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JOB SATISFACTION AMONG UNITED STATES NAVY AND MARINE CORPS AVIATION OFFICERS - A STUDY OF THE IMPACT ON CAREER RETENTION

by

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United States Naval Aviation Officer retention has been identified by senior-level personnel managers as one of the largest challenges faced by the services in recent years. In robust economic times all branches of the armed forces face the challenge of retaining sufficient highly-trained volunteers. The aviation community is disproportionately affected due to the long lead time associated with aviation officer training and the potential for long-term lucrative civilian job opportunities compared with existing military pay and benefits. This study documents the development of a retention survey aimed to quantify Naval aviation officer attitudes towards job satisfaction and turnover intent. Previous research has indicated that measurements of job satisfaction are the most reliable predictor of one's intent to remain with an existing employer. To best understand this relationship, CART and logistic regression models are proposed to predict Naval aviation officer retention. These model were developed using a principal components analysis of survey data elements. Work satisfaction and age were analyzed in terms of their impact as moderators of the relationship between job satisfaction and retention. Work Satisfaction factors were found to be significant in models that predicted turnover intent half again better than if one was to merely provide a sample estimate.

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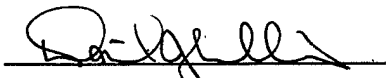
Author: 

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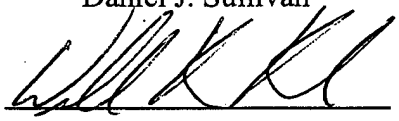
Approved by: 

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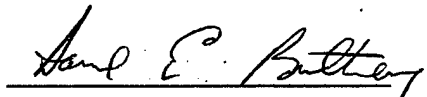

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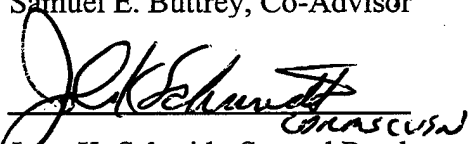

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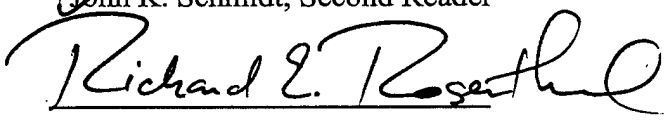

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ABSTRACT

United States Naval Aviation Officer retention has been identified by senior-level personnel managers as one of the largest challenges faced by the services in recent years. In robust economic times all branches of the armed forces face the challenge of retaining sufficient highly-trained volunteers. The aviation community is disproportionately affected due to the long lead time associated with aviation officer training and the potential for long-term lucrative civilian job opportunities compared with existing military pay and benefits. This study documents the development of a retention survey aimed to quantify naval aviation officer attitudes towards job satisfaction and turnover intent. Previous research has indicated that measurements of job satisfaction are the most reliable predictor of one's intent to remain with an existing employer. To best understand this relationship, CART and, logistic regression models are proposed to predict naval aviation officer retention. These models were developed using a principal components analysis of survey data elements. Work satisfaction and age were analyzed in terms of their impact as moderators of the relationship between job satisfaction and retention. Work Satisfaction factors were found to be significant in models that predicted turnover intent half again better than if one was to merely provide a sample estimate.

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EXECUTIVE SUMMARY

United States Naval Aviation Officer retention has been identified by senior-level personnel managers as one of the largest challenges faced by the services in recent years (Oliver, 1998). In robust economic times all branches of the armed forces face the challenge of retaining sufficient highly-trained volunteers ("Military to argue for more funding," 1998). The aviation community is disproportionately affected due to the long lead time associated with aviation officer training and the potential for long-term lucrative civilian job opportunities compared with existing military pay and benefits. This study documents the development of a retention survey aimed to quantify Naval aviation officer attitudes towards job satisfaction and turnover intent.

As job satisfaction research has shown, several prominent theories which use a factoring of behavioral attitudes (such as the JDI or MJDQ formats) to measure employee job satisfaction (Muchinsky, 1993; Steers & Porter, 1987) have been developed. This measurement approach has been used to consistently predict turnover intent which was also shown to be significantly correlated to actual turnover or retention (Mobley, 1977). Depending on the types of subjects included in the research, these studies have shown that certain demographic factors (age, tenure, marital status, etc.) as well as attitudes (such as satisfaction with pay, work, or supervisors) also play a predictive or moderating role in the level of satisfaction one derives from his or her work experience. The nature of this study then is to predict aviator retention behavior using survey data from a representative sample of aviators and determine appropriate factor measurements associated with job satisfaction (Amundson, 1987 provides a similar study of U.S. Air

Force Officers). By knowing these factors, the military will as a result be in a position to effect internal changes, which would influence desired retention behavior.

A preliminary analysis of retention survey data was conducted to quantify attitudinal responses irrespective of the dependent measure, turnover intent. Aviators appear most positively motivated in their careers by affiliation and job fulfillment needs. Physiological and security needs (Work and Pay Satisfaction factors) elicited very negative responses from the majority. To best understand the underlying relationship between this data and the dependent measure, CART and logistic regression models are proposed to predict aviator retention. These models were developed by means of a principal components analysis of survey data elements. Work satisfaction and age were analyzed in terms of their impact as moderators of the relationship between job satisfaction and retention. Due to the fact that early in their careers aviators transition from an obligated to a voluntary retention status, the issue of 'tenure,' or the surrogate 'age,' played an important role in model generation. CART models generated after initially delineating sample data by respondent's age were vastly improved and comprised of significantly different independent measures given the behavioral differences which exist in aviator age groups. Through logistic regression modeling, Work Satisfaction factors were found to be significant in four models (broken down separately by branch of service and tenure) that predicted turnover intent half again better than if one was to merely provide a sample estimate.

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I would like to acknowledge the financial support provided by the Naval Aviation Systems Command without which the survey data collection efforts would not have been possible. Additionally, I wish to acknowledge the steadfast devotion of my wife, Emily, who remained at home with my children, Charlotte and Carl, on our 10th wedding anniversary while I was busy surveying the attitudes of my aviator contemporaries.

