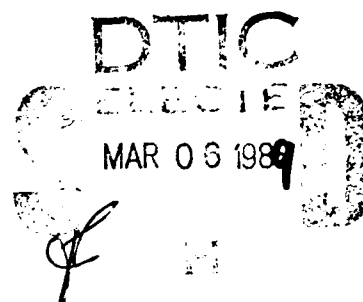


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NAVAL POSTGRADUATE SCHOOL

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THESIS

REENLISTMENT BEHAVIOR OF FIRST AND SECOND
TERM MARINE CORPS ENLISTED PERSONNEL

by

Thomas A. Finn

December 1988

Thesis Advisor:

Stephen L. Mehay

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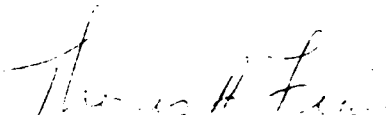
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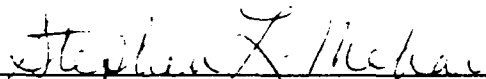
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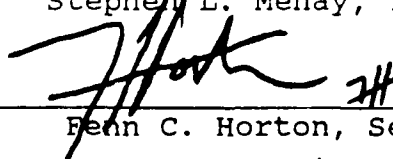


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ABSTRACT

This thesis investigates the reenlistment behavior of first-term and second-term enlisted Marines. The data set consists of Marines who have less than two years remaining on their enlistment contract and is divided into subsets to measure behavior differences between first and second term Marines and also between combat arms and non-combat arms occupational fields. Actual reenlistment behavior combined with survey data from the "1985 Survey of Officer and Enlisted Personnel" are used to measure the importance of individual attitudes towards various aspects of military life on the reenlistment behavior. The analysis is completed by using a logit, maximum-likelihood estimation technique which calculates the probability that a Marine will reenlist given his set of specific characteristics. This thesis also measures the validity of using an individual's stated intention to reenlist as a surrogate for actual reenlistment behavior. The results confirm previous research in this area and identify potential changes in the reenlistment behavior of women.

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I. INTRODUCTION

A. BACKGROUND

1. Why Study Reenlistment Behavior?

During the all volunteer force (AVF) era, the Department of Defense (DOD) has spent a considerable amount of time, money and effort on increasing the reenlistment rates of the various services. The two primary reasons for this are first, that each reenlistment reduces the need to recruit and train new personnel, thus reducing costs. Second, in an increasingly technical military, the loss of highly trained noncommissioned officers (NCO) cannot easily be replaced with new recruits. Therefore, as both cost containment, and quality enhancement, a high reenlistment rate is essential to today's military force.

While the services have met with great success in retaining personnel since about 1981, several factors suggest that it will become increasingly difficult in the years ahead. [Ref. 1:pp. 94-105] These reasons are the "birth dearth" generation which is coming to military age now and the improvement in the economy since the late 70's and early 80's. [Ref. 2] A recent study estimated that during the 1990's there will be about 25 percent fewer nineteen-year-olds than there were in the 1980's. [Ref. 3: p. 3] The improved civilian economy will be in direct

competition for this labor. Since it will be increasingly difficult and costly to attract and retain these men and women, we must know all we can about what motivates them to stay in the service. [Ref. 4:p. 2]

Optimal force mix is another reason to study reenlistment behavior. How much of our forces do we want or need to be career oriented versus first termers? While second tour and beyond personnel are increasingly valuable in many occupations, first tour personnel are adequate and even preferred in some jobs and ranks. If we were to raise the military wage high enough we could fill our ranks with second tour members. Conversely, a low enough wage would keep everyone from reenlisting (assuming there was some inducement to enlist them in the first place). The determination of optimal mix will not be studied in this thesis. This thesis deals with how the Marine Corps can attempt to manipulate pay and benefits as well as living and working conditions to maintain the optimal mix, once its level has been determined.

2. Economic Considerations

The essence of the reenlistment decision is: "Does the present value of military pay and non-pecuniary factors exceed the present value of civilian pay and non-pecuniary factors?" This is an extension of reservation wage theory which states that we

...assume each individual attempts to maximize the value of a utility function with the usual properties whose

arguments are the characteristics of jobs. Then, there is a level of military pecuniary returns--the reservation wage--just sufficient to induce the individual to reenlist. The reservation wage would compensate the individual not only for foregone civilian pecuniary returns, but also for substituting military nonpecuniary characteristics for those in the civilian sector. [Ref. 5:p. 4]

The problem is determining the equivalent monetary value of the various pecuniary and non-pecuniary factors which affect military life. It would be difficult enough to accurately evaluate the monetary alternatives facing a potential reenlistee, but considering the nonmonetary factors makes the problem seem overwhelming. Consider the difficulty in comparing military compensation to civilian compensation. Military pay is composed of base pay and a variety of pays and allowances, some of which are rendered in kind. For example, basic allowance for quarters (BAQ) and variable housing allowance (VHA) are paid if a member is not assigned to government quarters. Can we assume that the combined amounts of BAQ and VHA represent the monetary value of living in family quarters on base? When considering the value of base housing we must remember that it includes utilities, maintenance, a school system, no taxes, a short commute to work, fire protection and security as well as a general support system of neighbors who understand most of your problems. Also the value and availability of base housing varies with the location of each assignment. Other pays and allowances as well as tax advantages and value of

the retirement program further compound the problem of comparing military with civilian pay.

On the nonpecuniary side of the problem we have items such as medical and dental care, regular family separations, personal risk, frequent moves, and undesirable tour locations. Some of these factors are seen as benefits by some people, while others see them as disadvantages. For example, some members may look at unaccompanied overseas tours as a chance to escape family responsibilities for a while. Others see personal risk as an exciting adventure. While still others look forward to moving. Wearing a uniform and being part of a unique organization is another nonpecuniary aspect which can have both negative and positive effects.

Other differences between military service and civilian employment include: formal long-term enlistment contracts, almost exclusively entry-level hiring, using job training as a recruitment incentive, 24-hour-a-day availability, and short notice transfers to remote locations, to name a few.

The reasons why a person enlisted can be the reason he or she gets out. For example, those who enlist for specific training or GI Bill benefits maximize the value of these incentives by using them as soon as possible, i.e., by leaving at the end of the first enlistment.

The problem, then, is how to model and evaluate the many variables which comprise the reenlistment decision for over 30,000 members of the Marine Corps each year. [Ref. 1: pp. 94-97] In order to "market" a military career the Marine Corps must know what factors influence the reenlistment decision. To what extent do pay, job satisfaction and family considerations sway the decision process? Certainly, the Marine Corps can attract adequate numbers of reenlistees merely by increasing pay sufficiently or by paying large enough bonuses, but will they retain the best NCO's by this method, and is it the most cost effective means? Perhaps the higher quality men and women place more emphasis on job satisfaction and quality of life factors. If so, they could possibly be persuaded to reenlist with improvements in these areas at a lower cost than with increases in pay. Logic would indicate that a person whose skills command a higher wage in the civilian economy would not choose, without receiving some other benefits, to remain in the military where one never knows if and when he or she will be called on to make the ultimate sacrifice. Knowledge of the relative importance of pecuniary and non-pecuniary variables in the reenlistment decision is crucial to the decisions of how much money to spend in each area.

This thesis will focus on the non-pecuniary factors influencing the reenlistment behavior of first and second

term Marine Corps enlisted men and women.¹ The impact of these factors will be observed through the use of survey data.

B. RESEARCH QUESTIONS

This thesis answers the following questions.

- What are the effects on reenlistment behavior of a Marine's level of satisfaction with aspects of military life such as pay, job satisfaction, and family environment?
- How do the effects of these and other variables differ among different occupational fields?
- Is intention to reenlist correlated closely enough with actual behavior to allow researchers to use intention to predict actual behavior data?

¹For the sake of brevity, "he" and "him" will be used to refer to Marines of either sex.

