

NAVAL POSTGRADUATE SCHOOL MONTEREY, CALIFORNIA



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U. S. MARINE CORPS COMPANY - GRADE OFFICER RETENTION

by

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March 1997

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OFFICER RETENTION**

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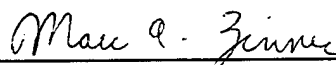
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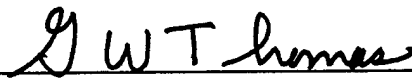
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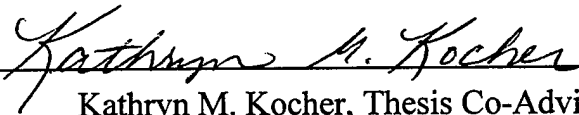


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ABSTRACT

This thesis analyzed factors which influenced the retention of male, junior Marine Corps officers who were serving within their initial period of obligated service. A broad social science approach combining organizational and individual behavioral factors was used to model the turnover decision. A multivariate logistic regression model was estimated using these factors to determine their relative importance in explaining differences in the actual retention behavior of these officers. Subsequent models were then estimated to identify and explain differences in the factors affecting the retention between married and single personnel.

Data for this study were drawn from a matched file of responses to the 1992 *Department of Defense Survey of Officers and Enlisted Personnel and Their Spouses* with 1996 follow-up retention information from the Defense Manpower Data Center's Master Loss File. The factors found to influence significantly the sample members' decisions to remain on active duty included: commissioning source; occupational specialty; deployment to Operation Desert Shield/Storm; satisfaction with various intrinsic aspects of life in the Marine Corps; concerns with the force drawdown; whether or not the officer had searched for civilian employment in the last twelve months; whether or not the officer believed that the skills he had acquired in the Marine Corps would be transferable to the civilian market; and the influence on the career decision of the officer's spouse. Finally, recommendations regarding future policy as well as areas for further related research were made.

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I. INTRODUCTION

Job turnover represents a process in which the linkage between an individual and an organization is severed. Most frequently, it is a voluntary decision on the part of the individual to leave the organization, and often represents a loss in terms of productivity, manpower, and subsequent recruitment and training costs. Job turnover, in any organization, is usually costly and often detrimental, and therefore represents a behavior to be reduced. A logical step in this direction is to identify the factors that correlate with turnover and thereby provide a focus for the efforts of manpower planners in increasing retention.

The primary focus of this thesis is on the factors that influence the retention of company-grade Marine Corps officers who are within their initial period of obligated service. Differences in the retention behavior of married and single personnel are also analyzed. The relative importance of these factors for the retention decision are examined as well as policy implications for managing officer retention.

A. BACKGROUND

For most organizations, employee retention and turnover have long been recognized as important manpower planning issues. An organization trains and educates its workforce to enhance productivity and profit. Unlike physical capital such as plant and equipment, human capital has the ability to leave an organization freely prior to an expiration date. With this voluntary separation the training and experience that an organization invests in the worker is lost and must be replaced. There are additional costs, namely the costs of rehiring and retraining. These costs take on particular significance when dealing with the turnover of an organization's junior management.

With rare exceptions there is no lateral entry into the Marine Corps', officer corps. The "closed nature" of the military personnel system means that the military draws its experienced personnel from within the system [Ref. 1]. The pyramid structure of the officer corps is, therefore, maintained through recruitment, promotion, and retention. As such, the Marine Corps depends on the flow of new officer accessions in order to maintain endstrength and force structure in a steady state environment. However, maintaining the accession rate during one of the most difficult recruiting environments in the history of the all volunteer force is not easy [Ref. 2:p. 19].

The 1994 DoD *Youth Attitude Tracking Survey* (YATS) and the 1994 Marine Corps *Awareness and Attitude Study* reveal pertinent data about the challenges that face both officer and enlisted recruiters. Advertising awareness for the Marine Corps, for example, is at its lowest level since 1989. Additionally, the number of young Americans describing themselves as simply "not interested" in military service has increased significantly [Ref. 3:p. 20]. Among prospects, almost half still feel that military hiring is down due to defense cuts and base closures. With the growth of peacekeeping operations, many sense an uncertainty about the future role of the military. Furthermore, the Marine Corps Study also revealed that 30 percent of America's youth feel that the value and prestige of the military has declined [Ref. 3:p. 20].

Maintaining accessions in this hostile environment are not the only concern. As the pace of technological development increases, additional training is required [Ref. 4:p. 3]. Any increase in experience or training makes an individual more costly for the Marine Corps to replace as the sunk costs rise. The Marine Corps provides considerable amounts of costly up front training to newly commissioned officers at the same time that it is paying their salaries. Currently, all Marine Corps officers,

regardless of commissioning source, attend the Basic School (TBS) in Quantico, Virginia for a period of six months. Upon completing TBS, officers attend follow-on Military Occupational Specialty (MOS) training which can last from 3 months to two years. Marine officers are then assigned to various Fleet Marine Force (FMF) units, bases, or stations for their initial assignments. It is generally these company-grade officers who are directly responsible for the supervision, management, and training of enlisted Marines on a daily basis. The performance of these officers in carrying out their assigned responsibilities directly affects the readiness capabilities of the Marine Corps.

Retaining highly motivated and trained personnel requires innovative leadership, diligent planning, and careful management of resources. In order to accomplish this, manpower planners must consider the significant factors that affect the individual's decision to remain on active duty. If these factors are known and amenable to managerial action, then fiscal and policy decisions can be targeted directly towards the most influential of them. The individual will then be more likely to continue on active duty. Increased retention of qualified, highly trained officers will not only contribute to the combat readiness of the Marine Corps, but will also reduce the fiscal and nonpecuniary costs associated with personnel turnover.

B. PURPOSE

The purpose of this thesis is to develop a model that will identify the major factors affecting the retention of junior Marine Corps officers and suggest policy that may reduce personnel costs and increase effectiveness. Retention, in this study, is defined as the individual officer's voluntary decision to remain on active duty beyond his initial obligation [Ref. 5:p. 2]. The term "initial obligation" refers to the contractual period of service that an individual officer incurs. The length of this initial period of obligation varies between three and seven years, depending on

occupational specialty and/or commissioning source. For the purpose of this study, company-grade Marine Corps officers are defined as Second Lieutenants (O-1), First Lieutenants (O-2), and Captains (O-3). Warrant Officers (W-1 through CWO-5), and officers with prior enlisted experience are not included in this study because the majority of these officers have already completed their initial service obligation and are therefore considered "careerists." Officers with less than 12 months of service are also excluded. These officers either have not completed training or are not considered to have had sufficient time in an operational environment to make informed career decisions.

Differing from most econometric studies of turnover which attempt to capture the bivariate effect of one particular piece of the turnover puzzle, this thesis takes a social scientific approach by examining the relationship between a more complete set of explanatory variables and retention behavior. As such, an all encompassing model is developed and tested to determine the factors that influence junior Marine Corps officers in their decisions to stay or leave the service. Subsequent models are then estimated to determine if there are differences in the retention behavior of married and single junior officers.

This thesis utilizes responses to the *1992 DoD Survey of Officer and Enlisted Personnel* as well as subsequent personnel data from the Defense Manpower Data Center (DMDC) for estimating the models. Respondents of the 1992 survey are matched with their military service status as of 1 June 1996. Creating this "matched member file" provides information on actual retention which is used as the dependent variable in the model. Explanatory variables for the models come from selected responses to the survey, including demographic characteristics, military experience, perceptions of external opportunities, and satisfaction with various aspects of military life. Utilizing the statistical software package, *SAS*, principal components analysis is

employed to combine the effect of explanatory variables measuring similar attributes. Factor analysis is then used to identify meaningful mathematical functions of related groups of questionnaire responses. Logistic regression techniques are utilized to estimate a retention model and draw conclusions about the factors that affect Marine Corps company-grade officer retention.

As a result of this study, Marine Corps manpower planners have more complete information on the factors that affect the career orientation of junior officers. These results can serve as a management tool for manpower policy makers by expanding their ability to explain retention behavior and identify policies that are likely to increase the likelihood that junior officers will remain on active duty beyond their initial service obligation. The retention of educated and experienced personnel is essential for the Marine Corps to maintain its status as the premier military force-in-readiness.

II. LITERATURE REVIEW

In its broadest sense, turnover is the term used to describe the leaving behavior of employees when they sever their association with the organization. It can be characterized as either a voluntary or involuntary process. The dichotomy of the turnover process is that it can have both positive and negative consequences for the individual as well as the organization. For the individual, there may be obvious advantages to leaving an organization. Positive economic and job-related benefits may result from the turnover decision. Depending on the individual's skills and abilities, as well as the job market, some may find higher salaries and increased opportunities. There are also nonpecuniary ways for the individual to benefit from the turnover process. The individual may find a more suitable job match or employment in an area that might benefit his or her family. On the other hand, the turnover process may also have negative consequences for individuals. Turnover frequently results in a loss of seniority and associated benefits. Often, the greater the seniority one has with an organization, the greater the cost of turnover. There are lost friendships, disruption of the family, and moving expenses. Additionally, there is a significant amount of stress placed on the individual and the family as the search for and the transition into a new job is underway. [Ref. 6:p. 144]

The costs borne by organizations associated with turnover are more widely recognized. Turnover in an organization may disrupt operations and jeopardize efficiency. The monetary costs of recruitment, selection, training, and development are often substantial. Determining a dollar figure for lost productivity, knowledge, and experience until the new employee has learned the process is difficult at best. Organizations can realize positive aspects of the turnover process. According to Mowday, Porter, and Steers (1982), "The positive consequences of turnover for

organizations may include increased innovation, employee motivation and morale, and overall effectiveness." [Ref. 6:p. 152] Organizations with effective manpower planning systems are better able to minimize the negative consequences of turnover. Those organizations that focus on internal promotions to fill vacancies can attempt to manage the turnover process and slate junior members for advancement, lessening the disruption brought about by employee turnover. [Ref. 6:p. 153]

For the most part, turnover should be viewed as a natural phenomenon for organizations. Certain levels of turnover will always exist. The goal for personnel planners is to manage the turnover process more efficiently. As a result, the subject of turnover has been exhaustively studied by industrial/organizational (I/O) psychologists and labor economists. This chapter will present the major findings of civilian and military turnover research.

A. CIVILIAN TURNOVER RESEARCH

Few areas within I/O psychology have received as much attention as employee turnover. Comprehensive studies on job turnover date back to the mid- 1950s. The majority of these early studies followed a univariate approach, assessing the impact of a single variable on organizational turnover. For example, books such as *Job Attitudes: Review of Research and Opinions* by Herzberg, Mausner, Peterson, and Capwell (1957) highlight the relationship between job dissatisfaction and turnover. Subsequent studies such as the March and Simon (1958) classic, *Organizations*, began to examine the desirability of moving as well as the ease of movement in the job market. In the late 1960s labor economists began to focus on the sizeable influence of money and labor market factors on industry wide turnover rates. Starting in the 1970s the focus shifted back to I/O psychologists such as Mobley (1977) who examined job turnover as it related to job expectations, satisfaction, work environment, and compensation. A synthesis of psychological and economic factors in a

multivariate context began to emerge in the mid 1970s (Mobley, Griffeth, Hand, and Meglino, 1979). In the 1980s, turnover studies (Mowday, Porter, and Steers, 1982) began to examine the effects of worker's job expectations as well as organizational commitment. More recently, I/O psychologists such as Lee and Mitchell (1994) have begun to construct turnover models that include the effects of "shocks" to the system.

The predominant conclusion reached in these numerous studies is that the predictors of turnover can be classified into three general categories: (1) internal work related; (2) external work related and (3) personal. Table 2.1 summarizes the most widely recognized correlates with the turnover process as well as their expected directions of relationship.

The traditional theoretical turnover models that have evolved include an interaction of these general categories. Brief summaries of findings from the civilian turnover literature within each of these categories will be discussed separately.

1. Internal Work Related

Although studies of turnover have looked at a wide variety of professions and used numerous variables in their attempts to explain the decision to leave or stay on the job, the most common findings in the literature have focused on various work related variables. Concepts such as job satisfaction and organizational commitment are quite common in the literature. Beginning with Herzberg, Mausner, Peterson, and Capwell (1957), the most consistent finding has been the demonstration of an inverse relationship between overall job satisfaction and turnover. [Ref. 7]

Simply put, job satisfaction is the extent to which a person derives pleasure from a job. The higher the satisfaction with the workplace, the less likely the chance of turnover. Researchers such as Porter and Steers, 1973; Price, 1977; Mobley, 1977; Mobley, Horner, and Hollingsworth, 1978; and Michaels and Spector, 1982; have

Table 2.1. Common Correlates with Turnover

CORRELATE	DIRECTION OF RELATIONSHIP*
<i>INTERNAL WORK RELATED</i>	
Pay	Negative
Performance	Negative
Role Clarity	Negative
Task Repetitiveness	Positive
Overall Satisfaction	Negative
Pay Satisfaction	Negative
Satisfaction with Work Itself	Negative
Satisfaction with Supervisor	Negative
Satisfaction with Co-Workers	Negative
Satisfaction with Promotion	Negative
Organizational Commitment	Negative
<i>EXTERNAL WORK RELATED</i>	
Employment Perceptions	Positive
Unemployment Rate	Negative
Accession Rate	Positive
Union Presence	Negative
<i>PERSONAL</i>	
Age	Negative
Tenure	Negative
Education	Positive
Marital Status	Negative (for married)
Number of Dependents	Negative

Table 2.1 (Continued)

CORRELATE	DIRECTION OF RELATIONSHIP*
<i>PERSONAL (Continued)</i>	
Intelligence	Positive
Behavioral Intentions	Positive
Met Expectations	Negative

*A positive correlate with turnover means an increase in this factor will increase the likelihood of turnover. For example, An increase in an individual's perception of alternative employment opportunities will increase the likelihood of turnover for that individual.

Source: Cotton and Tuttle (1986), p. 61.

replicated this relationship across diverse organizations and job levels within organizations. [Ref. 8]

Individual facets of overall job satisfaction have also been assessed for their relationship to turnover. Satisfaction with the work itself, pay, promotion opportunities, and coworkers have been shown to correlate significantly in the negative direction with turnover. In addition, measures of overall satisfaction with the larger organization, rather than the specific job itself, have been discovered to account for a large portion of the variance in the turnover process. [Ref. 9:p. 5]

Defined by Mowday, Porter, and Steers as the extent to which the individual identifies with and is involved in an organization, organizational commitment is viewed as a process in which the individual is linked both behaviorally and attitudinally to an organization. [Ref. 6:p. 20] The theory underlying commitment suggests that an employee's organizational commitment should be a reliable predictor of turnover. Those individuals who are committed to the organization should be more likely to remain with the organization.

