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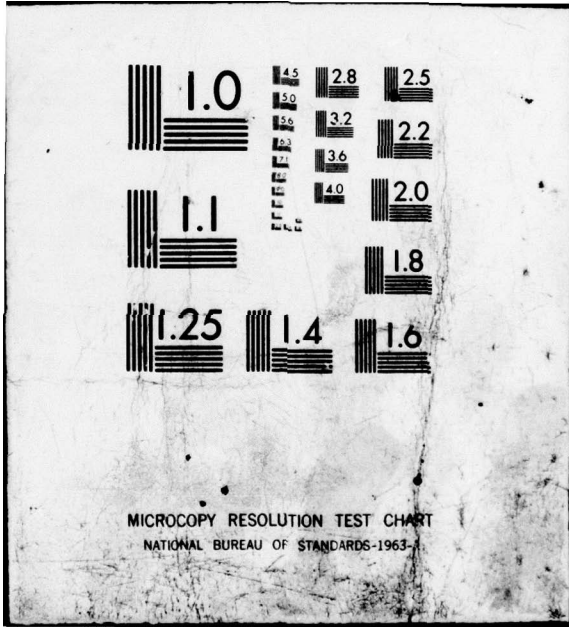
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SVIB PREDICTION OF RETENTION

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SVIB PREDICTION OF RETENTION

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Report No. 1B5.04-75-023

Project No. 139A

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ABSTRACT

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Using the responses of entering Class of 1971 cadets to the 399 items in the Strong Vocational Interest Blank (SVIB) several special keys were developed to distinguish between cadets at entrance who are likely to graduate and those likely to become motivational resignees. Three Graduation Keys were cross validated on responses by entering cadets in the Class of 1968 to the SVIB. At USMA, like USNA, USCGA, and USAFA, the SVIB demonstrated significant utility in identifying entering cadets who are either very likely or very unlikely to graduate from the academy.

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SVIB Prediction of Retention

1. BACKGROUND:

a. Evaluations of the Strong Vocational Interest Blank (SVIB).

Super (1949) stated that the SVIB "...is without question one of the most thoroughly studied and understood psychological instruments in existence." Cronback (1960) said the SVIB "...ranks very near the top among psychological tests of all types." More recently Anastasi (1968) stated "With regard to validity, there is considerable evidence that individuals tend to enter and to remain in occupations in which they receive high SVIB scores...there are 88 chances in 100 that a student who had scored 55 or higher on an occupational scale would be employed in that occupation 18 years later, while there are only 17 chances in 100 that a student scoring below 30 would be employed in that occupation." Wiskoff (1970) from his review concluded as follows: "Civilian research over the last several decades has clearly shown that vocational interest tests provide a very effective approach for measuring the likelihood that given individuals will elect and remain in specific occupations for an extended period of time."

b. The Standard SVIB Scales.

The standard scales obtained from the SVIB are of three types. There are 55 "occupational" scales (based on responses of successful men in each occupation), 22 "basic interest" scales (each based on homogeneity of content), and several "non-occupational" scales. The occupational scales include "Army Officer," "Air Force Officer," "Public Administrator," and several others of interest. The 22 basic interest scales provide descriptions of the interest-content patterns of selected criterion groups and might serve as predictors of the USMA relevant criteria. The non-occupational scales for which the results might be of interest are Specialization, Occupational Level, Masculinity, Liberalism, Social Introversion, the "A-B Scale", and Academic Achievement (A-Ach).

c. Special College Graduation Scales.

Special scales from selected items of the Strong Vocational Interest Blank (SVIB) have been found to be significantly valid predictors of graduation from the U.S. Coast Guard Academy (Enger & Fisher, 1972). When cross-validated on a second group the scale (obtained from a regression equation based on 30 selected items) held up reasonably well, yielding a point biserial correlation of .21 with actual graduation. The chi-square (of 13.5, 1 df) between predicted graduation-separation and actual graduation-separation was statistically significant beyond the 0.01 level. Another special scale (developed by the usual SVIB scaling procedure from responses of USNA students) was found to be an even more valid predictor (ranging from .34 to .43 for several cross validation samples) of first summer "motivational disenrollment" from the U.S. Naval Academy (Donn & Abrahams, Sept. 1970). Early motivational disenrollment was predicted more validly than was later disenrollment. When using the SVIB alone, motivational disenrollment was found to be more predictable than disenrollment for academic reasons.

The use of the special USNA keys as a tool for recruiting USNA and NROTC candidates was explored with fruitful results by Thomas and Hinsvark (1973). High school students with high scores on two of the Navy's four special keys were contacted. Of 91 contacted and followed up a year later, 14% had applied for an NROTC scholarship or to the Naval Academy. Over

half of the Naval Academy candidates had not considered applying prior to seeing their interest profiles.