II. LITERATURE REVIEW

A. GENERAL

Previous studies of reenlistment behavior can be roughly divided into two categories: those whose primary focus has been on various aspects of pecuniary influences, versus those which try to capture the effects of nonpecuniary variables. Of the studies dealing primarily with pay, those using the annualized cost of leaving approach (ACOL) appear to emerge with general acceptance. Examples of these studies are: "Reenlistment Bonuses and First-Term Retention" by Enns [Ref. 6], "An Empirical Analysis of Pay and Navy Enlisted Retention in the AVF: Preliminary Results" by Warner and Simon [Ref. 7], and "The Effects of Selective Reenlistment Bonuses on Retention" by Cymrot [Ref. 8]. Of the studies which examine nonpay variables three studies are widely quoted: "Models of the First Term Reenlistment Decision" by Chow and Polich (1980) [Ref. 9], "The Influence of Non-Pecuniary Factors on Labor Supply: The Case of Navy Enlisted Personnel" by Warner and Goldberg (1981) [Ref. 10], and "Relating Attitudes Toward Navy Life to Reenlistment Decisions" by Fletcher and Giesler (1981) [Ref. 11]. A comparison of these studies follows.

B. STUDIES FOCUSING ON PECUNIARY INFLUENCES

The ACOL approach theorizes that a person facing the reenlistment decision would incur a reduction in the present value of his expected military earnings over the term of the enlistment if he leaves the service. His earnings include any reenlistment bonus and usually discounts future earnings at 10%, although studies have estimated that personnel less than 25 years old have discount rates as high as 20%. [Ref. 12] These personnel are also assumed to have a preference for civilian life upon which they can, at least subconsciously, place a monetary cost. After comparing the present values of his military and civilian earnings over the term of the future enlistment period, an individual determines whether staying in is monetarily more attractive. He is then assumed to compare the differential between the earnings (the ACOL) to his monetary estimate of his preference for civilian life. If the ACOL exceeds the value of his positive taste for civilian life, he will reenlist; if not, he will leave the service. Implicit in this process is a person's ability to accurately estimate the value of his future military earnings (difficult enough), the value of his potential civilian earnings (considerably more difficult), and the monetary value of his preference for civilian life (assuming that he does, in fact, have a preference for civilian life). Obviously if the value of civilian earnings exceeds the value of military earnings or

a person has a preference for military life, the choice is much simpler. At the first reenlistment point, reenlistment bonuses are very important in increasing the value of military earnings above civilian earnings, especially for those with skills that are readily transferred to civilian life. At second and subsequent reenlistment points, bonuses become less important as personal discount rates decrease and the value of retirement becomes important. The ACOL approach has been used to determine pay elasticities and the effects of alternative retirement systems on retention. Some of the findings follow.

Enns [Ref. 6] examined the effects of bonuses on first term reenlistment. Using 1971-1974 (pre-SRB) data he modelled the reenlistment rate as a function of pay and bonuses while controlling for demographic variables such as race, education level, mental aptitude, dependents and entry age. His estimates of pay elasticities ranged from 2.1 (Army) to 3.4 (Air Force) with the Navy rate at 2.58. He also examined the Army data to estimate the effects of lump sum versus installment bonuses and found that lump sum bonuses had a greater effect.

Warner and Simon [Ref. 7] attempted to determine the effects of pay on both first and second term retention decisions in the Navy. They used AVF-era data and the ACOL model to examine the pay elasticities for 16 occupational groups. They found that pay elasticities ranged from 1.0 to

3.0 with those in "white-collar" ratings having the highest elasticity and those in the more physically demanding ratings having the lowest elasticities. They estimated that a one-level increase in an SRB multiple would raise the reenlistment rate by two to five percent. They also found that the larger the first term bonus, the less likely a person would be to reenlist at the second decision point, where bonuses are smaller. This is due to the fact that some of those who reenlisted at the first decision point did so because the large bonus increased their pay such that it outweighed their preference for civilian life. At the second decision point their taste for civilian life either did not change, or perhaps increased, while the bonus decreased.

Cymrot [Ref. 8] used the ACOL approach to examine the relationship between SRBs and enlisted retention in the Marine Corps from 1979 through 1985. He grouped the Marine Corps' 356 Military Occupational Specialty (MOSs) into 22 skill families based on the assumption that people in similar occupations have similar responses to bonuses. Each skill family was divided into three experience zones corresponding to the SRB zones. His model estimated reenlistment rates in the various skill families and zones across the spectrum of bonus multiples from zero to five. His method predicted reenlistment rates for all possible bonus multiple levels in all skill families, even though

some multiples were never paid in some skill families. This allows planners to predict the effects of unprecedented bonus levels. Other explanatory variables included in the model were unemployment rate, net pay, and pay grade. He found that in zone A (21 months to six years of service), a one percentage point increase in the unemployment rate increases the predicted overall retention rate by 4.4 percentage points. Changes in zones B (six to ten years of service) and C (ten to 14 years of service) were 1.9% and .7% respectively. Net pay was defined as the difference between potential military pay and civilian pay for a one year period. Its effect was generally insignificant due in large part to the problems involved with estimating both military and civilian earnings. Cymrot hypothesized that pay grade captures much of the real variation in military pay. Those of higher pay grades were found to be more likely to reenlist than those of lower grades. This is only logical since pay grade is a measure of past success and future prospects within the Marine Corps.

Cymrot also examined the model the Marine Corps is using to allocate bonus funds. He found that the bivariate approach which considers only reenlistment rate and bonus level is currently being used. He pointed out several instances where the simple bivariate model predicted that increasing the bonus multiplier would decrease reenlistments. This effect was caused, in part, by the use

of the bivariate model and, in part, by not considering the bonus as part of an overall compensation package during a period (FYs 1981 and 1982) when large increases in base pay and allowances occurred.

C. STUDIES FOCUSING ON NONPECUNIARY INFLUENCES

Since it is generally acknowledged that there is more to occupational decisions than just pay, many studies have attempted to measure the effects of these other influences. These effects are usually measured in addition to the compensation effects in order to avoid omitted variable bias in the estimates. Generally, opinion surveys are used to measure the influence of these factors on reenlistment behavior. While this approach generates self-reported data with its inherent bias, it is the only practical method of estimating these effects since these factors do not readily lend themselves to experimentation.

Chow and Polich [Ref. 9] analyzed the reenlistment rates of approximately 4,000 personnel surveyed in the 1976 DOD Personnel Survey. These personnel were all within one year of reenlistment and were from the three "other" services (non Marine Corps). The Marines were not included due to missing data. They estimated the effects of RMC, bonuses, in-kind allowances, and "negative" aspects of the military service environment. They also considered several factors that are less subject to control by the military, including factors relating to civilian employment opportunities, and

individual attitudes toward military service. A unique aspect of their study was that they constructed a measure of RMC and compared it to the individuals' self reported estimates. They were also able to test the relationship between reenlistment intentions and actual behavior.

Their significant findings were:

- Reenlistment intention closely correlates with actual reenlistment. Of those who said they were going to reenlist, 86% actually did, while only 5% of those who said they were not going to reenlist actually did so. Of those who said there was a greater than 90% chance of their reenlisting, 89% actually did reenlist. The correlation rates for the Navy were significantly higher than for the other two services in the study.
- Higher reenlistment rates were found among those who had higher bonus multiples, females and nonwhites, and among personnel with dependents living in government housing.
- Reenlistment rates were lower among those who underestimated the value of their compensation, those who had completed high school or had been to college when they entered the service, those whose test scores indicated high mental ability, and among Air Force personnel.
- Family separation, frequent rotation and unusually long hours of work did not significantly affect reenlistment.
- Pay elasticity was estimated to be 3.9, this means that a ten percent increase in pay would result in a 39 percent increase the reenlistment rate. While even 100% changes in the service environment factors increased the estimated reenlistment rate by less than 5%.
- Changes in policy, such as educational programs or payment in cash of all allowances, including tax advantages, which would increase members' perception of their compensation would increase reenlistment rates by no more that 11%.