Internal work-related variables that were confirmed to be statistically significant by the Cotton and Tuttle (1986) meta-analysis were pay, overall job satisfaction, satisfaction with the work itself, pay satisfaction, satisfaction with supervision, and organizational commitment. Each of these variables was negatively correlated with turnover. In other words, the greater the satisfaction, the less likely the turnover. [Ref. 8]

2. External Work Related

Closely related to the turnover process are the perceived alternative job opportunities that an individual may face. The economic variables measuring alternative employment opportunities as well as transferability of skills across marketplaces have been examined as possible correlates to turnover. The perception of either good alternative employment prospects or skill transferability usually shows a positive relationship with turnover or a negative relationship to retention. Perceived job alternatives, benefits, and a person's perception of his or her own marketability are substantial factors in the turnover process. Mobley, Horner, and Hollingsworth (1978) found that perceived alternatives were positively related to the intent to leave the organization which was, in turn, highly related to actual turnover. Arnold and Feldman (1982) found that intention to seek alternative employment was highly correlated with the turnover process. While these intentions of Canadian accountants were self reported, it seems likely that, if an individual is looking for alternative work opportunities, that individual is less likely to be retained in his present position. By actively looking for another job, the accountants were, in a sense, committing themselves to the turnover process. [Ref. 10]

3. Personal

Most turnover studies include various types of biodemographic variables. These variables include individual characteristics such as age, tenure, sex, marital

status, and education. While these variables alone cannot explain or predict the turnover process, they are essential for inclusion in any multivariate turnover model. Failure to include this category of explanatory variables will surely limit the research and potentially cause omitted variable bias.

Cotton and Tuttle conducted a meta-analysis in which they analyzed the results from over 120 professional turnover studies conducted by the leaders of the turnover field such as Porter, Steers, Mobley, Meglino, Hand, and Muchinsky. They discovered that the most frequently used personal variables included age, tenure, gender, education, marital status, number of dependents, met expectation, and behavioral intentions. The most consistent finding from this set of variables has been the demonstration of a negative relationship between turnover and both age and tenure. [Ref. 8]

As March and Simon (1958) noted early on, as age or tenure in the organization increases, the individual's opportunities for alternative employment become more limited. This decrease in ease of movement may increase the perceived attractiveness of the present employer. [Ref. 11] In other words, the older the individual or the greater the time the individual has accumulated in the organization, the less likely he or she is to leave the organization. Other personal characteristics discovered to be statistically significant across studies include: education, number of dependents, met expectations, and behavioral intent. Education and behavioral intentions are positively correlated with turnover while number of dependents and met expectations are negatively related. [Ref. 8]

Many studies have focused on the individual's perceived expectations about the job and how these expectations may affect the turnover process. Beginning with Porter and Steers (1973), several studies have found that employees who enter organizations with more realistic expectations are less likely to leave voluntarily than

employees whose expectations are unrealistic. This concept of "met expectations" is directly linked to the industrial/organizational concept of "realistic job previews." These previews are supposed to provide individuals with realistic expectations about the jobs they are considering. The better the match between the preview and the actual experience the greater the likelihood that expectations will be met, and the less likely it is that the individual will leave. Muchinsky and Tuttle (1979) discovered strong support for the importance of realistic job previews. They note, "Reductions in turnover have been achieved through the use of pre-employment books, job training, and orientation programs." [Ref. 12:p. 64]

More recently, Pearson (1995) reexamined the turnover process as it relates to the met-unmet expectations framework. He discovered that, if Australian railroad workers had their expectations about the job at hand met, they were more likely to be retained in the organization. One possible cause of bias in this study, however, may be due to the limited variables that were included in the analysis. The variables focused solely on the satisfaction/met expectations area and disregarded the potential effects of bio-demographic factors. [Ref. 13]

The stated *intention* to withdraw from an organization has been demonstrated in several studies to be the variable most predictive of actual turnover. Mobley, Griffeth, Hand, and Meglino (1979) considered behavioral intentions to stay or leave to be a major integrative component in the turnover process. [Ref. 14] In a meta-analysis, Steel and Ovalle (1984) analyzed the strength of the relationship between stated intentions and actual turnover. They concluded that intentions are strong antecedents of actual turnover behavior. These results were compared to the strength of the relationship between job satisfaction/organizational commitment and turnover. The intention to turnover had a much stronger association with turnover than did either job satisfaction or organizational commitment. A problem with

including behavioral intention as an explanatory variable in a multivariate regression retention model is that it may moderate the potential effects of the other explanatory variables resulting in a potentially biased model. [Ref. 15]

A summary concept consisting of various personal characteristics, preconceived expectations, and individual experiences referred to as commitment propensity was hypothesized by Lee, Ashford, Walsh, and Mowday (1992). By conducting a four year longitudinal study of Air Force Academy cadets, they were able to conclude that personal characteristics and experiences that individuals bring to the organization help shape subsequent work attitudes and behaviors that affect organizational commitment and turnover. Using survival analysis, the authors predicted that an increase of one standard deviation in initial commitment would yield a decrease in the probability of turnover of 66%. [Ref. 16]

More recently, a new school of thought has emerged in the turnover research arena. Applying concepts from decision making theory, statistics, and social psychology, Lee and Mitchell (1994) proposed that "shock theory" should be included in the turnover model. Shocks are "jarring" events that initiate the psychological decision processes involved in quitting a job. The shock can be any expected or unexpected change to the individual that challenges the status quo with respect to that individual's employment. [Ref. 17]

Rather than traditional turnover models which emphasize that turnover is caused by job dissatisfaction and then followed by an evaluation of employment alternatives and job search, Lee and Mitchell proposed that some people just up and quit their jobs without alternative employment opportunities. They discovered that 58% of their sample of West coast nurses that they interviewed reported that "shock" impacted their decisions to quit. One nurse, for example, stated that husband had recently retired and they planned on traveling for a year. Her quitting her job had

nothing to do with dissatisfaction or alternative employment opportunities. Instead, quitting was part of her plan for future action. This study presented a new perspective on employee turnover. It will be interesting to see how the theory develops once it is subjected to methods of empirical testing. [Ref. 18]

While the three forementioned categories are examined separately, they are each interrelated and affect the turnover process simultaneously. Steers and Mowday (1982) argued one such sequential model stating that turnover is determined by a simultaneous combination of intent to leave, availability of alternative opportunities, and individual characteristics. More specifically, the three stage process begins with the individual's values and job expectations as they influence the individual's affective responses to the job. Next, these affective responses are viewed as influencing the individual's desire and intention to stay or quit, with the choice depending on a variety of external work related factors. Finally, the intention to stay or quit would ultimately lead to the act/behavior of staying or leaving. Steers and Mowday did point out that this process may differ across organizations. For some, intentions to stay or leave directly predict actual leaving. For others, the intention to stay or quit activates a search for alternatives, which, in turn, leads to quitting. [Ref. 6:p. 123]

In summary, a major limitation with most civilian turnover research is that it limits itself to variables of a single discipline. Economists tend to focus only on economic variables, while psychologists and sociologists include the variables of their own disciplines. Statistically, this limitation of variables lends itself to omitted variable bias. It has only been recently that the conventional models have been challenged and now include such concepts as "shock" by Lee and Mitchell (1994) and "commitment propensity" by Lee, Walsh, and Mowday (1992).

B. MILITARY TURNOVER RESEARCH

Because career decisions of enlisted personnel occur at specific contractual reenlistment points, the overwhelming majority of military turnover research has focused on enlisted retention. The reenlistment decision involves an explicit choice to remain in the service for a fixed period of time, and thus involves serious consideration and strong commitment on the part of the individual.

Since there are no specific points of reobligation in the officer ranks, the turnover process is somewhat different. The Marine Corps commissions its officers from three major sources: 1) the U.S. Naval Academy (USNA); 2) the Naval Reserve Officer Training Corps (NROTC); and 3) Officer Candidates School (OCS). Upon entry into the Marine Corps, newly commissioned officers, like their enlisted counterparts, agree to remain on active duty for a specific period of time. This first period of obligated service for these officers is generally five years for USNA graduates, four years for NROTC graduates, and three years for OCS graduates. Once regular commissioned officers (USNA and NROTC graduates for the most part) reach their End of Obligated Service (EOS), they are free to leave the service or can continue to serve on active duty without incurring another contractual period of obligated service. Those officers with reserve commissions (OCS graduates) must compete for regular commissions after their third year of service. If the officer is augmented into the regular officer ranks, he too can then continue to serve indefinitely as long as he is promoted.

Bruce, Burch, Conroy, and Wilcove conducted a comprehensive review of both civilian and military research literature on turnover and retention. Like civilian studies, military turnover researchers have concentrated on a variety of background (age, marital status, family size, race, and educational level), psychological (satisfaction, met expectations) variables and economic (pay, reenlistment bonuses,

unemployment) variables. For the most part, results between the two sectors have been consistent. Many of the variables depicted in Table 2.1 have been examined in a military context. Differences, however, do occur in the extent to which the various factors have been examined. For example, military researchers have extensively studied the effect of family factors such as separation and spousal support on retention while civilian studies in this area have been limited. [Ref. 19]

The majority of economic related retention decisions focus on the Annualized Cost of Leaving Model (ACOL). The ACOL model was developed by Warner and Goldberg (1984) to predict retention based on pecuniary and nonpecuniary cost-benefit analysis. If an individual's cost of leaving the military is greater than his expected utility derived from civilian employment, then the individual will remain in the service. [Ref. 20]

Using the ACOL model, Cymrot (1987) studied the effect of selected reenlistment bonuses on the retention of Marine Corps enlisted personnel. Results demonstrated that increases in the bonuses increases retention. Furthermore, the higher the rank of the enlisted Marine, the more likely he was to remain in the service. [Ref. 21]

A few studies have applied the theoretical framework of the ACOL model to officer retention. Riebel (1996) attempted to use the ACOL model to analyze the effects of increases of bonuses on the retention of Naval aviators. Conclusions from this thesis note that the ACOL model is, "A feasible approach for predicting the retention decision of Naval Aviators." [Ref. 22:p. 37] In addition, it was demonstrated that increases in aviation bonus pay have a significant impact on retention. More specifically, doubling the yearly contract payment of the aviation bonus was estimated to increase retention by .625 percent. [Ref. 22:p. 37]

Bowman's (1995) study of the cost-effectiveness of service academies has implications on the retention issue as it relates to the various accession sources,

namely USNA, NROTC, and OCS. Using the economic theory of human capital, he attempted to determine which commissioning source provided the Navy with the most cost-effective means of producing unrestricted line officers. Bowman concluded that regular commissioned officers, especially graduates of the Naval Academy, would be more likely to make the Navy a career and be promoted at "first look" compared to reserve commissioned officers. [Ref. 1]

Bowman argued that the Naval Academy and NROTC programs tend to provide more "firm specific" human capital that ultimately reduces the voluntary quit behavior. Firm specific human capital can be classified as training or education that related directly to the organization where the individual will be employed. This can be compared to "general" human capital which is training or education that can be applied across organizations. Next, Bowman stated that the Naval Academy and NROTC provide a screening process that can gradually "weed out" those individuals who are less inclined to make the Navy their career. The extra military training during the college years sorts out those less inclined to the military way of life before greater training investments are made following commissioning. Finally, Bowman believes that the Navy ultimately benefits from the early cost-disadvantages of the regular commissioning programs through the greater likelihood that these officers will choose to remain in the Navy for longer periods of time. [Ref. 1]

The Center for Naval Analyses (1995) conducted a study examining successful officer careers for Marine Corps officers looking specifically at augmentation, promotion, and voluntary turnover. They used longitudinal (cohort) data from the U. S. Marine Corps Headquarters Master File, information from The Basic School (TBS), and information from augmentation and promotion boards from 1984 through 1993. The resulting data set contained 7,397 observations. Once those officers who

failed to augment or promote to captain were dropped, 2,818 officers remained for observation. [Ref. 23]

A logistic regression model was run with voluntary continuation in the Marine Corps up to seven years as the stated dichotomous dependent variable. Results from the model demonstrated that differences in survival were not by racial-ethnic background or gender but by commissioning source, occupational type, marital status, General Classification Test (GCT) score, and TBS leadership class rank. More specifically, aviators and married officers were more likely to remain in the Marine Corps than combat arms officers and single officers respectively. OCS graduates were less likely than Naval Academy or NROTC graduates to remain in the Marine Corps. An increase in an officer's TBS leadership class standing resulted in increased chance of retention. A decrease in GCT score also led to an increased chance of retention. [Ref. 23]

In a 1996 Department of Defense (DoD) study entitled "Minorities and Women in the Officer Pipeline," differences in retention rates between White men and minorities and women were estimated using statistical models. Data from 1967 through 1991 revealed that Black men were more likely to voluntarily remain on duty than their White counterparts. Furthermore, women were less likely to be retained at almost all career stages. The analysis emphasized that the disparities in retention across race and gender may be caused by differences in education, commissioning source, and occupation. [Ref. 24]

Marsh (1989) investigated the total length of time both officers and enlisted personnel expected to remain in the Navy by utilizing the 1985 *DoD Survey of Officers and Enlisted Personnel*. The study developed a causal model in which satisfaction with the military as a way of life varied as a function of one's duty history, expectations, and family status. Marsh focused specifically on stated intentions from

survey data. His results, therefore, are only as reliable as the coincidence of intended and actual retention behavior. Multiple regression analysis revealed that the most important causes of retention intentions were months spent on active duty, the highest paygrade that the individual expected to reach before leaving the Navy, and overall satisfaction with the military as a way of life. Each of these variables had significant positive effects on retention intentions. An interesting observation in this study was that, among officers, the higher the present paygrade, the lower their satisfaction with the military life and the shorter their expected future years of service. For enlisted personnel, the more they believed their families would be better off if they had civilian jobs, the less satisfied they were with military life and the less likely their reenlistment intentions were. [Ref. 25]

Using a longitudinal sample of active duty Army nurses (officers) and the 1985 *DoD Survey of Officers and Enlisted Personnel*, Kocher and Thomas (1994) analyzed actual retention behavior. Their logistic regression model included external market factors (alternative employment perceptions, unemployment) personal factors (race, age at entry, family status, tenure), and work-related factors (satisfaction with various aspects of the job). Results of their study revealed that satisfaction with work, military life, location/assignment, as well as race, and family status had significant effects on the retention of Army junior nurse-officers. [Ref. 26]

