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ASSOCIATE EVALUATIONS: NOMINATIONS VS. RATINGS

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Army Research Institute for the Behavioral and Social Sciences
Arlington, Virginia

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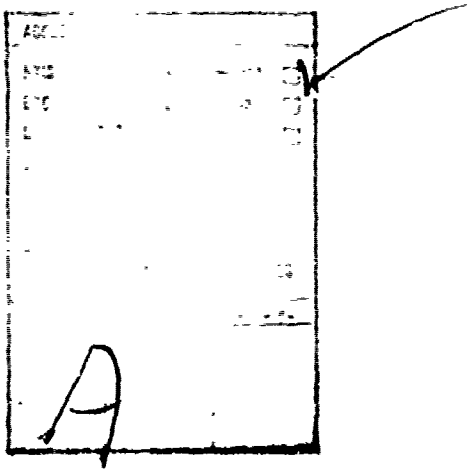

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Two general methods of associate (peer) evaluations--the rating procedure and the nomination procedure--are most often used. While both techniques produce similar results, the variation in procedure used to obtain the data has limited most direct comparisons. Because of this, the differences between the several methods of making the evaluations have not been adequately explored. In this study 3 methods of associate (peer) evaluation--one rating procedure and two nomination procedures--were compared in terms of reliability.

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20. interrelationships of techniques, relationships with other leadership measures, and relationships with concurrent performance measures. All three evaluations yielded levels of reliability adequate for use in short-range individual selection; all three methods measured the same individual attributes. The nomination method was suggested as the clear choice for operational use because of the additional benefits of minimal rater resistance, ease of scoring, and simple administration.

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ASSOCIATE EVALUATIONS: NOMINATIONS VS. RATINGS

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FOREWORD

The Leadership Performance Technical Area has among its objectives the identification of personal characteristics of performance and their potential for use in the Officer Career Management System and the points of application of these measures in improving current procedures used for military school selection, promotion nomination, and duty assignment. As one aspect of the evaluation of these personal characteristics, research is now underway for the experimental introduction of peer ratings in Officer Basic Courses and is projected for Officer Advanced Courses. Peer (or associate) evaluations have in the past been found to be valid predictors of future performance (potential) in a number of military situations but must be investigated in the new setting in which they are now being applied.

The entire task is responsive to special requirements of the Deputy Chief of Staff for Personnel and the Military Personnel Center, as well as to the objectives of RDTE Project 2Q1631bA755, Manpower System Development.

The present publication examines the effects of evaluation procedures on psychometric properties, reliability, and concurrent validity of associate evaluations.

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ASSOCIATE EVALUATIONS: NOMINATIONS VS. RATINGS

BRIEF

REQUIREMENT:

To determine if a nomination procedure of associate evaluations can be substituted for a rating procedure.

PROCEDURE:

Data were collected on 125 Army officers attending Branch Basic School. Three different scoring procedures were used, representing a rating procedure and two nomination procedures. Estimations of reliabilities were compared across procedures, and correlations (indices of relationships) were compared with a degree-of-acquaintanceship score, a Leadership Battery, and school grades.

FINDINGS:

The reliabilities of all procedures were very similar, with some indications that the use of too many individuals in a nominations technique might lower reliability. With the exception of the acquaintanceship scores, there were no differences between techniques in the correlation with other scores. The nomination technique with fewer individuals nominated had a significantly lower relationship with acquaintanceship. A nomination procedure is found most readily usable.

UTILIZATION OF FINDINGS:

The present analysis is the first step in the experimental introduction of associate ratings into Army Schools. The use of a nomination technique saves rater time and effort, is administratively simple and increases acceptance of associate evaluations. Future research will focus upon the issues of reliability across schools, acceptability, feasibility, and validity of associate evaluations.

