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AN ENLISTED PERFORMANCE PREDICTION MODEL FOR
HULL TECHNICIANS

by

Glen Leverette

December 1983

Thesis Advisor:

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These models predict the future fleet performance of HT personnel as measured by length of service, paygrade achieved, and recommendation for reenlistment. Other results and recommendations regarding implementation and future research are also discussed.

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An Enlisted Performance Prediction Model for
Hull Technicians

by

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Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

The purpose of this study is to determine if the Navy's system of assigning personnel to the Hull Maintenance Technician rating can be enhanced. The technique used is a multivariate model with subjectively defined categories of "success" and "failure" as criterion variables. Biographical data available at the time of enlistment are used as predictor variables. Two independent models were created using available data on personnel entering the Navy in 1976, 1977 and 1978. The models were validated on a random sample drawn from the 1976-1978 data base. Random sample data are not included in the model development.

These models predict the future fleet performance of HT personnel as measured by length of service, paygrade achieved, and recommendation for reenlistment. Other results and recommendations regarding implementation and future research are also discussed.

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I. INTRODUCTION

The objective of this study is to determine if assignment standards for Hull Maintenance Technicians (HT) can be improved using data that was available at the time of enlistment. Studies concerning personnel assignments to ratings have traditionally been validated against training criteria with completion of "A" School as the measure of success for validation. Other studies have been primarily concerned with attrition as the measure of success. This thesis will attempt to improve the assignment process as measured by the performance of HTs in the fleet. It should be noted that this is a duplication of an original criterion developed by Whitaire and Deitchman [Ref. 1]. Further study of enlistment standards in the assignment process has been conducted by Sandel and Gleason [Ref. 2].

The following discussion provides a brief overview of the HT rating.

Hull Maintenance Technicians do the metalwork and carpentry required to keep all types of shipboard structures and surfaces in good condition. They also take care of ship plumbing and ventilation systems, repair ships small boats, and perform firefighting and damage control duties.

Hull Maintenance Technicians repair decks, structures and hulls using such techniques as welding, soft soldering,

riveting and caulking. This involves working with both light and heavy gauge metals including aluminum, stainless steel, sheet brass, sheet copper, steel plates and sheet and corrugated iron. They heat-treat metals to control expansion and contraction and use hot and cold forming techniques. They lay out and fabricate various metal forms and connector pieces such as funnels and elbows; they make flanges, metal patches and metal tubing.

In the area of carpentry, HT's repair wooden structures such as gangways, platforms and gratings; they replace deck coverings and deck treads, and they finish and seal wooden surfaces using stains, paint and other finishing materials.

Steamfitting and plumbing duties include clearing systems blocks, installing, repairing or replacing salt-and fresh-water lines, steam piping, steam traps, fuel piping, flushing systems and gravity drains.

In addition to repairing and servicing ventilation and sprinkling systems, HT's are in charge of the maintenance and storage of portable emergency tools and equipment. They inspect, test and maintain fire stations; they periodically inspect, recharge and weigh portable carbon dioxide and dry chemical fire extinguishers; and they test/operate permanently installed fire control systems. After fires, they operate blower equipment to clear smoke, and other equipment to take up excess water or other extinguishing material. They conduct post-fire checks for gas presence and adequate oxygen supply.

In damage control efforts during and after shipboard emergencies, HT's make repairs to protect against water leaks and to ensure ship stability and moment (balance) in the water.

Hull Maintenance Technicians are assigned to all types of ships and their work assignments take them to all parts of the ship. Ashore, they are assigned to training centers, repair facilities and other sites where their special skills are needed. Much of their work aboard ship is performed in engineering spaces where the temperatures are very warm and the noise level is high.

Hull Maintenance Technicians spend approximately 10-12 years on sea duty during a 20 year enlistment in the Navy. The remaining 8-10 years of the 20 year period in the Navy will be spent on shore duty providing support for fleet units. Navy women in the HT rating generally work at shore facilities in the United States and overseas.

While previous training and experience are not required, HT's need good mechanical aptitude, good general learning ability, and a knowledge of practical arithmetic. They should be self-reliant individuals who can remain calm in emergencies and act quickly under stress. Individuals may qualify for the HT rating through on-the-job experience, personal study, or by attending a service school [Ref. 3].

Considering the increasing costs of the all volunteer force, both in equipment and manpower, in conjunction with

a projected increase in fleet size to 600 ships, there appears to be an obvious need to study and improve assignment techniques and enlistment standards.

Thomason [Ref. 4] found that first term attrition is significantly different among Navy recruits and is a function of initial rating assignment. In light of the reasons previously mentioned this finding indicates that further research and study in the area of assignment procedures and techniques is desirable. Improvement in selection processes and assignment techniques, it is assumed, should result in higher retention, higher state of readiness, lower training costs, and a more capable, experienced Naval force.

II. LITERATURE SEARCH RESULTS

A. SUMMARY OF PREDICTOR VARIABLES

The following is a summary of the studies on enlistment standards and assignment processes that predict the future fleet performance of selected Navy ratings.

Bond [Ref. 5] developed three distinct models as predictors of ET enlistment performance for three different cohorts in the ET rating. Of the nine variables used in the development of the models, months in the delayed entry program, age of individual at the time of entry, and marital status were predictor variables in each model. Number of dependents, a variable in the ETNF and ETAEF cohort models, was also used to predict the performance of the ETN rating in a study conducted by Lurie [Ref. 6]. The models developed by Bond tended to be of more value in assessing chances of failure rather than success in the ET rating.

Snyder and Bergazzi [Ref. 7] in a study of enlistment standards to predict "success" in the Boiler Technician (BT) and Machinist's Mate (MM) (non-nuclear) ratings concluded that for an individual with no preference between either the BT or MM rating, Asvab Aptitude Area Score--Subscale NO and Asvab Aptitude Area Score--Subscale MK were discriminating variables for each rating. Additionally, the difference between these two scores was statistically

significant. They stipulated that a recruiter should closely review the scores of these two Asvab subtests for a recruit who desired either rating, but indicated no preference. For the recruit who wanted to be either a BT or MM, Highest Year of Education Completed and Asvab Aptitude Area Score--Subscale NO were the principal variables that predicted "success" in the BT and MM rating.

Whitmire and Deitchman [Ref. 1] concluded that the results of their study of success and failure predictors for the Aviation Structural Mechanic rating (AM) indicated potential for substantial improvement in the Navy's initial assignment of individuals to the AM rating. Variables used in their AM model were Term of Enlistment (no. of years), Marital Status (1, other, 2, married), Asvab Aptitude Area Score--Subscale GS, Highest Year of Education Completed, Asvab Aptitude Area Score--Subscale NO, Asvab Aptitude Area Score--Subscale AI, Number of Dependents (1, none), Armed Forces Qualification Test Percentile, and Asvab Aptitude Area Score--Subscale MK.

Gleason and Sandel [Ref. 2] in a study of enlistment standards for the Aviation Antisubmarine Warfare Technician (AX) and Aviation Antisubmarine Warfare Operator (AW) found that, in the case of the AX model, only a 4% improvement in selection over the current process was realized. Further, the high false success assignment rate of the AW model did not improve the selection rate for the AW rating. The

conclusion of the study was that the variables used in the study did not improve the Navy's current process of assigning individuals to the AX and AW ratings.