Lakhani (1991) conducted a retention cost-benefit analysis of U. S. Army junior officers. He hypothesized that the utility derived by a junior officer from staying or separating from the Army consists of three parts. The first part consists of monetary aspects such as pay, allowances, and retirement benefits. The second part consists of non-pecuniary benefits like career commitment and satisfaction. The last part is comprised of various immeasurable attributes such as taste for Army life and the potential effects of satisfaction with family life on job satisfaction. These three

parts taken together form a utility maximization function which suggests that a junior officer will stay in the Army if the net benefit derived by these attributes exceeds the net benefit available from alternative civilian employment. [Ref. 27]

Lakhani used the *1985 DoD Survey of Officers and Enlisted Personnel* question that measured expected ultimate years of service as a proxy for retention. Independent variables included in his study were pay, satisfaction with military life, chance of promotion, military occupational specialty (MOS), various demographic characteristics (age, sex, and race), years of service, expectations of military life, intention to join the reserves, assignment overseas, and undesirable next duty location. Separate simultaneous regression equations were analyzed to examine the reciprocity of retention and satisfaction with military life. Results from this sequential regression revealed that satisfaction with military life was most affected by retention intentions and met expectations about military life. Furthermore, retention can be improved by increasing satisfaction with military life, pay, and perceived chances of promotion. [Ref. 27]

Burch, Morrison, and Sheposh (1991) studied the factors affecting surface warfare officer (SWO) retention by utilizing the Steers and Mowday (1982) models as a framework. Using a sample of 3,059 married SWOs who were surveyed in 1986, they discovered that stated career intent had the strongest influence on officer retention. Furthermore, search for alternative employment opportunities had a direct impact on the turnover process. Also the individual's level of organizational commitment, as well as spousal support and tenure, had a direct influence on the officer's career intent. One surprising result found in this research was that the officer's level of promotability (based on previous fitness reports) did not increase the ability to accurately predict turnover. [Ref. 28]

A study published in 1981 by Mohr, Holzbach, and Morrison examined spousal influence on the career decisions of junior SWOs. The stated purpose of this study was to determine how SWO junior officers perceived the experiences, attitudes, and opinions of their wives, and how they perceived that their career decisions were influenced by their wives. Their somewhat limited survey data of 312 officers (63% of whom were married) revealed several interesting results. First, junior officers indicated that their wives had a major impact on their career decisions. Second, according to wives, the least favorable aspect of a Navy career was extended periods of separation. Third, officers whose wives were supportive of a Navy career were more intent on remaining in the Navy. Fourth, those wives who were supportive of a Navy career tended to be more involved socially and emotionally in that career. Fifth, wives of junior officers with high career intent viewed Navy careers more positively than did wives of junior officers with low career intent. Sixth, there was greater spousal support for those officers whose wives did not work outside the home. [Ref. 29]

Results from the *1991 Navy-Wide Personnel Survey* support several of the findings published by Mohr, et al. Randomly surveying 3% of the enlisted population and 11% of the officer population, the survey attempted to gather information on a wide variety of topics including personal and career information. Some 60% of the officer population agreed with the statement that their spouses had a major impact on career decisions. Other findings from the survey were that retirement benefits and pay were important positive factors in career decisions. Sea duty and family separations were important negative factors in career decisions. [Ref. 30]

Serving in the military in the wake of a drawdown is another area that has potential effects on the turnover/retention decisions of officers. Wong and McNally (1994) studied the "downsizing process" as it related to U. S. Army officers. Using

a modified version of the Mowday, Porter, and Steers (1982) Organizational Commitment Questionnaire on a sample of 900 officers, they hypothesized that the organizational commitment of survivors would be lower than it was before downsizing. Results revealed a weakening of the "psychological contract" with the Army associated with downsizing. A significant decrease in organizational commitment was discovered. [Ref. 31]

In another study focusing on downsizing, Evans (1995) discovered numerous concerns from Army officers and enlisted personnel. Using interviews, she found that downsizing brought about increased concerns over leader behavior, access to information, continued commitment, stress and family, satisfaction, readiness, and career intention. Information, satisfaction, commitment, stress, and leadership can either positively or adversely affect intentions to stay in the military. Evans notes, "The downsizing is perceived as a breach of faith on the military's part and there is a growing lack of trust and faith in the military that threatens commitment, readiness, and retention." [Ref. 32:p. 284] The author emphasizes that the military must pay close attention to the concerns of its soldiers in the wake of the changing environment of downsizing. [Ref. 32]

Various theses have been written by Naval Postgraduate School students analyzing the turnover/retention process. Ashcraft (1987) developed a model to test the career orientation of junior unrestricted line naval officers. Using responses from the *1985 DoD Survey of Officers and Enlisted Personnel*, the influence of biodemographic characteristics, length of service, family financial situation, intrinsic and extrinsic job satisfaction, and perception of external job opportunities were investigated. He used stated intention to remain in the Navy beyond initial obligation and intention to remain in the Navy for at least 20 years as his dependent variables. Conclusions reached by Ashcraft revealed that the amount of time spent on sea duty,

the perceived probability of finding a good civilian job, and satisfaction with the extrinsic aspects (satisfaction with: pay, current job, training, work environment) of the military were most important in predicting retention. [Ref. 33:p. 62]

A similar thesis focusing on the factors affecting junior Marine Corps officer retention was conducted by Thielmann (1989). This thesis utilized responses to the *1985 DoD Survey of Officers and Enlisted Personnel* as well as follow-up data on survey respondents who remained on active duty as of 1989. Factors that were found to most strongly influence male, junior officers to remain on active duty beyond their initial obligation were: commissioning source, marital status, military occupational specialty, race, and various intrinsic (satisfaction with: co-workers, work conditions, personal freedom, current job assignment, service to country) and extrinsic (satisfaction with: promotion opportunities, job security, job training, pay) job satisfaction factors. [Ref. 34:p. 44]

Johnston (1988) studied the turnover of junior Army officers using structural equations techniques. Also using the *1985 DoD Survey of Officers and Enlisted Personnel*, he included various explanatory variables such as biodemographic characteristics (age, tenure, education, number of dependents), occupational characteristics (paygrade, military occupational specialty, time spent overseas, met expectations), expectations concerning alternative employment (probability of finding work, job offers received, searched for work in last year), satisfaction, and intentions to remain in the service. Running the model on a multitude of subsamples, results appear to be inconclusive at best. Johnston cited the small representation of turnover behavior as a predominant reason for the mixed results. The only consistent result was that intentions to remain in the service were strongly (negatively) related to turnover. [Ref. 35:p. 61]

In summary, research on military turnover has been extensive and similar to its civilian counterpart. The explanatory variables have come from the internal work related, external work related, and personal categories, which is consistent with the civilian literature. Table 2.2 summarizes the major findings of the civilian and military turnover research presented in this chapter.

Table 2.2. A Summary of Major Findings in Turnover Research

AUTHOR	FINDING
CIVILIAN RESEARCH:	
Herzberg, Mausner, Peterson, Capwell (1957)	Relation between dissatisfaction and turnover.
March and Simon (1958)	Turnover is largely influenced by satisfaction, desirability of leaving, and ease of movement.
Porter and Steers (1973)	Satisfaction relates to turnover. Major influences on turnover: personal characteristics, job, work environment, organization.
Price (1977)	Turnover is influenced by dissatisfaction and opportunity to leave.
Mobley (1977)	Dissatisfaction leads to thinking of quitting, intention to search, intention to leave, and actual turnover.
Mobley, Griffeth, Hand, and Meglino (1979)	Turnover is related to various individual, organizational, and economic factors as well as perceptions, expectations, and alternatives.
Mowday, Porter, and Steers (1982)	Turnover model should include variables measuring: job expectations and attitudes; intent to leave; available alternatives. Organizational commitment is a reliable predictor of turnover.
Arnold and Feldman (1982)	Turnover can be viewed as a function of tenure, intention to search for alternatives, and perceived job security.
Steele and Ovalle (1984)	Strong relation between behavioral intentions and turnover.

Table 2.2 (Continued)

AUTHOR	FINDING
Cotton and Tuttle (1986)	Factors that correlate with turnover can be characterized as external environmental, work-related, and personal.
Ashford, Lee, Mowday, Walsh (1992)	Personal characteristics, expectations, individual experiences determine commitment propensity which ultimately affects organizational commitment and turnover.
Lee and Mitchell (1994)	"Shocks" or jarring events can initiate the psychological decision processes involved in quitting. A search for viable alternatives are not necessary.
Pearson (1995)	Work related factors and met expectations are correlates with turnover.
MILITARY RESEARCH:	
Holzbach, Mohr, and Morrison (1981)	Spousal influence affects career decisions of junior SWO officers.
Warner and Goldberg (1984)	ACOL model used to predict retention.
Cymrot (1987)	Using ACOL, determines that increases in bonus increase enlisted retention.
Ashcraft (1987)	Sea duty, perceived probability of finding a civilian job, and satisfaction with extrinsic aspects of military are most important factors in predicting retention intention of junior Naval officers.
Johnston (1988)	Intentions to remain in the service strongly (negatively) related to actual turnover behavior of junior Army officers.
Marsh (1989)	Tenure, expected ultimate paygrade, and satisfaction all contributed to intentions of Navy personnel to remain on active duty.
Thielmann (1989)	Commissioning source, marital status, occupational specialty, race, intrinsic, and extrinsic factors influence junior Marine officer turnover.
Bruce, Burch, Conroy, and Wilcove (1991)	Literature review revealed that various personal, psychological, and economic factors influence the turnover process.
Burch, Morrison, and Sheposh (1991)	Stated career intent, search for alternative employment, organizational commitment are retention predictors for junior SWO officers.

Table 2.2 (Continued)

AUTHOR	FINDING
Lakhani (1991)	Retention can be improved by increasing satisfaction with military life, pay, and perceived chances of promotion.
Navy-Wide Personnel Survey (1991)	Spousal influence, sea duty, and family separation all important factors in the retention decision.
Kocher and Thomas (1994)	External market factors, work-related factors, and personal factors affect turn-over process of junior Army nurses.
Wong and McNally (1994)	Downsizing has reduced organizational commitment.
Evans (1995)	Effects of downsizing threaten retention.
Bowman (1995)	USNA and NROTC graduates are more likely to make the Navy a career.
Goldhaber, Lawler, Kletus, North, and Suess (1995)	Commissioning Source, occupational specialty, marital status, GCT score, and TBS leadership class rank have most influence on Marine officer retention.
Riebel (1996)	Using ACOL model, determines that bonuses can increase retention of Naval aviators.
DoD (1996)	Women less likely to be retained.

Source: Mowday, Porter, and Steers (1982), p. 120 and author.

III. MODEL DEVELOPMENT

A. CONCEPTUAL MODEL

As noted in the literature review, studies of the turnover process have focused on many of the same variables. What has differed amongst these studies is the specific categorization of the variables and their relative importance. Utilizing the three main categories addressed in the literature review, my objective is to gauge the partial effects of a broad range of determinants on turnover in order to yield insights for retention policy. Conceptually, the relative contributions of *personal* (biodemographic, military experience), *internal work related* (satisfaction, stress), and *external work related* (perception of external opportunities) factors will be examined. It is hypothesized that these three categories simultaneously influence the junior Marine Corps officer's decision to leave or remain on active duty.

$$\text{Retention} = f(\text{personal, internal work related, external work related})$$

B. DATA SOURCE

The 1992 *Department of Defense (DoD) Survey of Officers and Enlisted Personnel and Their Spouses* provides cross-service information on the attitudes, experiences, career intentions, and demographic characteristics of military members and their spouses. This self-reported information is widely used by DoD to assess the impact of a broad range of personnel policies. In addition to the survey questions, there is a supplement of matched demographic information gathered from various administrative records. [Ref. 36]

Sponsored by the Office of the Under Secretary of Defense for Personnel and Readiness, the Survey collected information in ten topic areas:

1. **Military Background:** Service, occupation, paygrade, commissioning source, years of service remaining, time spent overseas, and deployment to Operation Desert Shield/Storm,
2. **Present and Past Locations:** Length of stay, concerns with military moves, concerns with living conditions and surrounding community,
3. **Reenlistment/Career Intent:** Expected ultimate years of service and paygrade, spousal influence on career, and likelihood of promotion,
4. **Individual and Family Characteristics:** Gender, age, race, marital status, and education,
5. **Dependents:** Age, number, and concerns about family,
6. **Military Compensation, Benefits, and Programs:** Benefits received, health care, dental care, and satisfaction with various programs/facilities provided and used,
7. **Civilian Labor Force and Volunteer Experience of the Service Member:** Reasons and hours volunteered, perceptions of alternative job opportunities, concerns with the military drawdown,
8. **Labor Force Experience of Spouse:** Employment status of spouse,
9. **Family Resources:** 1991 earnings and debts of the household,
10. **Military Life:** Expectations about military life, satisfaction with various aspects of the military, and sources of stress and uncertainty. [Ref. 37]

A unique aspect of this survey, and its resultant data, is the richness of information available for turnover analysis. According to Doering and Grissmer, the Department of Defense concluded that, "Reliable systematic, cross service information about the characteristics, experiences, educational and occupational plans, attitudes towards the military, and preferences of household members needs to be

collected." [Ref. 5:p. 34] The primary motivation behind this concern for the family is that retention decisions are often affected by family preferences. [Ref. 5:p. 34]

Prior to the 1992 survey, the major military surveys focused only on the service member. These surveys assumed that the member's responses to questions regarding the spouse and family were accurately and objectively reported. The 1992 survey was the first time that a companion census of all spouses of those members surveyed was also conducted. As Doering and Grissmer note, "By asking both members and spouses to provide motivational information and retention intentions, we can better understand the interplay between military factors and strictly family factors in ultimate decisions." [Ref. 5:p. 35]

The sample population for the 1992 survey consisted of 59,930 active duty members, stratified by service, officer and enlisted status, and gender. In addition, surveys were sent to 64,643 spouses. However, only 24,165 spouses responded. The officer population from which the 1992 survey was drawn consisted of active-duty officers who were stationed in the United States or overseas on 30 September 1992. The survey sample consisted of 27,684 officers. Out of these, 4,189 were Marine Corps officers. The population of Marine Corps officers at this time was 19,586. [Ref. 36]

The 1992 survey information was subsequently merged with current information regarding retention. By matching the social security numbers of the survey respondents with the Master Loss File as of 1 June 1996, actual retention behavior was captured for study. The resultant merged data file included more than 500 variables.

C. DATA RESTRICTIONS

The purpose of this study is to examine those factors that affect the retention behavior of junior Marine Corps officers. As such, only company-grade officers (pay

grades O-1, O-2, and O-3) were selected for observation. Second lieutenants, first lieutenants, and captains account for 12, 17, and 30 percent of the officer corps respectively. It is these officers, more than likely, who would be in their initial period of obligation at the time of the survey. Warrant Officers and field grade officers (O-4 and above) would already have completed their initial service obligation and are therefore considered "careerists."

