

# Navy Personnel Research and Development Center

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## Development and Evaluation of An Officer Potential Composite

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**Development and Evaluation of an Officer Potential Composite**

**Idell Neumann  
Joyce D. Mattson  
Navy Personnel Research and Development Center**

**Norman M. Abrahams  
Personnel Decisions Research Institute  
Minneapolis, MN 55414**

**Reviewed by  
Marie D. Thomas**

**Approved by  
Patricia J. Thomas  
Head, Selection and Classification Division**

**Released by  
B. E. Bacon  
Captain, U.S. Navy  
Commanding Officer  
and  
J. S. McMichael  
Technical Director**

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| 13. ABSTRACT (Maximum 200 words)<br>A variety of selection factors related to United States Naval Academy (USNA) success have been combined into a single composite measure, the Candidate Multiple (CM), to serve as the primary tool for evaluating candidates. Although the CM is useful for predicting midshipmen performance, it has not included selection factors concerned with officer potential. The primary objective of this effort is to expand the scope of the USNA selection system to include the prediction of officer performance. The overall validation strategy involved four major components: (1) development of an officer performance criterion, (2) evaluation of current selection scores to predict that criterion, (3) development and validation of new measures to predict that criterion, and (4) determination of the relationship between officer performance predictors and USNA success. In evaluating various measures of officer performance, a score based on recommendations for promotion (from cumulative officer fitness reports) provided sufficient variability to use as a criterion. In addition to providing meaningful differentiation among officers, the Recommended for Early Promotion (REP) was significantly related to military and academic performance as a USNA midshipman. Two CM components, Combined Extracurricular Activities (COMPECA) and high school officials' Recommendations (RECS), exhibit significant relationships with the REP criterion. An experimental predictor showed a low positive relationship with the REP and combined with COMPECA and RECS into an officer performance composite (OPC). It appears that use of the OPC in selection would not adversely affect midshipman performance. Based on these results, it is recommended that: (1) the experimental measure of officer performance (REP) be further evaluated by examining its relationship to measures or status variables concerned with actual promotion and promotion rates, (2) the relationship between officer retention and the experimental criterion (REP) be explored, and (3) the Officer Potential Composite (OPC) be considered for integration into the current USNA selection system. |                                                          |                                                         |                                         |                                                                |  |
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## FOREWORD

This report describes the development and evaluation of an officer potential composite that could expand the scope of the United States Naval Academy (USNA) selection system to include the prediction of officer performance. Officer fitness reports were used to develop a criterion measure that permitted a performance score to be assigned to each officer. In turn, newly developed measures were combined with existing valid measures based on information available at the time of application to the Naval Academy to construct and evaluate a composite to predict this measure of officer performance.

This effort was conducted under the sponsorship of the Office of Naval Technology within exploratory development (Program Element 0602233N Project Task RM33M20.05 Integrating Officer Selection Systems) in response to a request by the USNA to develop a measure of officer potential in the selection of future midshipmen.

B. E. BACON  
Captain, U.S. Navy  
Commanding Officer

J. S. MCMICHAEL  
Technical Director

## **SUMMARY**

### **Problem**

Current United States Naval Academy (USNA) selection procedures are quite successful in identifying applicants with the greatest potential for successful performance during training. These procedures, which include a variety of selection factors related to academy success, have been combined into a single composite measure, the Candidate Multiple (CM), to serve as the primary tool for evaluating candidates. Although the Candidate Multiple is useful for predicting midshipmen performance, it has not included selection factors concerned with officer potential.

### **Objective**

The primary objective of this effort is to expand the scope of the USNA selection system to include the prediction of officer performance.

### **Approach**

The overall validation strategy involved four major components: (1) development of an officer performance criterion, (2) evaluation of the Academy's current selection scores for predicting that criterion, (3) development and validation of new scales to predict that criterion using instruments currently in the Academy's selection system, and (4) determination of the relationship between predictors of officer performance and measures of Academy success.

### **Results and Conclusions**

1. Although prior research has shown that most ratings on officer fitness reports do not provide adequate discrimination, there is sufficient variability in early promotion recommendations to provide meaningful differentiation among officers.

2. Although the operational selection measure (CM) is not related to officer performance as measured by Recommendation for Early Promotion (REP), two of its components, Extracurricular Activities (COMPECA) and Recommendations (RECS), individually exhibit significant relationships.

