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EMPIRICAL VERIFICATION OF TENTATIVE LEADERSHIP AREAS

Officer Leaders a-ll

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(6) EMPIRICAL VERIFICATION OF TENTATIVE LEADERSHIP AREAS

I. GENERAL STATEMENT OF THE PROBLEM

The ultimate goal of the Officer Leaders Task is the creation of a differential classification battery for commissioning officers in the United States Army. An essential condition for such a classification system is differential job performance, i.e., that substantial numbers of applicants for a commission will eventually perform better on one type of officer job than on another. However intuitively obvious this concept may seem, it is a stubborn fact that there is no objective evidence to support the notion of differential job performance on most Army officer jobs. Indeed, most current assignment policies and virtually all of the Army leadership doctrine and training are directed toward the development of a leader who will be effective in as many job situations as possible. In view of the above, differential job performance on Army officer jobs can best be regarded as an hypothesis which has yet to be verified. When verified, attempts should be made to determine in what types of jobs officers perform differently.

This is a report on an attempt to uncover from existing officer records evidence to support and elaborate on the hypothesis of differential job performance on Army officer jobs. The essential data extracted from these records were the operational efficiency ratings. The hypothesis was to be tested by attempting to demonstrate that job performance is more consistent overtime on similar job duties than it is on dissimilar job duties.

II. GENERAL OUTLINE OF STUDY

Five major steps were planned for this investigation. The first two steps were concerned with the selection of cases from existing officer records; the last three steps dealt with the analysis of these cases. An outline of these five steps follows:

1. For feasibility purposes, the more than 400 existing officer MOS were judgmentally reduced to ten job areas. Cases, therefore, consisted of company grade officers who worked in these ten areas.

2. Two types of cases were selected from existing 201 files:

   a. Those officers who has been sequentially rated in a single job area.

   b. Those officers who had been sequentially rated in two different job areas.

Each type of case was to be further categorized into an analysis group on the basis of the job area in which the officer performed. This categorization would allow for a possible total of ten intra-area (type 1) and 90 inter-area (type 2) analysis groups.

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3. Spot checks were to be made on sources of variance which might be irrelevant to the job performance variance existing within an analysis group. These sources were to include sequence of job area performance, ratee grade, and time interval between ratings. Whenever appropriate, adjustments were to be made to control these sources of variance.

4. The differential job performance hypothesis was to be tested by comparing the intra-area rating relationships against the inter-area rating relationships. If intra-area performance could be shown to be more consistent (manifest higher rating relationships) than inter-area performance, the hypothesis would be supported.

5. Given support for the differential job performance hypothesis (Step II D), an analysis of the clustering of the job performance relationships would be undertaken.

III. METHOD

A. DETERMINATION OF A PRIORI JOB AREAS

There are more than 400 officer MOS descriptions included in SR 605-105-5. Obviously, this is far in excess of the number that can reasonably be handled in a single investigation. Consequently, this number was first reduced by eliminating those MOS which had special professional requirements, e.g., a medical degree, and those which were so specialized that there were only a few officers in the MOS. This screening resulted in a reduction of 200 MOS. Following the procedures outlined below, the remaining MOS were grouped on the basis of technical knowledge requirements and character of job activity.

1. Grouping by two scientists (principally on basis of descriptions in SR 605-105-5).

2. Review by six scientists.

3. Review by seven commissioned officers.

4. Revisions resulting in 20 job areas.

5. Ranking of the 20 job areas to select the ten most promising ones.

The final list of ten officer job areas included:

1. General Communications
2. Transportation
3. Maintenance
4. Field Artillery
5. Construction Engineer

6. Infantry
7. Administrative
8. Supply
9. Finance
10. Intelligence

B. SELECTION AND COLLECTION OF CASES

1. Ideally, all of the cases in an analysis group were to be selected from the officer 201 files in accordance with the rating conditions one might set up in an experimental study.

a. Each of the ratee's two periods of job performance should have been evaluated by a different rater.

b. The rated officer should have been in the same grade over both periods of rated job performance.

c. All of the rated officers should have had the same grade.

d. In the case of the inter-area analysis groups, each ratee should have had an invariant sequence of job assignment, e.g., performance first in the Infantry job area and then in the Transportation job area.

e. There should have been no time break between the two periods of rated job performance.