The phrase "initial obligation" refers to the contractual period of obligated service that an officer incurs upon entering the service. These periods vary based on commissioning source and follow-on training. For example, Naval Academy graduates have a 5 year commitment, Naval Reserve Officer Training Corps (NROTC) graduates have a 4 year obligation, and Officer Candidate School graduates face a 3 year obligation. Those who receive flight training incur obligations up to 7 years. Survey question Q0004 asks respondents, "How many years of obligated service do you have remaining in your initial obligation." [Ref. 37] Officers who responded to this question by answering that they have completed their initial obligations or that they have more than four years remaining on their obligation were eliminated. This ensures that the officers remaining in the sample reached a decision point of whether to stay or leave prior to the date the data were matched with actual retention behavior, 1 June 1996.

A further restriction placed on the data for this study was years of service. Officers with less than 12 months and more than 7 years of active service were excluded. It was believed that officers with less than 12 months of service would not have had sufficient time to make informed career decisions. Since officers spend their first year in various training schools, they would not have had sufficient time in an operational environment to make an informed career decision. The seven year point

was used as a ceiling to capture the behavior of those aviators who incur the longer periods of obligation.

A final restriction was to delete lawyers and officers who were not yet assigned an occupational specialty. Lawyers have unique initial contracts and career paths. They advance in rank in different manners and do not have "typical" career paths. Officers with more than one year of service who were not yet assigned occupational specialties were still in the training environment and unable to make informed career decisions.

With these initial restrictions, a sample of 779 junior Marine officers remained for observation.

D. CANDIDATE EXPLANATORY VARIABLE ANALYSIS

The richness of the survey information available for turnover analysis allows for the extraction of numerous potential explanatory variables. Variables that fit within the personal, internal work related, and external work related categories were chosen for preliminary analysis. For example, candidate personal variables are: gender, paygrade, race, marital status, commissioning source, occupational specialty, entry age, current age, and years of service. Candidate internal work related variables are measures of job satisfaction and whether the military has met the officer's expectations. Measures of external work related variables include perceptions of alternative employment and transferability of military skills to the civilian market. The following tables characterize the attributes of the initial 779 sample members.

Table 3.1. Frequency Distributions of Categorical Variables (N = 779)

Variable (Name)	Number	Percent
<i>Gender</i>		
Male	692	88.8
Female	87	11.2
<i>Paygrade</i>		
2nd Lieutenant (2ndLt)	222	28.5
1st Lieutenant (1stLt)	435	55.8
Captain (Capt)	122	15.7
<i>Race</i>		
White + Other	731	93.8
African American	35	4.5
Hispanic	13	1.7
<i>Marital/Family Status</i>		
Single-no-Children (SNC)	345	48.8
Single-with-Children (SWC)	2	0.3
Married -no-Children (MNC)	242	34.2
Married-with-Children (MWC)	118	16.7
<i>Commissioning Source</i>		
Naval Academy (USNA)	98	12.7
Naval Reserve Officer Training Corps (ROTC)	218	28.2
Officer Candidate School (OCS)	457	59.1
<i>Occupational Specialty</i>		
Combat Arms (COMBAT)	182	23.4
Ground Support (SERVICE)	298	38.3
Pilot/Naval Flight Officer (AIR)	217	27.9
Air Support (AIRSPT)	82	10.5
<i>Military Experience</i>		
Deployment to Desert Shield/Storm (SWA)	289	39.3
Deployed for more than six months (AWAY)	316	43.1
<i>Perception of External Opportunities</i>		
Actively searched for outside job (ACTSRCH)	92	12.6
Believe skills are transferable (CIVTRAN)	529	73.2

Source: Author.

Table 3.2. Mean Distributions of Continuous Variables (N = 779)

Variable (Name)	Mean/Stan Dev
<i>Time/Tenure</i>	
Age entered active duty (ENTRYAGE)	23.08/1.46 years
Age as of 1/1/92 (AGECUR)	27.22/2.10 years
Years of active duty service as of 1/1/92 (YOS)	4.03/1.54 years
<i>Met Expectations</i>	
Military has met expectations (METEX)	3.67/0.87 ^a
<i>Satisfaction</i>	
Satisfaction with mil life (SATMIL)	5.30/1.52 ^b
Satisfaction with mil life: freedom (FREEDOM)	3.76/0.95 ^c
Satisfaction with mil life: acquaintances (ACQN)	4.19/0.85 ^c
Satisfaction with mil life: co-workers (COWORK)	4.11/0.79 ^c
Satisfaction with mil life: pay (PAY)	3.59/0.92 ^c
Satisfaction with mil life: assignments (ASSIGN)	3.66/0.92 ^c
Satisfaction with mil life: promotion opportunities (PROMOTE)	3.40/1.00 ^c
Satisfaction with mil life: retirement benefits (RETIRE)	3.31/0.85 ^c
Satisfaction with mil life: environment for family (ENVIRON)	3.37/0.93 ^c
Satisfaction with mil life: frequency of moves (MOVES)	3.36/0.85 ^c
Satisfaction with mil life: service to country (SERVE)	4.52/0.64 ^c
Satisfaction with mil life: current job (CURJOB)	3.83/1.05 ^c
Satisfaction with mil life: job training (TRAIN)	3.43/1.02 ^c
Satisfaction with mil life: job security (SECURE)	3.26/1.09 ^c
Satisfaction with mil life: work conditions (WORKCOND)	3.63/0.91 ^c
<i>Drawdown Concerns</i>	
Force reductions concern: long-term (LONG)	3.41/1.49 ^d
Force reductions concern: future type of work (WORK)	3.31/1.36 ^d
Force reductions concern: finding civilian work (CIVEMP)	3.26/1.37 ^d
Force reductions concern: financial burden (FINANCE)	3.38/1.41 ^d
Force reductions concern: adjusting to civilian life (ADJUST)	1.96/1.25 ^d

^a represents questions measured on a 1 to 5 Likert scale with:

1=strongly disagree

2=disagree

3=neither agree nor disagree

4=agree

5=strongly agree

^b represents questions measured on a 1 to 7 Likert scale with:

1=very dissatisfied

2=dissatisfied

3=somewhat dissatisfied

4=neither

5=somewhat satisfied

6=satisfied

7=very satisfied

^c represents questions measured on a 1 to 5 Likert scale with:

1=very dissatisfied

2=dissatisfied

3=neither

4=satisfied

5=very satisfied

^d represents questions measured on a 1 to 5 Likert scale with:

1=not at all concerned

2=somewhat concerned

3=moderately concerned

4=greatly concerned

5=very greatly concerned

Source: Author.

The stratified sample figures documented in Table 3.1 reveal some interesting results when compared to the true Marine Corps officer population during the 1990s. For example, during Fiscal Years (FYs) 1990 through 1993 females represented roughly 3.6 percent of Marine Corps second lieutenants, first lieutenants, and captains (O-1 to O-3). [Ref. 38] In FYs 1994 and 1995 this percentage rose to approximately 4.6 percent. The 11.2 percent figure for females in the sample used in this study is quite an overrepresentation.

In terms of racial distribution, the number of African American and Hispanic officers has steadily increased from FY 1991 to FY 1995 in spite of the Marine Corps drawdown of the early 1990s. From FY 1991 to FY 1995 the number of African

American O-1 to O-3s rose from 5.0 percent to 6.7 percent. During the same period Hispanic representation increased from 3.1 percent to 4.8 percent. The 4.5 percent and 1.7 percent figures depicted in Table 3.1 demonstrates that the sample data set in this study underrepresents the true population. [Ref. 38]

The commissioning source figures depicted in Table 3.1 are an accurate representation of the true population. The Marine Corps has traditionally accessed the majority of its officers through one the Officer Candidate School programs followed by NROTC and the U. S. Naval Academy. In addition, the sample military occupational specialty distribution is equivalent to the true population. Finally, the mean figures for entryage, current age, and years of service depicted in Table 3.2 are fairly consistent with what would be expected of a junior Marine Corps officer sample. [Ref. 38]

E. VARIABLE REDUCTION

1. Deletions and Combinations

When specifying the explanatory variables for an econometric model, theory should be the most important criterion for the inclusion of a variable. However, in order to reduce the potential effects of bias and maintain the statistical integrity of the model, it is sometimes necessary to omit or combine some of the candidate explanatory variables. In this study, for example, the literature [Ref. 24] supports the hypothesis that females behave differently than males in the retention decision process. As such, separate models should be estimated on male and female samples. Unfortunately, in spite of their "overrepresentation" in this sample, the 87 females do not provide a sufficient number of observations to estimate a multivariate regression model. Therefore, a retention model was estimated for male officers only.

The limited number of African American and Hispanic observations are also cause for concern. To remedy this, these two race/ethnic group categories are

combined into one "MINORITY" variable (1=African American or Hispanic; 0=other). Similarly, those who are single with children are combined with single no children officers to form the variable SINGLE (1=single; 0=other). Because of the high collinearity between age at entry and current age, only age at entry is retained in the model. Additionally, the collinearity between paygrade and years of service led to the use of years of service as the only time/tenure variable.

2. Principal Components and Factor Analyses

In order to reduce the number of variables that are measuring similar attributes amongst related groups of variables, the variable reduction techniques of principal components analysis and factor analysis were employed to discover any underlying dimensions. The survey questions regarding job satisfaction and force reduction were ideal candidates for these variable reduction techniques. These techniques were performed after females were deleted from the final restricted data set.

Principal components analysis is performed in order to simplify the description of a set of interrelated variables [Ref. 39:p. 371]. It is an exploratory technique that is useful in gaining a better understanding of the interrelationships among the variables. This technique transforms a group of related variables into new, uncorrelated variables called principal components. Each principal component is a linear combination of the original variables. In this study, for example, the fourteen satisfaction with military life variables were combined and reduced to three principal components.

Once the appropriate number of principal components were extracted using a predetermined eigenvalue cutoff score, factor analysis was then employed [Ref. 39:p. 396]. The factors obtained in factor analysis explain the interrelationships among the original variables. Once factors were extracted, they were rotated using the varimax rotation technique to derive more easily interpretable variables. Rotation of the

factors makes some of the factor loadings very large (near +/- 1) or very small (near zero). Ideally, any given variable will have a high loading on only one factor. If this is the case, it is easy to give each factor an interpretation arising from the variables with which it is highly correlated (high loadings). [Ref. 39:p. 409]

The fourteen survey questions concerning satisfaction with various work related job characteristics were reduced to three meaningful dimensions using the variable reduction techniques. Table 3.3 depicts these composite dimensions and the specific variables which relate to each new category.

Table 3.3. Factor Analysis of Job Satisfaction Variable

Factor Loadings			
Composite Dimensions and Item	FACTORA	FACTORB	FACTORC
<i>Intrinsic job satisfiers</i>			
Co-workers	0.786	0.161	0.065
Acquaintances	0.663	0.113	0.075
Current Job	0.658	0.004	0.263
Serve Country	0.554	0.120	0.115
Work Conditions	0.483	0.329	0.053
Personal Freedom	0.453	0.420	0.107
<i>Extrinsic job satisfiers</i>			
Frequency of moves	0.180	0.779	0.000
Environment for family	0.152	0.694	0.072
Pay	0.022	0.627	0.338
Retirement benefits	0.064	0.500	0.393
Assignment	0.375	0.401	0.364

Table 3.3 (Continued)

Factor Loadings			
Composite Dimensions and Item	FACTORA	FACTORB	FACTORC
<i>Advancement opportunities</i>			
Job security	0.062	0.099	0.785
Promotion opportunity	0.246	0.156	0.760
Job training	0.339	0.177	0.551

Source: Author.

A series of five questions addressed the area of force reduction concerns. Principal components analysis and factor analysis reduced these questions into two areas. As shown in Table 3.4, these dimensions were interpreted as employment opportunity concerns and personal concerns.

Table 3.4. Factor Analysis of Force Reduction Variables

Composite Dimension and Item	Factor Loadings	
	FACTORX	FACTORY
<i><u>Employment Concerns</u></i>		
Find civilian job quickly	0.882	0.178
Financial burden on family	0.854	0.210
Type of work	0.845	0.166
Long term opportunity in military	0.714	0.303
<i><u>Personal Concerns</u></i>		
Ability to adjust to civilian life	0.227	0.785

Source: Author.

3. Description of Final Sample and Variables

After deleting females and reducing the number of candidate explanatory variables using combinations or factor analysis, a sample of 692 observations and 22 variables remained. Once again, the restrictions imposed were: male; Marine Corps; officers in the paygrades O-1 to O-3; more than one but less than seven years of service; under some form of contractual obligation when surveyed in 1992, but free to leave the service prior to 1 June 1996; and no lawyers or individuals without assigned occupational specialties. Tables 3.5 and 3.6 provide a statistical description of the 692 observations remaining in the final data set.

Table 3.5. Frequency Distributions of Categorical Variables (N = 692)

Variable (Name)	Number	Percent
<i>Gender</i>		
Male	692	100.0
<i>Paygrade</i>		
2nd Lieutenant (2ndLt)	190	27.5
1st Lieutenant (1stLt)	383	55.3
Captain (Capt)	119	17.2
<i>Race</i>		
White + Other	649	93.8
Minority	43	6.2
<i>Marital/Family Status</i>		
Single	373	53.9
Married-no-Children (MNC)	206	29.8
Married-with-Children (MWC)	113	16.3
<i>Commissioning Source</i>		
Naval Academy (USNA)	92	13.4
Naval Reserve Officer Training Corps (ROTC)	176	25.3
Officer Candidate School (OCS)	424	61.3
<i>Occupational Specialty</i>		
Combat Arms (COMBAT)	182	26.3
Ground Support (SERVICE)	221	31.9
Pilot/Naval Flight Officer (AIR)	217	31.4
Air Support (AIRSPT)	72	10.4

Table 3.5 (Continued)

Variable (Name)	Number	Percent
<i>Military Experience</i>		
Deployment to Desert Shield/Storm (SWA)	276	42.3
Deployed for more than six months (AWAY)	301	46.4
<i>Perception of External Opportunities</i>		
Actively Searched for outside job (ACTSRCH)	80	12.4
Believe skills are transferable (CIVTRAN)	466	72.7

Source: Author.

Table 3.6. Mean Distributions of Continuous Variables (N = 692)

Variable (Name)	Mean/Stan Dev
<i>Time/Tenure</i>	
Age entered active duty (ENTRYAGE)	23.12/1.46 years
Age as of 1/1/92 (AGECUR)	27.22/2.1 years
Years of active duty service as of 1/1/92 (YOS)	4.07/1.56 years
<i>Met Expectations</i>	
Military has met expectations (METEX)	3.69/0.81 ^a

^a represents questions measured on a 1 to 5 Likert scale with:

1=strongly disagree

2=disagree

3=neither agree nor disagree

4=agree

5=strongly agree

Source: Author.