3. Performance as a USNA midshipman is significantly related to officer performance as measured by the REP.

4. Predictors empirically derived from applicant data reveal significant relationships with the officer performance criterion. These relationships are noteworthy since there is considerable time between USNA application and the cumulative measurement of officer performance.

5. Although the experimental predictors and composite show low positive relationships with USNA performance, it appears that their use will not adversely affect performance.

## Recommendations

Based on these results, it is recommended that: (1) the experimental measure of officer performance (REP) be further evaluated by examining its relationship to measures or status variables concerned with actual promotion and promotion rates, (2) the relationship between officer retention and the experimental criterion (REP) should be explored, and (3) an Officer Potential Composite (OPC), consisting of RECS, COMPECA, and an empirically derived predictor, should be considered for experimental integration into the current USNA selection system and evaluated further.

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## **INTRODUCTION**

### **Background and Problem**

Each year some 1,350 young men and women are selected for appointment to the United States Naval Academy (USNA) from a pool of approximately 15,000 applicants. To minimize both training and personnel costs, it is important to select those applicants with the highest potential. Current selection procedures are quite successful in identifying applicants with the greatest potential for success at the USNA. These procedures, which include a variety of selection factors related to academy success have been combined into a single composite measure, the Candidate Multiple, to serve as the primary tool for evaluating candidates. Although the Candidate Multiple is useful for predicting successful midshipmen performance, it has not included selection factors concerned with officer potential. While this deficiency in the Candidate Multiple has been clear from the inception, the necessary longitudinal data have only recently become available for relating applicant data to post-commissioning officer performance.

### **Objective**

The primary objective of this effort is to expand the scope of the USNA selection system to include the prediction of officer performance. The major steps in pursuing this objective are to (1) develop and assign officer performance scores from existing officer fitness reports, (2) identify relevant individual difference variables that demonstrate stable relationships with such measures of officer performance, and (3) evaluate the impact of such officer potential indicators on USNA predictors and criteria.

## **APPROACH**

The overall validation strategy involved four major components: (1) development of an officer performance criterion, (2) evaluation of the Academy's current selection scores for predicting that criterion, (3) development and validation of new scales to predict that criterion using instruments currently in the Academy's selection system, and (4) determination of the relationship between predictors of officer performance and measures of Academy success.

### **Subjects**

Two groups of subjects were used. The first included all Navy officers commissioned from the USNA classes of 1979 through 1982. These 3,309 subjects were used to develop and validate experimental criteria and predictors of officer potential.

These officers were among the most recent to have (1) at least 4 years of commissioned service with corresponding officer fitness records, (2) USNA selection and performance scores available, and (3) item response data for instruments used in the USNA selection program. For the most part, the officers whose fitness reports are included here were still on active duty at the grade levels considered. Several year groups were included to help ensure that results obtained would be stable across classes.

Table 1 presents the number of individuals with useable data in each of the 4 year groups, broken out by warfare specialty.

Table 1  
Sample Sizes Within Warfare Specialty for  
the USNA 1979-1982 Classes

| Warfare Specialty | USNA Class |      |      |      | Total |
|-------------------|------------|------|------|------|-------|
|                   | 1979       | 1980 | 1981 | 1982 |       |
| Surface           | 212        | 145  | 194  | 208  | 759   |
| Sub               | 129        | 165  | 190  | 161  | 645   |
| Air               | 252        | 266  | 288  | 308  | 1,114 |
| No specialty      | 206        | 195  | 168  | 222  | 791   |
| Total             | 799        | 771  | 840  | 899  | 3,309 |

The second sample included 4,823 midshipmen from the classes of 1987 through 1990. While these recent classes have insufficient or no officer performance data, they were used to help evaluate the impact these experimental predictors may have on Academy performance if used in selection. If negative relationships were observed between potential predictors and academy criteria, it would be difficult to consider their use in selection. This undesirable outcome would occur if midshipmen scoring high on an experimental predictor had lower Academic Quality Point Ratio (AQPR) or Military Quality Point Rating (MQPR) scores. These classes were the most current available with at least 1 year of USNA academic and military grades. The numbers of individuals available for analyses are presented in Table 2.