Other research has shown that other special SVIB keys are likely to be of assistance in increasing the accuracy with which the following can be predicted: Retention in the Officer Corps; Military career commitment of graduating cadets; Academic success at USMA; A cadet's Leadership Evaluation Score. Research on each of these areas is being conducted.

2. The general problem is to evaluate the ability of the Strong Vocational Interest Blank to help in reducing attrition at USMA.

The specific purpose of this research is to determine whether a special USMA Graduation Key can be developed that will be effective in identifying cadets at entrance for whom there is high probability that they will graduate and those for whom there is high probability that they will separate.

3. PROCEDURE:

a. Populations.

The Class of 1968, N=989, took Form M of the SVIB as Plebes in 1964. The Class of 1971, N=859, took Form T-399 as Plebes in 1967.

b. Materials.

The Strong Vocational Interest Blank (SVIB) Form T-399 consisting of 399 items, copyrighted 1966 and Form M, consisting of 400 items, copyrighted in 1938.

The respondent indicates whether he likes, is indifferent to, or dislikes selected occupations, school subjects, amusements, activities, or types of people (280 items); his preferences among sets of activities, kinds of people, or types of work (80 items), and gives a self-report on his present abilities or characteristics (39 items or 40 items depending on the form).

c. Criterion Data.

Graduation (1) versus "Motivational Resignation" (2), Other Resignations (3) and Other Separations (4), both during Plebe Year and as Upper-Classmen.

d. Methodology.

(1) Summary of major steps and guidelines.

(a) Using data from Class of 1971, identify items on Form T-399 for consideration, all with statistically significant r's or eta's, chi-squares, and a response alternative in which the difference between the % grads and the % of motivational resignees (either as Plebes or as Upper-Classmen) choosing that response is greater than 10% or is statistically significant. (In most items the p-value of none of these three types of statistics was greater than .10 and at least one had a p of less than .05.)

(b) Select items for Basic Key (Form T-399, Graduation Key '71A), considering criteria 1, 2, 3 as given in Appendix A. (In most items none of the three types of statistics had p-values greater than .05 and at least one was less than .02, however most weight was given to Plebe and upper-class consistency for one or more alternatives in Graduate minus Resignee response percentages and considerable weight was given to compatibility with trends for cadets lost by other administrative channels).

(c) Assign weights of +1, -1, or zero for each possible response to the items on the Basic Graduation Key, considering the directions and significance of the percentage differences (between responses by cadets who later graduate versus resign) and the five points listed in Appendix A.

(d) From Key A select items for a Rigorous Key (Form T-399, Graduation Key '71B) considering the magnitude of the percentage difference and the significance of the association statistics for Graduates-Motivational Resignees. (In most items the p was less than .001).

(e) Identify the items in SVIB Form T-399 Keys that are also in SVIB Form M. The items in common that were in Grad Key '71A comprise Grad Key '71C, and common items in Grad Key '71B comprise Grad Key '71D.

(f) Using experience with test-item statistics and knowledge about differences in characteristics of cadets who resign and those retained, select from the Basic Key A, items that, according to professional judgment, are most likely to retain discriminating power on other samples. Those items in common between Form T-399 and Form M comprise Grad Key '71E.

(g) Score the responses of each cadet in the Class of 1971 on all keys, and those in the Class of 1968 on Keys C, D, and E, to evaluate the ability of these SVIB keys to determine the probability that an entering cadet will graduate, resign, or be separated for other reasons.

(2) Key development.

The basic procedure used to identify items for further consideration was that developed by Strong and refined by Campbell (Campbell 1971, pp. 29-34 & 226). Using only the Class of 1971 data, the percents of each criterion group giving each of the three possible responses to each item were determined. The differences between the percentages for the retained group and the percentages for each of the three attrition groups was determined for each alternative to an item.

Table 1 illustrates the statistics that led to the selection and weighting of one of the items.

The pool of items for consideration included first, the items for which the difference (% retained minus % motivational resignees) was 10% or more for any response; second, those for which this difference (due to the high or low magnitude of the percentages) was highly significant ($p < .02$); and third, those for which the F test indicated a significant ($p < .05$) relationship between item responses and retained-resigned status at end of Plebe year or graduation. About one-third of the 399 items were included

TABLE 1
 STATISTICS RESULTING IN THE SELECTION OF ITEM 133
 AND THE WEIGHTS ASSIGNED TO EACH OF ITS RESPONSES

Response to Item 133 "Sociology"	% Choosing Response "Men in General*" in 1964	% Entering Cadets in 1964	% Grads - 4 ⁰ Motiv. Resig.	% Grads - Other Sep. 4 ⁰ yr.	% Grads - Resig. after 4 ⁰ yr.	% Grads - Other Sep.	Mean y Resig. (% Mot. Resig.) 1969	Weight in Army Officer Key Developed in 1969	Weight Assigned in Graduation keys
"Like"	42	34%	-8.5	-3	-9.3	-3	24%	0	-1
"Indifferent"	42	50%	12.7	2	13.7	0	15%	0	+1
"Dislike"	16	16%	-4.3	2	-4.4	3	24%	0	0
Total	100	100	NA	NA	NA	NA	19%	NA	NA