I. INTRODUCTION

A. OBJECTIVE STATEMENT

This study focused on developing a model for job satisfaction among U.S. Navy and Marine Corps Naval Aviators and Naval Flight Officers (NFOs) from which retention behavior can be predicted. In particular, the work satisfaction component of the job satisfaction model was analyzed across appropriate demographic frames of reference (i.e., age, aircraft type, rank, marital status, etc.) within the two branches of the Department of the Navy (DoN). To accomplish this goal, a retention survey was administered to Naval Aviators and NFOs (hereafter jointly referred to simply as aviators) to collect information about attitudes relating to job satisfaction. Data from this survey was used to determine those attitudes toward work that might be valid predictors of retention. The ages of survey respondents was also analyzed to determine if this variable moderates, or tempers, the relationship between job satisfaction and intent to continue military service. Should a relationship actually exist, different attitudes towards work from one generation to the next might necessitate organizational change in the workplace.

B. BACKGROUND

In this past decade, a myriad of political and economic events, both global and national, have transpired to reshape the United States Armed Forces. The thaw in tensions in the former Soviet Union has ushered in an era of prolonged peace and economic prosperity in the United States and to various degrees in the rest of the world. As a consequence of this positive trend, American voters appear to be casting their

ballots in favor of politicians who promise a redistribution of the "peace dividend." In recent years, our governmental representatives have reduced the overall size of America's defense forces, but not without negative consequences. The total number of military members has decreased, weapons systems procurement (both existing and planned for production) have been scaled back, and over 500 military installations have been the subject of closure/realignment actions (DoD, 1995). Attitudes of today's all-volunteer force towards career retention have been shaped by these measures in the midst of an undiminished level of operations.

One must occasionally step aside to determine whether the organization, its undercurrent of change, and the rate at which these changes have been effected, are having a negative impact on the individuals within the organization. In a critical report on the Quadrennial Defense Review, Spinney (1997) states that in its most recent attempt to construct a post-cold war military strategy, the Pentagon has "failed to weave forces and budget into a coherent military policy." Further, Spinney documents the decline in the FY97 DoD budget compared with post-Korean War outlays and the negative impact of budgetary decisions for forces of the 21st century. Some military members seem to be adhering to a view that the QDR more a matter of "Quickly Decreasing Readiness" than the Pentagon's official defense blueprint for the future (Wilson, 1997).

Whether our nation's forces are acting as peacekeepers or counter-drug observers, providing humanitarian assistance or training for the next global conflict, the demands placed on the military have been consistent while resources have declined ("Doing More With Less," 1998). In light of this predicament, one can easily argue that the military's readiness for conflict is a question that must be continually addressed. In

fact, as defense budgets are programmed for continued decline, the need for an assurance of military preparedness for the next conflict is greater than ever. As lives are indeed on the line, military members should not have to question their readiness capability as they embark on their next mission or deployment.

The effects of the drawdown on the psychological climate of personnel within any service or specific unit are extremely complex. Naval personnel may for example take issue with the most recent rate at which new ships are commissioned or unsuitable ones are decommissioned. On the other hand, certain aviation communities may be dissatisfied by a decision to restructure the measurement of training accomplishment (given perceived numbers of available aircraft and their rate of replacement). The politics of the QDR, and related actions, affect each service member differently. At the foundation of this evolutionary process, however, is the manner in which an organization (the Defense Department in this case) continues to motivate personnel (the *all-voluntary* military) and how employee behavioral responses can be predicted and satisfactorily controlled to the benefit of the organization. From the field of Industrial Psychology, established behavioral theory has shown that the major determinants of human motivation are the needs, desires and expectations individuals have concerning future events (Steers & Porter, 1987). The literature examined in this study shows a consistent relationship between job satisfaction and employee turnover.

C. WHY STUDY JOB SATISFACTION?

The study of job satisfaction derives from the broader research on how individuals adjust to work. Resulting from this research has been the Theory of Work Adjustment which, according to Zytowski (1973), is comprised of two major components: the

individual and the work environment. This theory entails decades of work supported by the U.S. Department of Health, Education and Welfare. Sometimes referred to as the person-environment fit (P-E fit), the Theory of Work Adjustment (Zytowski, 1973) states that an individual's adjustment to work depends on how well he or she: (1) *satisfies the basic requirements* of the job, and (2) is *satisfied by that job*. While job satisfaction is one of several possible consequences of the P-E fit (Dawis, 1992), only satisfaction can forecast whether an individual will voluntarily quit or remain on the job (Zytowski, 1973). For the purposes of this study, it can be assumed that after roughly two years of primary, intermediate, and advanced flight training, aviators have been accurately determined to be well-suited for the job. The remaining unknown variable is his or her satisfaction.

Initially, industrial psychologists conducted research into job satisfaction based on organizational desires for increased productivity (Amundson, 1987). Later in 1927, the Hawthorne studies investigated monotonous working conditions of factory personnel and came to the conclusion that the primary determinant of worker efficiency was not a satisfactory paycheck or acceptable working conditions, but good relations among workers and between workers and management. Over time, job satisfaction research has shifted focus away from increases in productivity.

Regardless of the development of a broader conceptual understanding of employee satisfaction, the soldiers, sailors, airmen and Marines of yesteryear could rely on their parent organization when it came to meeting their basic needs. This basic trust is grounded in the first principle of effective military leadership which requires that a leader knows his or her troops and look out for their general welfare. While this leadership

principle is still valid today, many conditions affecting the general definition of job satisfaction (such as revised organizational settings and goals) may have changed the service members' attitudes. This change can be presumed since job satisfaction itself is an individual assessment of one's job experiences.

For a member of the military, assessing the overall satisfaction with one's job may be an infrequent event or a seemingly never-ending evaluation. According to Muchinsky (1993), though it is not known whether job satisfaction has a *causal* relationship with important variables such as turnover and performance, the feelings of high job satisfaction are indeed *associated* with certain levels of these variables. One fact is certain: military personnel in good standing must eventually choose between extending their military service obligation or leaving the service after their initially contracted commitment. While continued service is in most cases voluntary, today's aviators may be silently voicing displeasure for further service by resigning their commissions in far greater numbers than expected (Peniston, 1997). Given the obvious negative impact on the organization, the concept of job satisfaction has in recent years taken on increased importance in light of the continued military drawdown and high operational demands.