Table 2  
Sample Sizes for the USNA 1987-1990 Classes

| Sample    | USNA Classes |       |       |       | Total  |
|-----------|--------------|-------|-------|-------|--------|
|           | 1987         | 1988  | 1989  | 1990  |        |
| Applicant | 5,773        | 4,924 | 5,294 | 5,282 | 21,273 |
| Class     | 1,328        | 1,012 | 1,334 | 1,149 | 4,823  |

### Predictors

The measures which could be used as possible predictors of officer potential are presented below under "operational" or "experimental" predictors. The eight variables listed under operational predictors are currently used in the selection program. The two predictors described as experimental were specifically constructed to predict officer performance. Both scales were derived from items included in currently administered instruments.

## Operational

1. Scholastic Aptitude Test--Verbal (SAT-V) or its empirically-derived American College Test (ACT) equivalent. This score represents the verbal aptitude of the individual as measured in a national competitive testing program designed for college admissions and scholarship awards. A minimum score of 520 is required for Naval Academy qualification, with waivers granted in exceptional cases.

2. Scholastic Aptitude Test--Mathematics (SAT-M) or its empirically-derived ACT equivalent. This score parallels the SAT-V except that it represents an individual's quantitative aptitude. Since the curriculum at the Naval Academy is heavily weighted with quantitatively-oriented courses, the minimum qualifying SAT-M score is 600. Waivers are occasionally allowed.

3. Rank in Class (R/C). This is a standardized score ( $M = 500$ ,  $SD = 100$ ), which is based on an individual's high school rank. It ranges from 200 to 800.

4. Recommendations (RECS). This is a score based on high school officials' estimates of the applicant's potential for success as a naval officer. The officials (usually one English and one Mathematics teacher) evaluate the candidate on communication skills, interpersonal relations, personal conduct, and leadership potential. An objective score derived by summing these evaluations, ranges from 0 to 1,000, with no minimum qualifying score required.

5. Extracurricular Activities (COMPECA). This is a score based on the Candidate Activities Record (CAR), a rather extensive application form that covers participation in both athletic and non-athletic extracurricular activities during high school. A rationally-derived scoring system is used to compute the COMPECA score that ranges from 300 to 800. There is no minimum qualifying score.

6. Career Interest Scale (CIS). The CIS consists of items from the Strong-Campbell Interest Inventory (SCII), a commercially-available career guidance instrument, which has been keyed to differentiate between high- and low-tenure Naval Academy officers (Neumann & Abrahams, unpublished report, 23 September 1982).

7. Technical Interest Scale (TIS). This scale consists of items from the SCII which have been keyed to identify Academy applicants with high interest in a technically-oriented curriculum (Neumann & Abrahams, 1974).

8. Candidate Multiple (CM). The Candidate Multiple is an empirically-developed composite which weights SAT/ACT scores, high school performance, extracurricular activities, letters of recommendation, and vocational interest scales to predict a combination of academic performance, military performance, and disenrollment (Alf, Neumann, & Mattson, 1988).

## **Experimental**

1. Activities Performance Scale (APS). In an attempt to improve over the rational score, COMPECA, the CAR was analyzed to identify those extracurricular items that were related to officer performance for inclusion in this scale.

2. Interest Performance Scale (IPS). The SCII was analyzed to identify those items that were related to officer performance for inclusion in this scale.

## **Criteria**

Two main types of criteria were used in this research: (1) measures of officer performance and (2) measures of USNA success. Officer performance criteria were needed to develop experimental predictors to be considered for inclusion in the CM. The USNA criteria were needed to assess the impact that these predictors might have on Naval Academy performance if used for midshipmen selection.

### **Officer Performance**

Since there is no generally accepted single measure of officer performance for use in this research, it became necessary to examine a variety of alternative measures. These measures were derived from performance data already existing in officer personnel records rather than from specially-administered "research only" performance evaluations. The operational instruments have the advantage of (1) providing a cumulative record of performance, (2) including performance information from a variety of career points, jobs, and reporting seniors, and (3) requiring no added expense or intrusion.

By contrast, a "research instrument" developed to measure officer performance would have the disadvantage of (1) requiring considerable personnel development time and cost, (2) providing a measure at only one point in time, from one reporting senior, for one job, and (3) only being available for officers whose supervisors agreed to participate. Since the fitness reports are routinely used in officer evaluations, they also afford a higher level of acceptability among the officer community than would a "research only" measure. Examination of fitness report data, directed at developing a useful performance criterion score, will be described in the Analyses section.