Warner and Goldberg [Ref. 10] estimated the relationship between wage elasticity and what they consider to be the major non-pecuniary element influencing reenlistment

decisions of Navy enlisted personnel: sea duty. They used the ACOL model with the additional variables of marital status, length of service (LOS), age, unemployment rate, and a sea duty variable which

...was the proportion of personnel in each individual's rating who were in sea duty in the next four LOS cells following the individual's LOS cell at the time of his decision. This proportion is a proxy for the individual's expected proportion of time spent in sea duty during another term of enlistment.

Their parameter estimate for the sea duty variable had a highly significant, negative effect on reenlistment. However, its maximum effect at the sample mean value was small. A 20% increase in sea duty is estimated to reduce the reenlistment rate by only .016. Warner and Goldberg estimate that this effect can easily be overcome by additional sea pay and bonuses. For example, a 10% increase in sea duty can be overcome by a 2% increase in pay.

Fletcher and Giesler [Ref. 11] examined Navy reenlistment decisions compared to individual satisfaction in three general areas. These areas were pay, quality of job, and quality of military life. Quality of job factors included autonomy, physical work environment, skill utilization, team effort, and relationships with peers, supervisors, and subordinates. Quality of military life factors included deployment time, housing, duty station, medical services, and ship habitability. They found that satisfaction with pay and with job factors are positively related to first term reenlistment, while the quality of

military life factors show a marked positive effect on career reenlistments. They also examined education and mental group and found that these factors are not consistently related to reenlistment probability.

They did not attempt to evaluate the size of the relative effects between satisfaction with pay, quality of job and quality of military life, but only sought to determine which variables that were significant for first and second term reenlistments. On the positive side for cost containment, they hypothesized that the quality of job factors which they report to be more important for first term reenlistment "can usually be improved through effective leadership and personnel management." [Ref 11:p. 10] Their most significant finding was that reenlistment behavior can be better predicted by organizational commitment than by satisfaction with specific job aspects. They conclude by stating that while quality of life elements significantly affect reenlistment, the cost of improving member's satisfaction with these elements remains to be determined.

D. SUMMARY

This chapter has examined studies that have tested theories of reenlistment behavior. While pay has generally been considered the primary factor influencing the reenlistment decision, nonpecuniary factors also have been theorized as having considerable influence. The studies which attempted to measure the effects of these nonpecuniary

factors found that those which were significant had only a minor effect on reenlistment behavior. Even a variable which is almost universally considered to be very important, sea duty, showed only minor effects. Several possible explanations occur, as discussed next.

Enlisted accessions come from a widely varied background with many combinations of educational level, personal values, economic class and motivations for joining. Some join for job training, work experience and educational benefits. Others join out of curiosity, a search for adventure or to "find themselves." When the time comes for the reenlistment decision, these factors combine with the individual's service experiences and a "gut feeling" to stay or leave emerges. A person could be totally satisfied with all aspects of the military, including pay, and still not reenlist because he does not visualize himself making a career of the military. While this could be considered to be just a strong taste for civilian life, this author believes it goes deeper. It could be the desire to do different things or to be consistent with one's original plan to spend four years in the military and then get out.

Incentives such as the GI Bill or specific technical training are worth more the sooner they are used. This is due to the individual having a longer period of time remaining in his life to reap the rewards of the training. This could skew the results when measuring satisfaction with

military life because these individuals could be very satisfied with military life but value the use of their training or benefits more.

The studies measuring nonpecuniary variables looked at a cross section of military members. Cymrot showed that pay has different effects when measured across different skill groupings. It is therefore likely that nonpecuniary variables would show different effects across these same skill groupings.

None of the studies attempted to measure individual attitudes concerning the military's ultimate reason for existence: combat. While they all recognize that military life is different from civilian life, they fail to focus on attitudes towards actual participation in combat. An individual's assessment of this risk factor can be a major factor in his reenlistment decision. It can also be a positive or negative influence. Anecdotal evidence indicates that there are Marines whose primary reason for being in the service is the potential opportunity to experience combat either for the first time or again. The only possible brushing of this area was by Fletcher and Giesler's finding that "reenlistment can be better predicted by organizational commitment than by satisfaction with specific job aspects." Organizational commitment is related to a person's belief in the purpose and goals of the organization. Besides the combat aspect, the military

offers unique opportunities in other areas as well. Cook put it best: "being able to play with some of the world's most expensive and exotic toys...travel...camaraderie...and responsibility...are important." [Ref. 4:p. 11]

Overall the author believes that nonpecuniary variables are more important in individual decisions than previous studies show. The attempts to measure the effects of these variables across the total spectrum of military personnel has diluted the effects. Individuals in more technically skilled occupational fields and/or lower risk occupational fields may have a value non-pecuniary variables differently than those in lesser skilled and/or higher risk occupational fields. By pooling their responses, the extremes may cancel each other out. The following chapters will attempt to measure the varying effects of some of these variables in differing occupational fields.

III. DATA AND METHODOLOGY

A. DATA¹

The data used in this study was the 1985 Department of Defense Survey of Officer and Enlisted Personnel, which surveyed 124,590 military personnel. The survey was conducted by mail during the first half of calendar year 1985. The population from which the survey was drawn consisted of all active-duty officers and enlisted personnel who were on active duty on 30 September 1984, with the exception of new enlisted accessions with fewer than four months of service. The population was stratified by service, length of service, and sex and random samples were drawn from each group. Officers, females, and Marine Corps personnel were sampled at a higher rate in order to permit more detailed analyses of these groups. Since this thesis deals only with Marine enlisted personnel, further references to the survey will deal only with those personnel.

The sample consisted of 20,053 randomly selected enlisted Marines of which 1230 (6.1%) had separated at the time the questionnaire was distributed and did not complete the survey. This biases the data somewhat as those

¹The following section quotes broadly from the Defense Manpower Data Center's 1985 DOD Survey of Officer and Enlisted Personnel User's Manual and Codebook.

remaining in the sample have a greater propensity to stay in the service. However, the size of the sample and further restriction of the data (limiting the sample to those with two years or less remaining on their enlistment) should reduce its effect to near zero. Of the 18,823 samples which were mailed, 13,898 (73.8%) were returned. Even though this is a high response rate for this type of study [Ref. 13:pp. 2-9], it does introduce bias into the data unless it can be determined that the those who did respond still represent a random sample. No such analysis was reported in Reference 13.

The questionnaires were designed to measure attitudes and opinions in two broad areas: first, those specifically concerned with family issues and, second, those concerned with broader issues of personnel management. The final survey consisted of nine sections which collected factual and opinion data on the following subjects: Military Information, Present and Past Locations, Reenlistment/Career Intent, Individual and Family Characteristics, Dependents, Military Compensation, Benefits and Programs, Civilian Labor Force Experience, Family Resources, and Military Life.

For this thesis the survey data was matched by DMDC with information from the Active Duty Military Master and Loss File in order to obtain actual reenlistment behavior. The variable used to determine this behavior was Reenlistment Eligibility. This information enabled the data to be

restricted to those members who had voluntarily separated and were eligible for reenlistment without a waiver, plus those who reenlisted.

The data were further restricted for this thesis to members between two and twelve years of service. Members with greater than 12 years have a retention rate in excess of 90 percent due to the proximity of retirement as well as the self-selection effects at previous reenlistment points. Those with fewer than two years were excluded to eliminate the effects of hastily formed opinions. The sample was also restricted to pay grades E-3 through E-6; those with two years or fewer remaining on their enlistment; and those on their first or second enlistment.

The final sample size was 2838, which was further divided into data sets consisting of those serving their first enlistment and those serving their second enlistment. Each of the enlistment data sets was further divided into two data sets named the Combat Arms data set, and Administrative, Maintenance and Logistics (AML) data set.

The Combat Arms data set consisted of Marines in infantry, artillery and armor occupational fields as well as two fields, communications operations, and motor transport, which have a large portion of their members serving in combat arms units. The AML data set consisted of all other Marines in the survey. Further division of the data sets into combat support and aviation sets was attempted but

resulted in data sets which had too few observations to be useful.