2. All of the cases collected met conditions a and b. Meeting the last three conditions, however, would have markedly reduced the size of the analysis groups. Hence statistical checks were made on a few sizable analysis groups to determine if it were of statistical consequence to meet the stated conditions. These analyses (See Appendix) suggested that ratee grade should be homogeneous in any single analysis group. Hence, all of the analysis groups were composed of cases having only one ratee grade, i.e., First Lieutenants or Captains. On the other hand, no statistically significant effects were noted when sequence of job assignment was reversed (cond. d). Nor was any significant difference found between a time break of less than 60 days and a time break of 60 days to a year. Consequently, officers having as much as a year's break between ratings and with both sequences of assignment were included in an analysis group.

C. DESCRIPTION OF RATING SCALE

The index or score used in the analyses was the sum of the rater and the endorser ratings on SECTION VI. PERFORMANCE OF PRESENT DUTY of the operational OFFICER EFFICIENCY REPORT FORM 67-4. The possible score ranges from zero to ten. Section VI is shown on the following page.

SECTION VI. PERFORMANCE OF PRESENT DUTY		
Considering only officers of his grade, branch, and about the same time in grade, rate the officer on performance of his duty assignment. Read all descriptions and place a heavy X in the box opposite best description.		
5. Outstanding Performance Of This Duty Found In Very Few Officers		
4. Performs This Duty In A Superior Manner.		
3. Performs This Duty In An Excellent Manner.		
2. Performs This Duty In A Very Satisfactory Manner.		
1. Performs This Duty In A Satisfactory Manner.		
0. Performs This Duty In An Unsatisfactory Manner.		
	(rater)	(endorser)

Figure 1

D. METHOD OF STATISTICAL ANALYSIS

Product moment correlation coefficients were computed to describe the relationships between the two sequential ratings given to each officer in a given analysis group. These procedures were carried out separately for captains and first lieutenants. There were two types of analysis groups:

1. Intra-Area: Those officers who had received a pair of ratings on performance within the same a priori job area. There were ten a priori areas; hence, ten such analysis groups.

2. Inter-Area: Those officers who had received a pair of ratings: one rating based upon performance in one a priori area and the second based upon performance in a second a priori area. Although there were 45 possible combinations, there weren't enough cases to form half of the possible number of analysis groups.

IV. RESULTS

A. INTRA- AND INTER-AREA COEFFICIENTS

1. The intra- and inter-area correlation coefficients found for Captains and First Lieutenants are summarized in Appendix Tables A-1 and A-2. The diagonal entries represent the intra-area correlation coefficients. The side entries are the inter-area coefficients. Three characteristics of these tables should be noted:

a. The diagonal (intra-area) coefficients were based upon fairly large N's; hence, these coefficients can be regarded as rather stable parameter estimates.

b. The side entry (inter-area) coefficients were computed on much smaller N's. Most of these coefficients are relatively unstable parameter estimates.

c. The actual number of side entries in each table is less than half of the total number possible (45), i.e., the number of side entries for captains is 21 and for first lieutenants, 15.

2. Given the variations in sample size on which the correlations are based, the question arose as to whether or not the variation in magnitude of correlation within a set of correlations might be attributed to the variations in sample size. The appropriate information for this preliminary analysis is summarized in Table A-3. It can be seen that the standard deviations of the obtained coefficients in the intra-area correlation analysis are almost identical to the average standard error of the same sets of r's. The standard deviation of one set of inter-area r's (first lieutenants) is considerably smaller than the average standard error of the same set, while the standard deviation of the set of inter-area r's for captains is only slightly higher than its average standard error. These results suggest that any analysis of the variation in r's within a set of r's could be dealing with variation which is due entirely to sampling error.

