and the withholding of and refusal of commissions.

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C. Officer Candidate Applicant Evaluation Report OCE-2, WD AGO PRT-652, was used only for applicants from military status and the composite score for civilian applicants was adjusted accordingly.^{6/}

D. Selection of applicants was based on composite scores computed according to the results of Phase II of PR-4076, Procedures for Selection of Enlisted Men for Officers Training.

1. For the three-instrument battery used on the military populations, the formula was: OCB + OCI mean + OCE. For the two-instrument battery used on the civilian populations, the formula was: 2(OCB + OCI mean) + 30.

2. No fixed cutting scores were established for the composite. Cutting scores for each class were established by AC/S G-1 after examination of the distributions of composite scores and taking into account the capacity of each class and procurement policy (see Table 1, Page 4).

VARIABLES

- A. The predictor variables were the scores on the following:
 - 1. OCB Biographical Information Blank
 - 2. OCI mean Officer Candidate Applicant Interview
 - 3. OCE Officer Candidate Applicant Evaluation Report
 - 4. Composite of the Biographical Information Blank (OCB), Officer Candidate Applicant Interview (OCI mean), and Officer Candidate Applicant Evaluation Report (OCE), or the composite of the Biographical Information Blank (OCB) and the Officer Candidate Applicant Interview (OCI mean)
 - 5. GCT Army General Classification Test
 - 6. OCT Officer Cundidate Test

^{6/}Refer to PRS Report 741, Procedures for Determining OCS Composite Scores for use with Civilian Applicants, The Adjutant General's Office, Personnel Research Section, 29 April 1947.

<u>7</u>/Refer to PRS Report 752, <u>Procedures for Selection of Enlisted Men for Officer</u> <u>Training</u>, The Adjutant General's Office, Personnel Research Section, <u>9 February 1948</u>.

- B. The criterion was dichotomized as follows:
 - 1. Graduation versus attrition before the end of the first month (i.e., before the first monthly reports were made).
 - 2. Graduation versus attrition at any time after the end of the first month (i.e., at any time after the first monthly reports were made).
 - 3. Attrition before the end of the first month versus attrition after the end of the first month.
 - 4. Graduation versus non-graduation.

PROCEDURES

Correlations between the individual predictors and composites and the separate criterion variables were obtained as follows:

A. Tetrachoric correlations for Classes 15, 16, 1, 3, and 4, using the criteria mentioned above under Variables, B 1, 2, 3.

B. Biserial correlations for Classes 4, 5, and 6, using graduation and non-graduation as the criterion, B 4 above.

Tetrachorics were computed for the Classes 15, 16, 1, 3, and 4, so that preliminary estimates of the relationship between the predictor and criterion variables could be obtained prior to the arrival of data for Classes 5 and 6. Classes 4, 5, and 6, were considerably larger than were the earlier classes and available information indicated that the grading and evaluation procedures for these classes at OCS might be more stable. On the arrival of data for Classes 5 and 6, biserial correlations were computed for Classes 4, 5, and 6.

In computing the tetrachoric coefficients, cuts were made on each predictor variable for Class 15, so that one-half of the population lay above and one-half below the cut point. These cutting points were maintained for all the classes, for reasons of economy of time. Although the populations were not always split 50-50 on the criterion variables, in most cases the split was not more extreme than 70-30.

No separate analyses were made for civilian and for military candidates. The results when the two populations were combined did not seem to warrant separate analysis in view of the relatively small number of applicants and graduates from civilian status.

RESULTS

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Table 3, Page 9, contains over-all data on the number of graduates in each class, the number of candidates eliminated before the end of the first month, and the number of candidates eliminated during the remainder of the course. These data differ slightly from those used in the various computations in the study because complete records were not available for all candidates. These data also differ slightly from those in Table 2, Page 6, because of the pending cases and the small number of graduates that were not commissioned.

TABLE 3

_			CL	AS	S			TOTAL - all	Average
	15	16	1	3	4	5	6	Classes	Class
Total Strength*	85	121	146	133	204	219	211	1119	+
Number Graduated**	41	55	54	70	104	107	127	558	
Percent Graduated	48	45	37	53	51	49	60		49.0
Attrition Before End of First Month- Number	33	41	42	31	36	41	21	245	
Attrition Before End of First Month- Percent	39	34	29	23	18	19	9		24.4
Attrition After End of First Month- Number	8	24	50	2 9	62	69	62	304	
Attrition After End of First Month- Fercent	9	20	34	22	30	32	29		25.1

ATTRITION BEFORE THE END OF THE FIRST MONTH AND ATTRITION AFTER THE END OF THE FIRST MONTH

* Total strength equals original strength plus turnbacks received. Students turned back from a class are treated as attrition cases.