D. LITERATURE REVIEW

1. Job Satisfaction Theories

Job satisfaction is a complex phenomenon and as such many different theories that attempt to explain what motivates people to enjoy their jobs have been offered (Muchinsky, 1993). In light of this complexity, while each new theory has improved our basic understanding of the elements of job satisfaction no single theory has been entirely

successful at encompassing all relevant facets of human behavior. These theories do provide a useful framework for conducting research.

a) Intrapersonal-Comparison Process

The most widely applied theory asserts that the degree to which one experiences satisfaction (or dissatisfaction) on the job results from comparisons made between that person's standards and the extent to which those standards are met. Since individuals are making these comparisons, theories of this type are termed intrapersonal. The inherent standards in the process may be: (1) physical and psychological needs, in line with Maslow (1954) "Hierarchy of Needs" as portrayed in Figure 1.1; or (2) human values which by nature vary from person to person. High levels of job satisfaction would tend to result from the attainment of higher-ordered needs, or an individual's most 'prized' values.

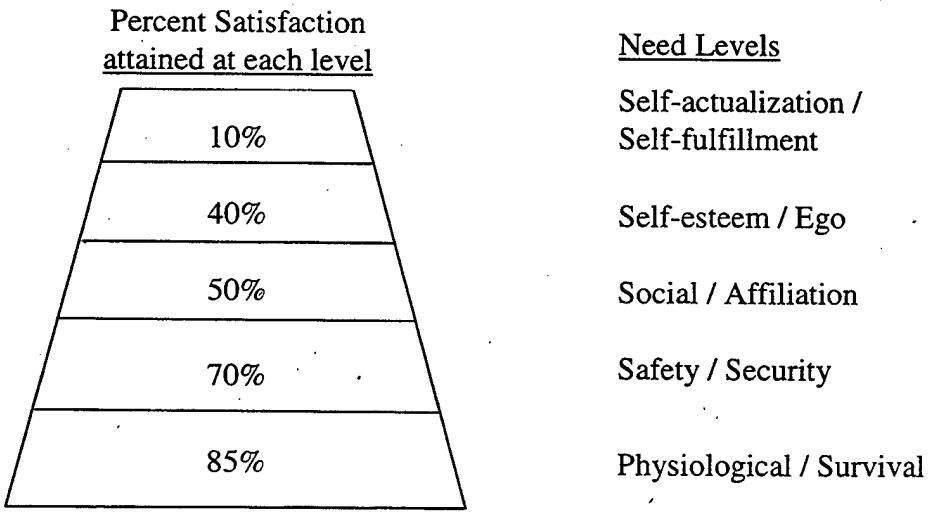

Figure 1.1. Hierarchy of Needs which reflects that higher-ordered need levels are linked to a declining relative potency of complete satisfaction (Maslow, 1954). Maslow's theory asserted that individuals strive to first attain low–level needs, in whole or in part, and subsequently strive for a higher level need which contributes a declining amount (reflected in relative percentages) towards one's complete satisfaction.

For purposes of this study, aviators who joined the service to attain a low-level need such as good pay (either a physiological or security need level) should be more inclined to consider leaving if more desirable job alternatives arise. Drawing on the notion that job satisfaction is a *personal* assessment, an analysis of values (as opposed to needs) provides additional 'flexibility' in research since all people possess the same set of needs (Muchinsky, 1993). According to Muchinsky (1993), a satisfying job would provide the opportunity to attain valued outcomes. For example, it is anticipated that an aviator who joined the military because he/she valued the prestige (self-esteem and pride) provided by serving in the military would be satisfied and desire career retention as long as prestige was attainable. Conversely, if prestige was an aviator's reason for joining the military and this need was not attainable, then these individuals should be inclined to consider leaving.

b) Interpersonal-Comparison Process

Contrary to Intrapersonal-Comparison based theories, some behaviorists feel that people tend to judge their level of job satisfaction through contrasts made among their co-workers (Salancik & Pfeffer, 1977). In other words, a comparison between co-workers about job-related factors is being made. For example, if an aviator possessed high-level job needs and his or her job facilitated the attainment of those needs yet he or she was considering leaving, it is likely that some interpersonal-comparison was being made to produce job dissatisfaction. The notion that social interactions are intertwined with satisfaction is intuitively appealing. However, while this approach has merit, it also has some shortcomings. One flaw of Interpersonal-Comparison theory is that job satisfaction evaluations are still made even when someone is working alone (Muchinsky,

1993). Further, if viewed in the extreme, this theory implies that the only means by which an organization can ensure a happy workforce in the long term would be to consistently hire happy employees.

c) Two-Factor Theory

Herzberg, Mausner, and Snyderman (1959) investigated job satisfaction using a completely different approach. This approach, known as Herzberg's two-factor theory, has generated a good amount of research and controversy (Muchinsky, 1993). The premise of the two-factor theory is that experiences of workers leading to feelings of satisfaction/dissatisfaction can be analyzed in terms of *content* and *context*. Content factors related to the job could be things such as achievement, recognition, promotion, and responsibility. Items relating to the job's context might happen to be company policies, supervision, salary and working conditions. Herzberg proposed that content factors, or *satisfiers*, resulted in feelings of job satisfaction. Conversely, context factors, or *dissatisfiers*, produced in workers feelings of job dissatisfaction. According to the two-factor theory, a job that is highly rewarding and consists of many content factors will produce job satisfaction. If this same job was seemingly unrewarding, workers would feel indifferent (Muchinsky, 1993). However, context factors yield job dissatisfaction when a job bears a low reward but merely indifference in employees whose jobs offer high reward (see Figure 1.2).

It can be easily seen from Figure 1.2 that a job's content factors ensure satisfaction while its context factors will obviate worker dissatisfaction. Although many prominent theorists have been able to provide valid arguments as to contextual factors

inducing job satisfaction, this theory remains somewhat controversial (Muchinsky, 1993). As a result, survey responses in this study were not analyzed relative to this theory.