Wardlaw [Ref. 8], in an analysis investigating the selection of recruits entering the Navy for the Operations Specialist rate (OS), found that the variables Marital Status (1, other 2, married), Asvab Aptitude Area Score--Subscale GI, Asvab Aptitude Area Score--Subscale WK, Asvab Aptitude Area Score--Subscale EI, Asvab Aptitude Area Score--Subscale MC, Asvab Aptitude Area Score--Subscale AR, and Highest Year of Education Completed provided cross-validation sample hit rates that exceeded the Navy's selection rates in the development of an OS prediction model. While Wardlaw's definition of success, achieved paygrade E-4 or above in less than four years and recommended for reenlistment, and definition of failure, did not make E-4 and not recommended for reenlistment, are different from those used in this study, the model should provide a reasonable prediction tool for success and a very good prediction model for failure in the OS rating. Wardlaw's model provided a 6.33% and 17.85% improvement in classification rates for success and failure respectively.

In a study of selection standards for the Ships Serviceman, Personnelman, and Aviation Technician ratings, Nesbitt [Ref. 9] developed stepwise regressions on length-of-service criterion which supported the hypothesis that entry age,

educational level, and ability tests would be significant predictors of performance. Validity coefficients were large enough to suggest that the predictor equations were sufficiently powerful to improve selection on the three criteria. Stepwise regression equations were developed for different combinations of variables selected to predict "goodguy" and "badguy" performance for whites and blacks in each of the ratings. Nesbitt's study did not provide a general classification model for each of the ratings, which would have resulted from the use of discriminant analysis in the research.

A summary of the predictor variables used in these studies is provided in Table I. All of the variables used indicate that the personal and background attributes of individuals are crucial factors in the assignment process. It is felt that the results of this study may provide improved information to Navy recruiters regarding the type of individuals they should recruit to fill billet requirements in the HT rating.

B. DEFINITION OF CRITERION VARIABLES

Based upon these and other research efforts this study defines "success" as:

1. Completed 3.9 years of the initial term of enlistment,
2. Achieved paygrade E-4, and
3. Recommended for reenlistment.

Category 1 in the various tables and matrices presented denotes the "success" category.

"Failure" is achieved in this study if either of the following measures are met:

1. Failed to complete an enlistment,
2. Failed to be recommended for reenlistment,
3. Failed to achieve paygrade E-4.

Category 2 in the various tables and matrices denotes the "failure" category.

These two categories, "success" and "failure", while defined in such a manner to facilitate use by recruiters as measures of actual fleet performance, are mutually exclusive but do not account for all of the Hull Maintenance Technicians in the data set. Tables II and VIII show the frequency distributions of individual membership in the two categories.

173 individuals were excluded from analysis of those individuals initially assigned to the HT rating and 225 individuals were excluded from analysis of those who were subsequently assigned to the HT rating. These individuals were not included in the study because they fell into a "grey area" between the two criterion categories. The "grey area" is composed of individuals who only attained paygrade E3 or less, but had been recommended for reenlistment in the Naval Service. Attainment of paygrade E3 during the first 3.9 years of the initial term of enlistment is not considered adequate justification for classification in the

failure category. However, these personnel did not represent the type of individual performance this study attempts to predict. Further, some individuals in the "grey area", may be categorized as "system failures" in that their inability to completely satisfy "success" criteria could be attributable to Navy promotion policies for the HT rating, rather than individual failure.

Further explanation of the success definition is required. Completion of three years, nine months of service was selected as a measure of success in order to allow all personnel in the data base to qualify for eligibility in the success category. This was necessary because the data were updated only as recently as October 1982, which would exclude some 1978 entrants from meeting all three measures of success. This could result in a number of successful personnel being classified as failures. However, some failures could also have been classified as successes. Secondary analysis suggested that after changing from completion of three years, nine months of service to completion of four years, as a measure of success, 765 observations that were originally classified as successful dropped to the failure category. Consequently, 12.5% of the 6077 observations in the data base would have been classified as failures using completion of four years of service as a measure of success. Therefore, in order to facilitate inclusions of the 1978 cohort in the analysis,

with an opportunity to qualify for eligibility in the successful category, three years nine months was substituted in place of a four year enlistment without appreciable loss of prediction accuracy.

III. STATISTICAL TECHNIQUES

The following is a brief description of the statistical procedures used and how they were applied in this analysis.

1. Frequency analysis: Frequency distributions give a count of how frequently each value of the variables occurs among the data sets. In this study frequency analysis was performed to provide the counts of "success" and "failure" as well as the counts for each predictor variable used in the models. Results are contained in Tables II through VII for those individuals who began their enlistment as HT's and Tables VIII through XII for those individuals subsequently assigned to the rating.
2. Multivariate Correlation Analysis. Through the use of this procedure the relationships between the variables have been studied. Causal interpretation can not be made safely but as a descriptive tool, correlation analysis has potential for predicting values on one variable given information on another variable. A summary measure that communicates the extent of positive linear relationship or correlation of a set of predictor variables with a criterion variable is called a multiple correlation coefficient, denoted by "R".

3. **Stepwise Discriminant Analysis.** Given a set of predictor variables it is not necessary to utilize every one in the determination of a multiple R^2 . So one begins by selecting the one predictor variable that correlates most highly with the criterion variable and then introduces as a second predictor variable, the one that accounts for the most of the residual variance in the criterion variable. Variables are continually added until inclusion of another predictor variable would account for only an insignificant amount of variance in the criterion variable.
4. **Discriminant Analysis.** Discriminant analysis is a procedure for identifying whether quantitative values on various predictor variables are related to values of a categorical variable. The results present a tabulation of the object's actual group membership versus their predicted group membership. In order to predict membership of each individual in one of the criterion groups, discriminant analysis develops a model using the predictor variables shown to have high correlation with the criterion variables. This is accomplished by development of a cut-off score which is the weighted sum of the predictor values. Probability of group membership is assigned based on the sum of these weighted values. Individuals' are assigned to the group for which their observations have the highest probability.

Discriminant analysis uses a prior probability of group membership when assigning predicted group membership. Discriminant Analysis offers the option of assigning either actual or equal values to the prior probabilities of membership in the criterion categories. Actual probability is based on the frequency distributions in the sample. Prior knowledge of group membership increases the chance of the discriminant analysis procedure correctly assigning individuals into categories based on new predictor variables. This study uses the actual proportions of success and failure of the sample groups. This is felt to be appropriate since the objective of this thesis is to improve on the current selection process. It is understood that all individuals in the study have been screened and were selected based on their meeting the eligibility requirements of the HT rating.

IV. MODELS

Two separate models were created for those individuals assigned to the HT ratings. A general discussion of model development for both models will be given followed by a separate discussion of each model.

Each data base for the HT rating was separated through a random sample process into two subsets. Deriv8 and Valid8. For each model Deriv8 was used strictly for analysis purposes and Valid8 was used for validation.

A frequency analysis of group membership in the success and failure categories was conducted on both data bases to determine the accuracy of the Navy's current assignment process. The success rate for those initially assigned as HT's was 60.8% and for those who were subsequently assigned to the HT rating, the success rate was 70.9%. Considering these percentages, the models developed in this study would have to have higher success rates if they are to be included in an improved assignment process.

In computing the actual models two basic statistical procedures, stepwise discriminant and discriminant analyses were used.