**Slight differences between the number graduated and number commissioned are a result of cases reported as pending and the withholding of and refusal of commissions.

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A. It will be noted that for Classes 15, 16, and 3, more attrition occurred during the first month than during the remaining five months (39%, 34%, and 23% as against 9%, 20%, and 22%, respectively).

B. For the other classes, although more cases of Attrition occurred after the first month than during the first month, the first month attrition was greater than was the mean attrition per month during the remaining five months (2%, 1%, 1%, 1%), and % as against 6.8%, 6.0%, 6.4%, and 5.8% for Classes 1, 4, 5, and 6, respectively).

An average of 49% was graduated. For the individual classes, the percent graduated ranged from 37% to 60% with slightly more graduating in the later than in the earlier classes.

Tables 4, 5, 6, and 7, Pages 11 and 12, contain the tetrachoric coefficients between the predictors and graduation versus non-graduation and the three attrition criteria for Classes 15, 16, 1, 3, and 4.

A. Examination of these tables r-vealed that all coefficients showed marked fluctuations from class to class. For example, the tetrachorics between the predictor composite and graduation versus non-graduation (Table 4, Page 11) for the successive classes were .40, .34, -.10, .10, and .19, respectively. In the instance of the correlation between the GCT and graduation versus non-graduation, which might be expected to show greater stability because of the previously established validity of the GCT, fluctuations were similar: .39, .04, .47, -.07, and .12.

B. The magnitudes of the tetrachorics were low. As an illustration of the 120 correlations in the four tables, only 38 were equal to or greater than .30 (sign disregarded). Examination of the four-fold tables indicated that two of these tetrachoric correlations were unreliable, as indicated by the fact that one of the frequency distributions is cut at the tail, with less than 10% of the entire population in one of the arrays. Six of the tetrachorics could not be computed because they were outside the range of the tetrachoric computing diagrams.

C. Similar comments regarding low magnitude and unreliability may be applied to all of the criterion breakdowns.

Table 8, Page 13, contains the biserial coefficients for Classes 4, 5, and 6, between the predictors and the criterion, graduation versus non-graduation. Examination of Table 8 revealed the fact that the biserial coefficients of predictors with graduation-attrition were uniformly low, ranging from -.13 to .14. For the three classes combined, the coefficients were zero.

CONCLUSIONS

The following conclusions may be drawn:

A. The principal finding was the lack of correlation between the predictors and the various breakdowns of the school criteria (graduation and attrition). This lack of correlation may have resulted from one or more of the following causes:

1. The relatively heavy attrition occurring early in the course which resulted primarily from administrative irregularities rather than poor performance at OCS.

Predictor		с	LASS	3		
Variable	15	16	1	3	4	
Composite	.40	. 34	10	.10	.19	
OCB	. 29	.32	15	.01	.05	
OCI	.49	• 39	.05	.15	.13	
OCE	27	.32	08	. 24	.00	
SCT	• 39	.04	.47	07	.12	
OCT	.26	.2]	. 38	34	.17	

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TETRACHORIC CORRELATION COEFFICIENTS (CLASSES 15, 16, 1, 3, 4) CRITERION: GRADUATION VB NON-GRADUATION

TABLE 4

TABLE 5

TETRACHORIC CORRELATION COEFFICIENTS (CLASSES 15, 16, 1, 3, 4) CRITERION: GRADUATION vs ATTRITION BEFORE THE END OF THE FIRST MONTH

Predictor		C	LASS	3		
Variable	15	16	1	3	4	
Composite	•33	.30	21	. 04	.38	
OCB	.30	.47	09	.24	.20	
001	.50	.29	09	05	•35	
OCE	42	.25	13	.19	.16	
GCT	. 38	.05	.50	05	.08	
OCT	.30	. 23	•5 3	52	.19	

TABLE 6

D		С	LASS	5		
Variable	15*	16	1	3	4	
Composite	**	* *	03	.19	.05	
OCB	.29	15	05	31	05	
OCI	.30	•55	18	•31	02	
OCE	**	.47	.00	.17	02	
GCT	•35	.01	• 44	.12	.13	
OCT	.05	.10	.25	10	.09	

TETRACHORIC CORRELATION COEFFICIENTS (CLASSES 15, 16, 1, 3, 4) CRITERION: GRADUATION VS ATTRITION AFTER THE END OF THE FIRST MONTH

*The correlations in this column are unreliable as indicated by the fact that the distribution of the criterion is cut at the tail with only 9% of the population of complete cases in one of the arrays.