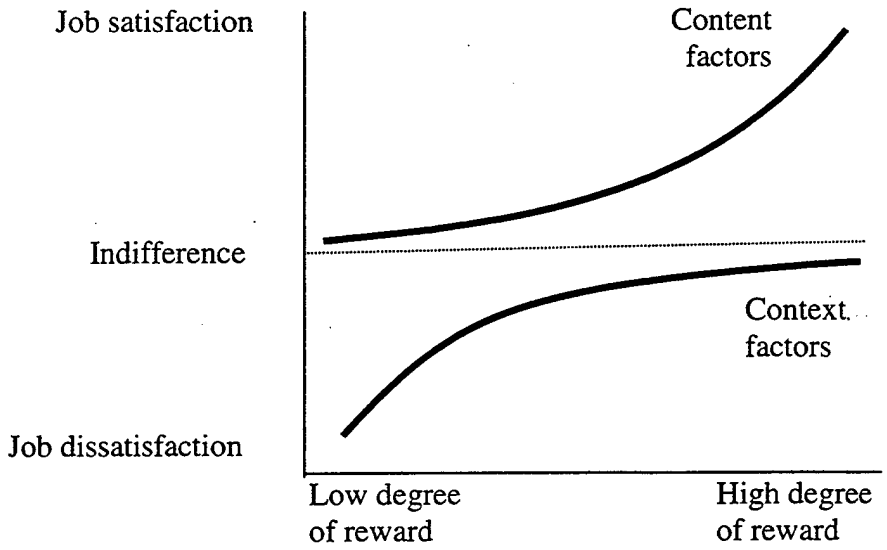

Figure 1.2. Representation of effects of Herzberg's two factors on job satisfaction (Muchinsky, 1993).

2. Measuring Job Satisfaction

While Herzberg and others used personal interviews in the conduct of their research, a more reliable and valid technique is to employ a standardized survey to capture job satisfaction attitudes. Through the use of standardized surveys, the validation of results is facilitated and meta-analytical comparisons are made possible (Fowler, 1993). As interest in the field of worker behavior has increased in recent years, surveys of various types have been developed to measure worker job satisfaction. To obtain a comprehensive understanding of worker attitudes, research on life (global) satisfaction may utilize broadly formulated open-ended surveys. To understand a particular component or 'facet' of job satisfaction, however, researchers may develop narrowly focussed closed-question surveys. Smith (1992) developed an analogy that she termed

the "River of Satisfaction" to help explain the dynamics of feelings (events), facet satisfactions and global satisfaction.

Satisfaction-related behavior begins as events that Smith characterizes as raindrops. These events collectively merge downstream into tributaries represented as facet satisfactions. Facet satisfactions merge into job satisfaction and ultimately life satisfaction. The five facets in the "River of Satisfaction" analogy also represent the scales utilized in the Job Descriptive Index (Smith, 1992).

a) Job Descriptive Index

Developed and revised by Smith, Kendall, and Hulin (1969, 1985), the Job Descriptive Index (JDI) is comprised of questions that measure five facet satisfactions: pay, work, promotion, co-worker, and supervision, plus a general global measure. Years of development have shown the JDI to be a highly valid measure of job satisfaction (Muchinsky, 1993). Research has also shown that the JDI provides a reliable measure of job satisfaction and hence is very useful in longitudinal studies. As such, the JDI is the most commonly used measure of job satisfaction. Based on these findings, the JDI will be used to develop a factorial framework associated with responses to open-ended survey questions.

b) Minnesota Job Description Questionnaire

The next most popular measure of job satisfaction is the Minnesota Job Description Questionnaire (MJDQ) developed by Weiss, Dawis, England, and Lofquist (1967). Weiss et al. (1967) utilized twenty variables (facet scales), each containing 5 questions, to measure job satisfaction (refer to Appendix B). Four facet satisfactions

(pay, promotion, co-worker, and supervision) are common to both the MJDQ and the JDI. Weiss (1973) reasoned that it would be possible to predict job satisfaction by measuring the individual differences in responses to this set of 20 variables. While the number of facets being measured is a subjective issue that the researcher typically defines (Muchinsky, 1993), the independence of facets is a minor issue. The common set of variables used in both the JDI and the MJDQ will be used to facilitate the categorization of responses to open-ended survey questions as shown in Appendix B. Independence of these factors will be determined in the course of data analysis.

3. Job Satisfaction As It Relates To Job Behavior

Numerous studies of work-related behavior have been conducted in an attempt to show a causal relationship between demographic characteristics such as age and gender and job satisfaction (i.e., Glenn, Taylor, & Weaver, 1977; Amundson, 1987; Muchinsky, 1993). However, the results of these studies have been inconsistent or inconclusive as to the nature of this relationship. Glenn et al. (1977) showed that while job satisfaction varies directly with age among both males and females, differences in age accounted for only two to three percent of the variance in the dependent measure, job satisfaction, and that therefore further attempts to explain the correlation are required. Amundson (1987) cites various studies on the relationship between gender and job satisfaction in his study which showed that gender was not a distinguishing factor of job satisfaction among U.S. Air Force Officers. Perhaps since job satisfaction is an *individual* response (Muchinsky, 1993), age and gender are factors that are less critical in the study of job satisfaction as it relates to turnover. The debate on this issue will no doubt continue.

More recently, Schneider, Gunnarson and Wheeler (1992) asserted that physiological characteristics are not key variables for determining one's job satisfaction, but that one's available opportunities are a better predictor. In the meantime, if age plays some moderating role in influencing one's level of job satisfaction, then this relationship needs to be better understood given the considerable effort associated with recruiting and retaining tomorrow's all-volunteer forces. This need arises from the evolving composition of today's military forces. As the percentage of service members from the Baby Boom era decline, there has been a great deal of focus on possible differing views and values of the new generation of volunteers who are filling out today's ranks (Blazar & Fuentes, 1997). According to Blazar & Fuentes (1997), this so-called "Generation X" is comprised of youth having higher expectations for their lifestyles than Baby Boomers. Sensing the importance of how military service could fulfill (or fail to meet) these expectations, the Commandant of the Marine Corps convened a special conference of the challenges posed by the assimilation of this emerging group. Of import to the Commandant is the belief that today's leaders must understand the young people that are being recruited today in order to train them to be good Marines (Blazar & Fuentes, 1997).