A. MODEL 1

The stepwise discriminant analysis identified five variables that best explained the differences between the

success and failure categories; Screen, Entry Pay Grade (E00--O11) AFQT Percentile, Standardized Asvab Aptitude Area Score--Subscale NO, and Standardized Asvab Aptitude Area Score--Subscale MC. Of the five variables, Screen had the highest r^2 : .0327, that is it explained 3.27% of the difference between the two categories. See Table XIII.

Correlations between the five predictor variables selected by the stepwise discriminant analysis procedure were sufficiently low to eliminate multicollinearity as an issue in the study. It is also considered noteworthy that while previous studies on enlistment standards used raw Asvab Subtest scores, in this study, Asvab Subtest scores were recoded to facilitate use of standardized Asvab Subtest scores which are currently used in the Navy's assignment process. The recode procedure would permit the models developed in this study to be used in the recruiting command without the requirement to standardize raw Asvab test scores.

Using prior probabilities of 61% and 39%, for category 1 and category 2 respectively, a discriminant analysis was run using the five predictor variables identified in the stepwise discriminant analysis. The results of the discriminant analysis are shown in Table XIV. The positions shown in the discriminant matrix are as follows:

1. (1,1) The number and percentage of successful individuals correctly assigned to the successful category. "True Positives"

2. (1,2) The number and percentage of individuals assigned to the unsuccessful category who were actual successes. "False Negatives"
3. (2,1) The number and percentage of unsuccessful individuals incorrectly classified as successful. "False Positives"
4. (2,2) The number and percentage of failures correctly classified. "True Negatives"

The predictive ability of the model is described by its "hit rate". The total "Hit Rate" is the percentage of correct classifications divided by the total number of classifications made. The analysis produced a hit rate of 66.9% for the model derivation run and 65.4% for the validation run.

The results show that the model would correctly assign 6.1% more individuals to the HT rating than the Navy's current assignment process. Although a 6.1% increase in the number of individuals that were correctly assigned to the success category is considered to be an improvement, the relatively small percentage of unsuccessful individuals that were incorrectly classified as successful also tended to add credibility to the model.

B. MODEL 2

Seventeen variables were initially selected for inclusion in the stepwise discriminant analysis for Model 2. Four variables: Screen Score, AFQT Percentile, Entry Paygrade

(E00--011), and Race were identified as the predictor variables. Since the primary objective of this study is to select variables that can realistically be used in the assignment process to predict future fleet performance, it is the opinion of the author that in assigning individuals to the HT rating (or any Navy rating), using race as a selection criterion is inappropriate. There are substantial social, moral, legal, and political issues that could result from attempts by the Navy to attain certain racial balances within a rating based upon the higher probability of success in the rating of a particular ethnic or racial group. Therefore, race was deleted from the analysis and a subsequent stepwise discriminant analysis selected Screen Score, AFQT Percentile, Standardized Asvab Aptitude Area Score--Subscale SI, and Entry Paygrade (E00--011) as the predictor variables for Model 2. Multicollinearity was not an issue because the between variable sample correlations were not sufficiently high. A stepwise selection summary is shown in Table XV.

Model 2 produced a hit rate of 71.2% for the model and 71.7% for the validation run which, considering the Navy's success rate of 70.9%, indicated only negligible improvement. However, this model, in both the model and validation runs, failed to correctly classify any individuals who were unsuccessful (see Table XVI).

In view of the fact that both the Navy's success rate and the hit rate for Model 2 were approximately 10% higher

than the success rate for Model 1 and the inability of Model 2 to correctly classify failure, additional analyses of group 2 membership was performed. A frequency distribution of the variable Rcpgsct (recruit program/school rate), which identifies the occupation rate in which an enlistment is made (Table XVII) showed that of the 3081 individuals who were not assigned to the HT rating at enlistment, recruit program school rate codes were not reported for 1910 cases and 30 cases were assigned missing values. Individuals were assigned to the HT rating from a variety of source ratings. Further, 28.5% of these individuals enlisted and were assigned the occupational speciality code "OR" (mechanical specialities; fabrication). Acceptance of this occupation specialty implies motivational interest in the HT rating.

As a result of the large number of individuals (1910) for whom recruit program/school rate codes were not reported and the lack of data on individuals who may have met the criterion for success (as defined in this study) prior to being assigned to the HT rating, it is likely that the inability of model 2 to classify failures correctly may be attributed to data distortion. That is, the probability of being classified as successful may be artificially high as a result of those individuals subsequently assigned to the HT rating who met the success criterion of this study in their "old" rating.

Additional discriminant analyses were run using different values for prior probabilities instead of the .71 and .29

probabilities of success and failure attained from the sample data. The results of Table XVIII show that by using probability combinations of .50 and .50, .60 and .40, .61 and .39 (prior probabilities used in Model 1), .65 and .35, and .70 and .30, a positive relationship can be shown to exist between prior probabilities of success and failure and the ability of the model to correctly classify individuals in these two categories. That is, the higher the prior probability an individual has of being successful, the propensity of the model to classify that individual in the successful category also increases. Therefore, because of possible data bias, deemed attributable to the result of those individuals subsequently assigned to the HT rating who may have met the success criterion of this study before assignment to the rating, the predictive power of Model 2 is questionable.

While Model 2 was unable to correctly predict failure of those individuals who were not initially assigned to the HT rating, the differential that exists between the Navy's actual success rates within the rating substantiate the two model approach used in this study.

V. CONCLUSIONS

The results of both models indicate that improvement can be made over the Navy's current assignment process for Ht's. For those individuals assigned to the HT rating at the beginning of their enlistment, Model 1 offers measurable improvement (6.1%) in the ability of Navy recruiters to predict the success or failure, as defined in this study, of individuals prior to their assignment to the HT rating.

Because Model 2 offered only negligible improvement to the current assignment process, its use as a selection process alternative is not deemed feasible. In order for an enlistment standards model to be considered in the assignment process, it must not only be able to predict success, but failure also. The inability of Model 2 to correctly classify failure for those who were not assigned to the HT rating at the beginning of their enlistment severely limits its use as a predictive instrument.

Given the relatively high percentages of individuals correctly classified as successful in Model 2 and the Navy's high success rate for individuals who were not initially assigned to the HT rating, the 10% differential that exists between the actual Navy success rates for both groups is best explained by the assumption that some of the individuals who were subsequently assigned to the HT rating may have

been successful in their source ratings which would tend to artificially inflate the Navy's actual HT success rate.

Given that 51.4% of the HT's in this study did not begin their enlistment in the HT rating, a careful review of the assignment procedures for individuals who are not assigned to the HT rating at the time of enlistment could be made to determine what selection criteria are being used and the extent of their applicability to the initial assignment process.

Considering the definitions of success and failure used in this study and the data available at the time of enlistment, the Navy is adequately screening individuals for the HT rating. However, use of the variables provided in Model 1 would enhance the assignment process for those individuals who were selected to begin their enlistment in the HT rating.