### **USNA Performance**

The measures of midshipmen performance deemed most relevant to assessing experimental predictor impact are described below:

1. Academic Quality Point Ratio (AQPR). The AQPR used in this study is the cumulative grade-point average earned by a midshipman after 4 years at the Academy for the officer sample and after 1 year for the midshipmen sample. If a midshipman disenrolled, the last available AQPR was used.

2. Military Quality Point Rating (MQPR). The MQPR is a composite rating assigned at the end of every semester to each midshipman. It is a weighted composite based on grades earned in physical education, professional competency review, military performance, conduct, and

professional courses. This rating is of special importance since research conducted at the Academy (Howland, 1970)<sup>1</sup> and more recently at Navy Personnel Research and Development Center (NAVPERSRANDCEN) has shown that a similar measure is related to later officer performance. A cumulative MQPR was computed for each midshipman, based on the 4 years' ratings at the Academy for the officer sample and after 1 year for the midshipmen sample. As with the AQPR, if a midshipman disenrolled, the last available MQPR was used.

3. All Disenrollment (ALL DIS). Since any decrease in the overall disenrollment rate would be desirable, the prediction of this criterion was examined. This measure includes all midshipmen who separate from the Academy either voluntarily or involuntarily, with the exception of medical discharges. The latter are not included since it seems highly unlikely that such separations would be predictable from the variables being investigated here. In the most recent graduating class (1987), about 19 percent of the midshipmen disenrolled voluntarily or involuntarily within the first 2 years, and approximately 23 percent disenrolled by the end of the 4-year program.

Development of the officer potential criterion began with a thorough review of information routinely included in each fitness report. Based on this review, three variables or rating dimensions were identified that potentially provide (1) comprehensive evaluation, (2) periodic ratings, and (3) relatively complete data.

1. Command Desirability--a reporting senior's rating of the desirability of an officer being under his/her command in a "command assignment."

2. Mission Contribution-Evaluation--a reporting senior's evaluation of "the officer's contribution to the unit's mission while effectively integrating the man and the mission."

Both the command desirability and mission contribution-evaluation ratings are made on a percentile scale that ranges from the top 1 percent to the bottom 30 percent with five intermediate steps.

3. Recommendation for Promotion--a reporting senior's recommendation of the individual for (1) early promotion, (2) regular promotion, or (3) no promotion.

## Analyses

Analyses were directed at four primary objectives: (1) officer potential or performance criterion development, (2) validation of operational selectors, (3) development of experimental predictors of officer performance, and (4) evaluation of experimental predictors on current USNA classes.

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<sup>1</sup>Howland, R. W. (July 1970). *Recruitment research study group study plan* (Memorandum to Superintendent: U.S. Naval Academy).

## Criterion Development

For each of the three potential criteria, a summary score across an officer's fitness records was computed. Fitness reports were considered qualified and included in this summary only if (1) they were based on ensign (ENS), lieutenant junior grade (LTJG), and lieutenant (LT) performance, (2) the reporting senior indicated that ratings were based on close observation, and (3) the reporting senior was simultaneously rating other officers in his/her command (i.e., either a "periodic" or "detachment of reporting senior" occasion). The latter restriction served to eliminate fitness reports where a reporting senior evaluated only one officer who is being detached, unlike the periodic ratings where all officers are rated. Application of these three criteria resulted in the exclusion of a small portion of all fitness reports available.

Inspection of the criterion distributions revealed a large number of individuals receiving top ratings. Since this kind of skewed distribution could undermine the usefulness of a rating, a summary score was computed for each factor to indicate the proportion of occasions on which the officer received the highest possible rating. A score of 1.00 thus indicates that the officer received the highest rating (e.g., top 1% or recommended for early promotion) for all qualified fitness reports, while a score of 0.00 indicates that he or she never received a top rating. Using these computational methods, over 58 percent of individuals received a score of 1.00 on Command Desirability and over 61 percent received such a score on Mission Contribution.<sup>2</sup> Clearly, these variables showing such large percentages with maximum scores would not provide the differentiation necessary to serve as criteria.