4 Sig. of:

r	N.S.	N.S.
Eta y/x	.02	.02
Nonlinearity	.01	.005
Chi-square	.02	.02

* National SVIB sample used in developing occupational scales.

in this pool for further consideration. From these was selected a basic list of 81 items that met three criteria. First, they were predictive of graduation vice motivational resignation in the Class of 1971. Second, the sign of the % differences between the responses of the three attrition groups ("Motivational Resignee," "Other Resignee," and "Other") were NOT significantly in conflict. Third, the patterns of significant differences between the responses for the Class of 1971 Plebe year status groups tended to be consistent with those of the final, four-year status groups. Appendix A summarizes the considerations in making this basic item selection (considerations 1-3) and in assigning weights of +1, -1 or zero to each of their 243 responses (considerations 5-9). Since it was based on graduation-motivational resignation data from the Class of 1971, the basic form T-399 key was called Graduation Key '71A. Of the 183 keyed responses, 85 were keyed +1 and 98 were keyed -1. An even more rigorous key (statistically) was developed by selecting only items with all responses very significantly related (at the .001 level) to graduation or with one response having a difference of 9% or more. The 43 items in this Graduation Key '71B had 44 responses with +1 weights and 50 with -1 weights, a possible range of 94 points.

Of the 81 items in the basic key for Form T-399, 66 were included also in Form M (that had been given to the Class of 1968); these constituted Grad Key '71C. The 30 items in T-399 Grad Key '71B that were also in Form M comprised Grad Key '71D. Grad Key '71E included 46 items selected from Key C that, in addition to meeting the basic statistical standards, were judged to be most likely to retain significant discrimination in other classes. (Considerations 4 & 9 in Appendix 1).

(3) Key validation.

For the Class of 1971, each cadet's score on each of the five graduation keys (A-E) was determined. For the Class of 1968 each cadet's scores on Graduation Keys '71C, '71D, and '71E were determined. The relationship between each of the above eight sets of SVIB special key scores and graduation-attrition status was calculated. The following statistics were obtained: the point-biserial correlation with graduation-motivational resignation, the correlation ratio (eta), non-linearity test, F-statistics, chi-squares, and distribution statistics for each key in each status group.

4. RESULTS and DISCUSSION:

a. Graduation Key '71C.

The basic characteristics of the five Class-of-1971-based Graduation Keys and the distribution statistics on each for the Class of 1971 and Class of 1968 populations (by class and by status group) are summarized in Appendix B.

Data needed for initial evaluation of Graduation Key '71C are given in Table 2. As the key was developed on the Motivational Resignation versus Graduation groups for the Class of 1971, the absolute magnitude of and relationships between the statistics for these two Class of 1971 groups tend to be somewhat inflated by chance (sampling) fluctuations in the measure. The application of the Grad '71C key to the Class of 1968 indicates the results to be expected if the SVIB is given to other new cadets and scored on this key. Several points shown in Table 2 warrant attention. The correlation coefficient of .20 is too low to warrant use of this key alone for general prediction. However, it could be combined with other, equally low independent predictors of resignation vs retention to yield quite acceptable over-all prediction. Furthermore, even a correlation as low as .10 can provide very useful predictions for those with very high

TABLE 2

Percent of Cadets in Each Interval on Strong Vocational Interest
Blank Graduation Key '71C who were in Each Retention
Status Group Four Years Later

Graduation Key '71C* (X) SVIB Score	Key Development Group Class of 1971 (Y) Status				Key Validation Group Class of 1968 (Y) Status			
	f	(1)	(2)	(3)	f	(1)	(2)	(3)
		% Grad.	% Mot. Resig.	% Other Sep.		% Grad.	% Mot. Resig.	% Other Sep.
M + 1.5 SD & Higher	43	95	0	5	54	87	6	7
M + 1.0 SD to M + 1.5 SD	92	84	5	11	100	84	8	8
M + 0.5 SD to M + 1.0 SD	155	84	6	10	117	78	13	14
M to M + 0.5 SD	156	69	15	17	175	75	12	13
M - 0.5 SD to M	134	77	16	7	143	67	18	15
M - 1.0 SD to M - 0.5 SD	126	59	24	16	118	69	15	16
M - 1.5 SD to M - 1.0 SD	69	55	33	12	92	58	20	23
M - 2.0 SD to M - 1.5 SD	44	36	57	7	66	68	12	20
(Below M - 1.5 SD)	(65)	(41)	(49)	(9)	(125)	(58)	(22)	(20)
Below M - 2.0 SD	21	52	33	14	59	47	32	20
Total f's	840	599	143	93	924	652	136	136
Corrsp. %'s	100	71	17	12	100	71	15	15
Mean SVIB	12.12	14.20	4.06	11.24	10.94	12.40	7.02	7.82
SD	11.34	10.80	10.43	10.45	10.64	10.15	11.41	10.55
r_{xy} pt. bis.			.35			.20	.20	
Eta y/x			.37			.20	.22	