If variation in a set of correlation coefficients can be attributed to sampling error, than the mean of a set of correlation coefficients can be taken as a representative index for that set. Given this information, the basic problem posed in this research,--Does intra-area job performance differ from inter-area job performance?--can be answered by a comparison of the means of the intra- and inter-area sets of coefficients in Tables A-1 and A-2. For captains, these were .404 and .378, respectively. The difference of .026 is neither statistically nor practically significant. The results for first lieutenants were similar. The mean intra-area r was .338 while the mean inter-area r was .349, here too a negligible difference (.011). It can be stated, therefore, that intra-area performance was not demonstrated to be more consistent than inter-area performance. Consequently, the hypothesis of differential job performance on Army officer job could not be supported by these data.

IV. DISCUSSION AND CONCLUSIONS

When results are negative, the coarseness of any investigation which is dependent upon the collection of available data leaves a feeling of dissatisfaction. This study is no exception. There were three features of the present study which are primarily responsible for that dissatisfaction.

A. THE MEASURING INSTRUMENT

The probability of reflecting differential job performance was lowered because of the type of rating scale used. Put in another way, this type of rating scale may engender halo effect when used to measure several aspects of performance on a single job. The same conditions which cause this effect in a single job may operate across jobs to produce a similar halo effect.

B. THE PERFORMANCE PRESUMABLY MEASURED

An MOS is a crude index of the actual work performed. For example, an officer may have an infantry MOS and perform as a PX or club officer. Or even if he is doing work which is normally in the Infantry job area, he could be completely occupied with only one of a large number of staff or field duties. Unfortunately, the groupings of MOS's used in this study would result in an even more heterogeneous grouping of job duties. In spite of the reasonableness of the a priori groupings, it is extremely doubtful that the separate analysis groups were made up of officers performing the same job duties.

C. THE "ACCIDENT" OF ASSIGNMENT

As evidenced by both the number and size of the inter-area analysis groups, most officers stay and perform in a single job area. It is conceivable that there are biasing factors (insofar as the study is concerned) involved in a "drastic" change of assignment. Little worthwhile information is available on this point. It cannot be certain, therefore, that the intra- and inter-area analysis groups are truly comparable--an assumption which was necessary for the conduct of this study.

In spite of the foregoing, the essential fact remains that the results of this study do not support the hypothesis of differential job performance.

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APPENDIX

EFFECTS OF RATING CONDITIONS ON DATA ANALYZED

Insufficient data were collected to yield sizable analysis groups and, at the same time, maintain some of the rating standards or conditions thought desirable for the proper conduct of this study. It was decided, therefore, to check on the effects of these rating conditions on the data to be used in the study. Those rating requirements which did not affect the ratings significantly would be dropped. The cases not meeting the a priori standards could then be incorporated into the various analysis groups. The rating conditions analyzed were:

1. Quality - the time interval between the two rated performance periods was dichotomized: (1) from 1 to 60 days and (2) from 60 days to a year.

2. Rank - Two ranks were used: captains and first lieutenants.

3. Sequence - the sequence of job performance, i.e., first performance in one MOS and then performance in the same or a different MOS was handled in all combinations. The tables presented in the Appendix give the specific combinations tested.

Analyses of variance were carried out for selected MOS's to detect the effects of the conditions described above. Preliminary checks of the homogeneity of the variances by means of Bartlett's test established that one of the conditions for this type of analysis was satisfied. A schematic outline of the results is given in Tables A-4, A-5 and A-6. In these tables a check mark indicates an effect which is significant at better than .05 level of confidence. No entry means an insignificant effect.

Table A-1

CORRELATION COEFFICIENTS BETWEEN TWO PERFORMANCE RATINGS OF CAPTAINS FOR INTRA-AREA AND INTER-AREA ANALYSIS GROUPS*

MOS GROUPING	1	2	3	4	5	6	7	8	9	10
1. Gen. Communication	.38 (347)									
2. Transportation		.39 (576)								
3. Maintenance		.35 (108)	.38 (450)							
4. Field Artillery	.42 (42)	.76 (28)		.43 (225)						
5. Construction Engr					.43 (472)					
6. Infantry		.31 (45)				.44 (373)				
7. Administrative	.53 (37)	.42 (75)	.36 (47)		.31 (57)	.25 (141)	.44 (630)			
8. Supply		.26 (103)	.40 (46)	.12 (29)	.40 (60)	.40 (170)	.55 (127)	.45 (757)		
9. Finance									.33 (356)	
10. Intelligence		.27 (30)		.28 (86)	.47 (34)	.38 (156)	.30 (109)	.33 (69)		.37 (937)

*The N's involved in each analysis group is given in parentheses below and to the right of each correlation coefficient.