APPENDIX A

TABLES

TABLE I

Summary of Predictor Variables

Author(s)	Rating(s)	Variables
Bond	ET	Months in Delayed Entry Program, Number of Dependents, Age of Individual at time of Entry, Waiver Required, Asvab Aptitude Area Score Subscales AI, NO, EI, and MK, Marital Status
Snyder and Bergazzi	BT	Highest year of Education Completed, Asvab Aptitude Area Score-- Subscales WK, MK, GI, AR, and NO, Age of Individual at time of Entry
	MM	Highest Year of Education Completed, Age of Individual at time of Entry, Asvab Aptitude Area Score--Subscales GI, NO, WK, and MI
Whitmire and Deitchman	AM	Term of Enlistment, Marital Status, Highest Year of Education Completed, Number of Dependents, AFQT Percentile, Asvab Aptitude Area Score--Subscales NO, AI, GS, and MK
Gleason and Sandel	AX	Screen Score, Entry Paygrade, Asvab Aptitude Area Score--Subscales GI, and NO
	AW	Screen Score, Entry Paygrade, Asvab Aptitude Area Score--Subscales AR, and MK
Wardlaw	OS	Marital Status, Highest Year of Education Completed, Asvab Aptitude Area Score--Subscales GI, MK, EI, MC, AR, and MK

TABLE II
Frequency Distribution of Initial HT's

C1	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
1	173			
2	1664	1664	60.863	60.863
	1070	2734	39.137	100.000

TABLE III
Screen Scores

SCREEN	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
57	188	2	0.074	0.074
59	2	3	0.037	0.110
62	3	5	0.074	0.184
63	3	8	0.110	0.294
66	14	22	0.515	0.809
68	16	38	0.588	1.398
70	49	87	1.802	3.200
71	10	97	0.368	3.568
72	84	181	3.089	6.657
73	11	192	0.037	6.694
74	7	199	0.648	7.342
75	22	221	0.074	7.416
76	4	225	1.508	8.923
77	73	298	2.685	11.608
78	85	383	3.126	14.734
79	190	573	6.988	21.722
80	17	590	0.625	22.347
81	43	633	1.581	23.929
82	118	751	4.340	28.268
83	29	780	1.702	29.971
84	12	792	0.597	30.568
86	32	824	1.177	31.745
87	20	844	0.503	32.248
88	59	903	2.199	34.447
89	63	966	2.317	36.764
90	66	1032	2.713	39.477
91	66	1098	2.221	41.698
92	1	1100	0.044	41.742
93	9	1109	0.331	42.073
94	9	1118	0.331	42.404
95	1	1119	0.074	42.478
96	1	1120	0.052	42.530
	3	1123	0.110	42.640

TABLE IV
Entry Pay Grade (E00--011)

ENTRPAIG	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
1	2320	2320	79.807	79.807
2	315	2635	10.836	90.643
3	272	2907	9.322	100.000

TABLE V
AFQT Percentile (or equivalent)

AFQTPCNT	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0	23	23	0.791	0.791
1	11	24	0.034	0.826
1	11	25	0.034	0.860
1	11	26	0.034	0.894
1	14	29	0.103	0.998
1	15	33	0.069	0.066
1	16	33	0.069	0.135
1	17	37	0.138	0.127
1	18	47	0.344	0.617
1	19	62	0.516	0.933
2	23	85	0.791	0.924
2	23	119	0.170	0.099
2	25	144	0.860	0.995
2	25	144	0.034	0.888
2	27	190	0.548	0.536
2	29	233	0.655	0.187
2	30	241	0.103	0.290
3	6	308	0.300	0.259
3	6	372	0.202	0.797
3	7	446	0.546	0.342
3	7	447	0.034	0.777
3	9	455	0.172	0.549
3	9	554	0.165	0.333
3	9	554	0.069	0.782
3	9	554	0.034	0.811
3	9	646	0.400	0.222
3	9	655	0.277	0.497
3	11	659	0.172	0.669
3	11	777	0.059	0.729
3	11	781	0.138	0.866
3	11	787	0.206	0.733
3	11	904	0.025	0.997
3	11	916	0.411	0.100
3	13	921	0.172	0.682
3	13	1066	0.782	0.464
3	13	1066	0.103	0.567
3	12	1188	0.162	0.729
3	12	1188	0.138	0.867
3	13	1199	0.241	0.108
3	13	1329	0.610	0.717
3	13	1337	0.275	0.992
3	13	1472	0.644	0.636
3	14	1480	0.275	0.912
3	14	1622	0.888	0.865
3	12	1745	0.162	0.028
3	10	1755	0.344	0.372
3	10	1764	0.110	0.681
3	13	1902	0.747	0.428

Table V Continued

67	92	1994	3.165	668
68	45	1998	.1138	688
69	99	2003	.00.00	688
70	44	2102	.03.40	722
71	18	2106	.00.13	722
72	18	2223	.00.05	766
73	97	2223	.00.44	766
74	95	2332	.33.33	800
75	44	2422	.00.26	888
76	71	2427	.13.88	888
77	79	2498	.44.22	888
78	22	2577	.71.88	888
79	22	2579	.00.99	888
80	76	2655	.61.14	888
81	33	2658	.10.33	999
82	63	2721	.16.77	999
83	49	2770	.68.66	999
84	33	2773	.10.33	999
85	32	2805	.10.11	999
86	31	2844	.03.44	999
87	33	2849	.00.77	999
88	22	2882	.44.77	999
89	14	2886	.17.22	999
90	55	2901	.48.22	999
91	55	2907	.17.22	999
92	55	2907	.20.66	999
93	55	2907	0.206	999
94	55	2907	0.206	999
95	55	2907	0.206	999
96	55	2907	0.206	999
97	55	2907	0.206	999
98	55	2907	0.206	999
99	55	2907	0.206	999
100	55	2907	0.206	999

TABLE VI

Sasvab Aptitude Area Score--Subscale NO

SASVABNO	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
20	34	17	0.5	0.5
22	17	11	0.3	0.8
23	1	18	0.0	0.8
24	1	19	0.0	0.8
25	4	23	0.0	0.8
26	1	24	0.0	0.8
27	1	25	0.0	0.8
29	5	30	0.0	0.8
30	5	35	0.0	0.8
31	10	45	0.0	0.8
32	17	62	0.0	0.8
33	20	82	0.0	0.8
34	31	113	0.0	0.8
35	33	146	0.0	0.8
36	34	180	0.0	0.8
37	40	220	0.0	0.8
38	49	269	0.0	0.8
39	56	325	0.0	0.8
40	60	385	0.0	0.8
41	59	444	0.0	0.8
42	91	535	0.0	0.8
43	90	625	0.0	0.8
44	101	726	0.0	0.8
45	113	839	0.0	0.8
46	148	987	0.0	0.8
47	136	1123	0.0	0.8
48	159	1282	0.0	0.8
49	133	1415	0.0	0.8
50	124	1539	0.0	0.8
51	134	1673	0.0	0.8
52	142	1815	0.0	0.8
53	177	1992	0.0	0.8
54	107	2100	0.0	0.8
55	107	2207	0.0	0.8
56	96	2303	0.0	0.8
57	100	2403	0.0	0.8
58	88	2491	0.0	0.8
59	88	2579	0.0	0.8
60	57	2636	0.0	0.8
61	67	2703	0.0	0.8
62	45	2748	0.0	0.8
63	39	2787	0.0	0.8
64	36	2823	0.0	0.8
65	33	2856	0.0	0.8
66	34	2890	0.0	0.8
67	29	2919	0.0	0.8
68	18	2937	0.0	0.8
69	31	2968	0.0	0.8

SASVABMC	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
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[illegible]

TABLE VIII
Frequency Distribution of Subsequent HT's

C1	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
1	225	2025	70.903	70.903
2	831	2856	29.097	100.000