B. METHODOLOGY

This thesis attempts to measure the effects of individual attitudes towards several aspects of military life on the probability that an individual will reenlist. It is an attempt to update the 1980 Chow and Polich study and apply it to the Marine Corps. Changes in critical questions, notably the absence in the 1985 survey of the question referring to the individual's estimate of Regular Military Compensation (RMC), prevented a close approximation of the Chow and Polich study. Therefore, while the general structure of attempting to measure the influence of nonpecuniary variables on reenlistment behavior is similar, the actual variables used are not comparable due to significant changes in the survey's questions. None of the non-pecuniary, survey variables used by Chow and Polich are duplicated in this study. Three demographic variables, FEM, RACE, and COLLEGE are duplicated in this study.

This thesis also measures the validity of using intention to reenlist when studying Marine Corps reenlistment behavior. Chow and Polich did not include Marine Corps data in their study.

1. Independent Variables

a. Opinion Variables

Five variables were used to measure the influence of an individual Marine's attitudes towards various aspects of military life. These variables are discussed below.

(1) PAY. This variable measures a Marine's dissatisfaction with his pay. It is formed from the response to question 0109105E which ranks satisfaction with pay and allowances on a scale from one (very satisfied) to five (very dissatisfied). It is used as a continuous variable. This variable is used rather than actual pay on the theory that relative satisfaction with pay is more important than the actual amount. Evidence of this effect is found in studies by Hulin [Ref. 14:pp. 122-126] and Kraut [Ref. 15:pp. 233-243]. The expected effect of this variable is that the more dissatisfied a Marine with pay and allowances, the more likely he is to leave, ceteris paribus.

(2) CIVJOB. This variable measures a Marine's self reported probability of finding a good civilian job if he were to leave the Marine Corps at the time the survey was answered. It is formed from the response to question 096E92, which ranks the probability of finding a good civilian job from zero in ten (no chance) to ten in ten (certain). It is used as a continuous variable. It is used as an attitudinal proxy for the civilian/military pay

comparison in the ACOL model. Also, those who are more certain of finding a good job may have already investigated their prospects in anticipation of leaving the Marines. The expected effect of this variable is that the more certain a person is that he will find a good civilian job, the more likely he is to leave, ceteris paribus.

(3) EXPECT. This variable measures a Marine's attitude toward how well life in the Marine Corps has met his expectations. It is formed from the response to question O108104A which ranks agreement with the statement: "Life in the military is about what I expected it to be" on a scale from one (strongly agree) to five (strongly disagree). It is used as a continuous variable. It is used on the theory that when a person enlists in the Marine Corps, he has certain pre-conceived expectations about military life. How well or poorly the Marine Corps meets these expectations has a considerable effect on a person's satisfaction with the organization. Royle and Robertson [Ref. 16:p. 27] found satisfaction with the organization as a whole was an important predictor for retention. Also, this variable attempts to measure the effects of Fletcher and Giesler's [Ref. 11:p. 16] finding that quality of military life factors show a marked increased effect on career reenlistments. This variable was used instead of question O110E106 which measured satisfaction with the military as a way of life because O110E106 was found to be

too highly correlated with reenlistment behavior, having almost an identity relationship. The expected effect of this variable is that the more the Marine Corps failed to meet a person's expectations, the more likely he is to leave, ceteris paribus.

(4) FAMENV. This variable measured a Marine's dissatisfaction with the military way of life as it relates to family environment. It is formed from the response to question 0109105F which ranks satisfaction with family environment on a scale from one (very satisfied) to five (very dissatisfied). It is used as a continuous variable. It is included as a summary variable to test Fletcher and Giesler's findings that several factors which affect the family environment impact on retention. [Ref. 11:p. 16] Also, with the high and increasing number of married enlisted Marines it is important to know how much emphasis they put on family environment as a reenlistment consideration. The expected effect of this variable is that the more dissatisfied a Marine is with the military way of life as it relates to family environment, the more likely, he is to leave, ceteris paribus.

(5) JOBSAT. This variable measured a Marine's dissatisfaction with his current job. It was formed from the response to question 0109105J which measured satisfaction on a scale from one (very satisfied) to five (very dissatisfied). It is used as a continuous variable.

Its inclusion attempts to measure Fletcher and Giesler's [Ref. 11:p. 16] finding that satisfaction with job factors are positively related to reenlistment. The expected effect of this variable is that the more dissatisfied a Marine is with his current job, the more likely he is to leave, ceteris paribus.

b. Demographic Variables

Seven demographic variables are included. These are described below.

(1) CHILD. This is used as a continuous variable which measures the effect of each additional child on the probability of reenlistment. The impact of this variable is hypothesized to be ambiguous as one individual may decide to reenlist for the job security when faced with another child to raise, while another individual may get out to seek a better job or family environment.

(2) FEM. FEM is a dummy variable which has the value of one if the Marine is female and zero otherwise. The expected effect of this variable is hypothesized to be ambiguous. Chow and Polich [Ref. 9] found women more likely to reenlist. However, the greater number of women in the armed services today over the time of their study may have caused female behavior to more closely approximate that of men. On the one hand, women would be less likely to leave, ceteris paribus, due to the fact that they get equal pay and equal opportunity in the military without having to serve in

the most arduous and risky occupations. On the other hand, the call to motherhood, coupled with family separations inherent in a Marine Corps career would make some women more likely to leave.

(3) RACE. RACE is a dummy variable which has the value of one if the Marine is black or hispanic, and zero otherwise. The expected effect of this variable is that minorities would be less likely to leave, ceteris paribus, due to the equal pay and equal opportunity afforded by the military.

(4) COLLEGE. COLLEGE is a dummy variable which has a value of one if the Marine has completed one or more years of college, and zero otherwise. The expected effect of this variable is that those Marines with higher education abilities and aspirations will be more likely to leave, ceteris paribus.

(5) MAR. MAR is a dummy variable which has a value of one if the MARine is married, and zero otherwise. The expected effect of this variable is that those Marines who are married will be less likely to leave, ceteris paribus. This may be due to their having a working spouse which will increase the family income or that they may highly value the security that a steady paycheck brings.

(6) RANK. RANK is a continuous variable which has the value of the individual's pay grade (i.e., E-3 = 3). The expected effect of this variable is that the higher an

individual's rank, the less likely he is to leave, ceteris paribus. This variable accounts for the propensity of a person who does well in a job to continue in it. Higher rank is the military's way of telling a person he is doing well.

(7) TIS. TIS is a continuous variable which is formed by adding the total months on active duty at the time the survey was answered to the average months remaining on the current enlistment. (Average months remaining on the current enlistment was calculated by averaging the high and low limits of the answers to question E9, i.e., if the individual answered that he had "3 to 6 months" remaining, 4.5 was added to his months in service.) This calculation approximately equalized the time in service at the reenlistment point for all observations. The expected effect of this variable is that the longer a person serves, the longer he is likely to serve, ceteris paribus. This is due not only to the self selection effect that those who like their job tend to stay in it longer but also that the longer one stays in the military, the higher the present value of retirement becomes.

2. Dependent Variable

The dependent variable, LEAVE, is a dichotomous variable formed from the reenlistment code variable. All observations with codes other than "1A" and zero were deleted so that the sample consisted only of Marines who

were eligible and recommended for immediate reenlistment. This ensured that all those who left the service did so voluntarily. Those with a code of "1A" were assigned a value of one meaning that they did not reenlist. Those with a value of zero as a reenlistment code were given a value of zero meaning that they had reenlisted. Since more than two years had elapsed between completion of the survey and compilation of this data base, every Marine in the sample had made a reenlistment decision. This thesis does not consider extension of enlistment as a separate outcome due to anecdotal evidence that most extensions are effected in order to qualify for a higher bonus, or some other benefit later. Therefore, an extension is considered to be a reenlistment.

The following is a list of the explanatory variables with their hypothesized sign:

- PAY (+),
- CIVJOB (+),
- CHILD (ambiguous),
- FEM (-),
- EXPECT (+),
- FAMENV (+),
- JOBSAT (+),
- RACE (-),
- COLLEGE (+),
- MAR (-),

- RANK (-),
- TIS (-).