Vice Admiral Oliver (1998), Chief of Naval Personnel, stated that "our biggest challenge may be internal – focussing on how to retain the best and brightest Sailors." As stated earlier, job satisfaction has been shown to have an important causal relationship with dependent measures such as employee productivity and turnover. If Vice Admiral Oliver's challenge is to be met, it is critical that facet satisfactions that are predictive of retention should be understood so that potential changes in service policies might be addressed. In an early attempt to provide an understanding of the relationship between

job satisfaction and employee turnover, Mobley (1977) developed a heuristic model which identified possible intermediate linkages in the satisfaction-turnover relationship (Figure 1.3). Mobley, Horner, and Hollingsworth (1978) popularized this early heuristic model by computing significant correlations for these earlier hypothesized linkages.

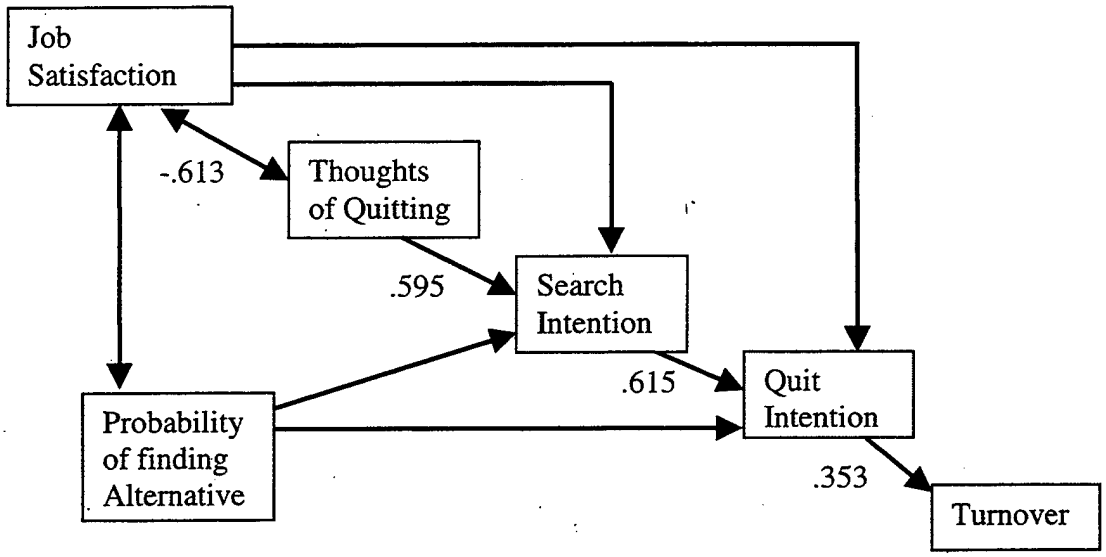

Figure 1.3. Model of the relationship between job satisfaction and employee turnover (including derived regression correlation coefficients for variable linkages). Mobley, Horner, and Hollingsworth (1978).

Hom, Caranikas-Walker, Prussia, and Griffith (1992) validated the results of Mobley, et al. by performing a meta-analysis on existing turnover models. They concluded that the military turnover process involved slightly different structural relationships than strictly civilian-oriented models since one's decision of retention in the service typically take place within a narrow decision-making window and the decision itself is irrevocable. Although the nature of being in the military was shown to moderate the process, it was observed that intentions to stay or leave are formed early and that job satisfaction was significantly correlated with eventual turnover ($p < .05$).

4. Military-Oriented Job Satisfaction Studies

Prior to the curtailment of the military's draft board, the concern about whether service personnel were satisfied with their jobs was not an issue of significant military research. However, the advent of the all-volunteer military changed the balance of this equation. Job satisfaction, as defined by Locke (1976), is "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences." This definition held little meaning in an organization which comprised members who, from time to time, may have questioned their need to serve yet were required to do so. Not until World War II did the military begin to realize the significance of studying job satisfaction. Studies were performed at that time which showed that leadership played an important role in a subordinate's job satisfaction. Until recent years, however, studies in the field of motivation and worker behavior tended to focus narrowly on the documented linkage with improved industrial productivity when looking at employee satisfaction on the job.

Hughes (1973) conducted a comprehensive review of the state of job satisfaction in industry and in the military. In her report, Hughes states that the Navy's Personnel Surveys provide the principle means for the Chief of Naval Personnel to keep tabs on "the pulse of the average Navy man." Given negative public sentiments against the military and the war in Viet Nam which was coming to a close, numerous research projects on job satisfaction were being conducted by the Office of Naval Research. Studies at this time were focussed on increasing Navy personnel retention through expanded career counseling efforts, developing a measurement instrument of factors affecting job stability and personnel retention, and other similar topics.

About this time, morale within a military unit was viewed to have a strong relationship with military personnel behavior yet there seemed to be a clear definition neither of morale nor of how it should be measured. Through studies of platoon-sized U.S. Army units, Motowidlo and Borman (1977) developed rating scales around eight dimensions of morale based on behavioral content disclosed by soldiers in group workshops. Using these scales, it was observed that unit members who rated high on some morale scales were more likely to report high intentions to reenlist. More specifically, intentions to reenlist were most strongly correlated to behavior such as pride in one's unit.

During the 1980s, the percentage of married military members was on the rise. As a result, the U.S. Army Research Institute felt a need to study how family factors affected retention (Bell, Stewart, & Gade, 1990). To that end, the Army Family Research Program undertook a long-range program of inter-related research activities to determine a volunteer soldier's motivation to remain in the Army. Summarizing in-work progress of the research program, Bell et al. (1990) reported that family programs, especially housing and childcare, were increasingly important retention-related factors. However, numerous gaps in comprehending the retention issue as it related to military families were noted.

