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U. S. NAVAL SCHOOL OF AVIATION MEDICINE
U. S. NAVAL AVIATION MEDICAL CENTER
PENSACOLA, FLORIDA

THE VALIDITY OF THE OFFICER-LIKE-QUALITY MEASURES
USED IN THE U. S. NAVAL SCHOOL, PRE-FLIGHT

SPECIAL REPORT No. 61-6

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61-4-5
XEROX

20 JUNE 1961

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SUMMARY PAGE

THE PROBLEM

The purpose of this investigation was to determine the relative validities of the components of the pre-flight officer-like-quality grade (OLQ) and the weights which, when applied to these components, would yield the most valid composite grade.

FINDINGS

The current procedure of using plus and minus factors for cadet rank, activities, and demerits makes the OLQ grade less accurate as a predictor of subsequent attrition. Weightings of .4, .2, .4 for average peer rating, average instructor rating, and average military rating, respectively, would increase the validity of the OLQ grade.

RECOMMENDATIONS

The average OLQ grade should not be modified by addition or subtraction for cadet rank, activities, and demerits.

No change in weights should be made at this time, pending more detailed studies of the composition of the average instructor rating and the average military rating.

INTRODUCTION

A feature of the quality control procedures current in naval aviation training is the use of grades already made by a student to assist administrators in deciding whether a failing student should be dropped or given another chance. The objective of this procedure is the early elimination from training of students who have a high probability of later failure. Information concerning the probabilities of failure related to various grades already made by the student is provided in CNATRA Instruction 1610.5A (1). One of the more dependable of these reference grades as a predictor of subsequent success in training is the pre-flight final over-all grade. This grade is a weighted composite of all of the grades made in the U.S. Naval School, Pre-Flight, the weights having been determined so as to give the most accurate possible prediction of subsequent success.

For naval aviation cadets and aviation officer candidates one of the major components of this weighted grade is the officer-like-quality rating (OLQ) which takes 30 per cent of the total weight. The OLQ grade, however, is itself a composite, and while the weight that it should take in the pre-flight grade has been determined by statistical processes, the optimum weights of the ingredients of the OLQ grade have not been so determined.

This study examines the relative validities of the components of the pre-flight OLQ grade and determines the weights which should be applied to each to yield the most valid composite.

THE OFFICER-LIKE-QUALITY GRADE

The OLQ grade is a composite of the following three sub-grades, each of which is also a composite:

A. Average Peer-Rating

In the eighth week of training, NavCad's and AOC's are asked to nominate from their class the three top men and the three bottom men in terms of their leadership potential. These nominations are totaled and the totals converted to standard scores. In the twelfth week the process is repeated. The first component of the OLQ grade is the average of these two ratings with a 35 per cent weight.

B. Average Instructor Rating

At the time that data for this study were collected (1958) the instructor sub-grade was the average of ratings assigned to students by their instructors in Aviation Science, Leadership, and Survival. In each of these the instructor named the top three and bottom three men in the class in terms of his judgment of their leadership potential. The highest nominee received a score of 86, the next 74, the third 62;

the bottom man 14, next bottom 26, and third from bottom 38; all unrated men received 50. Beginning in 1959 ratings by the military tactical officer were substituted for those of the survival instructor. The tactical officer assigns a grade each week which represents his opinion of the man's leadership behavior during that week. At the end of fourteen weeks these weekly grades are averaged. The result is combined with the aviation science and the leadership instructors' ratings with weights of 40, 30, 30, respectively. This instructor rating then becomes 35 per cent of the OLQ grade.

C. Military Rating

The third portion of the OLQ grade is the military rating. Forty per cent of this grade is assigned by the drill sergeant, based upon the man's performance in military drill; 40 per cent is assigned by the tactical officer, based upon how well the man passed inspections; and 20 per cent is awarded by the cadet officer of the battalion in respect to how well the man stands his assigned watches. This weighted military grade is given a weight of 30 per cent in the OLQ composite. The composite is then modified by subtracting points for the number of demerits the man received, and adding points for his rank as a cadet officer and for extra-curricular activities, such as singing in the choir, ushering at chapel, or committee work.