*Based on 150 keyed responses to the 66 items common to SVIB Form T399 (given to entering Class of 1971) and Form M (given to entering Class of 1968) that discriminated with high significance and consistency between Cadets who later graduated and those who were separated as motivational resignees.

or very low scores. For cadets with a score of 1.5 standard deviations above the incoming class mean Grad '71C score there are about 9 chances in 10 that they will graduate ($p=.87 \pm$ a standard error* of .0458), about 1 in 20 that they will become motivational resignees ($p=.06 \pm .0323$), and about 1 in 20 that they will be separated for other reasons ($p=.07 \pm .0347$). If a new cadet has a very low score (more than 1.5 standard deviations below the mean) the chances are negligibly better than 50-50 that he will graduate ($p=.58 \pm .0441$) and he is about as likely to be separated by motivational resignation as otherwise (these standard errors are less than .04). If his score is more than two standard deviations below the mean he is more likely to be a motivational resignee than to be separated otherwise (respectively $p=.32 \pm .06$ and $p=.20 \pm .05$).

Another noteworthy point is the comparison of the mean score made by cadets who later graduated, those who became motivational resignees and those later separated via other channels. As might be expected since the primary consideration in item selection was graduation versus motivational resignation, in the key development class the "other" group fell between the two criterion groups but was only about one-third of the way below the mean for the Graduate group, i.e. about two-thirds of the difference above the motivational resignation group. However, in the validation Class of 1968, the Grad Key '71C mean score for the motivational resignation group was not significantly below that for the "other" group. Both the "motivational resignees" and the "other" attrition groups seem to have about the same typical pattern of interests on the items included in Grad Key '71C.

b. Graduation Key '71D.

This key was developed to determine whether adhering more closely to the usual procedure for developing SVIB occupational keys would, in spite of the reduced number of items, yield a substantial increase in the validity obtained. The pertinent data from this key are given in Table 3. Even in the Key Development Group (Class of 1971), it discriminates very little better than did Key '71C. (The correlations and the standard score difference between the subgroup means are both slightly larger. When cross-validated by applying it to a new Class, the point-biserial correlation of .35 shrank to .16, even lower than the validity of the Key '71C. However, its curvilinear correlation (η) was significantly greater than its linear ($p<.01$) and the same as that for Key C). In Key '71D, the effect of the use of statistically more rigorous two-group differentiation criteria for item selection and keying was counteracted in overall validation by the reduction of the number of items from 66 for Key '71C to 30 for Key '71D and of the number of keyed responses from 150 to 65. The reduced number of keyed items and responses resulted in a considerable reduction in reliability.

*In two out of three replications, the percent graduating is expected to be within the range $M-1$ SE and $M+1$ SE.

TABLE 3

Percent of Cadets in Each Interval on Strong Vocational Interest
Blank Graduation Key 71D Who Were in Each Retention
Status Group Four Years Later

Graduation Key '71D* (X) SVIB Score	Key Development Group Class of 1971 (Y) Status				Key Validation Group Class of 1968 (Y) Status			
	f	(1)	(2)	(3)	f	(1)	(2)	(3)
		% Grad.	% Mot. Resig.	% Other Sep.		% Grad.	% Mot. Resig.	% Other Sep.
M + 1.5 SD & Higher	53	91	2	8	60	87	8	5
M + 1.0 SD to M + 1.5 SD	100	84	7	9	121	27	12	11
M + 0.5 SD to M + 1.0 SD	146	81	6	10	154	75	10	15
M to M + 0.5 SD	135	75	10	14	142	70	14	16
M - 0.5 SD to M	117	71	16	15	194	20	15	15
M - 1.0 SD to M - 0.5 SD	121	57	31	10	141	68	19	13
M - 1.5 SD to M - 1.0 SD	74	49	39	13	75	60	17	23
M - 2.0 SD to M - 1.5 SD	45	47	42	11	37	65	27	8
(Below M - 1.5 SD)	(65)	(43)	(45)	(12)	(59)	(52)	(30)	(17)
Below M - 2.0 SD	20	35	50	15	22	32	36	32
Total f's	851	600	150	101	946	667	143	136
Corsp. %'s	100	71	18	12	100	71	15	14
Mean SVIB	4.15	5.28	-0.12	3.76	4.36	4.95	2.63	3.25
SD	5.70	5.31	5.35	5.38	5.55	5.39	5.94	5.40
r_{xy} pt. bis.			.38				.16	
Eta y/x			.39				.21	

c. Graduation Key '71E.