3. Analysis Method

The data were analyzed using the SAS LOGIST procedure on the IBM 370 Model 3033 computer at the Naval Postgraduate School. This procedure uses the maximum likelihood method to calculate the probability that an individual observation will exhibit the behavior under examined. The estimating equation is of the following form:

$$\ln [P/(1-P)] = \alpha_0 + \sum \beta_i X_i$$

where

- P = the probability of not reenlisting,
- $\ln [P/(1-P)]$ = the log-odds of not reenlisting,
- X_i = the explanatory variables, and
- β_i = the parameters to be estimated.

The results of estimating the LOGIT model are presented in Chapter IV.

IV. ANALYSIS

A. GENERAL

The segmenting of the data described in Chapter III produced seven data sets which are named: Combined, First Enlistment Combined, First Enlistment Combat Arms, First Enlistment AML, Second Enlistment Combined, Second Enlistment Combat Arms, and Second Enlistment AML. The results of estimating the model for all seven data sets are presented in Tables 1-7. All seven estimates were significant at the .01 level using the likelihood ratio to test goodness of fit. The model chi-squares for each data set are presented in the tables.

The maximum effect of each variable was evaluated by selecting an observation with a calculated probability as close to .5 as possible for each data set. The value of .5 was used as the most likely point where an individual's evaluation of his decision variables will be critical. Values above .5, in this case, will lead to leaving the Marine Corps. Using a spreadsheet and the formula $P_i = 1/(1 + e^{-Z})$ the actual value of each variable for the chosen observation was then increased or decreased by one unit as appropriate and the change in the predicted probability was then observed. Since most of the variables were dummy variables, or had values from one to five (11 in

the case of CIVJOB), and TIS had values ranging from 28.5 to 137, a ten percent change was made in the value of TIS to equalize its effect across its range.

A classification table was calculated for each data set and is printed in Tables 1-7. One method of evaluating how well the model predicts is to calculate how much better it predicts than a model which knows nothing about the individuals and merely classifies them as being in the part of the group with the higher number of members. For example, it can be seen from Table 1 that 57 percent of the observations left the Marine Corps (were true positives). If the model classified everyone in the group as positive, it would be correct 57 percent of the time. This is known as the "naive" method and its value is printed on each classification table. Other methods of evaluating the classification power of the model are:

- Sensitivity--calculates the percentage of true positives which were predicted to be true,
- Specificity--calculates the percentage of true negatives which were predicted to be negative,
- False positive rate--calculates the percentage of predicted positives which were true negatives,
- False negative rate--calculates the percentage of predicted negatives which were true positives.

Using the naive method, the model predicted well on the combined data set, and on the second enlistment data sets. However, it barely exceeded the naive method for the First Enlistment data sets. Also, on the First Enlistment data

sets, the model predicted a very high percentage of Marines would get out who actually stayed. The specificity was only 17 percent for the First Enlistment, Combined data set. For the Second Enlistment data sets, the reverse was true, the model predicted that many more Marines would stay in than did. The probable reason for this disparity was that the model did not control for reenlistment bonuses. The behavior of first term enlisted Marines has been shown to be positively influenced by a bonus. The absence of a bonus for most second term Marines could be responsible for the model's prediction that more Marines would stay than actually did. This is consistent with the finding by Warner and Simon [Ref. 7] that the larger the first term bonus, the less likely a person would be to reenlist at the second decision point.

B. INDEPENDENT VARIABLES

Independent variables are discussed in order of significance from most significant to least significant.¹ Each parameter estimate, when significant, had the hypothesized sign except where noted. A summary of these results are presented in Table 8.

JOBSAT was significant at the one percent level for five of the seven data sets, at the five percent level for one

¹Maximum effects will be reported for some non-significant variables for the sake of comparison. No other importance should be attached to them.

data set and at the ten percent level for the other. Its maximum effect in the Combined data set was five percent. Its highest maximum effect was seven percent in the First Enlistment, Combat Arms group. This means that for every one level increase in dissatisfaction a Marine reported that he is with his job, he is about five percent more likely to leave when his enlistment is over, ceteris paribus.

RACE was also significant at the one percent level for five of the seven data sets, at the five percent level for one and insignificant for one. In the Combined data set it had the highest maximum effect of all the variables at ten percent. That is, the probability that a Marine will reenlist is ten percent higher if he is a minority, ceteris paribus. In the Second Enlistment, Combat Arms data set its maximum effect was 22 percent.

CIVJOB was also significant at the one percent level for five of the data sets, at the five percent level for one, and insignificant for one. Its maximum effect in the Combined data set was three percent. That is, for every ten percent more probable a Marine is of finding a good civilian job, he is three percent more likely to leave, ceteris paribus. Its highest maximum effect in any data set was also three percent in both AML sets.

RANK was significant at the one percent level in four data sets, at the ten percent level in one and insignificant in two. Its maximum effect in the Combined data set was

nine percent. That is, for every rank higher in grade a Marine is, he is nine percent more likely to reenlist, ceteris paribus. The highest maximum effect was in the Second Enlistment, AML data set at 15 percent.

MAR was significant at the one percent level for three data sets and insignificant for the other four. Its maximum effect in the Combined data set was eight percent. That means that a Marine who is married is about eight percent more likely to reenlist than an unmarried Marine, ceteris paribus. The highest maximum effect was in the First Enlistment, AML group at 17 percent.

CHILD was significant at the one percent level for two data sets, at the five percent for one and insignificant for four data sets. Its maximum effect in the combined set was three percent, but it was insignificant in that data set. It was significant in both combat arms sets, at the five percent level for first enlistment and one percent level for second enlistment. While its effect was hypothesized to be ambiguous, in data sets where it was significant, its parameter estimate was negative. In the First Enlistment, Combat Arms data set, a Marine is 12 percent more likely to reenlist for each child he has ceteris paribus.

TIS was significant at the one percent level in one set, at the five percent level in one, at the ten percent level in two and insignificant in three data sets. Its maximum effect in the Combined data set was also its highest maximum

effect at two percent. That is, for every ten percent more months in service a Marine has, he is two percent more likely to reenlist, ceteris paribus.

PAY was significant in three data sets and insignificant in five. Its maximum effect in the Combined data set was two percent. Its highest maximum effect was five percent in the Second Enlistment, Combat Arms data set. That is, for every one level increase in dissatisfaction with pay a Marine is two percent less likely to reenlist, ceteris paribus.

COLLEGE was significant at the one percent level in one data set, at the ten percent level in one, and insignificant in five. Its maximum effect in a data set where it was significant was five percent in the Combined data set. That is, Marines who report completion of at least one year of college are five percent less likely to reenlist, ceteris paribus.

FAMENV was significant at the ten percent level in two data sets. Its maximum effect in the Combined data set was three percent. That is for every one level increase in dissatisfaction with the military as a family environment, a Marine is three percent less likely to reenlist, ceteris paribus.

FEM was significant at the ten percent level in one data set. Its maximum effect was five percent in the Combined data set. That is, women Marines are five percent more

likely to reenlist than men, ceteris paribus. Its effect was hypothesized to be ambiguous and its insignificance tends to support that hypothesis.

EXPECT was significant at the ten percent level in one data set. Its maximum effect in that data set was two percent. That is, for every one level increase in disagreement with the statement "Life in the military is about what I expected it to be," a Marine is two percent more likely to get out, ceteris paribus.

C. DATA SETS

The regression results from the different data sets were compared in order to determine if there were any differences in reenlistment behavior among Marines in the various occupational fields and enlistment groups. This comparison was done in two ways. First, the Combined, AML, and Combat Arms data sets for those at the first reenlistment point were compared to their respective counterparts at the second reenlistment point. This allowed identification of any reenlistment behavior differences between those at the first and second reenlistment points. Second, the AML and Combat Arms groups were compared to each other at each enlistment point. This allowed identification of any reenlistment behavior differences across occupational groups. The significance level selected for these comparisons was the five percent level. The results of these comparisons follow.