By contrast, only 26 percent were recommended for early promotion on all qualified fitness records (i.e., 26% received the highest score of 1.00 on the Recommended for Promotion score). Taken together, these data indicate that this score offers the greatest potential of all the measures for use as a performance criterion. In addition to its psychometric properties, a recommendation for promotion is considered an important means of identifying superior officers: As indicated in the Navy Military Personnel Command Instruction 1611.1, 12 May 1981:

A recommendation for early promotion is appropriate for outstanding officers who are considered by their reporting seniors to merit promotion ahead of their contemporaries. It is entirely acceptable for such nomination to be made regardless of the time in grade or promotional eligibility, for this procedure serves to identify our "head-and-shoulders" type performers.

Scores based on the "recommended for promotion" ratings were generated as described above for all officers in the classes of 1979-1982. Means were computed separately by class for each rank within warfare specialty and are reported in Table 3. Large differences in mean criterion scores were observed for individuals of different grades, warfare specialties, and year groups. Of

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<sup>2</sup>NAVMILPERSCOM Instruction 1611.1, NMPC-323 recently (Feb 87) formalized the introduction of two additional officer performance dimensions (i.e., tactical proficiency and leadership). Since these scales were recently introduced, ratings are only available on a limited sample. A preliminary analysis of the ratings assigned to these two evaluations revealed similar lack of variability. For example, 79 percent of all officers received the highest possible score (i.e., top 1%) on the leadership evaluations. Tactical proficiency showed even less variability, with 85 percent of all officers receiving the highest score.

**Table 3**

**Mean REP Score by Grade Within Warfare Specialty for the  
USNA 1979-1982 Classes**

| Warfare Specialty | Grade | USNA Class |      |      |      | Total |
|-------------------|-------|------------|------|------|------|-------|
|                   |       | 1979       | 1980 | 1981 | 1982 |       |
| Surface           | LT    | .576       | .601 | .652 | .528 | .590  |
|                   | LTJG  | .407       | .414 | .552 | .483 | .466  |
|                   | FNS   | .319       | .216 | .311 | .290 | .291  |
| Sub               | LT    | .671       | .674 | .703 | .677 | .683  |
|                   | LTJG  | .448       | .455 | .528 | .524 | .492  |
|                   | ENS   | .243       | .283 | .276 | .248 | .266  |
| Air               | LT    | .481       | .468 | .540 | .461 | .489  |
|                   | LTJG  | .249       | .217 | .298 | .268 | .259  |
|                   | ENS   | .199       | .069 | .067 | .316 | .151  |
| Not qualified     | LT    | .475       | .492 | .584 | .491 | .508  |
|                   | LTJG  | .367       | .385 | .468 | .435 | .412  |
|                   | ENS   | .197       | .370 | .327 | .238 | .286  |

Note. Since officers were followed longitudinally, the same officer may be represented at each rank (i.e., ENS, LTJG, LT).

the three classification variables, differences between grades are most pronounced. While sizable differences exist between class and specialty, they are somewhat less dramatic. As might be expected, higher ranking officers obtain higher scores than lower ranking officers.

The magnitude of these differences argued against the pooling of all individuals when using raw criterion scores. To eliminate these rating differences and permit the pooling of scores, standard scores ( $M = 50$ ,  $SD = 10$ ) were derived for each subgroup defined in Table 3. For example, within the surface community all fitness reports completed for those commissioned in 1981 while they were LTJGs formed one of the 48 subgroups within which scores were standardized. In this way, three standard scores were computed for each officer, one based on ENS fitness reports, one based on LTJG fitness reports and one based on LT fitness reports. Each of these scores indicates the officer's position relative only to his same-rank peers within his specialty and class. The three scores were then weighted by the number of fitness reports involved and summed to generate a single standard score that reflects the officer's complete fitness report history. This weighted sum of standardized scores is referred to as the Recommended for Early Promotion (REP) criterion.

## **Validation of Operational Selectors**

As indicated earlier, the operational predictors had been developed for predicting success at USNA and are currently used in midshipmen selection. To determine their relationship to the REP, validity coefficients were computed for the seven predictors that comprise the selection composite and were also computed for the selection composite itself (CM). In addition, the two USNA performance criteria, AQPR and MQPR were correlated with the REP. All correlations with REP were computed for the total sample as well as for each warfare specialty.