TABLE IX
Screen Score

SCREEN	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
5	1	1	0.0	0.0
6	1	2	0.0	0.0
7	1	3	0.0	0.0
8	1	4	0.0	0.0
9	1	5	0.0	0.0
10	1	6	0.0	0.0
11	1	7	0.0	0.0
12	1	8	0.0	0.0
13	1	9	0.0	0.0
14	1	10	0.0	0.0
15	1	11	0.0	0.0
16	1	12	0.0	0.0
17	1	13	0.0	0.0
18	1	14	0.0	0.0
19	1	15	0.0	0.0
20	1	16	0.0	0.0
21	1	17	0.0	0.0
22	1	18	0.0	0.0
23	1	19	0.0	0.0
24	1	20	0.0	0.0
25	1	21	0.0	0.0
26	1	22	0.0	0.0
27	1	23	0.0	0.0
28	1	24	0.0	0.0
29	1	25	0.0	0.0
30	1	26	0.0	0.0
31	1	27	0.0	0.0
32	1	28	0.0	0.0
33	1	29	0.0	0.0
34	1	30	0.0	0.0
35	1	31	0.0	0.0
36	1	32	0.0	0.0
37	1	33	0.0	0.0
38	1	34	0.0	0.0
39	1	35	0.0	0.0
40	1	36	0.0	0.0
41	1	37	0.0	0.0
42	1	38	0.0	0.0
43	1	39	0.0	0.0
44	1	40	0.0	0.0
45	1	41	0.0	0.0
46	1	42	0.0	0.0
47	1	43	0.0	0.0
48	1	44	0.0	0.0
49	1	45	0.0	0.0
50	1	46	0.0	0.0
51	1	47	0.0	0.0
52	1	48	0.0	0.0
53	1	49	0.0	0.0
54	1	50	0.0	0.0
55	1	51	0.0	0.0
56	1	52	0.0	0.0
57	1	53	0.0	0.0
58	1	54	0.0	0.0
59	1	55	0.0	0.0
60	1	56	0.0	0.0
61	1	57	0.0	0.0
62	1	58	0.0	0.0
63	1	59	0.0	0.0
64	1	60	0.0	0.0
65	1	61	0.0	0.0
66	1	62	0.0	0.0
67	1	63	0.0	0.0
68	1	64	0.0	0.0
69	1	65	0.0	0.0
70	1	66	0.0	0.0
71	1	67	0.0	0.0
72	1	68	0.0	0.0
73	1	69	0.0	0.0
74	1	70	0.0	0.0
75	1	71	0.0	0.0
76	1	72	0.0	0.0
77	1	73	0.0	0.0
78	1	74	0.0	0.0
79	1	75	0.0	0.0
80	1	76	0.0	0.0
81	1	77	0.0	0.0
82	1	78	0.0	0.0
83	1	79	0.0	0.0
84	1	80	0.0	0.0
85	1	81	0.0	0.0
86	1	82	0.0	0.0
87	1	83	0.0	0.0
88	1	84	0.0	0.0
89	1	85	0.0	0.0
90	1	86	0.0	0.0
91	1	87	0.0	0.0
92	1	88	0.0	0.0
93	1	89	0.0	0.0
94	1	90	0.0	0.0
95	1	91	0.0	0.0
96	1	92	0.0	0.0
97	1	93	0.0	0.0
98	1	94	0.0	0.0
99	1	95	0.0	0.0
100	1	96	0.0	0.0

TABLE X
Entry Pay Grade (E00--011)

ENTR PAYG	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0	1	1	8.8	8.8
1	1	2	6.4	15.2
2	1	3	6.4	21.6
3	1	4	6.4	28.0
4	1	5	6.4	34.4
5	1	6	6.4	40.8
6	1	7	6.4	47.2
7	1	8	6.4	53.6
8	1	9	6.4	60.0
9	1	10	6.4	66.4
10	1	11	6.4	72.8
11	1	12	6.4	79.2
12	1	13	6.4	85.6
13	1	14	6.4	92.0
14	1	15	6.4	98.4
15	1	16	6.4	100.0

TABLE XI
AFQT Percentile (or equivalent)

AFQT	PCNT	FREQUENCY	CUM FREQ	PERCENT	CUM	PERCENT
0	33	33	33	1.071	1.071	1.071
1	11	34	34	0.032	1.104	1.104
2	11	35	35	0.032	1.136	1.136
3	11	36	36	0.032	1.168	1.168
4	11	38	38	0.065	1.233	1.233
5	22	41	41	0.098	1.331	1.331
6	11	42	42	0.032	1.363	1.363
7	11	43	43	0.032	1.396	1.396
8	11	44	44	0.032	1.428	1.428
9	11	47	47	0.065	1.493	1.493
10	33	85	85	1.168	2.661	2.661
11	33	118	118	1.168	3.829	3.829
12	33	155	155	1.168	5.000	5.000
13	33	210	210	1.168	6.168	6.168
14	33	265	265	1.168	7.336	7.336
15	33	321	321	1.168	8.504	8.504
16	33	407	407	2.237	10.741	10.741
17	33	492	492	2.237	12.978	12.978
18	33	567	567	2.237	15.215	15.215
19	33	666	666	3.306	18.521	18.521
20	33	771	771	3.306	21.827	21.827
21	33	773	773	0.002	21.829	21.829
22	33	871	871	3.306	25.135	25.135
23	9	966	966	0.002	25.137	25.137
24	10	1071	1071	3.306	28.443	28.443
25	11	1072	1072	0.002	28.445	28.445
26	11	1078	1078	0.006	28.451	28.451
27	12	1203	1203	1.168	29.619	29.619
28	11	1209	1209	0.006	29.625	29.625
29	11	1327	1327	1.168	30.793	30.793
30	11	1329	1329	0.002	30.795	30.795
31	11	1334	1334	0.004	30.799	30.799
32	13	1473	1473	1.168	31.967	31.967
33	11	1480	1480	0.005	31.972	31.972
34	11	1485	1485	0.004	31.976	31.976
35	15	1637	1637	1.168	33.144	33.144
36	15	1646	1646	0.006	33.150	33.150
37	15	1650	1650	0.002	33.152	33.152
38	15	1804	1804	1.168	34.320	34.320
39	12	1812	1812	0.004	34.324	34.324
40	12	1941	1941	1.168	35.492	35.492
41	11	1947	1947	0.003	35.495	35.495
42	11	1955	1955	0.004	35.499	35.499
43	11	2067	2067	1.168	36.667	36.667
44	11	2024	2024	0.006	36.673	36.673
45	10	183	183	0.005	36.678	36.678
46	10	185	185	0.002	36.680	36.680
47	9	228	228	1.168	37.848	37.848
48	4	285	285	0.002	37.850	37.850
49	9	375	375	1.168	39.018	39.018
50	2	377	377	0.002	39.020	39.020
51	10	332	332	1.168	40.188	40.188
52	10	488	488	1.168	41.356	41.356
53	2	487	487	0.002	41.358	41.358
54	2	580	580	0.004	41.362	41.362