1. Combined First Enlistment versus Combined Second Enlistment

PAY, CHILD and RANK were significant at the second reenlistment point but not at the first reenlistment point. First termers reenlist for reasons other than satisfaction with pay. The further along in a career a Marine is, the greater the impact satisfaction with pay has on reenlistment behavior. The increased importance of children on second term reenlistment is probably due to the fact that the average number of children for the first term group was .23 while the average for the second term group was .90 or almost four times as many. The difference in the importance of RANK is probably due to two factors. First, the average rank of the first term group was less than E-4, while the average rank of the second term group was almost E-5. The higher a Marine's rank, the more he has committed himself to the Marine Corps. Second, the longer a Marine serves, the higher rank he must be in order to be eligible to reenlist. E-3's and most E-4's would not be allowed to reenlist at the second reenlistment point. The only variable which was significant for the first termers but not for the second termers was MAR. This effect is probably due to the difference in the number of married Marines in each group, 34 percent at the first reenlistment point and 67 percent at the second reenlistment point. MAR was the variable with the largest maximum effect in the first term while RANK had the largest maximum effect in the second term.

2. AML First Enlistment versus AML Second Enlistment

In this comparison, JOBSAT and RANK were significant for the second termers but not for the first termers, while MAR again was significant for the first termers but not for second termers. MAR again had the largest maximum effect for the first termers while rank had the largest maximum effect for the second termers.

3. Combat Arms First Enlistment versus Combat Arms Second Enlistment

In this comparison, RACE and RANK were significant for the second termers but not for the first termers, while CIVJOB was significant for the first termers but not for the second termers. The variable with the highest maximum effect for the first termers was CHILD, while RACE had the highest maximum effect for the second termers.

4. AML First Enlistment versus Combat Arms First Enlistment

In this comparison, RACE and MAR were significant in AML but not in Combat Arms, while CHILD and JOBSAT were significant in Combat Arms but not in AML. The mean values of each variable were virtually the same in each group. The highest significant maximum effect in the AML group was RACE at 17 percent, while CHILD had the largest significant effect in the Combat Arms group at 12 percent.

5. AML Second Enlistment versus Combat Arms Second Enlistment

CIVJOB was the only variable which was significant in the AML group but not in the Combat Arms group. This is

probably due to the AML group containing all the technical occupations which are much more in demand in the civilian economy than are combat arms trained Marines. The reason this shows up at the second enlistment point but not at the first enlistment point is that first termers in Combat Arms specialties have not yet had a chance to self-select themselves out of that occupational field. At the second reenlistment decision point, those Marines still in Combat Arms do not have many skills which are attractive to the civilian job market. PAY and CHILD are the only variables significant in the Combat Arms group which are not significant in the AML group. The significant variable with the highest maximum effect in the AML group was RANK at 15 percent while in the Combat Arms group it was RACE at 22 percent.

D. REENLISTMENT INTENTION VS. REENLISTMENT BEHAVIOR

This data set provided the opportunity to test the validity of using an individual's reported intention to reenlist as a predictor of reenlistment behavior. Chow and Polich [Ref. 8] tested this relationship for Army, Navy, and Air Force personnel. They reported that an individual's self-reported probability of reenlistment correlated closely with his actual behavior and concluded that, in the absence of actual reenlistment behavior, "survey intentions can be used as accurate predictors of reenlistment behavior...." [Ref. 8:p. 11]. They measured this correlation for those

personnel within one year of their expiration of term of service (ETS).

This thesis tested the correlation between intentions and actual behavior for those within two years of ETS as well as within one year of ETS. The results are shown at Table 9. At first glance, the intention numbers do not seem to correlate highly with actual behavior. Of those who reported that they were certain to reenlist only 74.1 percent of the two year group and 77.8 percent of the one year group actually reenlisted. Of those who reported that there was "no chance" that they would reenlist, 13.3 percent of the two year group and 11.0 percent of the one year group actually reenlisted. Combining these categories shows that in the one year group 68 of 732 Marines or 9.3 percent exhibited behavior completely contrary to their intention. This appears to be too high a percentage of error when we are trying to measure the impact of variables at the five percent level, unless the errant behavior is randomly distributed. To test this possibility, the author reran the logistic regression on the combined data set using a new dependent variable. The new variable was constructed from the intention variable and categorized those who reported their probability of reenlistment as .5 or greater as stayers and those less than .5 as leavers. A comparison of the results of the regressions using the actual and intention dependent variables are shown in Table 10.

The number of stayers and leavers varies by only 55, or less than two percent of the sample population, between the two different methods. This indicates that categorizing individuals by their intentions is highly reliable, even out to two years before their ETS. The parameter estimates are very similar with only three variables, CHILD, EXPECT and FEM, showing large changes in significance. The maximum effects were also very similar with only FEM, EXPECT and RANK changing more than two percent. Changes of two percent or less in maximum effect can be due to rounding. These results indicate that categorizing individuals by their intentions is highly reliable, even out to two years before their ETS.

It is interesting to note that while the reenlistment intentions of women showed no difference from those of men, their actual behavior was significantly different, although only at the eight percent level. Women were five percent more likely to reenlist at the fifty percent probability level.

TABLE 1

COMBINED

VARIABLE	BETA	STD ERR	CHI-SQ	SIGNIF	MAX EFFECT
INTERCEPT	0.865	0.330	6.87	0.01	
PAY	0.092	0.043	4.48	0.03 **	.02
CIVJOB	0.076	0.015	25.02	0.01 ***	.02
CHILD	-0.051	0.046	1.22	0.27	.03
FEM	-0.216	0.122	3.15	0.08 *	.05
EXPECT	0.061	0.039	2.42	0.12	.01
FAMENV	0.080	0.043	3.48	0.06 *	.03
JOBSAT	0.204	0.033	36.84	0.01 ***	.05
RACE	-0.440	0.086	26.11	0.01 ***	.10
COLLEGE	0.254	0.096	6.93	0.01 ***	.05
MAR	-0.364	0.087	17.55	0.01 ***	.08
RANK	-0.389	0.067	33.06	0.01 ***	.09
TIS	-0.011	0.002	32.53	0.01 ***	.02 #

MODEL CHI-SQUARE = 442.64 WITH 12 DEGREES OF FREEDOM

* SIGNIFICANT AT 90% CONFIDENCE LEVEL
 ** SIGNIFICANT AT 95% CONFIDENCE LEVEL
 *** SIGNIFICANT AT 99% CONFIDENCE LEVEL
 # MAXIMUM EFFECT FOR 10% CHANGE IN TIS

CLASSIFICATION TABLE

PREDICTED

		NEGATIVE	POSITIVE	TOTAL
TRUE	NEGATIVE	663	543	1206
	POSITIVE	379	1253	1632
	TOTAL	1042	1796	2838

SENSITIVITY: 76.8% SPECIFICITY: 55.0% CORRECT: 67.5%
 FALSE POSITIVE RATE: 30.2% FALSE NEGATIVE RATE: 36.4%

NAIVE: 57.5%

TABLE 2

COMBINED

FIRST ENLISTMENT

VARIABLE	BETA	STD. ERR	CHI-SQ	SIGNIF	MAX EFFECT
INTERCEPT	0.355	0.512	0.48	0.49	
PAY	0.039	0.064	0.36	0.55	.02
CIVJOB	0.110	0.024	20.27	0.01 ***	.01
CHILD	-0.068	0.114	0.35	0.56	.07
FEM	-0.313	0.208	2.25	0.13	.07
EXPECT	0.103	0.063	2.67	0.10 *	.02
FAMENV	0.126	0.073	2.94	0.09 *	.03
JOBSAT	0.195	0.055	12.44	0.01 ***	.05
RACE	-0.380	0.143	7.03	0.01 ***	.10
COLLEGE	0.140	0.167	0.71	0.40	.03
MAR	-0.559	0.139	16.03	0.00 ***	.13
RANK	-0.194	0.101	3.61	0.06 *	.05
TIS	-0.015	0.006	4.74	0.03 ***	.01 #

MODEL CHI-SQUARE = 132.38 WITH 12 DEGREES OF FREEDOM

* SIGNIFICANT AT 90% CONFIDENCE LEVEL
 ** SIGNIFICANT AT 95% CONFIDENCE LEVEL
 *** SIGNIFICANT AT 99% CONFIDENCE LEVEL
 # MAXIMUM EFFECT FOR 10% CHANGE IN TIS