The 1980s also ushered in an era of strong economic growth. With the economy building up a head of steam, there were increased opportunities for civilian employment, especially among service members possessing marketable and transferable technical skills. Since many felt that more equitable pay was the answer to improved aviator retention, several studies were conducted on this specific issue (i.e., Rhodes (1986),

Ehmen (1988), Weber (1987), Gibb, Nontasak, and Dolgrin (1988), Mestemaker (1991), and Riebel 1996)). Coupled with strong economic growth were political pressures for a smaller military. As the military downsized, context factors such as service policies, salary and working conditions associated with being in the military began to increase in relevance. Along these lines, a survey of aviation squadron commanders by Hoffman (1988) reported that reductions in collateral duties and improvements in the promotion system were needed to improve retention. Noticeably absent in this report, however, was input from junior and mid-level officers who were not yet in command.

A detailed model of retention-related factors was recently developed by the Naval Personnel Research and Development Center (NPRDC) using Officer Master File and survey data from married Naval Aviators (Bruce & Burch, 1989). This study does a substantial job of determining correlation between external job factors and retention by including spousal support factors in its model. It is not known why only one model was built using only married officer survey data; however, the study does recommend that a similar analysis be carried out on unmarried aviators. Given the anticipated negative job satisfaction attitudes of aviators, it would have been somewhat impractical in the course of this present study to take a similar approach given the 22 page length of the NPRCD survey.

5. Measuring Job Satisfaction Among Military Members

To research job satisfaction among current members of the military, either existing data containing relevant behavioral data would be needed, or a survey to meet the needs of intended research would need to be developed. Past research on retention attitudes relied on responses generated by the DoN Retention Survey.

a) Department of the Navy Retention Survey

Since the mid-1970s, the Department of the Navy has administered a standardized retention survey to all officers and enlisted personnel at leave/stay decision points (Sharma, 1994). Using data obtained from retention surveys administered between FY90 and FY94, Sharma (1994) analyzed responses to determine if certain aspects of sea duty were predictive of enlisted retention. Sharma concluded that attitudes towards sea duty and the issue of family separation did not distinguish 'leavers' from 'stayers' in the Navy. More importantly, Sharma argued that the survey in its current form had limited reliability in this regard. For example, since the survey was voluntary in nature and sampled at the leave/stay decision point, survey methods generate a set of response from a non-probabilistic sample population that likely yield biased and unreliable estimates of total population parameters. Furthermore, global attitudes of personnel regarding life in today's military may have substantially changed since the creation of the original survey. Recommendations are made to reconsider the purpose for the survey and to redesign the survey so as to improve statistical reliability (Sharma, 1994).

b) United States Marine Corps Separation Survey

At the Center for Naval Analysis, work is presently in progress to redesign the Marine Corps' Climate Battery (retention and separation) surveys as well as address procedures associated with the conducting appropriate surveys. A sampling plan is being developed to address the issue of sampling bias and reliability issues are being addressed through redesign of the survey questionnaire. The intended method for capturing survey data is via standard computers resident at each participating unit. Surveys would be self-administered with each survey taking an estimated 25 minutes to complete. To obtain

survey responses from a representative population sample in a reasonable amount of time would require a considerable amount of administrative support and personnel distraction since responses would be collected individually versus in a group forum. While the redesign process is well-intentioned, its ultimate success is yet to be determined.

6. Literature Summary

As job satisfaction research has shown, several prominent theories have been developed which adequately use a factoring of behavioral attitudes (such as the JDI or MJDQ formats) to measure employee job satisfaction. This measurement approach has been used to consistently predict turnover intent which was also shown to be significantly correlated to actual turnover. Depending on the types of subjects included in the research, these studies have shown that certain demographic factors (age, tenure, marital status, etc.) as well as attitudes (such as satisfaction with pay, work, or supervisors) also play a predictive or moderating role in the level of satisfaction derived from one's work experience. The nature of this study then is to predict aviator retention behavior using survey data from a representative sample of aviators and determine appropriate factor measurements associated with job satisfaction. By knowing these factors, the military will as a result be in a position to effect internal changes, which would influence desired retention behavior.

E. RESEARCH QUESTIONS

The intent of this research is to develop a current model of factors correlated with one's desire for continued military service based on data obtained using a standardized aviator officer retention survey. Given the different set of workplace circumstances facing today's Navy and Marine Corps aviators, it is anticipated that this model will cast

new insight onto why these individuals are leaving the service in numbers far greater than expected. Utilizing previously discussed behavioral principles, analysis of survey data collected from a sample population of active duty aviators was conducted to build the model and answer specific research questions.

It is anticipated that respondents who identified *low-level needs* as their reasons for becoming aviators will be more inclined to consider leaving the military since these individuals perceive greater reward coming from an available external opportunity or some job which was otherwise unavailable when they joined the service. The level of *pay satisfaction* factors found in aviator respondents is expected to be positively correlated with and a consistently significant predictor of *intent to stay* across all demographic factors unless the respondent is a member of a bonus-eligible community. In these cases, higher actual (or anticipated future) earnings will mitigate to some degree the effect of higher wages obtainable from comparable external sources. It is anticipated that within each service, levels of *organizational satisfaction* factors will be positively correlated with *intent to stay* yet significant predictors only where personnel imbalances exist relative to service manning requirements. However, it will also be shown that differences exist across services in levels of *organizational satisfaction* factors since leadership styles and policies vary between the Navy and the Marine Corps.

Levels of *external (leisure and family) satisfaction* factors are expected to be positively correlated with and consistently non-significant predictors of *intent to stay* among all unmarried respondents since military personnel have been characterized as job-oriented; however, these levels should be significant for married members. Since most aviators volunteered for their present jobs presumably based on their desire to fly,

analysis should reveal that correlation levels of *work satisfaction* factors with intent to stay will be positively correlated with, and consistently significant for, any community experiencing a declining trend in budgeted flight hours per aircrew member.

The dependent variable used to determine one's desire for continued military service was obtained from responses to the question: "Are you considering leaving the military?" Independent measures taken from survey responses used to model one's intent to remain in the service included:

- rank
- marital status
- age
- spouse's education level
- source of commission
- designation (pilot or NFO)
- aircraft type
- monthly cockpit and simulator flight hours attained
- months of sea time and TAD/TDY in the past two years
- Aviation Continuation Program (ACP) participation
- collateral duty hindrance to maintaining flight qualifications
- open-ended responses given as reasons for: becoming an aviator, staying in the service, and leaving the service, and
- principal factors derived from a set of 27 5-point Likert-scaled questions on satisfaction.