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TABLE XII

Sasvab Aptitude Area Score--Subscale SI

SASVABSI	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
20	28	177	5.798	5.798
22	17	180	0.098	5.896
23	3	184	0.131	6.027
25	4	188	0.131	6.158
28	4	199	0.360	6.518
30	11	210	0.360	6.878
32	11	231	0.688	7.566
33	21	265	1.114	8.680
35	34	322	1.867	10.547
37	57	407	2.784	13.331
39	85	513	3.472	16.803
42	106	664	4.946	21.749
44	151	856	6.289	28.038
46	192	1119	8.614	36.652
48	263	1478	11.759	48.411
50	359	1857	12.414	60.825
53	379	2257	13.102	73.927
55	400	2657	14.447	88.374
58	800	2932	9.663	98.037
60	295	3053	3.963	100.000
65	121			

TABLE XIII
Stepwise Discriminant Analysis Summary - Model 1

Step	Variable		Number In	Partial R ²	F Statistic
	Entered	Removed			
1	Screen		1	0.0327	56.381
2	Entrpayg		2	0.0088	14.826
3	Afgtpcht		3	0.0041	6.802
4	Sasvabno		4	0.0013	2.156
5	Sasvabmc		5	0.0013	2.175

TABLE XIV
Discriminant Analysis Results

Model 1 (Data: Work.Deriv8)			
From C1	1	2	Total
.	⁹¹ 81.25	²¹ 18.75	¹¹² 100.00
1	¹⁰³⁹ 93.44	⁷³ 6.56	¹¹¹² 100.00
2	⁴⁹⁶ 81.05	¹¹⁶ 18.95	⁶¹² 100.00
Total Percent	¹⁶²⁶ 88.56	²¹⁰ 11.44	¹⁸³⁶ 100.00
Priors	0.6450	0.3550	
Hit Rate: 66.9%			
(Data: Work.Valid8)			
.	⁴¹ 80.39	¹⁰ 19.61	⁵¹ 100.00
1	⁴⁵⁸ 92.53	³⁷ 7.47	⁴⁹⁵ 100.00
2	²³³ 81.47	⁵³ 18.53	²⁸⁶ 100.00
Total Percent	⁷³² 87.98	¹⁰⁰ 12.02	⁸³² 100.00
Priors	0.6450	0.3550	
Hit Rate: 65.4%			

TABLE IV
Stepwise Discriminant Analysis Summary - Model 2

Step	Variable		Number In	Partial R**2	F Statistic
	Entered	Removed			
1	Screen		1	0.0037	6.853
2	Afqtpcnt		2	0.0084	15.489
3	Sasvabsi		3	0.0014	2.620
4	Entrpayg		4	0.0013	2.464

TABLE XVI
Discriminant Analysis Results

Model 2
(Data: Work.Deriv8)

From	1	2	Total
C1			
.	138 100.00	0 0.00	138 100.00
1	1365 99.85	2 0.15	1367 100.00
2	549 100.00	0 0.00	549 100.00
Total	2052	2	2054
Percent	99.90	0.10	100.00
Priors	0.7135		0.2865

Hit Rate: 71.2%

(Data: Work.Valid8)

.	83 100.00	0 0.00	83 100.00
1	604 100.00	0 0.00	604 100.00
2	238 100.00	0 0.00	238 100.00
Total	925	0	925
Percent	100.00	0.00	100.00
Priors	0.7135	0.2865	

Hit Rate: 71.7%

TABLE XVII
Recruit Program/School Rate

RATING	RCPGSCRT	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
	-	30	1910	62.60	26.60
Q	0200	10	1920	0.33	66.93
U	0250	2	1922	0.06	67.29
M	0300	2	1925	0.06	67.93
S	0350	3	1927	0.06	68.99
E	0400	1	1928	0.03	69.64
S	0450	2	1930	0.06	70.30
T	0500	3	1933	0.09	71.38
T	0550	8	1941	0.26	73.64
G	0600	1	1942	0.03	74.18
M	0601	1	1943	0.03	74.61
G	0602	1	1948	0.03	75.11
M	0604	5	1950	0.06	75.84
T	0800	2	1951	0.03	76.13
T	0801	1	1952	0.03	76.46
T	0810	1	1957	0.03	76.99
T	1000	5	1958	0.06	77.63
R	1002	1	1969	0.03	78.16
T	1500	1	1970	0.03	78.69
T	1611	1	1973	0.03	79.17
A	1622	3	1974	0.03	79.67
O	1644	1	1976	0.03	80.00
R	1655	2	1978	0.06	80.66
T	1700	2	1979	0.03	81.11
T	2000	1	1981	0.03	81.55
N	2000	2	1984	0.06	82.22
S	2200	3	1988	0.09	83.30
K	2490	4	1991	0.13	84.43
S	3700	3	1995	0.09	85.57
M	3800	3	2000	0.13	86.70
E	3900	4	2008	0.22	88.88
R	4000	1	2030	0.07	89.99
B	4100	2	2033	0.09	90.66
E	4200	3	2035	0.06	91.33
H	4600	2	2041	0.06	91.99
I	5300	6	2042	0.19	93.22
C	5410	1	2043	0.03	93.66
E	5700	1	2044	0.03	94.11
S	6180	1	2045	0.03	94.61
V	6200	1	2046	0.03	95.11
A	6206	1	2053	0.22	97.33
D	6300	7	2054	0.03	97.66
A	6400	1	2060	0.19	99.88
T	6500	6	2062	0.06	100.00
W	6700	2	2063	0.03	100.00
A	6704	1			

Table XVII Continued

AE	6800	11	2074	0.361	67.978
AM	6900	12	2076	0.066	68.043
AS	7500	11	2077	0.033	68.076
HM	8000	7	2084	0.229	68.305
DT	8300	2	2086	0.066	68.371
TA	9910	9	2095	0.055	68.666
OB	9911	3	2098	0.066	68.764
DE	9913	1	2099	0.033	68.797
OE	9914	1	2100	0.033	68.830
JK	9919	17	2117	0.033	69.387
ON	9920	11	2128	0.036	69.748
OP	9923	5	2133	0.064	69.912
OR	9925	32	2165	0.049	70.960
OV	9927	3	2168	0.088	71.059
W	9931	87	3040	2.581	99.639
OW	9932	4	3044	0.131	99.771
OZ	9935	3	3047	0.098	99.869
		4	3051	0.131	100.000

NOTE: THE SYMBOL "_" MEANS; CODE NOT REPORTED.

TABLE XVIII
Discriminant Analysis Results

(Variable Prior Probabilities)

PRIOR PROBABILITY OF SUCCESS	FAILURE	MODEL HIT RATE (%)	VALIDATION HIT RATE (%)
.71	.29	70.9	71.7
.70	.30	70.9	71.7
.65	.35	70.7	70.5
.61	.39	68.5	67.3
.60	.40	67.2	65.4
.50	.50	39.8	40.6