Table 3.7 provides a summary of the explanatory variables (by conceptual category) that are included in the final regression model.

Table 3.7. Final Model Explanatory Variables by Category

Personal:	
Race	Deployed time from home
Age at entry	Years of service
Occupational specialty	Deployment to Desert Shield
Marital status	
Internal Work Related:	
Intrinsic satisfiers	Extrinsic satisfiers
Met expectations	Advancement opportunities
External Work Related:	
Employment concerns	Personal concerns
Transferability of military skills to civilian market	
Active search for outside employment	

Source: Author.

IV. MODEL ESTIMATION

A. MODEL SPECIFICATION

An officer's decision to remain on active duty is binary. If the respondent was still on active duty as of 1 June 1996, he was considered a "stayer" and coded as a 1. Otherwise, he was considered a "leaver" and coded as a 0.

Since the retention decision was formed as a dichotomous choice, the logistic regression procedure was most appropriate. Logistic models use sets of explanatory variables to predict the probability that an individual will choose a particular outcome, in this case retention. The logistic regression model is best suited for equations with binary dependent variables because it avoids the unboundedness problem associated with the linear probability model by using a variant of the cumulative logistic distribution. [Ref. 40:p. 518]

In this study, the value of the dependent variable is interpreted as the probability of an officer remaining on active duty. The model is specified as:

$$P(\text{remain on active duty}) = 1/1 + e^{-(B_0 X_0 + B_1 X_1 + \dots + B_k X_k)}$$

P is the probability that an officer remains on active duty and e is the base of the natural logarithm. The X_i s are the values of the explanatory variables, the B_i s are the values for the estimated parameters of the model, and K denotes the number of explanatory variables measured for each individual.

B. EXPLANATORY VARIABLE DEFINITIONS AND HYPOTHESIZED RELATIONS

Explanatory variables chosen for the model are based upon the literature review as well as my personal experience as a junior Marine Corps officer. Individual variable definitions and their expected signs are discussed below.

1. Personal

a. Race/Ethnic Group

As discussed in Chapter III, African American and Hispanic observations were combined to form the dichotomous variable MINORITY. The expected sign of this variable is not clear. Research by Goldhaber *et al* [Ref. 23] states that race is not a significant factor in the retention decision of junior Marine Corps officers. On the other hand, research conducted by the Department of Defense [Ref. 24] revealed that African American men were more likely to remain voluntarily on active duty than their White counterparts.

b. Marital Status

The variables MNC (married-no-children) and MWC (married- with-children) are categorical variables created from the survey question regarding current marital status. It was expected that married officers would remain on active duty at a higher rate than single officers and that married officers with children would remain on active duty at an even greater rate. It was hypothesized that the opportunity costs associated with leaving active duty and finding employment with similar pay and benefits were greater for those officers supporting dependents. Research by Thielmann [Ref. 34] showed that those officers who were married with children were 18.3 percent more likely to remain on active duty. The variables MNC and MWC, compared to SINGLE, are expected to have positive signs.

c. Entryage

The variable measuring an individual's age at entry to the Marine Corps is a continuous variable calculated by dividing his length of service by 12 to obtain years of service and then subtracting years of service from the respondents current age. It was expected that the older the officer at the time of entry to the service, the more likely he would remain on active duty because of increased maturity and not

wanting to "start over" [Ref. 8]. Therefore, the expected sign of this variable was positive.

d. Years of Service (YOS)

The tenure variable for this model is years of service (YOS). Respondents were asked for their length of service in months. By dividing their answers by 12, length of service was converted to years of service. It was expected that, as an officer accrued more years of active service, his propensity to remain in the service would also increase. The longer an officer stays in the service, the less likely it is that he will retain any of the marketable skills he may have acquired in college, especially if the officer received a technical degree. Also, the longer an officer remains in the service, the closer he is to becoming eligible for the retirement benefits that he qualifies for at the 20 year mark. The expected sign of this variable, therefore, was positive. Evidence to support this hypothesis was found in Marsh [Ref. 24] as well as Arnold and Feldman [Ref. 10].

e. Commissioning Source

The survey question regarding commissioning source was transformed to form the categorical variables USNA and ROTC. USNA represents the Naval Academy, NROTC represents officers commissioned through the Naval Reserve Officer Training Corps (scholarship or non-scholarship). The base case category was OCS (officer candidates school). It was expected that officers accessed via the Naval Academy or NROTC, compared to OCS, would remain on active duty for longer periods. These officers receive regular commissions upon graduation and are therefore free to remain on active duty. OCS commissionees receive reserve commissions and must face an often difficult augmentation hurdle in order to have the option to remain on active service. Research by Bowman [Ref. 1], Thielmann [Ref. 34], and

Goldhaber et al [Ref. 23] supports this theory. The variables USNA and NROTC should have positive signs.

f. Military Occupational Specialty

The variables COMBAT, AIR, AIRSPT, are categorical variables created from the primary military occupational specialty (pmos) information in the matched member file. COMBAT represents those officers who have a pmos in the infantry, artillery, armor, or amphibious vehicle fields. Officers serving as pilots or naval flight officers (NFOs) form the AIR category. AIRSPT represents those officers serving in the areas of aircraft maintenance, air control/support, anti-air warfare, or air traffic control. Remaining officers serve in the following ground support fields: personnel and administration; intelligence; logistics, engineers, communications, signals intelligence, supply, financial management, motor transport, data systems, public affairs, and military police. Since the majority of the survey respondents have ground support specialties, this category serves as the base case.

It was expected that officers serving in the COMBAT or AIR fields would be more likely to remain on active duty. The skills acquired by combat arms officers are less easily transferable to the civilian marketplace. While aviation skills are easily transferable, many junior officer aviators choose to remain on active duty in order to accumulate flight hours and experience before transferring to the civilian airlines. Those officers serving in the air support occupations have skills that are readily transferable and would, therefore, be less likely than ground support officers to remain on active duty (whether air or ground) and aviators (pilots or NFOs) would be less likely than those officers serving in combat arms to remain on active duty. These expectations are consistent with the findings of Thielmann [Ref. 34] and Goldhaber et al [Ref. 23].

g. Military Experience

A benefit of the 1992 DoD survey was that it captured the attitudes of military members in the recent aftermath of a major regional conflict. The dichotomous variable SWA was created to represent an officer's service in Operation Desert Shield/Storm. If an officer served in the Persian Gulf region for any period of time during this conflict, he was coded as a 1, otherwise he was coded 0. The expected sign of this variable was unclear. On one hand, it could be positive. Officers with this experience may remain on active duty for longer periods if they believed that the combat experience/credibility they garnered would have a favorable impact on a long term career. Also, there is the "mystique" of combat service that might increase retention. On the other hand, those officers who believed that "One war was enough," and do not want to risk their lives again would tend to leave active duty at a greater rate. In addition, service in the Persian Gulf region during the war may have caused "shock" to the officer. In keeping with the theory proposed by Lee and Mitchell [Ref. 17], this shock may initiate the voluntary turnover process.

Another area of concern for those officers making career decisions is the amount of time deployed away from family (whether spouses or other relatives) [Refs. 30 and 33]. The categorical variable AWAY was formed to measure the impact of deployed time on the retention decision. If an officer had been deployed for more than six months, he was coded a 1. Otherwise, he was coded a 0. It was expected that an increase in the amount of time spent deployed from home would diminish an officer's desire to remain on active duty.

2. Internal Work Related

Studies of turnover/retention dating back to Herzberg et al in 1957 and carrying forward to the present all mention the importance of satisfaction in the stay/leave decision. The satisfaction variables used here were designed to measure

an officer's perceived satisfaction with specific aspects of the military as a whole as well as his current job.

a. *Intrinsic Job Satisfiers (FACTORA)*

The variables that "loaded" most heavily on FACTORA were responses to those survey questions that measured the officer's satisfaction with various nonpecuniary aspects of the military. These included satisfaction with: co-workers; current job; acquaintances; service to country; work conditions; job assignments; and personal freedom. It was hypothesized that the sign of FACTORA would be positive. In other words, an increase in personal satisfaction with these intrinsic aspects of military life should lead to an increased likelihood of retention.

b. *Extrinsic Job Satisfiers (FACTORB)*

An officer's satisfaction with pay and allowances, retirement benefits as well as living environment for his family and frequency of permanent change of station moves all loaded heavily on FACTORB. Increasing an officer's satisfaction in any of these areas should result in an increase in retention.

c. *Advancement Opportunities (FACTORC)*

The variables that weighed most heavily on this category were satisfaction with promotion opportunities, job security, and job training. Once again, it was expected that the more the officer was satisfied with this area the greater the chances he would remain on active duty.

d. *Met Expectations (METEX)*

The variable METEX was created from the survey question that asked officers whether or not the military had lived up to preconceived expectations. Based on the research found in Mowday, Porter, and Steers [Ref. 6], Ashford, Lee, Mowday, and Walsh [Ref. 16], and Pearson [Ref. 13], it was believed that the more an officer's

expectations about military service were met, the more likely he would stay in the service.

3. External Work Related

A vast amount of the research presented in the literature review [Refs. 6, 8, 10, 11, 19, 26, and 28] highlights the importance of perceived external opportunities in the retention decision.

a. Search for Civilian Employment (ACTSRCH)

The first variable in this category examined whether or not the officer had actively looked for civilian employment within in the last 12 months. If the officer stated that he had looked, he was coded a 1, otherwise he was coded a 0. A negative sign was anticipated for the ACTSRCH variable. If the officer was actively looking for work outside the military then, it was assumed, he was making preparations to leave the Marine Corps.

b. Transferability of Military Skills (CIVTRAN)

The variable CIVTRAN was designed to measure whether or not the officer believed his military skills were transferable to the civilian marketplace. If the officer responded affirmatively to this question he was coded as a 1, otherwise he was coded as a 0. A negative sign was anticipated for this variable as well. Those officers who feel that their skills are easily transferable should be more likely to leave the service.

c. Force Reduction Concerns (FACTORX, FACTORY)

In the wake of the military drawdown of the late 1980s and early 1990s, the survey attempted to get a feel for how military personnel were responding. A series of five questions addressed this area by asking respondents, "How concerned are you about the following as a result of the current talk about force reductions in the military strength: long term opportunities in the military; the kind of work you plan

to go into if you leave; whether you will be able to get a civilian job quickly if needed; the financial burden on you and your family should you have to leave the military unexpectedly; and ability to adjust to civilian life?" [Ref. 37:p. 163] The variable reduction techniques of principal components analysis and factor analysis were utilized to produce two force reduction variable, FACTORX and FACTORY.

FACTORX consisted primarily of employment concerns in the wake of a drawdown. Concerns with the: ability to find a civilian job quickly; financial burden on the family; type of work; and long term opportunity in the military loaded heavily on FACTORX. Personal concerns such as the officer's ability to adjust to civilian life after a drawdown loaded on FACTORY. It was hypothesized that the more concerned the officer was about the drawdown the more likely it would be that he would remain on active duty. Those not concerned about the drawdown probably believed that they would have little trouble finding another career or adjusting to civilian life. The research by Wong and McNally [Ref. 30] and Evans [Ref. 31] highlights the significance of the drawdown on organizational commitment and retention.

Table 4.1 provides a summary of the explanatory variables discussed in this chapter and their hypothesized relationships to actual retention behavior.

Table 4.1. Explanatory Variables and Expected Signs

VARIABLE (NAME)	EXPECTED SIGN
<i>PERSONAL</i>	
<i>Race</i>	
Minority	? (as compared to WHITE)
<i>Marital Status</i>	
Married-no-Children (MNC)	+ (as compared to SINGLE)
Married-with-Children (MWC)	+ (as compared to SINGLE)
<i>Time/Tenure</i>	
Years of Service (YOS)	+
Age at entry (ENTRYAGE)	+

Table 4.1 (Continued)

VARIABLE (NAME)	EXPECTED SIGN
<i>Commissioning Source</i>	
Naval Academy (USNA)	+ (as compared to OCS)
Reserve Officer Training Corps (ROTC)	+ (as compared to OCS)
<i>Military Occupational Specialty</i>	
Combat Arms (COMBAT)	+ (as compared to Ground Support)
Pilot/Naval Flight Officer (AIR)	+ (as compared to Ground Support)
Air Support (AIRSPT)	- (as compared to Ground Support)
<i>Military Experience</i>	
Deployed to Desert Shield/Storm (SWA)	? (as compared to no deployment to SWA)
Deployed for more than six months (AWAY)	- (as compared to not deployed for more than 6 months)
<i>INTERNAL WORK RELATED</i>	
<i>Satisfaction with military life</i>	
Intrinsic Job Satisfiers (FACTORA)	+
Extrinsic Job Satisfiers (FACTORB)	+
Advancement Opportunities (FACTORC)	+
Met Expectations (METEX)	+
<i>EXTERNAL WORK RELATED</i>	
Actively searched for outside work (ACTSRCH)	-(as compared to not actively searching)
Transferability of military skills (CIVTRAN)	-(as compared to believing that mil. skills are not transferable to civilian workforce)
<i>Force Drawdown Concerns</i>	
Employment Concerns (FACTORX)	+
Personal Concerns (FACTORY)	+

Source: Author.

C. MODEL RESULTS

The purpose of this analysis was to identify those factors that are significant to the retention decision of junior Marine Corps officers. The estimated logistic regression retention model is presented in Table 4.2. A discussion of the model results, beginning with those explanatory variables that were not statistically significant, follows the table.

Table 4.2. Logistic Regression Results for Marine Officer Retention (N=692)

Variable	Parameter Estimate	Probability Value
<i>PERSONAL</i>		
MINORITY	0.2551	0.4629
MNC	-0.0873	0.6874
MWC	0.3021	0.2916
YOS	-0.0923	0.3098
ENTRYAGE	0.0337	0.6634
USNA***	1.2795	0.0001
ROTC***	1.1554	0.0001
COMBAT*	-0.4409	0.1008
AIR***	1.2884	0.0001
AIRSPT**	-0.7791	0.0260
SWA*	-0.3777	0.1054
AWAY	-0.0227	0.9194
<i>INTERNAL WORK RELATED</i>		
Intrinsic Job Satisfiers***	0.4742	0.0001
Extrinsic Job Satisfiers	-0.0323	0.7572
Advancement Opportunities	0.1264	0.2356
METEX	0.1303	0.2605
<i>EXTERNAL WORK RELATED</i>		
ACTSRCH**	-0.7300	0.0339
CIVTRAN*	-0.3935	0.0962
Employment Concerns***	0.3507	0.0010
Personal Concerns*	0.1884	0.0603

***=significant at one percent; **=significant at five percent; *=significant at ten percent

Source: Author.

