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EXPANSION OF THE NAVAL FLIGHT OFFICER STUDENT PREDICTION SYSTEM

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NAVAL AEROSPACE MEDICAL INSTITUTE
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SUMMARY PAGE

THE PROBLEM

The purpose of this study was to expand the Naval Flight Officer (NFO) prediction system to encompass all students in NFO training. Previously, predictions of success or failure in NFO training could be computed only for students who were commissioned in Aviation Officer Candidate School (AOC's). Since AOC's currently constitute but 50 per cent of the NFO input, usefulness of the system has been substantially restricted. Therefore, a similar capability is needed by administrators who are confronted with decisions about non-AOC students.

FINDINGS

Four selection test scores and five academic performance measures available for non-AOC's were included in a multiple-regression analysis. The results of this analysis reveal that a combination of two aptitude test scores and two performance measures is useful for predicting a completion versus attrition criterion. Decisions regarding non-AOC student NFO's should be improved by use of this extension of the NFO prediction system.

INTRODUCTION

The Naval Flight Officer (NFO)* student prediction system has been used by the staff of Naval Air Basic Training and Basic Naval Aviation Officer (BNAO) School since November, 1966 (1). The Aviation Psychology Division of the Naval Aerospace Medical Institute computed predictor scores for approximately eighty such students during the first year of its use. Administrative use of these predictor scores has improved the accuracy of decisions about marginal students and students requesting transfer from pilot training into NFO training.

Presently predictor scores can be computed only for student NFO's who have been commissioned in Aviation Officer Candidate School. Since graduates of Aviation Officer Candidate School (AOC's) currently constitute but 50 per cent of the student NFO input, usefulness of the system has been substantially restricted. Consequently, administrators have requested the system be expanded to permit computation of predictor scores for all student NFO's.

This study was conducted to develop a predictor score equation and conversion table for non-AOC's in NFO training.

PROCEDURE AND RESULTS

Training records of 1150 non-AOC students who entered naval air training as NFO's in classes 64-21 through 67-20 were used as data for this study. The records of students dropped for reasons of medical disqualification, personal hardship, disciplinary action, and death were excluded from the analysis.

The criterion used in this study was "complete versus attrite," that is, whether or not the student was formally designated an NFO after completion of training. The variables chosen for consideration as possible predictors of this criterion included the initial selection test scores and grades received during the flight preparation portion of the academic course work taken prior to entering BNAO School. The means and standard deviations of these variables are listed in Table I. The correlation matrix of these variables and the complete versus attrite criterion is shown in Table II.

The Wherry-Doolittle multiple-regression technique was used to determine which variables in combination would yield the highest multiple correlation with the criterion. Four variables were selected with a shrunken multiple correlation of .235. The variables, in the order in which they were selected, are Navigation grade, Power Plants grade, MCT score, and AQT score.

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* NFO's function in various nonpilot aviation specialties such as navigation, radar interception, and electronic countermeasures evaluation.

Table I

Means and Standard Deviations of Test Scores and Course Grades*

	Mean	S. D.
I. Initial Selection Test Scores		
Aviation Qualification Test (AQT)	85.6	13.2
Mechanical Comprehension Test (MCT)	57.5	8.6
Spatial Apperception Test (SAT)	18.4	6.5
Biographical Inventory (BI)	33.8	13.1
II. Flight Preparation Grades		
Aerodynamics (Aero)	49.0	8.7
Navigation (Nav)	51.1	8.5
Power Plants (Eng)	49.3	9.5
Physiology (Phy)	51.8	9.0
Physical Training (P. T.)	50.3	7.0

* based on 1150 non-AOC students

Table II

Intercorrelations of Predictor Variables and the Completion Versus Attrition Criterion (N=1150)

	MCT	SAT	BI	Aero	Nav	Power	Phy	P. T.	Crit.
AQT	.38*	.24	-.04	.44	.45	.30	.28	.04	.15**
MCT		.36	.27	.43	.27	.43	.33	.05	.14
SAT			.14	.22	.18	.21	.15	-.01	.09
BI				.18	-.01	.23	.11	.10	.02
Aero					.50	.59	.47	.15	.18
Nav						.37	.32	.06	.21
Power							.46	.10	.18
Phy								.10	.15
P. T.									.11

* r = .07 required for significance beyond the .01 level, one-tailed.