F. ASSUMPTIONS

If statistical predictions generated from models derived from a sample population of aviators are valid, it is assumed that they will remain valid across the total population of aviators in the Navy and Marine Corps. This is a reasonable assumption since those sampled (who were non-deployed) and those who were not sampled for this study (who were primarily in a deployed status) are subject to similar deployment rotation cycles. Other essential elements of their internal work environment and external opportunities are also inherently equivalent.

G. SCOPE AND LIMITATIONS

The scope of this study is limited to discussion of aviators' satisfaction with their primary job assignments and their work environment in general. Since interviews and surveys were conducted only at flying squadrons, there will be no specific comparisons made, or separate conclusions drawn about, aviators assigned away from a flying squadron. As discussed later in detail, given that worker attitudes are molded by events, results drawn from this study are somewhat limited. Should the nature of these events dramatically change (for example, an economic downturn, or a military conflict occurs) the accuracy of the model in predicting job satisfaction will also change.

II. METHODS

A. SUBJECTS

Active duty U.S. Navy and Marine Corps aviators stationed at air stations or bases on the east and west coasts volunteered in this study. Aviators stationed at training commands or deployed were excluded from this sample. Deployed officers were excluded for expediency. Meanwhile, aviators stationed at training commands possessing limited job experience were deemed ineffective in providing feedback regarding career retention.

B. SAMPLE POPULATION

A total of 1,680 active-duty aviators were surveyed (1213 Navy, 467 Marine Corps). From this raw total, surveys from 1,669 aviators (1203 Navy, 466 Marine Corps) were incorporated into the database used in this study. The 11 excluded survey respondents are mentioned in the Data Tabulation section.

Demographically, the survey sample was not representative of the total aviator population. Because deployment schedules vary, the sample is not proportional to the total aviator populations within some aircraft communities. Also, since training and non-flying commands were excluded from this study, the sample population was not representative with respect to age. To compensate for a disproportionately stratified sample frame, survey data was weighted by community and age prior to conducting the analysis. The sample's stratification relative to the total population is presented in the Analysis chapter.

C. INSTRUMENT

This study analyzes data extracted from responses to a one-page (front and back) survey developed to measure job satisfaction attitudes and their effect on retention. Patterned after the existing DoN Retention Survey yet taking into account its identified shortcomings (see Sharma, 1994) and the lack of attitudinal data linked to retention identified by the DoN (N88), a modified survey was tailored for use in this study (see Appendix A).

The survey was comprised of demographic questions and both open-ended and closed (five-point Likert-scaled) questions on topics related to job satisfaction. Open-ended questions were included to solicit a broad range of attitudinal responses (Fowler, 1993) while closed questions obtained ordinal-scaled responses. The DoN (N88) was consulted during the survey design and had final approval of the style and content of the survey.

Demographic questions on the front page of the survey provided both discrete and continuous data for analysis. The design of each question was based on the type of response needed for the study. Some closed questions were used to record a discrete (factor) response for variables such as: rank, marital status, commissioning source, component (regular or reserve), geographic coast, number of dependents, year group, spouse's level of education, aircraft classification and type, receiving flight pay (ACIP) or aviation continuation pay (ACP), and whether the aviator was considering leaving the military. See Appendix A for valid responses to questions. Other closed questions required respondents to provide an answer within an interval range such as: age (six levels of response), and average monthly number of flight hours and simulator hours (five

levels per response). Still other closed questions measured demographic responses on a continuous scale for variables such as: months at sea or on temporary additional duty (TAD/TDY) in the past two years, and spouse's monthly gross take-home pay.

Attitudinal questions solicited either open-ended or Likert-scaled responses. Some questions were designed to be open-ended because of the uncertainty regarding the range of possible responses. These questions included: one's reasons for deciding to become an aviator, and beliefs about aviator's reasons for staying in and leaving the military. Responses to these questions were next categorized according to a factoring process developed utilizing existing job satisfaction theory described later in this chapter.

D. PROCEDURE

1. Data Collection Procedure

The intent of the survey sampling plan was to collect data from a broad base of non-deployed aviation commands. To standardize the survey process itself, only aviators who were available during the command visit participated in the survey. Blank surveys were not left with commands since the interviewers conducting the survey would not have been available to properly administer the survey (to introduce the study, explain its intent, clarify survey questions, etc.).

Through service chain-of-command coordination, approval was obtained to administer the survey because of the sensitivity of the retention issue among most aviators. Visits were conducted at a time and location convenient to each squadron to ensure non-interference and maximum participation. Once at the command, a standard introductory brief was provided explaining the survey's purpose and the intended use of survey data. Personnel were instructed that information was solicited anonymously for

thesis research that would potentially be reviewed by higher headquarters to improve aviator retention. Data collection was conducted in a casual, informal manner. Clarifications to survey questions were provided during the data collection effort. Surveys were completed in an average of 10 minutes.

2. Data Analysis Procedures

a) Survey Data Tabulation

The *categorical* measures (independent variables) used in this study were: rank, age, marital status, spouse's education, source of commission, assigned coast, classification, aircraft type (current primary designation), participant in the FY94 through FY98 ACP programs, and flight hours and simulator hours per month. The *continuous* independent variable measures in the survey were months at sea and TAD/TDY (in the past 2 years). The binary dependent measure used in the study was the respondent's declaration that he or she was "considering leaving the military." All survey data was typed into a data matrix as further described below.

The question on pay grade encompassed grades O-1 through O-6. In building the response database, prior-enlisted respondents (pay grades O-2E and O-3E) were absorbed into pay grades O-2 and O-3 respectively. This modification was due to limited representation (less than 5% of all responses) and a need to reduce the number of levels of this factor. The respondent's age was tabulated as a six-level factor. Survey responses for one's "Year Group", which would have better defined each respondent's age, were excluded from the database because respondents disagrees on the interpretation of the term. Thus, age and pay grade were used to measure an aviator's tenure. Each respondent's aircraft type was aggregated over all aircraft models in current inventory to

reduce the factor levels of this variable (i.e., F-18C and F-18D were assimilated as F-18). Ten U.S. Navy responses (4 C-2 and 6 C-9 aviators) and a singular U.S. Marine response (C-12 aviator) were excluded from the study since the associated population data (and hence weighting factors) was unavailable at the time of the study.