APPENDIX B
VARIABLE LABEL DEFINITIONS

ENTRYAGE=Age of Individual at Time of Entry
CHYEC=Highest Year of Education Completed
AFQTPCNT=AFQT Percentile (or equivalent)
ASVABGI=Asvab Aptitude Area Score--Subscale GI
ASVABNO=Asvab Aptitude Area Score--Subscale NO
ASVABAD=Asvab Aptitude Area Score--Subscale AD
ASVABWK=Asvab Aptitude Area Score--Subscale WK
ASVABAR=Asvab Aptitude Area Score--Subscale AR
ASVABSP=Asvab Aptitude Area Score--Subscale SP
ASVABMK=Asvab Aptitude Area Score--Subscale MK
ASVABEI=Asvab Aptitude Area Score--Subscale EI
ASVABMC=Asvab Aptitude Area Score--Subscale MC
ASVABGS=Asvab Aptitude Area Score--Subscale GS
ASVABSI=Asvab Aptitude Area Score--Subscale SI
ASVABAI=Asvab Aptitude Area Score--Subscale AI
TERMENLT=Term of Enlistment (No. of Years)
ENTRPAYG=Entry Pay Grade (E00--O11)
MRTSTAT1=Marital Status (1, Other, 2, Married)
NDPNDT1=Number of Dependents (1, None)
MNTHSDEP=Months in Delayed Entry Program
HYPAYGRD=Highest Pay Grade
SCREEN=Screen Score
DEPEND=Number of Dependents

APPENDIX C
SAS PROGRAM TO CREATE HT FILE

```
//LEVERETT JOB (2720,0171),'LEVERETT',CLASS=K
//*MAIN ORG=NPGVM1.2720P
// EXEC SAS
//SAS.WORK DD SPACE=(CYL,(10,10))
//FILEIN DD UNIT=3400-5,VOL=SER=ENLIST,
// DISP=OLD,DSN=ENLIST.ALL.A7678
//FILEOUT DD UNIT=333v,MSVGP=PUB4B,DISP=(NEW,CATLG,DELETE),
//      DSN=MSS.S2720.NRATEHT,
//      DCB(blksize=6400)
//SYS DD *
/*
//
```

APPENDIX D

SAS PROGRAM TO SCREEN PERSONNEL NOT DESIRABLE FOR ANALYSIS

```
//LEVERETT JOB (2720.0171), 'LEVERETT', CLASS=C
//MAIN ORG=NPGVM1.2720P
// EXEC SAS
//FILEIN DD DISP=SHR,DSN=MSS.S2720.NRATE
//FILEOUT DD UNIT=3330V.MSVGP=PUB4Z, DISP=(NEW,CATLG),
// DSN=MSS.S2720.HTSCREEN,DCB=(BLKSIZE=6400)
//SYSIN DD *
DATA FILEOUT.HTSCREEN;SET FILEIN.NRATEHT
KEEP=0;
IF(ISC3 EQ 32) THEN KEEP=9;
IF(ISC3 EQ 50) THEN KEEP=9;
IF(ISC3 EQ 94) THEN KEEP=9;
IF((ISC3 GE 10) AND (ISC3 LE 16)) THEN KEEP=9;
IF((ISC3 GE 40) AND (ISC3 LE 42)) THEN KEEP=9;
IF(ISC3 EQ 22) THEN KEEP=9;
IF KEEP NE 9;
/*
//
```

APPENDIX B

SAS PROGRAM TO CREATE DATA FILE FOR MODEL 1

```
//LEVERETT JOB (2720,0171), 'LEVERETT', CLASS=A
//MAIN ORG=NPGVM1.2720P
// EXEC SAS
//FILEIN DD DISP=SHR, DSN=MSS.S2720.HTSCREEN
//FILEOUT DD UNIT=3330V, MSVGP=PUB4A, DISP=(NEW,CATLG),
// DSN=MSS.S2720.HTSTART2
//SYSIN DD *
DATA FILEOUT.HTSTART2;
SET FILEIN.HTSCREEN;
IF(RCPGSCRT EQ 4300);
/*
//
```

APPENDIX F
SAS PROGRAM TO CREATE DATA FILE FOR MODEL2

```
//LEVERETT JOB (2720,0171) 'LEVERETT',CLASS=C
//MAIN ORG+NPGVM1.2720P
// EXEC SAS
//FILEIN DD DISP+SHR,DSN=MSS.S2720.HTSCREEN
//FILEOUT DD UNIT=3330VMSVGP=PUB4Z,DISP=(NEW,CATLG),
// DSN=MSS.S2720.HTENDED2,DCB=(BLKSIZE=6400)
//SYSIN DD *
DATA FILEOUT.HTENDED2;SET FILEIN.HTSCREEN:
IF(DMDCRATE EQ 'HT');
IF(RCPGSCRT NE '4300');
/*
//
```

APPENDIX G

SAS PROGRAM FOR STEPWISE DISCRIMINANT ANALYSIS

MODEL 1

```
//LEVERETT JOB (2720,0171), 'SMC 1965', CLASS=C
//*MAIN ORG=NPGVM1.2720P
// EXEC SAS
//FILEIN DD DISP=SHR,DSN=MSS.S2720.HTSTART2
//SYSIN DD *
DATA CORRECT;SET FILEIN.HTSTART2;
      IF HYEC=1 THEN CHYEC=3.5;
      IF HYEC=2 THEN CHYEC=8;
      IF HYEC=3 THEN CHYEC=9;
      IF HYEC=4 THEN CHYEC=10;
      IF HYEC=5 THEN CHYEC=11;
      IF HYEC=6 THEN CHYEC=12;
      IF HYEC=7 THEN CHYEC=13;
      IF HYEC=8 THEN CHYEC=14;
      IF HYEC=9 THEN CHYEC=15;
      IF HYEC=10 THEN CHYEC=16;
      IF HYEC=11 THEN CHYEC=18;
      IF HYEC=12 THEN CHYEC=20;
      IF HYEC=13 THEN CHYEC=11.5;
      HYEC=CHYEC;
IF(RCPGSCRT EQ '4300')
THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD GE 4) AND (LNGTHSRV GE 0309))
THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD GE 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD LT 4) AND (LNGTHSRV GE 0309))
```

```

THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD LT 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=0) AND (HYPAYGRD GE 4) AND (LNGTHSRV GE 0309))
THEN CATEGORY=1;
IF((NOTRCMD=0) AND (HYPAYGRD GE 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=0) AND (HYPAYGRD LT 4) AND (LNGTHSRV GE 0309))
THEN CATEGORY=2;
IF((NOTRCMD=0) AND (HYPAYGRD LT 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF CATEGORY=1 THEN C1=1;
IF CATEGORY=2 THEN C1=.;
IF CATEGORY=3 THEN C1=2;
DATA DERIV8;SET CORRECT;IF DVSMPL01=1;
DATA VALID8;SET CORRECT;IF DVSMPL01=0;
PROC FREQ DATA=CORRECT;TABLES C1;
PROC FREQ DATA=DERIV8;TABLES C1;
PROC FREQ DATA=VALID8;TABLES C1;
PROC STEPDISC DATA=DERIV8 SIMPLE STDMEAN TCORR WCORR; VAR
    SASVABGI SASVABNO SASVABAD SASVABWK SASVABAR SASVABSP SASVABWK
    SASVABEI SASVABMC SASVABGS SASVABSI SASVABAI SCREEN ENTRPAYG
    MRTLDEND AFQTECNT;
CLASS C1;
/*
//