** correlations of variables with the criterion are point biserial

By appropriately weighting these four variables, predictor scores were computed for the 1150 students. A frequency distribution of these scores was constructed and divided into intervals. This distribution was then used to derive the percentile ranks and "percentage completion" figures shown in Table III.

DISCUSSION

The variables selected as predictors for non-AOC's (Nav, Power, MCT, and AQT) are the same variables currently used as predictors for AOC's in NFO training (1). As with prediction for AOC's, Navigation received the largest weight. This consistency is encouraging, since it is logical that scores received in a navigation course are predictive of future performance in a training program heavily loaded with instruction in navigation.

As expected, accuracy of the NFO student prediction system is greater for AOC's (R_{pb} = .459) than for non-AOC's (R_{pb} = .235). Since non-AOC's are graduates of other military programs,* they have met other initial selection standards, have completed previous military training, and probably have been indoctrinated with the nature of naval aviation before selecting it as a possible career. Therefore, this sample of students tends to be somewhat homogeneous,and the range of differences useful for predicting the criterion is more restricted. No comparable restriction of range occurs with AOC's, so that predictive accuracy for AOC's should be somewhat higher.

Part of this difference in predictive accuracy may also be attributed to statistical technique. As attrition rates become lower, the point biserial correlations of variables with a completion versus attrition criterion are restricted in magnitude. Since non-AOC's have a lower attrition rate (10%) than AOC's (20%), the AOC correlations will tend to be higher than the non-AOC correlations.

Administrators can receive a predictor score for a non-AOC by reporting the student's name to the Student Prediction Center at the Naval Aerospace Medical Institute. By referring this score to the non-AOC predictor score conversions presented in Table III, the administrator can determine the appropriate percentile rank and estimated probability of the student's completing NFO training. Percentile rank refers to that percentage of successful students in the past whose predictor score fell below a given point on the distribution. The "percentage completion" figures indicate the proportion of students in various segments of the predictor score distribution who eventually completed training. When considering the probability of a student's completing, comparison should be made with the average student probability, which is 90 out of 100.

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* such as the U.S. Naval Academy, Naval Reserve Officer Training (NROTC), and Marine officer training at Quantico, Virginia.

Table III

Non-AOC Predictor Score Conversions

Predictor Score Intervals	Percentile Rank*	Percentage Completion
Less than 200	1	40 out of 100
200 - 219	1	
220 - 239	3	65 out of 100
240 - 259	6	
260 - 279	11	
280 - 299	16	
300 - 319	22	
320 - 339	30	
340 - 359	40	
360 - 379	49	90 out of 100
380 - 399	59	
400 - 419	69	
420 - 439	79	
440 - 459	87	
460 - 479	93	
480 - 499	97	
500 - 519	99	99 out of 100
More than 519	99	

* compared with successful students

REFERENCE

1. Peterson, F. E., Booth, R. F., Lane, N. E., and Ambler, Rosalie K., Predicting success in naval flight officer training. NAMI-996. Pensacola, Fla.: Naval Aerospace Medical Institute, 1967.

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13 ABSTRACT

This study extends the Naval Flight Officer (NFO) prediction system to permit predictions of success or failure in training for officer students who are not graduates of Aviation Officer Candidate School (non-AOCs).

Two aptitude test scores and two performance measures were selected as the best combination of variables for predicting a completion versus attrition criterion. Use of this expanded system should improve decisions regarding non-AOC student NFO's.

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