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RESEARCH MEMORANDUM SRM 73-2

OCTOBER 1972

THE NAVY ADJECTIVE LIST AS A PREDICTOR OF ENLISTED RETENTION

**Norman M. Abrahams
Lynn A. Lacey**

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SUMMARY

A. Problem

The heavy loss of highly trained and experienced naval personnel who fail to reenlist continues to be a major personnel problem.

B. Approach

One approach to reducing the impact of turnover is to place men with the greatest likelihood of reenlistment in assignments which are most critical and for which training is most expensive. The present research evaluates the effectiveness of an experimental test, the Navy Adjective List (NAL), in identifying men with superior reenlistment likelihood. The relationship between several types of NAL scale scores and subsequent career decisions was determined for a sample of 390 men who had been tested as recruits.

C. Results

Empirical keys developed from NAL responses had limited value in predicting retention. However, rational scales measuring anxiety, achievement, and social desirability were moderately effective individually and in combination.

D. Conclusions and Recommendations

The results of this study suggest the adjective check list approach to have some value in predicting tenure. It is planned to refine and expand the scales measuring the psychological dimensions found most effective. Experimental administration to a sample of enlisted personnel near the end of their first enlistment will permit evaluation of the new scales.

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Norman M. Abrahams
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October 1972

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Naval Personnel and Training Research Laboratory
San Diego, California 92152

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THE NAVY ADJECTIVE LIST AS A PREDICTOR OF ENLISTED RETENTION

A. PROBLEM AND BACKGROUND

The purpose of this research is to evaluate the Navy Adjective List (NAL) for possible use in the selection and classification of enlisted men as a means of increasing the Navy's retention rate. The NAL, developed to measure "need for achievement," was found to predict language school performance when empirically keyed (Neumann, Abrahams, & Githens, 1968). However, Lau, Lacey, and Abrahams (1970) did not find the empirical keys on the NAL to be effective in predicting achievement of Navy enlisted personnel at a number of other schools. The present research evaluates the NAL against a reenlistment criterion for a Navy recruit sample.

B. PROCEDURE

1. Sample

The present sample consisted of 390 enlisted men who were tested during recruit training and followed up at the end of their first enlistment status. Two criterion groups were identified. The high tenure group consisted of 53 men who either reenlisted or extended their first enlistments 12 months or more. Those who had initially obligated themselves for six years of service ($n = 23$) were considered high tenure in some of the analyses. The low tenure group consisted of 314 men who were no longer on active duty.

2. Instrument

The NAL contains 110 adjectives such as "competitive," "tolerant," "friendly," "shy," "dominant," etc., to each of which the respondent makes one of the following responses:

N = Does Not apply to me.

A = Accurately applies to me.

L = Applies to me a Little.

The respondents were instructed to cross out those adjectives that they did not understand.

3. Analyses

Two empirical keys were constructed from the NAL to predict retention status. The first was developed and cross-validated with six-year obligors included in the high tenure sample, the second key was developed and cross-validated excluding six-year obligors. For both scales approximately two-thirds of each sample was used for construction of keys and one-third was used for cross-validation of the keys. In each case all item responses having a percent difference of 13 or greater were selected for the scoring keys. Weights of +1 were assigned to those responses more often selected by reenlistees and weights of -1 to those responses more often selected by non-reenlistees.

In addition to the empirical keys, the samples were scored on the following four scales derived from a rational clustering of adjectives: Achievement, Anxiety, and Positive and Negative Desirability. The Achievement scale consisted of 53 achievement-oriented adjectives. The Anxiety scale consisted of 29 anxiety-oriented adjectives. For each of these two scales, adjectives endorsed with an 'A' (accurately applies) received a weight of two; those endorsed with an 'L' (applies a little) a weight of one; and those responded to with 'N' (does not apply) a weight of zero. Scores were then computed by summing the weights assigned to each response to the adjectives included in each scale.

To develop the Positive and Negative Social Desirability scales five judges rated all adjectives on these dimensions. The Negative Desirability scale consisted of the 35 adjectives that were rated least desirable by the five judges and the Positive Desirability scale included the 40 adjectives considered most socially desirable. For each of these scales, adjectives endorsed with an 'A' received a weight of twice the average desirability rating of the adjective; each adjective endorsed with an 'L' received the average desirability rating as a weight; and each adjective endorsed with an 'N' received no weight.

Two matrices containing the intercorrelations between retention status and the four rationally-derived scales were computed. The first matrix was based on the total sample while the second was based on the total sample excluding six-year obligors. From each matrix multiple-regression equations were computed for the four scales.