## **Development of Experimental Predictors**

The CAR, a basis for one of the experimental scales for predicting officer performance, requires each applicant to indicate participation, honors, and awards for a wide variety of athletic and non-athletic activities for each year of high school. To enhance the stability of these individual CAR items based on each year's participation, the separate responses for the 10th, 11th, and 12th grade were combined into a single variable. In this way, each "summary response" reflects the entire high school record for the activity, award, or honor.

To develop and evaluate experimental scales for the SCII and the CAR, two separate subsamples were needed, one for item analysis and one for cross-validation. One subsample was formed by randomly selecting approximately 40 percent of the total group for cross-validation ( $N = 927$ ). Of the remaining midshipmen ( $N = 1,324$ ), only those scoring in the upper or lower one-third of the criterion distribution were used for key- construction ( $N = 888$ ).

To construct the scale on the CAR items, the proportion endorsing each summary response was computed separately for the high and low performers. For each activity, honor, or award the difference between these proportions was computed. In this way, those 16 item responses with differences greater than eight percent were retained for inclusion in an experimental scale called the Activities Performance Scale (APS). Similarly, an experimental SCII scale, the Interest Performance Scale (IPS) consisting of 40 item responses with differences greater than 12 percent was developed. The same key- construction and cross-validation groups were used for the IPS as were used for the APS.

Finally the APS and the IPS Scales were evaluated for their prediction of officer performance over and above that afforded by operational measures.

## **Evaluation of Experimental Predictors on the Most Recent Classes**

Although it is not possible to validate the experimental officer performance predictors against an officer performance criterion on the most recent USNA classes, it is possible to assess the impact of these potential predictors against USNA performance (AQPR, MQPR, and ALL DIS). For example, if one or both of these scales was a useful predictor of REP but had a negative relationship with USNA performance, its usefulness would be limited. These relationships were explored for the combined 1987-1990 classes.

## RESULTS AND DISCUSSION

### Validity of Operational Selectors

Table 4 presents the uncorrected zero-order validity coefficients of the operational selectors with the standardized experimental performance score for the combined sample as well as the warfare specialties.

Overall, the operational selectors show varying relationships with the REP criterion. The three academically oriented selection scores (SAT-Verbal, SAT-Math, and Rank-in Class) yield correlations of -.01, -.06, and .01 with REP in the total sample. Of the remaining predictors, only the non-academically oriented RECS and COMPECA showed useful relationships with the officer performance criterion (i.e., .09 and .13 respectively).

The RECS score, while showing a promising relationship with REP is based on an earlier recommendations form than is currently being used<sup>3</sup>. As a consequence, the currently used RECS score may be considered parallel but not equivalent.

The single most valid predictor of REP is the COMPECA score ( $r = .13$ ) derived from the CAR. While there have been a few minor revisions of questions on this form, they are unlikely to affect the rank order of applicants, since they concern less popular activities.

The CM, a weighted combination of operational selectors designed to predict USNA performance measures, yields a validity of .01 for predicting REP in the total sample (Table 4). The discrepancy between the CM's validity of .01 and the higher validities shown for the COMPECA and RECS components is a result of the relatively low weight given to COMPECA and RECS in the CM.

Validities of the operational selectors for each warfare specialty are also shown in Table 4. The pattern of validities closely parallels that observed on the total sample. The COMPECA and RECS tended to show the highest relationship.

These results taken together suggest that the academically-oriented predictors (i.e., SAT, R/C) are not useful in the early identification of officer potential. At first glance, this may suggest that academic ability is completely unrelated to officer performance. However, it should be emphasized that those who are admitted and ultimately commissioned are highly selected on academic measures. On the other hand, the nonacademic predictors appear to be mildly related and may benefit from additional analyses focussed on identifying their most valid components.

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<sup>3</sup>Improvements made in the new form's scale and items increased its relationship to USNA military performance.