Those explanatory variables that fail to demonstrate their statistical significance often provide important insight for policy makers. Some surprising results were found in this model. Particularly peculiar was the statistical insignificance of the component variables measuring extrinsic job satisfiers and satisfaction with

advancement opportunities. Numerous retention studies [Refs. 8, 27, 33, and 34] have indicated the importance of extrinsic satisfiers, such as pay, promotion, and benefits, when it comes to increasing retention rates.

In order to investigate possible explanations for these unexpected results, univariate analysis was employed. While the standard deviations appeared to be consistent across the three "satisfaction" components, a closer examination of the frequency responses given for the variables that formed the intrinsic job satisfier component revealed that the majority (in excess of 75 percent) of the survey respondents were either "satisfied" or "very satisfied" (answers of 4 or 5 on the Likert scale). On the other hand, the majority (in excess of 50 percent) of the responses given by the sample members for the variables that formed the extrinsic job satisfier and advancement opportunity components were "neither satisfied nor dissatisfied" (an answer of 3 on the Likert scale). This failure to demonstrate a strong opinion, in either direction, may have contributed to the statistical insignificance of the extrinsic job satisfier and advancement opportunity components.

The significance of "met expectations" indicated in various studies [Refs. 12 and 13] failed to be substantiated by this model. One possible explanation might be the limited variation in the sample member's perceptions of met expectations. More than 75 percent answered that military life had met their expectations. The standard deviation of this variable (0.8), compared with other similar satisfaction variables (1.0), highlights this limitation.

Another surprise was the failure of either of the time/tenure variables (entryage and years of service) to demonstrate their statistical significance. Researchers such as Arnold and Feldman [Ref. 10] and Cotton and Tuttle [Ref. 8] have placed a strong emphasis on the importance of tenure in the turnover process. The tight restrictions (more than one, but less than seven years of service) placed on the sample data set,

more than likely, contributed to the insignificance of these variables. The sample members were not uniformly distributed across the years of service category. Rather, they were skewed towards the upper end (7 years of service) of the scale. For example, more than 400 of the 692 sample members had in excess of 4.1 years of service.

The statistical insignificance of the race/ethnic variable did not come as a surprise for three reasons. First, the small number of minority observations in the sample alone was cause for concern. Second, the literature review surrounding this area [Refs. 23 and 24] indicated mixed results. Third, there is also an element of self selection that comes into play. Those minorities that join the Marine Corps, like their White counterparts, do so voluntarily. Therefore, minority officers may be more similar to their White officer counterparts than civilian minorities are when compared to their White civilian peers.

Finally, there is little explanation for the insignificant statistical results surrounding the marital status variables. One possible explanation may be that these junior officers have only been married for a relatively short amount of time. They have, therefore, yet to fully experience the inherent stresses that military life can place on the family. Because of the policy implications surrounding this issue, a separate model consisting only of married personnel was subsequently estimated and is discussed later in this thesis.

Turning to those explanatory variables that were statistically significant, USNA, ROTC, AIR, Intrinsic Job Satisfiers, and Force Drawdown Employment Concerns were significant at the one percent level. The variables AIRSPT and ACTSRCH were significant at the five percent level. The variables COMBAT, SWA, CIVTRAN, and Force Drawdown Personal Concerns were significant at the ten percent level.

Logistic regression coefficients, unlike their linear regression counterparts, are difficult to interpret. To resolve this, the partial effects of the explanatory variables

were calculated. This is done by measuring the impact of a one unit change in each independent variable on the retention probability of a referent junior Marine Corps officer. Using the modal value for categorical variables and the mean value for continuous variables, the "base case" male junior Marine Corps officer was White; his marital status was single; he was commissioned through Officer Candidates School; he had a ground support occupational specialty; he did not deploy to Operation Desert Shield/Storm nor had he been deployed for more than six months; he had not actively searched for civilian employment; and he did believe that his military skills were transferable to the civilian marketplace. In addition, the referent individual entered the Marine Corps when he was 23.12 years old. He had 4.07 years of service. Values used for his level of satisfaction with intrinsic and extrinsic aspects of military life, advancement opportunities, met expectations, and individual and employment concerns with the drawdown were all at the mean levels for the restricted sample.

Table 4.3 summarizes the "characteristics" of the base case junior, Marine Corps, male officer. This base case officer with "average" characteristics had a probability of remaining in the Corps of 0.425. Table 4.4 depicts the results of the

Table 4.3. Characteristics of the Base Case Individual

CATEGORY	BASE CASE
Race/Ethnic Group	White
Entryage	23.12 years
Years of Service	4.07 years
Marital Status	Single
Commissioning Source	OCS
Military Occupational Specialty	Ground Support
Deployed to Desert Shield/Storm?	No
Deployed for more than 6 months?	No
Has actively searched for outside work?	No
Believes military skills are transferable?	Yes

Source: Author.

Table 4.4. Partial Effects of Significant Explanatory Variables on Junior Marine Officer Retention (N=692)

Base Case Variable	Change	Partial Effect
<i>PERSONAL</i>		
OCS	USNA	0.301***
OCS	ROTC	0.276***
Ground Support	Combat	-.103*
Ground Support	AIR	0.302***
Ground Support	AIRSPT	-.172**
No deployment to SWA	Deployed to SWA	-.089*
<i>INTERNAL WORK RELATED</i>		
Intrinsic Job Satisfiers (mean)	+1 standard deviation	0.118***
<i>EXTERNAL WORK RELATED</i>		
No active search for civilian work	Has searched for civilian work	-.162**
Believes military skills are transferable to civilian market	Does not believe skills are transferable	0.098*
Force Drawdown Employment Concerns (mean)	+1 standard deviation	0.087***
Force Drawdown Individual Concerns (mean)	+1 standard deviation	0.047*

***=significant at one percent;**=significant at five percent;* =significant at ten percent

Source: Author.

partial effects for the explanatory variables that were significant in the logistic regression model. A discussion of the partial effect of each significant explanatory variable on the retention decision follows Table 4.4. An overall assessment of the impact of these factors in the retention process is discussed in the final chapter.

The fact that there were statistically significant variables in each of the conceptual categories demonstrates the importance of the *personal*, *internal work related*, and *external work related* factors in the turnover decision process of junior Marine Corps officers. Beginning with the significant "personal" variables, a junior

officer commissioned through either the Naval Academy or the Reserve Officer Training Corps is 30 or 28 percent, respectively, more likely to continue his military career than a junior officer accessed through one of the Officer Candidate School programs. With respect to occupational specialties, a junior pilot or Naval flight officer was 30 percent more likely to stay on active duty than a ground support officer. A combat arms officer and an air support officer were 10 and 17 percent less likely, respectively, to remain on active duty when compared to a ground support officer. An officer who deployed to the Persian Gulf region during Operation Desert Shield/Storm was almost nine percent less likely than an officer who did not deploy to continue his active duty service.

The only "internal work related" variable that was statistically significant was the composite dimension that measured intrinsic job satisfiers. A one standard deviation increase from the average component score for this factor was associated with almost a 12 percent increase in retention likelihood.

Each of the original "external work related" variables was statistically significant. If an officer was actively searching for civilian employment, then the chances of him remaining on active duty decreased by 16 percent when compared to the officer who was not actively searching for outside opportunities. Next, the officer who did not believe that the skills he acquired in the military were transferable to the civilian marketplace was almost ten percent more likely to remain in the Marine Corps than the officer who believed that the skills he acquired in the Marine Corps would be transferable to the civilian market. Finally, a one standard deviation increase from the average component score for the composite force drawdown variables, employment concerns and individual concerns, was associated with an 8.7 and a 4.7 percent increase in retention likelihood, respectively.

D. GOODNESS OF FIT

The ultimate goal in any multivariate regression model is to find explanatory variables that are theoretically sound and relevant for meaningful policy interpretation. In addition, the richness of a social scientific model is often measured by the number of statistically significant explanatory variables. In this model, 11 of the 20 explanatory variables used proved to be statistically significant at the 10 percent level.

The amount of multicollinearity present is another "goodness of fit" measure often applied to multivariate regression models. A strong linear relationship between two or more explanatory variables can affect the estimation of the equation. If present, multicollinearity causes difficulty in the identification of the separate effects of the explanatory variables in the regression model [Ref. 40]. Therefore, in order to more closely explore the relationships amongst the explanatory variables, collinearity diagnostics for an identical ordinary least squares regression model were employed. A correlation matrix was generated and revealed that no significant multicollinearity ($r < 0.3$) existed between explanatory variables. Additionally, variance inflation factors were produced for each explanatory variable and all were below the generally accepted 2.0 cutoff.

Overall "goodness of fit" for the logistic regression model was calculated using the -2 Log L criterion. This statistic has a Chi-Square distribution with the null hypothesis that all regression coefficients in the model are zero [Ref. 41:p. 21] The junior Marine Corps officer retention model produced a -2 Log L Chi-Square score of 141.027 with 20 degrees of freedom and a probability value of 0.0001. From this, the null hypothesis that all of the explanatory variables in the model were zero was rejected. It is concluded, therefore, that the model has some explanatory power.

The Hosmer and Lemeshow goodness of fit test is another measure applied to logistic regression models with binary responses. This "lack of fit" test has the null

hypothesis that the model provides a good fit to the data. A Pearson Chi-Square statistic is generated and then compared to the Chi-Square distribution [Ref. 41:p. 67]. For this particular regression model, for example, the Hosmer and Lemeshow goodness of fit statistic was 6.03. When this statistic was compared to a Chi-Square distribution, the resulting probability value was 0.6440. From this, I was unable to reject the null hypothesis, and therefore concluded that the model fit the data well.

The coefficient of concordance for the model was 78 percent. Concordance ratios, however, are difficult to interpret as goodness of fit measures. A more intuitive approach is to examine the model's ability to classify stayers and leavers correctly. Table 4.5 depicts the model's ability to classify stayers and leavers.

Table 4.5. Classification of Stayers and Leavers with the Model

<u>Actual</u>	<u>Leavers</u>	<u>Predicted</u> <u>Stayers</u>	<u>Total</u>
Leavers	66.9%	33.1%	305
Stayers	35.3%	64.6%	379

Source: Author.

The predictive capability of the model was determined by substituting the actual characteristics of the individuals into the logistic equation. If the predicted probability from the equation exceeded the actual retention rate (.55 in this model), the individual was predicted to stay. Predicted probabilities below the .55 cutoff were classified as "leavers." The model correctly classified 66.9 percent (204/305) of the leavers and 64.6 percent (245/379) of the stayers. Overall, the rate of correct classification for the model was 65.6 percent (204+245/684). These figures can be compared to the "naive" prediction rule which assumes that everyone follows the

majority, or 100 percent of the officers would be stayers. In this study, for example, the naive model would be correct 55.4 percent (379/684) of the time. Since this particular logistic model correctly predicted close to 66 percent of the cases, compared to the 55 percent figure obtained using the naive model, it was concluded that the logistic equation was useful.

V. A CLOSER EXAMINATION OF MARRIED AND SINGLE PERSONNEL

A. DISCUSSION

As previously mentioned, the lack of statistical significance of the family status variables (MNC/MWC) in the retention decision model came as a surprise. The Marine Corps, with its fast paced operational tempo and lengthy deployments, can place great stress on the family. For the purpose of investigating possible policy implications, and because a fair amount of military retention research [Refs. 28, 29, and 30] has focused on the importance of the family in the turnover decision process, this chapter examines the 319 married and 373 single junior Marine Corps officers in the sample more closely. Table 5.1 compares the attributes of the married and single officers in the sample data sets. Next, Tables 5.2 through 5.5 examine, for both groups, the factor loadings for the composite dimensions measuring satisfaction with various aspects of military life and force drawdown concerns. Separate logistic regression models are then estimated and presented in Tables 5.6 and 5.7. Finally, the partial effects for the statistically significant explanatory variables in the two models are compared in Table 5.8. Policy implications of these findings are discussed in detail in the final chapter.

The descriptive characteristics in Table 5.1 reveal some interesting differences. First, the married junior officers in the sample have, on average, almost 7 more months of service than the single officers. From this it follows that greater percentages of married officers would be first lieutenants or captains versus second lieutenants. Also, a greater percentage of married officers have been deployed away from their families (not limited to spouse) for more than 6 months. This too follows from the longer length of service for married personnel. Because they have been in the service longer, they would have had more opportunity to be deployed.

Table 5.1. Comparative Descriptive Statistics, Single vs Married

Variable (Name)	SINGLE ONLY (N=373)	MARRIED ONLY (N=319)
	Number/percent	Number/percent
<i>GENDER</i>		
Male	373 / 100%	319 / 100%
<i>RACE/ETHNIC GROUP</i>		
White + Other	334 / 89.5%	295 / 91.9%
Minority	39 / 10.5%	24 / 8.9%
<i>TIME/TENURE</i>		
Years of Service (YOS)	3.82 years (mean)	4.30 years (mean)
ENTRYAGE	23.00 years (mean)	23.27 years (mean)
<i>PAYGRADE</i>		
2nd Lieutenant	123 / 33.0%	67 / 20.9%
1st Lieutenant	198 / 53.1%	185 / 57.9%
Captain	52 / 13.9%	67 / 21.2%
<i>COMMISSIONING SOURCE</i>		
Naval Academy (USNA)	50 / 13.0%	42 / 13.2%
Naval Reserve Officer Training Corps (ROTC)	111 / 30.0%	65 / 19.8%
Officer Candidate School (OCS)	212 / 57.0%	212 / 67.0%
<i>OCCUPATIONAL SPECIALTY</i>		
Combat Arms (COMBAT)	113 / 30.3%	69 / 21.6%
Ground Support (SERVICE)	126 / 33.8%	95 / 30.0%
Pilot/Naval Flight Officer (AIR)	98 / 26.3%	119 / 37.3%
Air Support (AIRSPT)	36 / 9.7%	36 / 11.1%
<i>MILITARY EXPERIENCE</i>		
Deployment to Desert Shield/Storm (SWA)	139 / 41.7%	137 / 42.9%
Deployed for more than six months (AWAY)	147 / 39.4%	154 / 48.3%
<i>PERCEPTION OF EXTERNAL OPPORTUNITIES</i>		
Actively searched for outside job (ACTSRCH)	36 / 11.0%	44 / 13.8%
Believe skills are transferable (CIVTRAN)	235 / 72.8%	231 / 72.4%

Source: Author.

More differences between the two groups exist in the commissioning sources. Thirty percent of the single officers were commissioned through the ROTC program compared to 20 percent of the married officers. Whereas 67 percent of the married officers were commissioned at OCS, only 57 percent of the single officers were. In terms of occupational specialties, a greater percentage of single officers are in the combat arms fields while a greater percentage of married officers are either pilots or Naval flight officers.