```

APPENDIX H
SAS PROGRAM FOR DISCRIMINANT ANALYSIS

MODEL 1

```
//LEVERET JOB (2720,0171),'LEVERET SMC 1965',CLASS=B
//*MAIN ORG=NPGVM1.2720P
// EXEC SAS
//FILEIN DD DISP=SHR,DSN=MSS.S2720.HTSTART2
//SYSIN DD *
DATA CORRECT; SET FILEIN.HTSTART2;
      IF HYEC=1 THEN CHYEC=3.5;
      IF HYEC=2 THEN CHYEC=8;
      IF HYEC=3 THEN CHYEC=9;
      IF HYEC=4 THEN CHYEC=10;
      IF HYEC=5 THEN CHYEC=11;
      IF HYEC=6 THEN CHYEC=12;
      IF HYEC=7 THEN CHYEC=13;
      IF HYEC=8 THEN CHYEC=14;
      IF HYEC=9 THEN CHYEC=15;
      IF HYEC=10 THEN CHYEC=16;
      IF HYEC=11 THEN CHYEC=18;
      IF HYEC=12 THEN CHYEC=20;
      IF HYEC=13 THEN CHYEC=11.5;
      HYEC=CHYEC;
IF(RCPGSCRT EQ '4300')
THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD GE 4) AND (LNGTHSRV GE 0309))
THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD GE 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD LT 4) AND (LNGTHSRV GE 0309))
```

```

THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD LT 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=0) AND (HYPAYGRD GE 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=0) AND (HYPAYGRD LT 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=0) AND (HYPAYGRD GE 4) AND (LNGTHSRV GE 0309))
THEN CATEGORY=1;
IF((NOTRCMD=0) AND (HYPAYGRD LT 4) AND (LNGTHSRV GE 3039))
THEN CATEGORY=2;
IF CATEGORY=1 THEN C1=1;
IF CATEGORY=2 THEN C1=.;
IF CATEGORY=3 THEN C1=2;
DATA DERIV8;SET CORRECT;IF DVSMPLO1=1;
DATA VALID8;SET CORRECT;IF DVSMPLO1=0;
PROC DISCRIM S POOL=YES DATA=DERIV8 OUT=MODEL;VAR
SCREEN ENTRPAYG AFQTPCNT SASVABNO SASVABMC;
PRIORS 1=.61 2=.39;
CLASS C1;
PROC DISCRIM DATA=MODEL TESTDATA=VALID8;TESTCLASS C1;
/*
//

```

APPENDIX I
SAS PROGRAM FOR STEPWISE DISCRIMINANT ANALYSIS

MODEL 2

```
//LEVERETT JOB (2720,0171), 'SMC 1965', CLASS=C
//*MAIN ORG=NPGVM1.2720P
// EXEC SAS
//FILEIN DD DISP=SHR,DSN=MSS.S2720.HTENDED2
//SYSIN DD *
DATA CORRECT; SET FILEIN.HTENDED2;
      IF HYEC=1 THEN CHYEC=3.5;
      IF HYEC=2 THEN CHYEC=8;
      IF HYEC=3 THEN CHYEC=9;
      IF HYEC=4 THEN CHYEC=10;
      IF HYEC=5 THEN CHYEC=11;
      IF HYEC=6 THEN CHYEC=12;
      IF HYEC=7 THEN CHYEC=13;
      IF HYEC=8 THEN CHYEC=14;
      IF HYEC=9 THEN CHYEC=15;
      IF HYEC=10 THEN CHYEC=16;
      IF HYEC=11 THEN CHYEC=18;
      IF HYEC=12 THEN CHYEC=20;
      IF HYEC=13 THEN CHYEC=11.5;
      HYEC=CHYEC;
IF((DMDCRATE EQ 'HT') AND (RCPGSCRT NE '4300'))
THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD GE 4) AND (LNGTHSRV GE 0309))
THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD GE 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD LT 4) AND (LNGTHSRV GE 0309))
```

```

THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD LT 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=0) AND (HYPAYGRD GE 4) AND (LNGTHSRV GE 0309))
THEN CATEGORY=1;
IF((NOTRCMD=0) AND (HYPAYGRD GE 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=0) AND (HYPAYGRD LT 4) AND (LNGTHSRV GE 0309))
THEN CATEGORY=2;
IF((NOTRCMD=0) AND (HYPAYGRD LT 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF CATEGORY=1 THEN C1=1;
IF CATEGORY=2 THEN C1=.;
IF CATEGORY=3 THEN C1=2;
DATA DERIV8;SET CORRECT;IF DVSMPLO1=1;
DATA VALID8;SET CORRECT;IF DVSMPLO1=0;
PROC FREQ DATA=CORRECT;TABLES C1;
PROC FREQ DATA=DERIV8;TABLES C1;
PROC FREQ DATA=VALID8;TABLES C1;
PROC STEPDISC DATA=DERIV8 SIMPLE STDMEAN TCORR WCORR; VAR
    SASVABGI SASVABNO SASVABAD SASVABWK SASVABAR SASVABSP SASVABWK
    SASVABEI SASVABMC SASVABGS SASVABSI SASVABAI SCREEN ENTRPAYG
    MRTLDPND AFQTPCNT;
CLASS C1;
/*
//

```

APPENDIX J
SAS PROGRAM FOR DISCRIMINANT ANALYSIS

MODEL 2

```
//LEVERET JOB (2720,0171),'IEVERET SMC 1965',CLASS=B
//*MAIN ORG=NPGVM1.2720P
// EXEC SAS
//FILEIN DD DISP=SHR,DSN=MSS.S2720.HTENDED2
//SYSIN DD *
DATA CORRECT; SET FILEIN.HTENDED2;
      IF HYEC=1 THEN CHYEC=3.5;
      IF HYEC=2 THEN CHYEC=8;
      IF HYEC=3 THEN CHYEC=9;
      IF HYEC=4 THEN CHYEC=10;
      IF HYEC=5 THEN CHYEC=11;
      IF HYEC=6 THEN CHYEC=12;
      IF HYEC=7 THEN CHYEC=13;
      IF HYEC=8 THEN CHYEC=14;
      IF HYEC=9 THEN CHYEC=15;
      IF HYEC=10 THEN CHYEC=16;
      IF HYEC=11 THEN CHYEC=18;
      IF HYEC=12 THEN CHYEC=20;
      IF HYEC=13 THEN CHYEC=11.5;
      HYEC=CHYEC;
IF(DMDCRATE EQ 'HT') AND (RCPGSCRT NE '4300'))
THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD GE 4) AND (LNGTHSRV GE 0309))
THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD GE 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD LT 4) AND (LNGTHSRV GE 0309))
```

```

THEN CATEGORY=3;
IF((NOTRCMD=1) AND (HYPAYGRD LT 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=0) AND (HYPAYGRD GE 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=0) AND (HYPAYGRD LT 4) AND (LNGTHSRV LT 0309))
THEN CATEGORY=3;
IF((NOTRCMD=0) AND (HYPAYGRD GE 4) AND (LNGTHSRV GE 0309))
THEN CATEGORY=1;
IF((NOTRCMD=0) AND (HYPAYGRD LT 4) AND (LNGTHSRV GE 0309))
THEN CATEGORY=2;
IF CATEGORY=1 THEN C1=1;
IF CATEGORY=2 THEN C1=. ;
IF CATEGORY=3 THEN C1=2;
DATA DERIV8;SET CORRECT;IF DVSMPL01=1;
DATA VALID8;SET CORRECT;IF DVSMPL01=0;
PROC DISCRIM S POOL=YES DATA=DERIV8 OUT=MODEL;VAR
SCREEN ENTRPAYG AFQTPCNT SASVABSI;
PRIORS 1=.71 2=.29;
CLASS C1;
PROC DISCRIM DATA=MODEL TESTDATA=VALID8;TESTCLASS C1;
/*
//

```

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