PROCEDURES AND RESULTS

On page 29 of CINATRA Manual P-69 (3) the point is made that, if a student's grades are to be used or useful in making administrative decisions about that student, it is worthwhile to weight grades so that they give the most accurate prediction of later success or failure. With this in mind, and by use of data obtained from the records of 951 cadets who completed pre-flight during 1958, the inter-relationships of the OLQ components and training success criteria were determined.

THE CRITERIA

Cases that did not complete the flight training program were divided into three types:

- LM - Those who voluntarily withdrew.
- FAIL - Those who were dropped from the program because of failure to meet minimum standards in flight, or academic, or officer performance.
- OTHER - Those who left the program for reasons, mainly physical, other than LM or FAIL.

A fourth criterion grouping in this study is the total (TOT) of these three types of separations from training.

ANALYSIS

Table I shows the intercorrelations of the OLQ components and composites and the bi-serial correlations of each component and composite with the four types of dichotomous completion-elimination criteria.

Note first that, as shown in the table, the average peer rating has a slightly higher validity than does either the 8th or 12th week peer ratings alone for the LM, FAIL, and TOT criteria. The average instructor rating has very little validity. The average military rating has nearly as high validities as does the average peer rating. The average of the three has a slightly higher correlation with FAIL, OTHER, and TOT than does the average peer rating along, but is slightly poorer as a predictor of LM cases. The OLQ grade (which is variable 6 modified by a minus factor for demerits and plus factors for cadet rank and extra-curricular activities) is less valid than the unmodified average; in other words, the minus and plus factors make the grade worse, rather than better.

Inspection of the standard deviations (S.D.) shows substantial differences in the S.D.'s of the averages which make up the OLQ (variables 3, 4, and 5). Because of these differences the real weights of the components into the OLQ are approximately 31, 24, 14 instead of the 35, 35, 30 intended.

OPTIMUM WEIGHTS

In order to determine how the components should be weighted so that the composite would most accurately predict subsequent failure (FAIL), multiple correlation procedures were applied to the data in Table I. The result is limited by the fact that the combinations of sub-grades within the "Instructor rating" and the "Military rating" are almost certainly not optimal, and by the possibility that the small criterion correlations of the "Instructor rating" may represent academic ability--which is better measured by academic grades. Within these limits, it can be said that the correlation of variable 6 with the failure criterion is raised from the .37 shown in Table I to .42 when the components are weighted as follows:

Av. Peer rating	.4
Av. Inst. rating	.2
Av. Mil. rating	.4

Table I

Intercorrelations of Pre-Flight OLQ Grades and Completion-Elimination Criteria

	2	3	4	5	6	7	LM	FAIL	OTHER	TOT	S.D.
1. Peer Rtg. - 8th wk.	.76	.94	.24	.48	.81	.79	.21	.34	.17	.30	9.6
2. Peer Rtg. - 12th wk.		.93	.19	.47	.78	.76	.20	.35	.15	.29	9.0
3. Av. Peer Rtg.			.22	.51	.85	.82	.22	.36	.17	.31	8.8
4. Av. inst. Rtg.				.07	.61	.59	.06	.16	.13	.14	6.8
5. Av. Mil. Rtg.					.71	.73	.18	.32	.13	.28	4.7
6. Av. 3, 4, 5						.98	.19	.37	.19	.32	5.0
7. Overall OLQ							.17	.34	.14	.28	5.9

CONCLUSIONS AND RECOMMENDATIONS

The fact that the correlations of the final pre-flight OLQ grade with the various types of attrition are lower than those of the average OLQ grade before the application of plus and minus factors for cadet rank, activities, and demerits indicates that these modifications are making the grade less accurate as a predictor of subsequent attrition. These procedures should be discontinued.

Although this study indicates that a substantial increase in the validity of the OLQ grade would result from a change in the weighting of the components, it is recommended that changes be deferred until studies of the instructor rating and military rating components can be conducted. It is almost certain that such studies will result in further recommendations for change and in still more improvement in validity.

REFERENCES

1. A Guide for Prediction of Student Success. CNATRA INST 1610.5A. 15 Apr 1960.
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3. Measuring Training Progress. CNATRA P-69. Pensacola, Fla. Naval Air Training Command, 1960.

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