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THE PROBLEM

The U.S. Army has a long history of using associate evaluations--peer ratings--as selection and evaluation devices in training situations. The best known and most comprehensively researched Army program is the "Aptitude for Service Ratings" at the U. S. Military Academy.[1 2] Associate evaluations have also been investigated for use in personnel selection. Peer ratings in industry have been found capable of predicting future performance as well as accurately reflecting current performance.[3] However, the methods used in obtaining the data have varied considerably. Two methods are used most frequently: the rating procedure, where each member of the rating group assigns every other member a score from an evaluation scale, and the nomination procedure, where each member of the rating group selects a given number of top and bottom individuals in terms of value from the total group. While both techniques have produced similar results, they have been used primarily in different studies, so that direct comparisons are limited. However, Suci[4] found that several procedures produced results of about the same reliability and recommended the use of nominations because they were easier to prepare, administer, and score and less frustrating to the rater. Hammer[5] also found that rankings and nominations of the same individuals produced similar evaluations and recommended the use of nominations. However, neither studied the differences between the two techniques in their relationship with other measures.

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[1] Haggerty, H.R. Status report on research for the U.S. Military Academy. ARI Technical Research Report 1133. (DDC 432 090) October 1963.

[2] Tobin, D.J., and Marcum, R.H. Leadership evaluation. Research Report, Office of Military Psychology and Leadership, U.S. Army Military Academy. West Point, N.Y., 1967.

[3] Nadal, Ramon A. A review of peer rating studies. Research Report No. 68-8, Office of Military Psychology and Leadership, U. S. Army Military Academy. West Point, N.Y., 1968.

[4] Suci, G.J., Vallance, T.R. and Glickman, A.S. An analysis of peer ratings: I. The assessment of reliability of several question forms and techniques used at the Naval Officer Candidate School. Bureau of Naval Personnel Technical Bulletin 54-9. Newport, R.I., 1954.

[5] Hammer, C.H. A simplified technique for evaluating basic trainees on leadership potential. ARI Research Memorandum 63-10. 1963.

OBJECTIVES

The overall objectives of this study were to investigate the reliabilities of three types of associate evaluations and further to compare each evaluation's relationships with other measures of leadership and school performance. The specific objectives of the research were to compare three types of associate evaluations scoring--one rating procedure and two nomination procedures--in terms of 1) reliability, 2) interrelationship of associate evaluation techniques, 3) relationship with other leadership measures (i.e., the Officer Evaluation Battery), and 4) relationship with concurrent performance measures (i.e., school grades). Points 3) & 4) were included to expand knowledge beyond results of previous studies.

METHOD

Sample Population

All officers attending a nine week training course (N = 125) were used for the study. Almost all were 2nd Lieutenants on active duty only for the training period. While some individuals were appointed on a rotating basis to student command positions, these positions were primarily nominal in nature. The officers attended classes approximately 8 hours a day five days a week and went "home" in the evening. The officers were split into 4 platoons the platoon being the evaluation group within which leadership choices were made. Once an associate evaluation score was produced within a rating group then all individuals from all platoons were combined into one group for analyses reported in the results section.

Variables

Four distinct sets of data were collected. They were:

Associate evaluations. Each officer was forced to rate individuals along a 7-point scale with "equal" numbers in each category (rating scale). Each officer was then instructed to select the one officer in his platoon who had the highest leadership potential. Next he was instructed to select the officer who had the lowest leadership potential, continuing until 1/7 of the group was in the high and 1/7 in the low categories (nomination score 1). He then continued with the next highest and lowest 1/7 (top and bottom two categories, nomination score 2) and again the highest and lowest 1/7; the remaining 1/7 was placed in a middle category and included the individuals he did not know.

Experimental diagnostic leadership measures. The Officer Evaluation Battery (OEB) (PT 4934 and PT 4935) was administered to all officers at the start of training. The OEB yields seven scale scores:

Combat Leadership, Technical-Managerial Leadership, and Career Potential with a cognitive (or knowledge factor) and a non-cognitive (or attitudinal factor) for each, plus Career Intent. (See the "Manual for Interpreting the Officer Evaluation Battery"[6] for further explanation of the scales and development of the test.)