This key was developed by using professional judgment, test item data interpretation experience, and knowledge about differences between characteristics of retained cadets and those of resignees to select items from Key C judged most likely to retain significant discrimination power in other Classes. This resulted in a key with 46 items having 62 negatively, 47 positively, and 29 zero weighted responses. Table 4 summarizes the data for initial evaluation of SVIB Graduation Key '71E.

TABLE 4
Percent of Cadets in Each Interval on Strong Vocational Interest
Blank Graduation Key '71E who were in Each Retention
Status Group Four Years Later

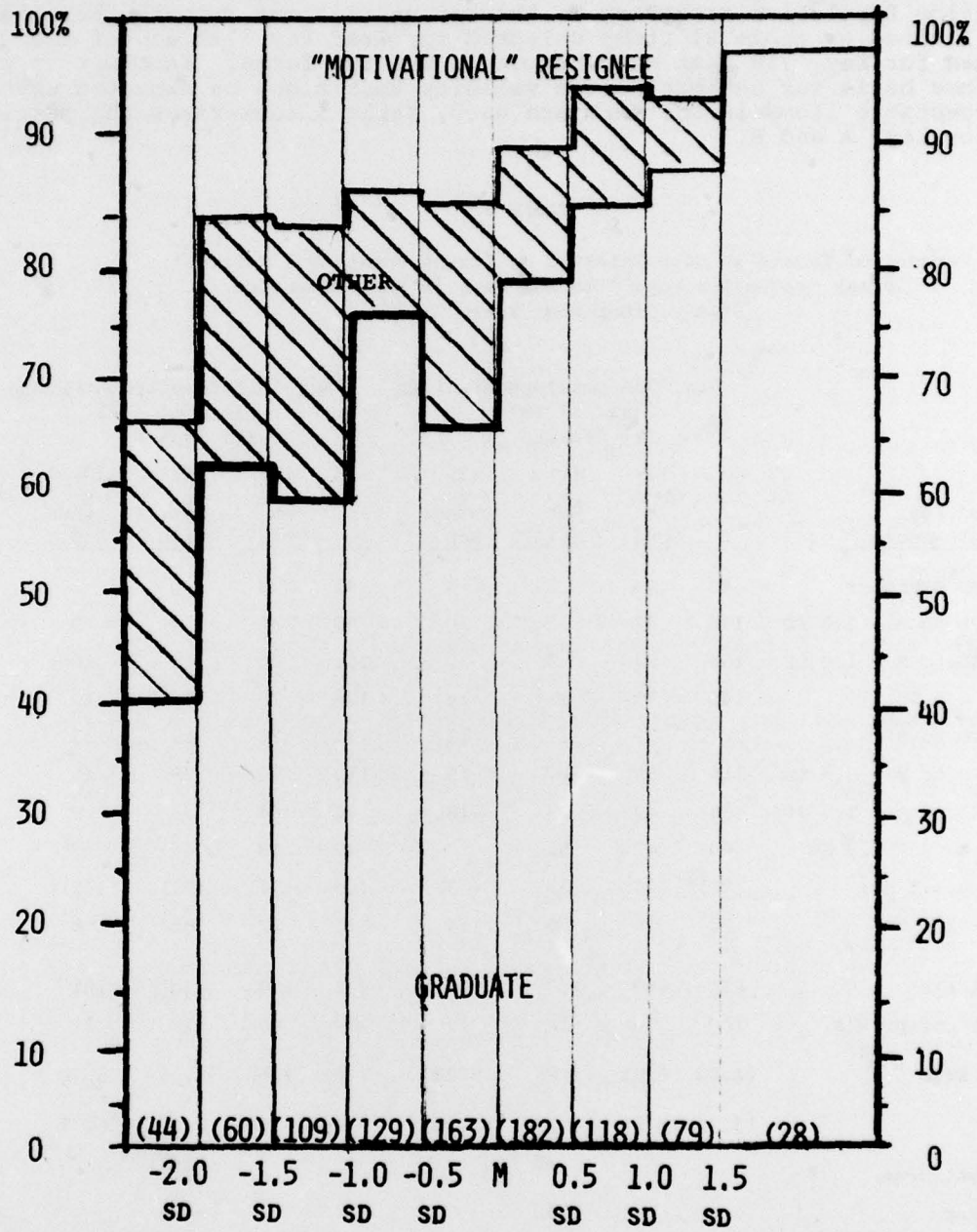
Graduation Key '71E* (X) SVIB Score	Key Development Group Class of 1971 (Y) Status				Key Validation Group Class of 1968 (Y) Status			
	f	(1)	(2)	(3)	f	(1)	(2)	(3)
		% Grad.	% Mot. Resig.	% Other Sep.		% Grad.	% Mot. Resig.	% Other Sep.
M + 1.5 SD & Higher	45	87	4	9	28	96	4	0
M + 1.0 SD to M + 1.5 SD	103	84	7	10	79	86	8	6
M + 0.5 SD to M + 1.0 SD	132	73	12	15	118	83	7	10
M to M + 0.5 SD	176	76	12	13	182	76	12	12
M - 0.5 SD to M	140	71	19	9	163	65	17	18
M - 1.0 SD to M - 0.5 SD	105	65	23	12	129	74	16	10
M - 1.5 SD to M - 1.0 SD	87	58	30	13	109	57	19	24
M - 2 SD to M - 1.5 SD	38	45	47	8	60	60	18	22
(Below M - 1.5 SD)	(63)	(44)	(43)	(13)	(104)	(51)	(26)	(23)
Below M - 2.0 SD	25	44	36	20	44	39	36	25
Total f's	857	600	150	101	912	648	134	130
Total Corsp. %'s	100	70	18	12	100	71	15	14
Mean SVIB	12.57	13.97	7.25	12.16	10.41	11.94	6.48	6.83
SD	9.37	8.82	9.61	9.38	9.62	9.16	9.91	9.52
r_{xy} pt. bis.			.29				.22	
Eta y/x			.29				.24	