Table 4

Validity of USNA Selection and Performance Scores to Predict  
REP for the Combined USNA 1979-1982 Classes

|                         | Warfare Specialty    |                  |                  |                               |                     |
|-------------------------|----------------------|------------------|------------------|-------------------------------|---------------------|
| Scores                  | Surface<br>(N = 501) | Sub<br>(N = 579) | Air<br>(N = 685) | Not<br>Qualified<br>(N = 486) | Total<br>(N = 2251) |
| <u>Selection</u>        |                      |                  |                  |                               |                     |
| SAT-V                   | .05                  | -.08*            | .05              | -.03                          | -.01                |
| SAT-M                   | -.03                 | -.08*            | -.09             | -.11**                        | -.06*               |
| R/C                     | -.03                 | -.04             | .05              | -.05                          | .01                 |
| RECS                    | .10**                | .04              | .14**            | .03                           | .09*                |
| COMPECA                 | .16**                | .07*             | .11**            | .19**                         | .13**               |
| TIS                     | -.10*                | -.04             | -.09**           | -.03                          | -.07                |
| CIS                     | .02                  | .03              | .02              | .00                           | .02                 |
| CM                      | .04                  | -.02             | .03              | .01                           | .01                 |
| <u>USNA Performance</u> |                      |                  |                  |                               |                     |
| AQPR                    | .18**                | .16**            | .28**            | .03                           | .15**               |
| MQPR                    | .30**                | .26**            | .34**            | .15**                         | .26**               |

\*p < .05.

\*\*p < .01.

Although the academically-oriented selection scores show little relationship to officer performance, the measure of actual USNA academic performance, AQPR, correlates .15 with the REP, as shown in Table 4. Further, MQPR, a measure of military performance as a midshipmen, is even more highly related to later performance ( $r = .26$ ) as an officer. While clearly not useful as selection variables, it is reassuring to note that these measures of performance in training are related to the newly-developed officer performance measure (REP).

### Experimental Predictors

Table 5 presents means, standard deviations, and correlations for the key construction and cross-validation samples used in constructing and validating the first of two experimental scales (i.e., the IPS Scale). A statistically significant correlation of .14 between the IPS Scale and REP was obtained for the cross-validation sample. Similarly, the APS scale based on the CAR, as seen in Table 6, showed a slightly lower but significant relationship as indicated by its validity of .12. By contrast, the operational score derived from the CAR (i.e., the COMPECA) yields a validity of .16 on the same cross-validation sample.

Table 5  
Means, Standard Deviations, and Correlations of the Interest  
Performance Scale for the Prediction of REP Across  
Warfare Specialties

| Sample                  | N   | Mean   | S.D. | Correlation<br>With REP |
|-------------------------|-----|--------|------|-------------------------|
| <u>Key-construction</u> |     |        |      |                         |
| High-criterion          | 454 | 105.46 | 4.77 |                         |
| Low-criterion           | 434 | 101.85 | 4.97 |                         |
| Total                   | 888 | 103.69 | 5.19 | .34                     |
| <u>Cross-validation</u> | 927 | 103.67 | 5.17 | .14*                    |

\*p < .01.

Table 6  
Means, Standard Deviations, and Correlations of the Activities  
Performance Scale for the Prediction of REP Across  
Warfare Specialties

| Sample                  | N   | Mean  | S.D. | Correlation<br>With REP |
|-------------------------|-----|-------|------|-------------------------|
| <u>Key-construction</u> |     |       |      |                         |
| High-criterion          | 454 | 98.42 | 2.12 |                         |
| Low-criterion           | 434 | 97.98 | 1.85 |                         |
| Total                   | 888 | 98.20 | 2.00 | .11                     |
| <u>Cross-validation</u> | 927 | 98.25 | 1.98 | .12*                    |

\*p < .05.

Considering the validities of all operational and experimental predictors, four appear to offer potential for predicting officer performance. These include the operational RECS and COMPECA in addition to the experimental IPS and APS Scales. Since the experimental APS is slightly less valid and uses significantly fewer items than COMPECA, the operational scale was selected along with RECS and IPS for inclusion in a composite score to predict officer performance.

Table 7 contains the results of combining these three variables into a single Officer Potential Composite (OPC) score. Correlations between the composite and performance are shown for each warfare specialty as well as the total sample. The composite's multiple R of .21, when corrected for "shrinkage" produced a validity of .20 for the total group. When used with a highly favorable selection ratio (i.e., approximately one selectee per seven qualified applicants), a correlation of this magnitude suggests a potentially useful predictor of officer performance. Further, when evaluating this relationship, it should be kept in mind that correlations as high as this over a comparable period of time are rarely reported in the personnel selection literature. The correlations of this composite within warfare specialty ranged from a high of .25 for Surface Warfare officers to a low of .13 for the Submarine Warfare specialty.