Training grades. A variety of evaluative techniques were used by the school to measure performance during training. Table 1 lists the various evaluations used.

Acquaintanceship ratings. Each officer was instructed to rate the degree to which he was acquainted with each member of his group. Ratings were done on a five-point scale (1 = DO NOT KNOW; 2 = MET ONCE OR TWICE; 3 = LIMITED CONTACT IN CLASSES; 4 = EXTENSIVE CONTACT IN CLASSES; and 5 = CLOSE PERSONAL RELATIONSHIP).

Analysis

Peer evaluations were scored three different ways.

1) $R = \frac{\Sigma_1^n r}{n}$

2) $N_1 = \frac{\Sigma_1^n rT_1}{n}$

3) $N_2 = \frac{\Sigma_1^n rT_2}{n}$

where:

R = associate rating score
r = scale score (1-7) received by a person
n = number of persons giving an evaluation
N_1 = nomination score 1
rT_1 = scale score transformed as follows:

1 = 1; 2, 3, 4, 5, or 6 = 2; and 7 = 3

N_2 = nomination score 2
rT_2 = scale score transformed as follows:

1 or 2 = 1; 3, 4, or 5 = 2; and 6 or 7 = 3

[6] U.S. Army Research Institute for the Behavioral and Social Sciences. Manual for interpreting the Officer Evaluation Battery. Arlington, Va: Army Research Institute, 1973.

Table 1

MEANS AND STANDARD DEVIATIONS OF VARIABLES
(N = 125)

Variable	$\bar{x}$	Standard Deviation
Evaluations		
Rating (R) 4th week	3.97	1.18
Rating (R) 8th week	3.96	1.16
Nomination (N_1) 4th week (top & bottom categories)	2.00	.30
Nomination (N_1) 8th week	2.00	.29
Nomination (N_2) 4th week (top & bottom two categories)	2.12	.36
Nomination (N_2) 8th week	2.11	.36
4th week acquaintanceship rating	3.37	.35
8th week acquaintanceship rating	3.[illegible]5	.34
OEB		
Combat Leadership (Cognitive)	107.62	20.07
Managerial-Tech Lead. (Cognitive)	107.27	21.80
Career Potential (Cognitive)	109.44	20.73
Combat Leadership (Non-cognitive)	109.05	[illegible]
Managerial-Tech Lead. (Non-cognitive)	101.47	[illegible]
Career Potential (Non-cognitive)	103.93	16.20
Career Intent (Non-cognitive)	93.39	17.66
School Grades		
Maintenance Management	84.12	8.08
Combat Engineer Practical (Lead.)	83.05	8.24
Leadership Exam	77.45	10.13
Night Land Navigation	93.60	15.64
Physical Fitness	79.68	5.27
Leadership, Staff, Intelligence, etc.	89.50	7.[illegible]3
Combat Operation	80.99	[illegible].64
Engineer Reconnaissance	83.86	7.89
Combat Engineer Practical (Tech)	80.48	6.50
Orienteering	89.12	7.52
Fixed Bridges and Construction	80.04	12.64
Heavy Construction	79.83	15.83

Acquaintanceship ratings were converted to scores for an indivual by computing his mean ratings. His score then became the degree to which he was known by the group as a whole.

Reliabilities of associate evaluations were estimated by using the split-half (group) technique,[7] where random halves (raters) of the rating group were used to produce two separate scores for each individual. These two scores from each half were correlated with each other over all rating groups. The correlation was then corrected by use of the Spearman-Brown prophecy formula. The same split of the rating group was used for the split-half estimate for all three associate evaluation techniques.

Product moment correlations were computed between all associate evaluation techniques. Zero order correlations were computed between each associate evaluation technique and the remaining variables. Hotelling's t-tests[8] for differences between pair-wise correlation coefficients were performed.