*Based on 109 keyed responses to the 46 items common to SVIB Forms T399 and M that, in addition to the statistical criteria used in Key 71C, were judged (from trends in differences between responses by cadets who later graduated, became motivational resignees, other resignees, or were separated for other reasons, and in some cases from logical and content considerations) to be most likely to retain significant discrimination in other classes.

Since 20 of the items in Key C that discriminated significantly for the Class of 1971 were not included in Key '71E, the relationships between Graduation-Resignation are not as high in the key development group for Key E as they were for Key C. The correlation coefficients were .22 and .35 respectively. The mean score made by the cadets who later graduated differed from the mean for later motivational resignees by .72 and .89 standard deviations. These reflected an overall overlap, in the graduation and resignation distributions, of 72% for Key E and of 65% for Key C. However, in the new validation group, Key E retained its validity so much better than Key C that (in spite of the disparity in the number of items, 109 versus 150 responses) Key E was at least as valid as Key C.

Figure 1 depicts graphically the relationship between level of a cadet's score on SVIB Graduation Key '71E and the probability that he will graduate. According to these validation data, if a cadet's score is more than two standard deviation units below the mean (i.e., has a SVIB Graduation standard score of less than 300), he is more likely to be separated than to graduate--he has about one chance in three (more precisely, graduation $p=.386 \pm$ a standard error of .073). If his score is between one and two standard deviations below the mean (standard scores of 300 to 400), his chances of graduating are little better than 50-50 (more precisely, $p=.580 \pm .0380$). On the other end of the distribution, cadets with scores at least 1.5 standard deviations above the mean (i.e., with SVIB Graduation standard scores of 650 or more) has less than one chance in 20 of being separated (more precisely, graduation $p=.967 \pm .035$).

FIGURE 1



VALIDITY OF STRONG VOCATIONAL INTEREST BLANK GRADUATION KEY '71E
 PERCENT OF CADETS IN EACH INTERVAL AT ENTRANCE IN 1964 WHO FOUR YEARS
 LATER WERE CLASSIFIED "GRADUATE," "MOTIVATIONAL RESIGNEE," OR
 "OTHER." (N=912; THE FREQUENCY FOR EACH INTERVAL IS WITHIN PARENTHESES.)

d. Graduation Keys '71A and '71B

Since the Key Development Population took Form T-399 and the Cross-validation Population took Form M, the key validations reported here had to be limited to those 81 items selected for Grad Key '71A and of the 43 selected for Key '71B that were common to the two forms. In order to provide some basis for estimating the validity that might be expected when all acceptable items in one form are used, Table 5 summarizes the pertinent data for Keys A and B.

TABLE 5

Percent of Cadets in Each Interval on Strong Vocational Interest
Blank Graduation Keys '71B Who Were in Each Retention
Status Group Four Years Later

Graduation Key (X) SVIB Score	Key '71A Development Group Class of 1971 (Y) Status				Key '71B Development Group Class of 1971 (Y) Status			
	f	(1)	(2)	(3)	f	(1)	(2)	(3)
		% Grad.	% Möt. Resig.	% Other Sep.		% Grad.	% Möt. Resig.	% Other Sep.
M + 1.5 SD & Higher	43	93	2	5	42	98	0	2
M + 1.0 SD to M + 1.5 SD	106	87	3	10	95	86	4	9
M + 0.5 SD to M + 1.0 SD	134	84	7	10	161	80	5	15
M to M + 0.5 SD	145	73	11	16	126	78	13	10
M - 0.5 SD to M	167	72	17	11	171	71	16	13
M - 1.0 SD to M - 0.5 SD	110	58	27	15	119	56	29	15
M - 1.5 SD to M - 1.0 SD	63	49	33	18	68	54	37	9
M - 2 SD to M - 1.5 SD	60	42	52	7	42	38	45	17
(Below M - 1.5 SD)	(82)	(40)	(51)	(9)	(68)	(34)	(53)	(13)
Below M - 2.0 SD	22	36	50	14	26	27	65	8
Total f's	850	599	150	101	850	599	150	101
Total Corrsp. %'s	100	70	18	12	100	70	18	12
Mean SVIB	14.04	16.81	3.86	9.23	7.02	7.66	-0.15	5.78
SD	13.33	12.51	12.13	12.25	7.54	6.98	6.95	6.71
r_{xy} pt. bis.			.38				.41	
Eta y/x			.40				.43	

*Based on the items in SVIB Form T399 selected for Keys A and B respectively. (For characteristics of these keys see Appendixes A and B.)