** Entries could not be computed because they were outside the range of the computing diagrams.

TABLE 7

TETRACHORIC CORRELATION COEFFICIENTS (CLASSES 15, 16, 1, 3, 4) CRITERION: ATTRITION BEFORE THE END OF THE FIRST MONTH VB ATTRITION AFTER THE END OF THE FIRST MONTH

Predictor -		C	LASS	3		
Variable	15	16	1	3	4	
Composite	*	<u> </u>	20	15	.42	
OCB	09	.56	.10	.42	.23	
OCI	.11	36	-,21	34	•33	
OCE	*	.78	25	09	.17	
GCT	.09	.06	.13	.06	06	
OCT	.19	.02	. 29	48	.10	

*Entries were not computed because they were outside the range of the computing diagrams.

		СL	ASS	3
Predictor Variable	4	5	6	4,5,6 Combined
Composite	.00	.07	12	.00
OCB	.01	.04	.03	.01
.CI	.02	.07	13	.01
OCE	.00	.04	08	.00
GCT	.00	.00	.14	.01
OCT	.01	.10	.12	.01

BISERIAL CORRELATION COEFFICIENTS (CLASSES 4, 5, 6) CRITERION: GRADUATION vs NON-GRADUATION

TABLE 8

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2. Inapplicability to the CCS populations of the predictors developed .rom experimental pre-OCS populations.

3. Irregularities in administration of selection instruments.

4. Differences between the criteria employed in the developmental study and the OCS criteria employed in this study.

5. The instability of the OCS criteria resulting from variations in grading and evaluation procedures from class to class.

B. It is possible that in addition to the reasons stated above, the mission of OCS and its implementation is such that performance at OCS cannot be satisfactorily predicted from selection instruments such as are currently used. This possibility is in line with the experience of the British who found that they could satisfactorily predict later performance as an officer but not performance at their officer candidate schools.⁰/ Further information on this point will be available on the completion of PJ-4118-07, Validation of OCS Selection and Classification Procedures Against Later Performance as an Officer.

RECOMMENDATIONS

A. The results of this study indicated that the school criteria could not be predicted. There is reason to believe that the school criteria were inadequate. The results to date of the factor analysis of the criterion variables (Phase II, 'J-4118-04b) hold no promise of yielding satisfactory criterion measures except, possibly, ratings by associates. It is, therefore, recommended that the work on Phase II be re-examined to determine whether it should be continued.

B. In the event that it is decided that adequate criteria cannot be developed for the classes involved in this study, it will probably be necessary to postpone the entire validation study.

C. Consideration should be given to planning the revision of the selection instruments and procedures using performance at OCS as the criterion.

TECHNICIANS

Project Director - A. G. Bayroff Statistical Advisor - Claire Tajen Machlin Report written - A. G. Bayroff

^{8/}This information was reported informally by Dr. F. C. Bartlett of Great Britain on a visit to the Personnel Research Section.

APPENDIX

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In this section are the data for Class 7, which were analyzed separately after completion of the main study. The results for Class 7 were similar to those for the other classes save that the mean for the selected applicants was a little lower. The data are included here as a matter of record.

- 15 -

TABLE	9
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COMPOSITE PREDICTOR SCORES CLASS 7

Highest Applicant	224
Lowest Applicant	40
Mean Applicant	142.1
Cutting Score	133
Number of Applicants	367
Number Selected	225
Mean of Selected Applicants	142.1

TABLE 10

ANALYSIS OF GRADUATED AOC CLASS 7: (FROM CHART "A" OF ANALYSIS OF AOC CLASSES, THE GROUND GENERAL SCHOOL, FORT RILEY, KANSAS)

Original Strength	221
Students Turned Back	21
Turnbacks Received	10
Turnbacks from Graduated Cl	88868
to Present Classes	
Number Commissioned	127
Percent Commissioned	57.5
Relieved	55
Resignation	* 56
Adjusted Percent Commission	.edî 55.0

*See Note Table 2.

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TABLE	11
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ATTAINING AFTER THE FIND OF THE FIRST MONTH (C.	1455 (
Total Strength	231
Number Graduated	127
Percent Graduated	55
Attrition before end of first month - Number	34
Attrition before end of first month - Percent	15
Attrition after end of first month - Number	67
Attrition after and of first month - Persent	20

TABLE 12

BISERIAL CORRELATION COEFFICIENTS CRITERION: GRADUATION VS NON-GRADUATION (CLASS 7)

Predictor Variable	r _{bis}
Composite	.25
OCB	.19
001	.13
OCE	.08
GCT	.26
OCT	.07