RESULTS

Table 1 lists all variables with their means and standard deviations. Table 2 presents the split-half reliabilities and intercorrelations for all associate evaluation techniques and for 4th and 8th weeks. The split-half reliabilities were quite similar for Ratings and N_1 nominations (top/bottom categories), but N_2 Nominations (top/bottom two categories) were lower, .85. The test-retest reliabilities were very high (.90's) for all methods. Finally, there was a high degree of relationship between all techniques for one session with slightly smaller values across sessions.

The relationships of associate evaluations with the Officer Evaluation Battery and school grades are shown in Table 3. One hundred and twenty-six pair-wise Hotelling t-tests were computed for differences between correlation coefficients for each associate evaluation (R, N_1, and N_2 for the fourth and the eighth week); i.e., six t-tests (R vs N_1, R vs N_2, and N_1 vs N_2 for the fourth and eighth weeks) were performed for each of the 21 variables. Three significant differences ($p < .05$) were found ($t = 2.35$ for fourth week R vs N_2, Managerial-Technical Leadership, cognitive; $t = 2.29$ for eighth week R vs N_2 Managerial-Technical Leadership, non-cognitive; and $t = 2.67$ for fourth week R vs N_1, Fixed Bridges and Construction exam). It was recognized that

[7] Gordon, L.V. Estimating the reliability of peer ratings. Educational and Psychological Measurement, 1969, 29, 305-313.

[8] Guilford, J.P. Fundamental Statistics in Psychology and Education. (4th ed.) New York: McGraw-Hill, 1956.

Table 2

RELIABILITIES AND INTERCORRELATIONS OF ASSOCIATE EVALUATIONS

Variable	Split/half reliability[a]	Intercorrelation 1	2	3	4	5
1. Rating 4th week	.90	---	---	---	---	---
2. Rating 8th week	.90	.94[b]				
3. Nomination (N_1) 4th week	.92	.92	.86			
4. Nomination (N_1) 8th week	.91	.89	.93	.92[b]		
5. Nomination (N_2) 4th week	.85	.97	.90	.91	.88	
6. Nomination (N_2) 8th week	.85	.91	.97	.95	.93	.91[b]

[a]corrected using Spearman-Brown prophecy formula.

[b]Test-retest reliabilities.

Table 3

CORRELATION OF ASSOCIATE EVALUATIONS
WITH OEB AND SCHOOL GRADES
(N=125)

Variable	EVALUATION					
	Fourth Week			Eigth Week		
	R	N_1	N_2	R	N_1	N_2
OEB						
Combat Leadership (Cog.)	.09	.09	.09	.15	.13	.14
Managerial-Tech. Lead. (Cog.)	-.36[a]	-.32	-.31[a]	-.30	-.27	-.29
Career Potential (Cog.)	-.10	-.11	-.08	-.07	-.07	-.06
Combat Leadership (N-Cog.)	.50	.53	.49	.49	.50	.47
Managerial-Tech. Lead. (N-Cog.)	.25	.28	.25	.29[a]	.26	.24[a]
Career Potential (N-Cog.)	.09	.08	.09	.13	.11	.12
Career Intent (N-Cog.)	.38	.39	.39	.35	.31	.34
School Grades						
Maintenance Management	.18	.23	.17	.26	.28	.26
Combat Engineer Practical (Lead)	.27	.27	.26	.32	.32	.30
Leadership Exam	.09	.11	.07	.13	.13	.13
Night Land Navigation	-.20	-.20	-.21	-.15	-.16	-.17
Map and Aerial Photo.	.12	.14	.16	.20	.17	.18
Physical Fitness	.29	.25	.27	.29	.23	.27
Leadership, Staff, Intell, etc.	-.02	.01	-.01	.09	.11	.08
Combat Operation	.11	.13	.10	.13	.17	.15
Unit Duties	.21	.22	.20	.21	.23	.19
Engineer Reconnaissance	.16	.15	.16	.17	.19	.14
Combat Engineer Practical (Tech.)	.19	.18	.21	.28	.27	.25
Orienteering	.08	.05	.12	.06	.05	.06
Fixed Bridges and Construction	.08[a]	.16[a]	.10	.13	.18	.13
Heavy Construction	.07	.12	.10	.14	.18	.15