CLASSIFICATION TABLE

PREDICTED

		NEGATIVE	POSITIVE	TOTAL
TRUE	NEGATIVE	72	351	423
	POSITIVE	59	942	1001
	TOTAL	131	1293	1424

SENSITIVITY: 94.1% SPECIFICITY: 17.0% CORRECT: 71.2%
 FALSE POSITIVE RATE: 27.1% FALSE NEGATIVE RATE: 45.0%

NAIVE: 70.3%

TABLE 3

COMBINED

SECOND ENLISTMENT

VARIABLE	BETA	STD ERR	CHI-SQ	SIGNIF	MAX EFFECT
INTERCEPT	1.615	0.588	7.55	0.01	
PAY	0.126	0.059	4.56	0.03 **	.04
CIVJOB	0.055	0.023	5.94	0.01 ***	.01
CHILD	-0.169	0.063	7.16	0.01 ***	.04
FEM	-0.122	0.165	0.55	0.46	.03
EXPECT	0.029	0.061	0.23	0.63	.01
FAMENV	0.078	0.062	1.54	0.21	.02
JOBSAT	0.215	0.050	18.85	0.01 ***	.06
RACE	-0.486	0.124	15.24	0.01 ***	.12
COLLEGE	0.240	0.141	2.91	0.09 *	.06
MAR	-0.088	0.133	0.44	0.51	.03
RANK	-0.554	0.110	25.45	0.01 ***	.13
TIS	-0.005	0.005	1.26	0.01 ***	.01 #

MODEL CHI-SQUARE = 134.43 WITH 12 DEGREES OF FREEDOM

* SIGNIFICANT AT 90% CONFIDENCE LEVEL
 ** SIGNIFICANT AT 95% CONFIDENCE LEVEL
 *** SIGNIFICANT AT 99% CONFIDENCE LEVEL
 # MAXIMUM EFFECT FOR 10% CHANGE IN TIS

CLASSIFICATION TABLE

PREDICTED

		NEGATIVE	POSITIVE	TOTAL
TRUE	NEGATIVE	599	184	783
	POSITIVE	330	301	631
	TOTAL	929	485	1414

SENSITIVITY: 47.7% SPECIFICITY: 76.5% CORRECT: 63.6%
 FALSE POSITIVE RATE: 37.9% FALSE NEGATIVE RATE: 35.5%

NAIVE: 55.4%

TABLE 4
AML
FIRST ENLISTMENT

VARIABLE	BETA	STD ERR	CHI-SQ	SIGNIF	MAX EFFECT
INTERCEPT	0.124	0.651	0.04	0.85	
PAY	0.131	0.081	2.59	0.11	.04
CIVJOB	0.104	0.033	9.91	0.01 ***	.03
CHILD	0.115	0.139	0.68	0.41	.03
FEM	-0.286	0.232	1.52	0.22	.07
EXPECT	0.130	0.081	2.55	0.11	.04
FAMENV	0.113	0.094	1.45	0.23	.03
JOBSAT	0.132	0.071	3.44	0.06 *	.04
RACE	-0.547	0.185	8.68	0.01 ***	.13
COLLEGE	0.105	0.193	0.30	0.58	.02
MAR	-0.704	0.179	15.43	0.01 ***	.17
RANK	-0.153	0.131	1.36	0.24	.13
TIS	-0.015	0.008	3.03	0.08 *	.01 #

MODEL CHI-SQUARE 85.26 WITH 12 DEGREES OF FREEDOM

* SIGNIFICANT AT 90% CONFIDENCE LEVEL
 ** SIGNIFICANT AT 95% CONFIDENCE LEVEL
 *** SIGNIFICANT AT 99% CONFIDENCE LEVEL
 # MAXIMUM EFFECT FOR 10% CHANGE IN TIS

CLASSIFICATION TABLE

		PREDICTED		TOTAL
		NEGATIVE	POSITIVE	
TRUE	NEGATIVE	55	212	267
	POSITIVE	42	547	589
	TOTAL	97	759	856

SENSITIVITY: 92.9% SPECIFICITY: 20.6% CORRECT: 70.3%
 FALSE POSITIVE RATE: 27.9% FALSE NEGATIVE RATE: 43.3%

NAIVE: 68.8%

TABLE 5

AML

SECOND ENLISTMENT

VARIABLE	BETA	STD ERR	CHI-SQ	SIGNIF	MAX EFFECT
INTERCEPT	1.528	0.710	4.63		
PAY	0.091	0.072	1.61	0.20	.02
CIVJOB	0.054	0.027	3.92	0.05 **	.01
CHILD	-0.088	0.072	1.48	0.22	.03
FEM	-0.057	0.176	0.10	0.75	.02
EXPECT	0.084	0.072	1.38	0.24	.02
FAMENV	0.046	0.075	0.38	0.54	.01
JOBSAT	0.232	0.059	15.54	0.01 ***	.05
RACE	-0.306	0.147	4.29	0.04 **	.08
COLLEGE	0.193	0.154	1.56	0.21	.05
MAR	-0.066	0.154	0.19	0.67	.02
RANK	-0.604	0.137	19.44	0.01 ***	.15
TIS	-0.003	0.006	0.27	0.61	.01 #

MODEL CHI-SQUARE = 80.34 WITH 12 DEGREES OF FREEDOM

* SIGNIFICANT AT 90% CONFIDENCE LEVEL
 ** SIGNIFICANT AT 95% CONFIDENCE LEVEL
 *** SIGNIFICANT AT 99% CONFIDENCE LEVEL
 # MAXIMUM EFFECT FOR 10% CHANGE IN TIS

CLASSIFICATION TABLE

PREDICTED

		NEGATIVE	POSITIVE	TOTAL
TRUE	NEGATIVE	449	123	572
	POSITIVE	252	195	447
	TOTAL	701	318	1019

SENSITIVITY: 43.6% SPECIFICITY: 78.5% CORRECT: 63.2%
 FALSE POSITIVE RATE: 38.7% FALSE NEGATIVE RATE: 35.9%

NAIVE: 56.1%

TABLE 6

COMBAT ARMS

FIRST ENLISTMENT

VARIABLE	BETA	STD ERR	CHI-SQ	SIGNIF	MAX EFFECT
INTERCEPT	0.436	0.866	0.25	0.61	
PAY	-0.143	0.111	1.66	0.20	.04
CIVJOB	0.126	0.037	11.44	0.01 ***	.03
CHILD	-0.466	0.207	5.06	0.02 **	.12
FEM	-0.228	0.527	0.19	0.66	.05
EXPECT	0.089	0.102	0.76	0.38	.03
FAMENV	0.142	0.120	1.40	0.24	.04
JOBSAT	0.300	0.092	10.59	0.01 ***	.07
RACE	-0.164	0.234	0.49	0.48	.04
COLLEGE	0.373	0.363	1.06	0.30	.09
MAR	-0.344	0.230	2.23	0.14	.08
RANK	-0.194	0.167	1.35	0.25	.04
TIS	-0.014	0.010	1.78	0.18	.01 #

MODEL CHI-SQUARE = 58.52 WITH 12 DEGREES OF FREEDOM

* SIGNIFICANT AT 90% CONFIDENCE LEVEL
 ** SIGNIFICANT AT 95% CONFIDENCE LEVEL
 *** SIGNIFICANT AT 99% CONFIDENCE LEVEL
 # MAXIMUM EFFECT FOR 10% CHANGE IN TIS