Table 7  
Validity of IPS, COMPECA, RECS, and an Officer Potential Composite  
to Predict REP for the Combined USNA 1979-1982  
Classes by Warfare Specialty

| Scores           | Warfare Specialty Qualified |                  |                  |                               | Total<br>(N = 1971) |
|------------------|-----------------------------|------------------|------------------|-------------------------------|---------------------|
|                  | Surface<br>(N = 221)        | Sub<br>(N = 579) | Air<br>(N = 685) | Not<br>Qualified<br>(N = 486) |                     |
| IPS              | .14*                        | .18**            | .15**            | .05                           | .14**               |
| RECS             | .17*                        | .02              | .16**            | .10                           | .11**               |
| COMPECA          | .17*                        | .06              | .14**            | .27**                         | .16**               |
| OPC <sup>a</sup> | .25**                       | .13*             | .21**            | .24**                         | .21**               |

\*p < .05.

\*\*p < .01.

<sup>a</sup>The OPC score is a composite of the IPS, RECS, and COMPECA to predict the REP.

To assess the impact of the experimental predictor of officer performance, IPS, and the OPC composite on USNA midshipmen performance, their relationships to USNA performance criteria are shown in Table 8. To provide baseline information for purposes of comparison, validities of the operational selection variables are also provided.

Although the composite was not developed to predict USNA performance, the correlations shown in Table 8 reveal a significant positive relationship with MQPR and ALL DIS. These data suggest there is little risk that its use will adversely affect midshipmen performance.

Table 8

Validity of USNA Selection Scores and an Officer Potential  
Composite to Predict USNA Performance for the 1987-1990 Classes  
at the End of Plebe Year

| Scores                          | USNA Performance |       |         |
|---------------------------------|------------------|-------|---------|
|                                 | AQPR             | MQPR  | ALL DIS |
| <u>Selection</u>                |                  |       |         |
| SAT-V                           | .31**            | .22** | .03     |
| SAT-M                           | .40**            | .26** | .05     |
| R/C                             | .42**            | .29** | .07     |
| RECS                            | .01              | .08** | .03     |
| COMPECA                         | .02              | .08** | .09     |
| TIS                             | .03*             | .03*  | .05     |
| CIS                             | .09**            | .07** | .03     |
| CM                              | .50**            | .34** | .09     |
| <u>Experimental<sup>a</sup></u> |                  |       |         |
| IPS                             | -.05**           | -.01  | .07     |
| OPC <sup>b</sup>                | -.01             | .07** | .10*    |

Note. AQPR and MQPR validities are Pearson  $r$ 's while the ALL DIS validities are biserial  $r$ 's.

\* $p < .05$ .

\*\* $p < .01$ .

<sup>a</sup>The Experimental IPS Scale was constructed on the SCII responses across Warfare Specialties.

<sup>b</sup>OPC score is a composite of the IPS and the operational RECS and COMPECA scores.

## CONCLUSIONS

Preliminary development and evaluation of an experimental measure of officer performance as well as experimental predictors of this performance measure suggest the following conclusions.

1. Although prior research has shown that most ratings on officer fitness reports do not provide adequate discrimination, there is sufficient variability in early promotion recommendations to provide meaningful differentiation among officers.

2. Performance as a USNA midshipman is significantly related to officer performance as measured by REP.

3. Although the operational selection measure (CM) is not related to the REP, two of its components, COMPECA and RECS, individually exhibit significant relationships.

4. Predictors empirically derived from applicant data reveal significant relationships with the officer performance criterion. These relationships are noteworthy since there is considerable time between USNA application and the cumulative measurement of officer performance.

5. Although the experimental predictors and composite show low positive relationships with USNA performance, it appears that their use will not adversely affect performance.

### **RECOMMENDATIONS**

Based on these results, it is recommended that:

1. The experimental measure of officer performance (REP) be further evaluated by examining its relationship to measures or status variables concerned with actual promotion and promotion rates.

2. The relationship between officer retention and the experimental criterion (REP) be explored.

3. The OPC be considered for experimental integration into the current USNA selection system.

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