As discussed in Chapter III, principal components analysis and factor analysis were employed to identify meaningful dimensions among related groups of variables. Tables 5.2 and 5.3 compare the married and single factor loadings for the satisfaction variables.

Table 5.2. Factor Analysis of Job Satisfaction Variables (Married Only)

Composite Dimensions and Item	Factor Loadings		
	FACTORA	FACTORB	FACTORC
<i>Intrinsic job satisfiers</i>			
Co-workers	0.791	0.165	0.001
Acquaintances	0.685	0.128	0.008
Serve Country	0.611	0.048	0.202
Current Job	0.559	0.051	0.329
Work Conditions	0.450	0.246	0.410
Personal Freedom	0.446	0.411	0.170
<i>Extrinsic job satisfiers</i>			
Frequency of moves	0.156	0.802	0.037
Environment for family	0.192	0.752	0.083

Table 5.2 (Continued)

	Factor Loadings		
Composite Dimensions and Item	FACTORA	FACTORB	FACTORC
<i>Extrinsic job satisfiers (continued)</i>			
Pay	0.080	0.668	0.360
Assignment	0.346	0.471	0.339
Retirement benefits	0.056	0.469	0.417
<i>Advancement opportunities</i>			
Promotion Opportunity	0.197	0.207	0.763
Job Security	0.092	0.072	0.759
Job training	0.372	0.246	0.565

Source: Author.

Table 5.3. Factor Analysis of Job Satisfaction Variables (Single Only)

	Factor Loadings		
Composite Dimensions and Item	FACTORA	FACTORB	FACTORC
<i>Intrinsic job satisfiers</i>			
Co-workers	0.779	0.170	0.159
Current Job	0.726	0.094	0.282
Acquaintances	0.615	0.116	0.110
Work Conditions	0.508	0.392	0.189

Table 5.3 (Continued)

Composite Dimensions and Item	Factor Loadings		
	FACTORA	FACTORB	FACTORC
<i>Intrinsic job satisfiers (Continued)</i>			
Serve Country	0.485	0.214	0.017
Personal Freedom	0.430	0.402	0.025
<i>Extrinsic job satisfiers</i>			
Frequency of moves	0.171	0.724	0.009
Environment for family	0.081	0.620	0.143
Pay	0.164	0.577	0.241
Retirement benefits	0.091	0.599	0.243
Assignment	0.347	0.397	0.386
<i>Advancement opportunities</i>			
Job Security	0.027	0.176	0.802
Promotion Opportunity	0.287	0.092	0.729
Job training	0.234	0.239	0.597

Source: Author.

It is interesting to note that the satisfaction component factors were comprised of the same variables for both married and single officers. There were slight differences, however, in the manner in which the variables that formed the new components loaded. For example, in the order of loading for the "intrinsic satisfaction component," acquaintances were second most important for married officers while current job was second for single officers. Finding acquaintances with similar family

situations (i.e. spouse, children of similar age) would be important for a young married officer whose wife might be away from family for the first time.

Tables 5.4 and 5.5 examine the married and single factor loadings for the concern with the force drawdown variables.

**Table 5.4. Factor Analysis of Force Drawdown Variables
(Married Only)**

Composite Dimension and Item	Factor Loadings	
	FACTORX	FACTORY
<i>Employment Concerns</i>		
Find civilian job quickly	0.891	0.186
Financial burden on family	0.869	0.199
Type of work	0.828	0.140
Long term opportunity in the military	0.703	0.043
<i>Personal Concerns</i>		
Ability to adjust to civilian life	0.625	0.776

Source: Author.

**Table 5.5. Factor Analysis of Force Drawdown Variables
(Single Only)**

Composite Dimension and Item	Factor Loadings	
	FACTORX	FACTORY
<i>Employment Concerns</i>		
Type of work	0.891	0.130
Find civilian job quickly	0.886	0.162
Financial burden on family	0.815	0.258
Long term opportunity in the military	0.650	0.317
<i>Personal Concerns</i>		
Ability to adjust to civilian life	0.215	0.965

Source: Author.

Once again, the new components were formed from the identical variables for both groups. Differences between married and single officers did, however, exist in the order of loading. For example, whereas married officers appeared to be most concerned with finding a civilian job quickly, the highest loading element in the "employment concerns" component for single officers was type of work. This makes sense since a married officer would have to find work quickly to support his family if separated in the wake of a drawdown. Without this pressure, a single officer would be able to be more selective.

B. MODEL RESULTS

Separate logistic regression retention models were estimated to compare the sample's 319 married personnel and 373 single personnel. Explanatory variables used

in these models differed from the original model only in that the family status explanatory variables were excluded. Also, an explanatory variable measuring the importance of the spouse's influence on the officer's career decision process was included in the "married only" model. Tables 5.6 and 5.7 reveal the logistic regression model results for married and single officers, respectively.

Table 5.6. Logistic Regression Results for Marine Officer Retention (Married Only, N=319)

Variable	Parameter Estimate	Probability Value
<i>PERSONAL</i>		
MINORITY	0.7142	0.2012
Spousal Influence*	0.5568	0.0642
YOS	-0.1606	0.2143
ENTRYAGE	0.0767	0.4702
USNA	0.5107	0.2446
ROTC**	0.8518	0.0343
COMBAT***	-1.0948	0.0078
AIR**	1.0262	0.0201
AIRSPT*	-0.8022	0.1014
SWA	0.3717	0.2794
AWAY	-0.1354	0.6722
<i>INTERNAL WORK RELATED</i>		
Intrinsic Job Satisfiers***	0.4093	0.0101
Extrinsic Job Satisfiers	-0.0828	0.5971
Advancement Opportunities***	0.3948	0.0138
METEX	0.0190	0.9075
<i>EXTERNAL WORK RELATED</i>		
ACTSRCH***	-1.3589	0.0067
CIVTRAN	-0.4038	0.2266
Employment Concerns***	0.3848	0.0142
Personal Concerns	0.1605	0.2610

***=significant at one percent ; **=significant at five percent; *=significant at ten percent.

Source: Author.

**Table 5.7. Logistic Regression Results for Marine Officer Retention
(Single Only, N=373)**

Variable	Parameter Estimate	Probability Value
<i>PERSONAL</i>		
MINORITY	0.4191	0.3752
YOS	0.1018	0.4382
ENTRYAGE	0.0363	0.7552
USNA***	2.1469	0.0001
ROTC***	1.6206	0.0001
COMBAT	0.1879	0.6101
AIR***	1.5166	0.0012
AIRSPT*	-0.7827	0.1029
SWA***	-1.3017	0.0001
AWAY	-0.970	0.7693
<i>INTERNAL WORK RELATED</i>		
Intrinsic Job Satisfiers***	0.6559	0.0001
Extrinsic Job Satisfiers	0.0489	0.7310
Advancement Opportunities	0.0625	0.6885
METEX	0.0495	0.7736
<i>EXTERNAL WORK RELATED</i>		
ACTSRCH	-0.1496	0.7809
CIVTRAN	-0.4253	0.2253
Employment Concern***	0.3742	0.0168
Personal Concerns	0.1237	0.3912

***=significant at one percent; **=significant at five percent; *=significant at ten percent.

Source: Author.

In the "married only" model 9 (of 19) explanatory variables were statistically significant at the ten percent level while 7 (of 18) explanatory variables were statistically significant in the "single only" model. In comparing the results from the two models, variables that were consistently statistically significant included: ROTC; intrinsic job satisfiers; and the occupational specialty variables AIRSPT and AIR. While the variables USNA and deployment to Operation Desert Shield/Storm were

statistically significant only in the single model, COMBAT, ACTSRCH, and the component measuring satisfaction with advancement opportunities were statistically significant solely in the "married only" model. Also of interest, the spousal influence variable proved to be statistically significant at the 10 percent significance level. Table 5.8 compares the partial effects for the statistically significant variables in the two models. A discussion of the partial effects, as well as possible explanations for differences in these results, follows the table.

Table 5.8. Partial Effects of Significant Explanatory Variables on Junior Marine Officer Retention (Model Comparison)

Base Case Variable	Change	Partial Effect Model SINGLE (N=373)	Partial Effect Model MARRIED (N=319)
PERSONAL			
Spouse has influence	Spouse has no influence	Not Applicable	-.137*
OCS	USNA	0.432***	0.124 (not sig)
OCS	ROTC	0.360***	0.199**
Ground Support	COMBAT	0.047 (not sig)	-.252***
Ground Support	AIR	0.343***	0.233**
Ground Support	AIRSPT	-.175**	-.192*
No deployment to SWA	Deployed to SWA	-.0262***	-.091 (not sig)
INTERNAL WORK RELATED			
Intrinsic Job Satisfiers (mean)	+1 standard deviation	0.162***	0.100***
Advancement Opportunities (mean)	+1 standard deviation	-.015 (not sig)	0.097***
EXTERNAL WORK RELATED			
No active search for civilian work	Has searched for civilian worked	-.036(not sig)	-.290***
Force Drawdown Employment Concerns (mean)	+1 standard deviation	0.093***	0.095***

***=significant at one percent; **=significant at five percent; *=significant at ten percent

Source: Author.

In order to interpret the meaning of the logistic regression coefficients, partial effect results were generated for the two models. Results for the "married only" model revealed that a junior officer who did not believe that his wife had a "good deal" of influence on his decision to stay in the Marine Corps was 14 percent less likely to remain on active duty when compared to a junior officer who believed his wife had influence on his decision to stay.

The results for married and single officers commissioned through the ROTC program were consistent. A married Marine officer commissioned through the ROTC program was nearly 20 percent more likely to remain on active duty than a married officer commissioned via OCS. A single Marine officer commissioned via the ROTC program was 36 percent more likely to remain on active duty when compared to the single Marine officer commissioned through OCS.

The explanatory variable USNA was significant for single officers only. A single Marine officer commissioned at the Naval Academy was 43 percent more likely to stay on active duty after his initial period of obligated service than a single officer commissioned at OCS. Service Academies and other military style institutions provide structure and strict discipline not found in civilian institutions. Because of this, almost "family" like relationships are often formed between classmates. For a single officer, this surrogate family can inspire loyalty to the military as an institution and therefore explain the significance of this explanatory variable in the retention process. While the married officer might have similar feelings, his loyalty is now foremost given to his dependents.

Deployment to Operation Desert Shield/Storm was significant for single officers only. A single officer who deployed to the Persian Gulf region during these operations was 3 percent less likely to remain on active duty when compared to a single officer who did not deploy.

Whereas the combat arms occupational specialty was not a significant explanatory variable for a single officer, a married combat arms officer was 25 percent less likely than a married ground support officer to stay in the Marine Corps. Combat arms officers tend to be away from home more often than other occupational specialties. Because of this, there may be increased spousal pressure to leave the Marine Corps. A single air support officer was 18 percent less likely than a single ground support officer to stay on active duty. This was similar to the married air support officer who was 19 percent less likely to remain on active duty when compared to the married ground support officer. The AIR explanatory variable was highly significant for both groups of officers. A married and single aviator were 23 percent and 34 percent, respectively, more likely to remain on active duty when compared to their ground support officer counterparts.

For a married junior Marine officer, a one standard deviation increase in the component measuring intrinsic job satisfaction resulted in a 10 percent increase in retention likelihood. For the single Marine officer, a one standard deviation increase in the component measuring intrinsic job satisfaction resulted in a 16 percent retention increase. The satisfaction with advancement opportunities component was significant only for married officers. A one standard deviation increase in this component increased retention likelihood by 10 percent. As shown in Table 5.2, satisfaction with promotion opportunity and job security loaded heavily upon this factor. The significance of this component in the retention decision process might be related to the opportunity costs associated with leaving active duty. These opportunity costs are probably greater for a married officer who is providing for dependents. If an officer and his family are satisfied with their comfort level, he will, more than likely, remain on active duty.

The force drawdown employment concerns component was a statistically significant explanatory factor for married and single officers. A one standard deviation increase in the force drawdown employment concerns component was associated with a 9 percent increase in retention probability for both groups. Finally, the ACTSRCH explanatory variable was a significant factor for a married junior officer only. A junior married officer who has actively searched for outside employment is 29 percent less likely to stay in the Marine Corps when compared to the married Marine officer who has not sought civilian employment. This explanatory variable was, more than likely, significant for the married officer for one of two reasons. First, it may be because he was more senior and anticipated leaving the service sooner than his more junior single counterparts. Or, secondly, it may be because the married officer has a family to provide for and, therefore, considered his search for outside work more seriously than did a single officer. More than likely, a married officer seeks to limit the amount of time he is unemployed during his transition out of the military and into the civilian sector.

C. GOODNESS OF FIT

In terms of goodness of fit, the "married only" model had a -2 Log L Chi-Square score of 81.4 with 19 degrees of freedom and a probability value of 0.0001. The "single only" model produced a -2 Log L Chi-Square score of 95.7 with 18 degrees of freedom and a probability value of 0.0001. From this, the null hypothesis that the regression coefficients in the models were zero was rejected. It was, therefore concluded that both models have explanatory power.

The Hosmer and Lemeshow goodness of fit test generated Pearson Chi-Square statistics of 9.56 ($p=0.298$) for the married model and 8.08 ($p=0.426$) for the single model. In neither case could the null hypothesis that the model provides a good fit

to the data be rejected. Therefore, these results reaffirmed that both models fit the data well.

In order to determine the percentage of cases that the models were able to correctly predict, the actual characteristics of individual married and single personnel were substituted into their respective estimated equations. Predicted probabilities were then generated using the actual retention rates as cutoff points. For example, if the predicted probability for a given married individual exceeded .54, then that individual was predicted to be a "stayer." Comparing predicted to actual outcomes, the married model was able to classify correctly 71.6 percent of the married "stayers" while the single model correctly classified 68.3 percent of the single "stayers." In terms of overall predicting success, the married and single models correctly classified 65.1 percent and 67.9 percent, respectively, of the sample as stayers or leavers. The married and single models were both vast improvements over the 53.5 percent and 56.8 percent, respectively, that would be correctly classified using the previously discussed (see Chapter IV) naive rule. Finally, ordinary least squares diagnostics were utilized and did not reveal any serious collinearity problems in either model.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

This thesis analyzed factors which influenced the retention of male, junior Marine Corps officers who were serving within their initial period of obligated service. A multivariate logistic regression model was estimated using these factors to determine their relative importance in explaining differences in the actual retention behavior of these officers. Subsequent models were then estimated to identify and explain differences in the factors affecting retention between married and single personnel.