CLASSIFICATION TABLE

PREDICTED

		NEGATIVE	POSITIVE	TOTAL
TRUE	NEGATIVE	31	125	156
	POSITIVE	21	391	412
	TOTAL	52	516	568

SENSITIVITY: 94.9% SPECIFICITY: 19.9% CORRECT: 74.3%
 FALSE POSITIVE RATE: 24.2% FALSE NEGATIVE RATE: 40.4%

NAIVE: 72.5%

TABLE 7

COMBAT ARMS

SECOND ENLISTMENT

VARIABLE	BETA	STD ERR	CHI-SQ	SIGNIF	MAX EFFECT
INTERCEPT	2.050	1.160	3.12	0.08	
PAY	0.219	0.111	3.90	0.05 **	.05
CIVJOB	0.056	0.041	1.87	0.17	.01
CHILD	-0.407	0.139	8.59	0.01 ***	.10
FEM	-0.685	0.561	1.49	0.22	.17
EXPECT	-0.121	0.118	1.04	0.31	.03
FAMENV	0.148	0.117	1.58	0.21	.04
JOBSAT	0.170	0.096	3.15	0.04 **	.04
RACE	-0.934	0.238	15.37	0.01 ***	.22
COLLEGE	0.587	0.373	2.47	0.12	.14
MAR	0.032	0.277	0.01	0.91	.01
RANK	-0.488	0.199	6.01	0.01 ***	.12
TIS	-0.010	0.009	1.25	0.26	.02 #

MODEL CHI-SQUARE = 71.13 WITH 12 DEGREES OF FREEDOM

* SIGNIFICANT AT 90% CONFIDENCE LEVEL
 ** SIGNIFICANT AT 95% CONFIDENCE LEVEL
 *** SIGNIFICANT AT 99% CONFIDENCE LEVEL
 # MAXIMUM EFFECT FOR 10% CHANGE IN TIS

CLASSIFICATION TABLE

PREDICTED

		NEGATIVE	POSITIVE	TOTAL
TRUE	NEGATIVE	147	64	211
	POSITIVE	68	116	184
	TOTAL	215	180	395

SENSITIVITY: 63.0% SPECIFICITY: 69.7% CORRECT: 66.9%
 FALSE POSITIVE RATE: 35.6% FALSE NEGATIVE RATE: 31.6%

NAIVE: 53.4%

TABLE 8

SUMMARY OF RESULTS

VARIABLE	<u>NUMBER OF DATA SETS AT SIGNIFICANCE LEVEL</u>			<u>HIGHEST SIGNIFICANT MAXIMUM EFFECT</u>
	<u>1%</u>	<u>5%</u>	<u>10%</u>	
JOBSAT	5	1	1	7%
RACE	5	1	0	22%
CIVJOB	5	1	0	3%
RANK	4	0	2	15%
MAR	3	0	0	17%
CHILD	2	1	0	12%
TIS	1	1	2	2%
PAY	0	3	0	5%
COLLEGE	1	0	1	5%
FAMENV	0	0	2	3%
FEM	0	0	1	5%
EXPECT	0	0	1	2%

TABLE 9

REENLISTMENT RATES BY SURVEY REENLISTMENT INTENTION
FIRST ENLISTMENT

<u>PROBABILITY CATEGORY</u>	<u>2 YR TO EAS REENLISTMENT RATE</u>	<u>1 YR TO EAS REENLISTMENT RATE</u>
1.00	.741	.778
.90	.753	.786
.80	.675	.647
.70	.571	.529
.60	.640	.546
.50	.451	.526
.40	.447	.500
.30	.408	.471
.20	.226	.231
.10	.282	.222
.00	.133	.110

TABLE 10
COMBINED
ACTUAL REENLISTMENT BEHAVIOR VS REENLISTMENT INTENTION

VARIABLE	<u>ACTUAL</u>			<u>INTENTION</u>		
	BETA	SIGNIF	<u>MAX</u> EFFECT	BETA	SIGNIF	<u>MAX</u> EFFECT
INTERCEPT	0.865	.01		-0.306	.37	
PAY	0.092	.03 **	.02	0.114	.01 ***	.03
CIVJOB	0.076	.01 ***	.02	0.107	.01 ***	.03
CHILD	-0.051	.27	.03	-0.205	.01 ***	.05
FEM	-0.216	.08 *	.05	0.024	.86	.01
EXPECT	0.061	.12	.01	0.304	.01 ***	.08
FAMENV	0.080	.06 *	.03	0.116	.02 ***	.03
JOBSAT	0.204	.01 ***	.05	0.268	.01 ***	.07
RACE	0.440	.01 ***	.10	-0.420	.01 ***	.10
COLLEGE	0.254	.01 ***	.05	0.231	.04 **	.06
MAR	0.364	.01 ***	.08	-0.369	.01 ***	.09
RANK	-0.389	.01 ***	.09	-0.239	.01 ***	.05
TIS	-0.011	.01 ***	.02 #	-0.014	.01 ***	.03 #

MODEL CHI-SQUARE = 645.92 WITH 12 DEGREES OF FREEDOM (INTENTION)

MODEL CHI-SQUARE = 442.64 WITH 12 DEGREES OF FREEDOM (ACTUAL)

* SIGNIFICANT AT 90% CONFIDENCE LEVEL
 ** SIGNIFICANT AT 95% CONFIDENCE LEVEL
 *** SIGNIFICANT AT 99% CONFIDENCE LEVEL
 # MAXIMUM EFFECT FOR 10% CHANGE IN TIS

V. CONCLUSIONS AND RECOMMENDATIONS

A. GENERAL

The analysis conducted for this thesis generally confirms previous findings and theories on the significance of a variety of variables. Job satisfaction was found to be the most significant variable affecting reenlistment behavior. While the direct effects of pay differentials between military and civilian pay were not measured, the combination of the variables RANK, PAY and CIVJOB confirm the findings of previous studies on the importance of higher pay and promotion to reenlistment behavior. Being in a minority racial group and being married continue to be positively related to the reenlistment rate. The greatest difference between this study and previous work is the insignificance of sex on reenlistment behavior. Although not including Marines, the Chow and Polich study found that sex had a greater effect on reenlistment behavior than did race. In particular, women were much more likely to reenlist than were men. This thesis found sex to be significant only in the Combined data set and only at the eight percent level of significance. This difference is probably due to the increased number of women in the armed services between the 1976 and 1985 surveys and also the increased number of occupational fields open to women. In

short, as the differences between the career opportunities of men and women shrink, their reenlistment behavior differences will also shrink.

B. IMPLICATIONS

The significance of job satisfaction in the reenlistment decision provides clear guidance to the Marine Corps. Emphasis must be placed on ensuring that job opportunities are both challenging and rewarding. This will be a leadership challenge in future years of budget cuts if the Marine Corps wishes to retain its best people.

The importance of children in the retention of Marines in combat arms specialties may pose a challenge to Fleet Marine Force organizations in their ability to deal with personal problems which can arise from family responsibilities. Current policy permits single parents to remain on active duty. While these parents are required to have dependent care arranged for short-notice deployments, 28.4 percent of the Marines in this data set who are single parents reported in the survey that their arrangements are not realistically workable. Another 15.8 percent reported that their arrangements are "probably" realistically workable. Since either of these two responses means that the respondent has previously lied to the Marine Corps, these percentages are probably lower than the actual percentages of Marines who do not have adequate dependent care arrangements.

The lack of significance of sex on retention may affect future planning. Current plans call for increased use of women in the Marine Corps. Historically, they have been easier to recruit and retain than men. If the results of this study predict future trends, women may become harder for the Marine Corps to attract and retain. As more opportunities open for women in civilian jobs, the equal opportunity attraction of the services may diminish. Also, the opening of many occupational fields, which were previously considered too arduous for women, may reduce the attraction of the Marine Corps to women.

C. RECOMMENDATIONS FOR FUTURE STUDY

Future reenlistment research should construct a variable which will account for the effects of the selective reenlistment bonus on reenlistment behavior. This variable must not only measure the effects of the bonus on those who received it but must also measure how it affected those who were eligible for it but did not reenlist. This change should reduce the disparity in the predictive power of the model between first and second enlistments.

Further examination of the reenlistment behavior of also women is necessary. Future research should determine if any reenlistment behavior differences exist between married and single females in the Marine Corps.

Future surveys also should reintroduce the question which asks for an individual's estimation of RMC. This

would allow testing of the effects of current Marine Corps policy of annually giving each Marine a written estimate of his RMC. The survey should also include a question which attempts to measure an individual's estimate of his personal combat risk and his attitudes towards serving in combat. This would allow researchers to more accurately measure the differences between civilian jobs and the military.

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