[a]Pairs significantly different, $p < .05$

the three tests performed within a week, R vs. N_1, R vs. N_2, and N_1 vs N_2, were not independent tests, and therefore the p value of .05 was inflated slightly to some unknown value. A more exact test was not found and the small number of significant differences found would indicate that this error did not produce an identifiable distortion in the results.

A different pattern emerged from acquaintanceship, as is shown in Table 4. No significant differences were found between Ratings and N_2 Nominations, but N_1 Nominations had a significantly lower relationship with acquaintanceship than either Ratings or N_2 Nominations (R vs N_1, 4th week: $t = 3.64$, $p < .05$; N_1 vs N_2, 4th week: $t = 3.03$, $p < .05$; R vs N_1, 8th week: $t = 3.86$, $p < .05$; and N_1 vs N_2, 8th week: $t = 5.16$, $p < .05$).

Table 4

CORRELATION OF ASSOCIATE EVALUATIONS WITH ACQUAINTANCESHIP

Evaluation	Acquaintanceship	
	Fourth week	Eighth week
Rating 4th week	.64	.51
Rating 8th week	.62	.50
Nomination (N_1) 4th week	.54	.33
Nomination (N_1) 8th week	.57	.39
Nomination (N_2) 4th week	.63	.55
Nomination (N_2) 8th week	.61	.53

CONCLUSIONS

The three methods of scoring the associate evaluations yielded comparable levels of reliability which were high enough to justify their use for individual selection purposes. There was some indication that the use of large numbers of individuals in high and low categories (N_2 Nomination technique) might yield slightly lower split-half

reliabilities. This would seem to reflect the difficulty of making reliable discrimination for the category 6 and 2 individuals plus the dilution of this information into category 7 and 1 individuals. Furthermore, the correlations of each technique with other leadership measures (OEB and school grades) and technical training grades indicated that the associate evaluation techniques were all measuring the same things. This was further substantiated by the high degree of interrelationship between techniques. The only difference found was the lower degree of relationship between N_1 Nominations and acquaintanceship scores. The implication is that the less extreme scores (middle categories) are determined more by the degree to which a person is known by individuals in the group. This did not, however, affect the relationship with other measures. This finding of a lack of relationship between acquaintanceship and performance has been consistent[9].

On the basis of these findings it would seem that nominations, using a relatively small number of individuals, can be substituted for full rating without any loss in reliability or degree of relationship with concurrent performance measures. A potential benefit is a decreased reliance on acquaintanceship (friendship/popularity) for the more difficult middle category evaluations.

An assumption made, but yet unproven, is that modifying the instructions to the raters to reflect only a nomination technique will not change their behavior, i.e., the individuals selected. Research is now underway to investigate the results of using a nomination technique very similar to the one administered here but with instructions for choosing individuals for only the top and bottom categories.

If the additional benefits of decreased rater resistance to making nominations and the greater ease with which evaluations can be administratively handled and scored are added to the above research findings, the nominations (N_1) technique is the clear choice for operational use. Two cautions should be added to this generalization. First, the effect of group size was not investigated and there are some reasons to suspect that the findings might not hold for smaller evaluation groups. Second, the use of associate evaluations as measures of long-term performance was not studied and the possibility exists that the evaluation techniques could yield different results for these measures. These two potential problem areas are now under investigation.

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[9]Hollander, E.P. and Webb, W.B. Leadership, followship, and friendship, an analysis of peer nominations. Journal of Abnormal and Social Psychology, 1955, 30, 163-167.

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