Table A-2

CORRELATION COEFFICIENTS BETWEEN TWO PERFORMANCE RATINGS OF FIRST LIEUTENANTS FOR INTRA-AREA AND INTER-AREA ANALYSIS GROUPS*

MOS GROUPING	1	2	3	4	5	6	7	8	9	10
1. Gen. Communication	.33 (219)									
2. Transportation		.40 (231)								
3. Maintenance		.19 (61)	.29 (210)							
4. Field Artillery	.43 (37)	.31 (31)		.37 (164)						
5. Construction Engr			.48 (32)		.33 (266)					
6. Infantry	.30 (99)	.47 (111)				.31 (376)				
7. Administrative					.35 (31)	.38 (111)	.32 (250)			
8. Supply		.28 (42)			.32 (29)	.31 (129)	.39 (40)	.42 (190)		
9. Finance									.21 (51)	
10. Intelligence				.31 (35)		.35 (114)	.36 (28)			.40 (196)

*The N's involved in each analysis group is given in parentheses below and to the right of each correlation coefficient.

Table A-3

COMPARISON OF AVERAGE STANDARD ERRORS OF SELECTED SETS OF CORRELATION COEFFICIENTS WITH OBTAINED STANDARD DEVIATIONS OF ACTUAL CORRELATION COEFFICIENTS

Sets of r's	Average Standard Error of Set of r's	Standard Deviation of Actual r's
Captains (from Table 1)		
intra-area	.039	.037
inter-area	.108	.130
First Lieutenants (from Table 2)		
intra-area	.066	.059
inter-area	.130	.071

Table A-4

ANALYSIS OF VARIANCE OF THE EFFECTS OF RANK, SEQUENCE, AND QUALITY OF RATINGS FOR SELECTED MOS's WHEN FIRST MOS IS THE SAME OR DIFFERENT THAN THE SECOND MOS

MOS	EFFECTS				
	MOS A	Quality B	Rank C	A·B	A·C
0200 Communications Officer			X	X	
1193 Field Artillery Unit Commander					
1542 Infantry Unit Commander		X			X
4010 Supply Staff Officer					
0600 Motor Transport Officer					X
1371 Combat Engineer Unit Commander					X
2110 Adjutant or Adjutant General					
4805 Automotive Maint and Repair Officer					
6201 Finance Disbursing Officer					
9501 Combat Intelligence Staff Officer					

Table A-5

ANALYSIS OF VARIANCE OF THE EFFECTS OF RANK, SEQUENCE, AND QUALITY OF RATINGS FOR SELECTED MOS's WHEN THE MOS OF BOTH RATINGS IS THE SAME

MOS	EFFECTS				
	MOS A	Quality B	Rank C	A·B	A·C
0200 Communications Officer			X		X
4100 Supply Staff Officer					
1542 Infantry Unit Commander			X		

Table A-6

ANALYSIS OF VARIANCE OF THE EFFECTS OF RANK, SEQUENCE, AND QUALITY OF RATINGS FOR SELECTED SEQUENCES OF SPECIFIC MOS's

2nd MOS*	1st MOS*	EFFECTS				
		MOS A	Quality B	Rank C	A·B	A·C
2110	2110 or 1542					
9301	9301 or 1542					
1542	1542 or 2110					
1542	1542 or 9301					X

*See previous tables for titles of MOS

There were 119 possible effects outlined in Tables A-4, A-5, and A-6. Ten of these effects were significant at better than the .05 level of confidence. Of these ten, rank (c) figured in eight significant effects (either as a main effect or as a second order effect). It was decided, therefore, that it would not be advisable to include both captains and first lieutenants in an analysis group. Sequence and quality, on the other hand, were felt to have so little effect on the rating variance that these factors could easily be disregarded when forming analysis groups.