C. RESULTS AND DISCUSSION

Tables 1 and 2 present means, standard deviations, and biserial¹ correlations of the empirically developed key with the retention criterion for both the key development and the cross-validation samples. Percentage overlap figures are also presented. The difference between the means of the high and low tenure cross-validation groups that included six-year

¹The dichotomous retention criterion is assumed to have an underlying continuous distribution.

obligors was statistically significant ($t = 2.67, p < .01$), indicating that the empirically-derived NAL scores differentiated between the high and low tenure groups. This scale yielded a biserial validity of .42 on cross-validation. However, when the six-year obligors were excluded from the validation and cross-validation samples the difference between the means of the high and low tenure cross-validation groups was sharply reduced and not statistically significant. Thus, the apparent validity of the first key appears to be due solely to the inclusion of the six-year obligors in the high tenure sample, and as such, provides no practical contribution to prediction. Nevertheless, these findings indicate that six-year obligors are discriminable from low tenure men in terms of their adjective self-descriptions.

Table 3 presents validities, Beta weights, and multiple correlations of the four rationally-derived scales for the two samples. The single most valid predictor among the rationally-derived scales for the total sample was the Anxiety scale, with a biserial correlation of $-.33 (p < .01)$ with retention status. The moderately high negative validity of this scale indicates the greater the number of anxiety adjectives a man endorsed as descriptive of himself, the less likely he is to reenlist. When Achievement scale scores and Positive Desirability scale scores were combined with Anxiety scores, the multiple correlation increased by 10 correlation points ($p < .001$). This multiple of .43 decreased to .38 when corrected for estimated shrinkage. The most valid predictor for the sample excluding six-year obligors was again the Anxiety scale, with a validity of $-.25$. Again, Achievement and Positive Desirability scale scores contributed to a significantly increased multiple correlation of .34 which reduced to .26 ($p < .01$) when corrected for shrinkage.

The moderate validity obtained by the rational scale scores for the sample excluding six-year obligors and the lack of validity for the empirically-constructed key is somewhat paradoxical. This finding appears to be due to lowness of the validities of the items on the rational scales that precluded their selection for the empirical keys which used a relatively rigorous criterion for item inclusion.

Although the Positive Desirability scale had low zero-order validity for each sample, it contributed quite significantly to the multiple correlation. Apparently, this scale operates as a suppressor variable, partialling out from Achievement scale scores those factors unrelated to the retention criterion. That is, the addition of Positive Desirability scores to the multiple-regression equations apparently allows the tendency for the subjects to describe themselves in a socially desirable manner to be partialled out from Achievement scores. These findings provide leads which may prove useful in future research.

D. SUMMARY AND CONCLUSIONS

This study investigated the utility of the NAL in predicting the retention status of naval recruits.

TABLE 1

Means, Standard Deviations, and Validities of Empirically-Derived
Key Developed on Total Sample

Sample	N	$\bar{X}$	S.D.	r_b	Percentage Overlap
<u>Key Construction</u>					
High Tenure	54	9.78	11.92	.75	50
Low Tenure	215	-3.60	7.74		
- - - - -					
<u>Cross Validation</u>					
High Tenure	22	5.50	11.09	.42**	72
Low Tenure	99	-1.14	7.74		

**Significant beyond the .01 level (Alf & Abrahams, 1971).

TABLE 2

Means, Standard Deviations, and Validities of Empirically-Derived
Key Developed on Sample Excluding Six-Year Obligors

Sample	N	$\bar{X}$	S.D.	r_b	Percentage Overlap
<u>Key Construction</u>					
High Tenure	40	15.35	10.96	.68	54
Low Tenure	215	3.60	8.39		
- - - - -					
<u>Cross Validation</u>					
High Tenure	13	5.54	6.59	-.03	97
Low Tenure	99	6.06	7.83		

TABLE 3

Regression Analyses for the Rational Scales

Predictor Scale	Total Sample		Without Six-Year Obligators	
	Validity	Beta Weight	Validity	Beta Weight
Achievement	.11	.78*	.12	.61*
Anxiety	-.33	-.25*	-.25	-.25*
Positive Desirability	.06	-.74*	.08	-.56*
Negative Desirability	-.29	.00	-.20	.07
Multiple R_{bis}	.43		.34	
Shrunken R_{bis}	.38		.26	

Note.--

*Indicates the scales which contributed significantly ($p \leq .01$) and were used in computing multiple correlations.

Empirical keys were constructed and cross-validated on a sample of Navy enlisted men. The first empirical key, developed on the sample including six-year obligors, was moderately correlated with the retention criterion. However, upon excluding six-year obligors, no relationship with reenlistment status was found.

The samples were also scored on four rationally-derived scales measuring positive and negative social desirability as well as anxiety and need for achievement. For the samples including six-year obligors, the validity of a linear combination of rational scale scores was virtually the same as the empirical scale in predicting retention. However, the rational scales, individually and in combination, were superior to the empirical scale for the sample excluding six-year obligors. Since the rationally-derived scales were moderately related to retention in both analyses, they appear to be more useful than the empirical scales.

It is planned to revise the NAL to refine the valid dimensions and then administer it to a larger sample of naval recruits for subsequent validation with a retention criterion. Since the retention criterion requires at least four years to mature, interim validity will be estimated by administering the NAL to a group of naval personnel whose obligated service is near completion.

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