Comparisons with Tables 1, 2, and 3 show that the longer scale A is slightly more valid and discriminating especially at the upper and lower portions of the distribution, than shorter Key C, whose items came from it. Likewise, longer Key B was more effective than its constituent but shorter Key D. Clearly, the obtained data for Keys C, D, and E on the Class of 1968 underestimate the effectiveness with which complete keys for all items in a form can be expected to function in predicting graduation from entering cadets' SVIB responses.

Attention is warranted to the evidence that shows the graduation keys are not merely measures of the extent to which a cadet's pattern of interests are similiar to those of Officers with high efficiency ratings. This fact is germane since response keying avoided conflicts with the regular SVIB Army Officer item Key. Of the 399 items in Form T-399, 17.2% are on the SVIB Army Officer occupational key. Of the 81 items in basic special Graduation Key '71A, 13.6% are on the Army Officer Key. Obviously there is no tendency for the two to be identical.

e. Graduation Keys '71 F, G, and H.

A recent revision of the SVIB, Form T-325, has reduced the number of items, combined the more useful items from the men's form and the women's form, and produced a more current test. In order to provide for use of the latest and coeducational form in future research on the SVIB, the items in Graduation Keys '71 A, B, and E that were common to Form T-399 and T-325 were identified and constitute Keys F, G, and H. The Class of 1971 data for these keys are summarized in Table 6. The 54 item Key F and the 30 item Key G discriminated between Class of 1971 cadets who later graduated and those who became motivational resignees about the same as did respectively corresponding Keys '71C and '71D. When cross-validated on a future group, it appears that Key '71H may be even more effective than Key '71E was in the Class of 1971.

TABLE 6

PERCENT OF CADETS IN EACH INTERVAL ON SVIB GRADUATION KEYS '71F, '71G, AND '71H IN EACH RETENTION STATUS GROUP FOUR YEARS LATER (All data based on the key development group, Class of 1971)

Graduation Key SVIB Score (x) SD's from mean	Grad Key '71F				Grad Key '71G				Grad Key '71H							
	f	% Grad	% Mot. Resig.	% Other	f	% Grad	% Mot. Resig.	% Other	f	% Grad	% Mot. Resig.	% Other	f	% Grad	% Mot. Resig.	% Other
+1.5 SD & Higher	46	87	2	11	40	90	0	10	45	87	4	9				
+1.0 to +1.5	95	85	8	6	83	89	5	6	84	88	4	8				
+0.5 to 1.0	153	84	6	9	167	83	7	10	154	78	11	10				
M to 0.5	152	67	16	17	186	71	16	13	184	73	12	14				
-0.5 to M	161	74	15	10	153	69	16	15	134	69	17	13				
-1.0 to -0.5	94	57	30	13	70	58	24	17	110	68	24	8				
-1.5 to -1.0	68	59	24	18	73	52	37	11	64	48	36	16				
-2.0 to -1.5	55	38	53	9	45	47	42	11	48	33	54	12				
(Below -1.5)	(82)	(41)	(48)	(11)	(79)	(43)	(47)	(10)	(76)	(42)	(45)	(13)				
Below 2.0	27	48	37	15	34	38	53	9	28	57	28	14				
Total: f's	851	600	150	101	851	600	150	101	851	600	150	101				
Corrsp. %'s	100	70.5	17.6	11.9	100	70.5	17.6	11.9	100	70.5	17.6	11.9				
SVIB: Mean	12.40	14.26	5.86	11.01	6.80	7.89	2.84	6.48	12.91	14.47	7.21	12.11				
SD	10.16	9.56	9.85	9.85	5.72	5.32	5.63	5.45	9.17	8.65	9.01	9.00				
r _{xy}			.33				.35				.32					
Eta y/x			.36				.37				.36					
Nonlinearity p			.05				N.S.				.002					

5. GENERAL COMMENTS:

Even with the limitations imposed by cross validation only of items common to the two forms, the SVIB has clearly demonstrated significant utility in identifying entering cadets who are either extremely likely or unlikely to graduate from USMA. Its utility in the middle probability ranges requires further investigation. The correlations of all the keys with Graduation versus Motivational Resignation are highly significant statistically (all p's <.001) but they are not now of sufficient magnitude to warrant the use of the SVIB Graduation Key alone as a general predictor of Graduation-Attrition or of non-resignation. However the very low correlation usually found between interest measures and the other promising retention predictors currently being investigated (Military Association Scale, Eysenck Personality Inventory, Rokeach Value Scales and limited demographic characteristics) indicates that the SVIB probably will contribute significantly to a composite predictor of retention. Even without the findings reported herein, the previously mentioned research at the USCGA and the USNA would make the above a tenable hypothesis.