A unique aspect of the models utilized in this study were their "completeness." Differing from most econometric studies of turnover which attempt to capture the effect of one particular piece of the turnover puzzle, this thesis examined the relationship between a more complete set of explanatory variables and retention behavior. As such, the relative contributions of a broad range of turnover determinants were analyzed to yield insights for manpower policy makers.

Data for this study were drawn from a matched file of responses to the *1992 Department of Defense Survey of Officers and Enlisted Personnel and Their Spouses* with 1996 follow-up retention information from the Defense Manpower Data Center's Master Loss File. Restrictions imposed were: male; Marine Corps officers, paygrades O-1 to O-3; more than one, but less than seven years of service; under some form of contractual obligation when surveyed in 1992, but free to leave the service prior to 1 June 1996; and no lawyers or individuals without assigned occupational specialties.

The factors found to influence significantly the 692 sample members' decisions to remain on active duty included: commissioning source; occupational specialty; deployment to Operation Desert Shield/Storm; satisfaction with various intrinsic

aspects of life in the Marine Corps; concerns with the force drawdown; whether or not the officer had searched for civilian employment in the last twelve months; and whether or not the officer believed that the skills he had acquired in the Marine Corps would be transferable to the civilian market.

The sample was subsequently divided into married and single personnel. For the 319 married junior Marine Corps officers the factors that weighed most heavily in their decisions to remain in the Marine Corps were: the influence on the career decision of the officers' spouses; commissioning source; occupational specialty; intrinsic job satisfaction; satisfaction with advancement opportunities; whether or not the officer had actively searched for civilian employment; and their concerns with finding a job in the wake of a drawdown.

Factors influencing the stay/leave decision for the 373 single Marine Corps officers were: commissioning source; occupational specialty; intrinsic job satisfaction; and civilian employment concerns following a drawdown.

The Marine Corps simply cannot control some of the factors found to be statistically significant in the retention process. For example, there is an established legal quota set for the number of Marine Corps officers commissioned on a yearly basis at the Naval Academy (USNA). Also, the Marine Corps cannot control whether or not its officers believe that the skills they are acquiring are transferable to the civilian sector.

What can be valuable to the Marine Corps manpower policy makers, however, are those statistically significant explanatory variables that they can address and influence. While multivariate analysis cannot confirm causality, it does explain the strength and direction of the quantitative relationship between a dependent variable and a set of explanatory variables. The results found in this study are not limited to descriptive or bivariate analysis. Rather, the multivariate approach utilized assesses

the joint effects of a broad range of factors on junior officer retention. Knowledge of the partial effects of the factors that are either relevant or irrelevant to the turnover decision process of junior officers allows manpower planners to direct resources into programs that are most likely to yield their desired end results.

Officers commissioned through the Naval Reserve Officer Training Corps (ROTC) program were 28 percent more likely than Officer Candidate School (OCS) commissionees to remain on active duty. The statistical significance of the ROTC and USNA explanatory variables were, most likely, related to the regular commissions that graduates of these programs received upon entering active duty. At the time this survey was administered and matched with follow-on data, officers with reserve commissions (OCS graduates) were forced to face an often difficult augmentation process. If augmented they would receive a regular commission and be allowed to remain on active duty. Starting in 1997, however, ROTC and Naval Academy graduates, like their OCS counterparts, will receive reserve commissions. Only time will tell if the higher retention likelihoods for ROTC and Naval Academy officers continue when they receive regular commissions.

There may, however, be another outcome. The "realistic job previews" [Ref. 12] that the ROTC and Naval Academy programs provide to their midshipmen may be an important factor in their retention process. Even without the initial regular commission, these officers may stay at greater rates than their OCS counterparts. If it is ultimately discovered that ROTC remains a significant explanatory variable in the retention process, then the Marine Corps may decide to steer some of its Platoon Leaders Class (PLC) program participants into ROTC non-scholarship programs if they are locally available.

The statistical significance of the occupational specialty variables provides important insight for manpower planners. Combat arms officers were 10 percent less

likely to remain on active duty when compared to ground support officers. For married officers, those in combat arms occupations were almost 25 percent less likely to remain on active duty than ground support officers. Air support officers, whether single or married, were roughly 18 percent less likely to remain on active duty than ground support officers. Pilots/Naval Flight officers were 30 percent (23 percent for married officers, 34 percent for single officers) more likely to stay in the Marine Corps when compared to ground support officers.

It is no surprise that junior officers assigned to flying billets were more likely to remain in the Marine Corps. First, their jobs, for the most part, are fun and exciting. Pilots are highly trained and given 25 million dollar toys to "play" with. Second, they receive extra compensation for their work. Besides aviation pay, fixed wing pilots often qualify for lucrative bonuses known as "aviation continuation pay." Also, while aviation skills are easily transferable to civilian airlines, many junior officer aviators choose to remain on active duty in order to accumulate the requisite flight hours and experience.

The longer initial periods of obligation also affect the increased retention rate for aviators. Because of the costly training they receive, most pilots face a seven year initial period of obligation. When comparing this to the three to five year initial obligation for ground officers, two things come to mind. First, greater time on active duty means the more time to become "indoctrinated" in the Marine Corps lifestyle. Second, the 20-year retirement point looks much more obtainable after 7 years than it does after 3 years. For some, 13 more years of service may not seem quite as "scary" when compared to 17 more years of service.

Air support officers (whether single or married) were roughly 18 percent less likely than ground support officers to remain in the Marine Corps. There are several possible reasons why this may be the case. Although they play a vital function, the

air support mission is often discounted. In the aviation community, air support officers are clearly "second class citizens" when compared to pilots. In the Marine Corps as a whole, air support officers, because of their small numbers (8 percent of the officer corps) find themselves in relative obscurity. While their ground support officer counterparts are also often treated as second class citizens, their importance is never overlooked. Also, numerous combat arms officers are laterally transferred into the ground support occupations, not the air support community, when augmented. In a sense, the stature of these ground support jobs increase as the numbers of officers with prior combat arms experience move into their ranks. Finally, air support officers such as air traffic controllers (who all receive Federal Aviation Administration certification) can transfer their military skills rather easily to the civilian workforce.

Although Marine Corps life can be difficult, no matter what the occupational specialty, the life of a combat arms officer can be particularly demanding. This lifestyle may have caused the lower retention rate for combat arms officers, found in this study, when compared to those in ground support occupations. When not on an extended overseas deployments, combat arms officers find themselves training in the field for weeks on end. Thus, even when these officers are "home," they are really away. For many, this grinding lifestyle is not only physically challenging, but it is also mentally tiring. The boyhood romanticism of playing soldier loses its mystique quickly when you are cold, wet, tired, and hungry on a frequent basis! In this light, the lower retention probability for combat arms officers is not surprising.

Implications surrounding the Marine Corps' "quality spread" policy of assigning occupational specialties to officers graduating from The Basic School (TBS) also arise from these "occupational specialty" results. Just prior to graduating from TBS, officers are divided into thirds based on their overall class standings. The thirds are then divided into thirds again. If an officer is in the top one third of any third, he then

receives his first choice of occupational specialty. This ensures that the Marine Corps has a "quality spread" of its officers. Or, in other words, not all the highest or lowest evaluated officers will wind up in one particular area.

In a typical TBS graduating class, the combat arms specialties are the first to be filled. Therefore, the combat arms occupations have officers from the top third of the top, middle, and bottom thirds. Since combat arms officers, in this study, were leaving active duty at a greater rate than ground support officers, the question arises, were the best Marine Corps officers leaving active duty? Or, were the officers who graduated in the middle or bottom thirds leaving because they believed they could not compete?

Those officers graduating in the top of the bottom third may be forced into a self fulfilling prophecy from the start of their careers. Within the first 6 months of their active duty careers, they know they are not top performers. Yet, they are assigned the same occupations (and often to the same units) and are forced to compete against those who they have been told are better. Psychologically, these officers do not start out on an equal level. These officers can either work extra hard to overcome the stereotype they are laden with because of their TBS class standing, or they can just sit back and decide it is not worth the effort. It would not only be interesting, but useful, to match this survey data with class standing information from TBS to see which officers are remaining on active duty.

The statistical significance of the occupational explanatory variables in the retention process leads to several policy recommendations. First, junior officers must be provided with realistic job previews of the communities that they are considering entering. The officer staff at TBS should have representation from as many occupational specialties as possible. These officers would then be responsible for "selling" their respective communities to the students. By doing this, a junior officer

would have a more realistic expectation about operational tempo as well as other concerns he may have about "life" in the Fleet Marine Force. Next, since many air support officers receive "general" training that is easily transferable to the civilian sector, certain officers i.e. those who we want to keep) may be targeted with incentives to remain on duty. Nonpecuniary benefits such as choice of school or duty station are often enough to entice young officers to remain on active duty.

The fact that the officers sampled in this data set who deployed to Operation Desert Shield/Storm were 10 percent less likely to remain on active duty when compared to officers who did not deploy is important. The results of this thesis are consistent with a special report published in the October 9, 1995 edition of the *Air Force Times*. In this report, Defense Department statistics indicated that only 35 percent of Marine Corps gulf-war veterans (officers and enlisted) remain in the service compared to the 45 percent who did not deploy and remain in the Marine Corps [Ref. 42]. What is most interesting is that senior officers (O-4 and above) with Desert Shield/Storm experience are more likely to remain on active duty than their counterparts who did not deploy to the Persian Gulf region during the war. Therefore, it is the junior officers and enlisted personnel with combat experience who disproportionately leave. This disparity between combat experienced stayers and leavers is more prevalent in the Marine Corps than any of the other services [Ref. 42].

The Marine Corps is an organization whose ultimate purpose is to win on the battlefield. Combat leadership experience can only be acquired through experience. As Marine Corps leaders with Vietnam combat experience approach retirement, it will be those junior officers with "experience" from the Persian Gulf War who will be called on for their expertise. If officers who serve in combat decide to leave the organization at greater rates, for one reason or another, then the Marine Corps needs

to be aware of this, and potentially target these "combat experienced" officers with incentives to remain on active duty.

It was interesting that the component measuring satisfaction with the "intrinsic" aspects of the Marine Corps, not the "extrinsic" aspects such as pay and retirement benefits, was a significant factor for those remaining on active duty. Increasing satisfaction with the intrinsic aspects (satisfaction with: co-workers; acquaintances; current job; work conditions; service to country; and personal freedom) of military life resulted in a 12 percent increase in retention likelihood for junior Marine Corps officers (10 percent for married, 16 percent for single). Although these intrinsic factors may be difficult for policy makers to target directly, the Commandant's recently unveiled "Transformation" policy strikes right at the core of this issue.

From the time he took office, General Krulak has emphasized the importance of the Marine Corps' "core values" of honor, courage, and commitment. What his "Transformation" program adds to these core values is teamwork. The Commandant's philosophy is that instilling values and increasing teamship/unit cohesion is an integral component in building a more effective combat force [Ref. 43]. Through the use of programs like the Marine Corps values card, "crucible" training and core values training, satisfaction with the intrinsic aspects of the Marine Corps should only increase, which in turn should result in increased retention.

The force drawdown of the early 1990s weighed heavily on the minds of the junior officers sampled in this study. Those Marine Corps officers who were concerned with their ability to find civilian employment in the wake of a drawdown were nearly 10 percent more likely to remain on active duty. Those officers who were concerned with their overall adaptability to civilian life were 5 percent more likely to remain in the Marine Corps.

With declining budgets and the recently announced Quadrennial Defense Review (QDR), the services must be braced for further cuts. The QDR will attempt to determine whether the United States military should abandon the requirement to be prepared to fight two simultaneous major regional conflicts. If policy makers decide to scale back the overall mission to fighting only one war, then substantial cuts in the current force could be justified [Ref. 44].

Those sampled in this study were either on or just about to enter active duty during the major force reductions of the early 1990s. Therefore, the respondents who remained on active duty as of 1 June 1996 know full well the turmoil that surrounds military personnel cuts. Many good people who wanted to remain in the Marine Corps were pushed out. Those who did remain were subject to increased operational tempo, unit realignments, and base closures. Anticipating this, Marine Corps policy makers should be prepared, well in advance, with the most equitable and appropriate ways to reduce overall end strength. A properly planned force drawdown can allow the Marine Corps to retain those we want and separate those we are willing to lose, thereby shaping the force for the 21st century.

Roughly 71 percent of today's Marine Corps officers are married [Ref. 38]. The matched retention data used in this thesis revealed that married officers were more likely to leave the Marine Corps than single officers. Therefore, the significance of the spousal support explanatory variable in the married only model should not be overlooked. Nearly 70 percent of the married sample responded that their spouses had a "good deal" of influence on their decisions to remain in the Marine Corps. Those junior officers who believed that their spouses had no influence were 14 percent less likely to remain in the Marine Corps.

There were other differences between the junior married and single officers sampled. First, the composite explanatory variable measuring satisfaction with

advancement opportunities proved to be statistically significant for married officers only. Also, the perception of external employment opportunities was more important in the retention decision process for married officers. Married officers who had actively searched for civilian employment were 29 percent less likely to remain on active duty when compared to those married officers who had not searched.

These results dictate that the Marine Corps must remain committed to the family and improving the quality of life for its personnel. Improvements in areas such as military housing, operational/personnel tempo, and community and family services have all been addressed in "Marines 2001 - A quality Life." In testimony before the Subcommittee on National Security of the House Appropriations Committee, the outgoing Marine Corps Deputy Chief of Staff for Manpower and Reserve Affairs, Lieutenant General George Christmas, discussed a "Family Team Building Program" [Ref. 45]. The intent of this program is to orient Marine Corps spouses to life in the military. According to General Christmas, "By being recognized as a valued part of the Marine Corps team, family members develop ownership of the mission." Quality of life clearly influences recruiting and retention. On a deeper and more important level, it also impacts morale, readiness, and, ultimately, combat effectiveness.

B. FUTURE RESEARCH

The small numbers of women and minorities sampled made it difficult to study the factors that may have affected the retention behavior of these important groups. Future surveys should attempt to assure adequate sample size of these groups in order to conduct appropriate retention analyses.

Surveys such as the *1992 DoD Survey of Officers and Enlisted Personnel* should be continued. They provide a great deal of information on the behavior of service members at a relatively low cost. More effort should be made to provide follow-up data on the matched member file in order to track these individuals

longitudinally through their careers. By doing this, changes in the members' attitudes and perceptions of the Marine Corps may be identified for appropriate future policy.

Follow-on research should also continue to study the significance of the family in the retention process. It will be interesting to see if programs such as the "Family Team Building Program" help increase the retention rates of junior married personnel. Finally, the Marine Corps should consider merging the DoD survey with other data such as officer performance/promotion records and TBS information. Merging these files will allow the development of an all encompassing retention model that manpower policy makers can utilize to understand the factors that truly affect junior officer retention.

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