However a caveat is appropriate here. These data were obtained from new cadets shortly after entering. Individuals might tend to respond differently as candidates and as new cadets to at least some of the keyed items --notwithstanding the fact that when taking the SVIB as candidates for a position at Minnesota Mining Corporation and when taking it after employment, applicants' scale scores were not significantly different (Campbell, 1971 p. 17). The Naval research did find a significant loss in the validity of their USNA retention key (developed on early resignees from responses to SVIB just after reporting) when applied to candidate populations.

Marron (1972) found that a valid cadet-based Military Attitude Scale Key lost most of its validity when applied to attitude scales completed by candidates. Logically also a key to identify the patterns of interests distinguishing attrition prone candidates from graduation prone candidates if developed from candidates' responses should discriminate between the two groups of candidates more validly than would such a key developed from cadets' responses. That candidates seeking admission to West Point would, at least unconsciously, tend to respond differently to some of the questions than they would if taking it as cadets is considered to be highly probable. All the considerations discussed in this section argue strongly that the newest form of the SVIB (T-325) be given to candidates before notification of acceptance, that Graduation Keys '71F, G, and H be cross validated on those who become cadets, and that a candidate based key be developed for the new form and cross validated. By also giving the SVIB Form T-325 to the same class during new cadet training the magnitude and significance of any tendency to respond differently to some items as candidates and as cadets could also be determined.

In fact a reliable measure of the magnitude of a candidate's tendency to distort his responses might even serve as a valid measure of another characteristic warranting consideration when evaluating him. Such a key might be developed by comparing responses made as candidates and as cadets. Such a key might also provide a moderator variable to increase the validity of the Graduation Key and any others (such as a Leadership Key) that are developed and found to be useful predictors of success at USMA.

6. CONCLUSION and RECOMMENDATIONS:

The evidence that a special SVIB key can be useful in identifying the attrition prone is sufficient to warrant continued research and development.

It is recommended that the SVIB be administered to the candidates to the Class of 1980 and that research and development on the utility of special keys to predict success at USMA continue.

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APPENDIX A

Summary considerations in selecting items and responses to be keyed.

ITEM SELECTION:

1. Magnitude and statistical significance of differences between % of each criterion group that made a given response (i.e. % of retained cadets minus % of motivational resignees who made that response to that question).
2. Level of significance of linear and nonlinear correlations of item's three responses first with retention-motivational resignation and second with retention-motivational resignation-other resignation-other separation ("p" values corresponding to F's).
3. Consistency of statistical characteristics and trends for different groups and levels (40, 10, different status groups).
4. Logical consistency in terms of known significant differences in characteristics of the status groups and the content of the items.

RESPONSE KEYING:

5. Chi square contribution of each response to a significant chi square for the item.
6. Mean score made on criterion (i.e. % retained) by individuals giving each response to item and level of significance of differences between these means.
7. Consistency between the different status groups.
8. Significant nonlinearity in relationships between score and status.
9. Keying on the regular SVIB successful Army Officer Scale.

APPENDIX B

Characteristics of the Graduation Keys

	'71A	'71B	'71C	'71D	'71E	'71F	'71G	'71H
No. Items Keyed	81	43	66	30	46	54	30	47
No. responses Keyed (Range)	183	94	150	65	109	124	66	109
Maximum Raw Score Possible	85	44	68	29	47	59	31	51
Minimum Raw Score Possible	-98	-50	-82	-36	-62	-65	-35	-58
All Items on Form T-399 (Cl '71)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
All Items on Form M (Cl '68)	No	No	Yes	Yes	Yes	No	No	No
All Items on Form T-325	No	No	No	No	No	Yes	Yes	Yes
Items Meet Acceptable Standards	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Items Meet Very Rigorous Statistical Standards	No	Yes	No	Yes	No	No	Yes	No
All Items Consistent both Statistically and Logically	No	No	No	No	Yes	No	No	Yes
Cl '71 Observations:								
Maximum Raw Score	49	24	42	20	33	36	20	34
Minimum Raw Score	-29	-16	-28	-15	-25	-22	-13	-21
Range	78	40	70	35	58	58	33	55
N	850	850	850	850	850	851	851	851
Mean	14.04	6.02	12.00	4.15	12.57	12.40	6.80	12.91
Standard Deviation	13.33	7.54	11.38	5.70	9.37	10.15	5.71	9.17
Median	14.62	6.48	12.15	4.47	13.31	13.09	7.39	13.55

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