Average monthly flight hours and simulator hours were each tabulated as 5-level factors. Factor level increments were pre-determined based on historical flight hour goals. The factor values were later converted into average values and treated as continuous variables so that their ratio (simulator to actual hours) could also be included in the analysis. (Although this method introduces inaccuracy into the derivation of ratios, given the interval nature of the data it was the only means to develop a proxy measure for testing.) Each remaining factor and continuous variable used in this study was tabulated in the database and analyzed exactly as recorded on the survey by each respondent.

The majority of effort in tabulating the survey database involved recording answers provided to open-ended survey questions and categorizing these answers within a "satisfaction factor" framework. Each of the three open-ended questions asked for four responses. More, or fewer, responses to each question were frequently encountered. Only the first four answers to each question were tabled since only four were solicited. If two like responses were provided to a question, only one was tabulated (e.g., if 'to fly' and 'to fly' were given as reasons for becoming an aviator, only one instance was recorded).

Once open-ended responses were recorded in the database, Appendix B was used to categorize each verbatim response within a "satisfaction factor" framework to facilitate eventual analysis. As previously described in the Measuring Satisfaction section,

satisfaction (global job and life satisfaction domains) is typically broken down and studied as independent factors or facets. From this research, a list of component factors is derived as Appendix B which correlates to facets of aviator satisfaction. These factors were then used to categorize, as accurately as possible, each verbatim open-ended response provided to attitudinal questions (survey questions 18, 21, and 22). For general responses (such as "I enjoy my job"), a general categorization was made ("Job Satisfaction"). More descriptive responses facilitated categorization using higher-order factors.

Once this categorization into factors was accomplished, individual factor counts were grouped within their respective first-order factors and tabulated as separate discrete variables in the database. For example, if a respondent's reasons for becoming an aviator were categorized as 'prestige,' 'training' and 'job security,' then the Organizational Satisfaction variable for question 18 was given a value of three, for the three reasons falling into this category. Grouping responses in this manner facilitated a principal components analysis of open-ended responses in line with first-order factors of job satisfaction inherent to established measurement scales.

b) Statistical Analysis

Data on aviator manning was obtained from Navy and Marine Corps headquarters and compared with the sample survey database to determine representativeness and the post-stratification weighting factors used in subsequent analysis and retention model generation. Next, a preliminary statistical analysis of Likert-scaled question responses (survey questions 27-53) was conducted followed by a principal components analysis (to derive components and scores for use in retention

model generation). Similarly, a preliminary analysis of the seven factor variables to survey questions 18, 21 and 22 was conducted followed by a second principal components analysis of these variables. Preliminary analysis in the form of cross-tabulation of demographic data elements (age, rank, aircraft type, etc.) and component factors was next conducted relative to the dependent measure. This analysis would corroborate variables included in the retention model.

Since the dependent measure was a binary variable, the independent variables discussed in Data Tabulation above were next used to fit classification trees and logistic regression models using the S-plus 4.5 software program. These models were developed to predict the response variable: "Are you considering leaving the military?" Classification tree models were developed to identify sub-groups of aviators which could be most accurately classified as "leavers" or "stayers" as well as specific variables that were used in logistic regression modeling. The logistic regression model was refined by step-wise exclusion of non-significant independent measures and inclusion of any significant interaction effects of independent variables to select the best performing model. Once this model was derived, it was used to predict the dependent measure on a holdout random sample of the data set.

III. RESULTS

A. PRELIMINARY DATA ANALYSIS

1. Sample Population Demographics

a) Aircraft Community

The sample population was initially compared relative to personnel inventory levels (at the time the retention survey was conducted) to determine the proportionality of survey data. The reason for this requirement was that proportional sampling was not conducted as part of the survey. The resulting analysis yields post-stratification weights to be used later. As previously stated, the age and aircraft type variables best differentiate all aviators and are thus used in the post-stratification process. Table 3.1 shows the proportion of U.S. Marine Corps subjects, by aircraft community, in the sample and in the population. Weights for each community and proportionate counts, which would have generated a stratified survey sample, are also shown.

Table 3.1. U.S. Marine Corps Aviator Survey Counts (n=466) relative to Manning Levels, by Aircraft Community. Manning data provided by CMC(MA).

Community	Count	%	Manning	%	Weight	Proportionate Survey counts
AH-1W	78	17.11%	437	11.35%	0.6637	52
AV-8B	44	9.65%	407	10.57%	1.0959	48
CH-46	41	8.99%	837	21.75%	2.4186	99
CH-53	69	15.13%	569	14.78%	0.9770	67
EA-6B	18	3.95%	235	6.11%	1.5467	28
F/A-18	131	28.73%	780	20.27%	0.7054	93
KC-130	58	12.72%	281	7.30%	0.5740	33
UH-1N	17	3.73%	303	7.87%	2.1116	36
Total	456	100.00%	3849	100.00%		456

Note: Tabled data reflects a total of 10 non-responses to this survey question.

A comparison of U.S. Navy subjects is reflected in Table 3.2 below. As this table shows, the Navy's VAM community was sampled at 0.34% of total sample frame while they represent 2.13% of fleet personnel. Meanwhile, the VFA community was sampled at 24.4% compared to their actual 9.6% proportion of aviators. As a result, high positive weights are placed on VAM data points while a low positive weight is applied to VFA data.

Table 3.2. U.S. Navy Aviator Survey Counts (n=1203) relative to Manning Levels, by Aircraft Community. Manning data provided by DoN (Bupers).

Community	Count	%	Manning	%	Weight	Proportionate Survey counts
VFA	294	24.71%	896	9.65%	0.39	115
VF	61	5.13%	883	9.51%	1.86	113
VAM	4	0.34%	198	2.13%	6.34	25
VAQ	133	11.18%	686	7.39%	0.66	88
VS	95	7.98%	675	7.27%	0.91	87
VAW/VRC	108	9.08%	723	7.79%	0.86	93
VP/VPU	189	15.88%	2022	21.78%	1.37	259
ES-3	29	2.44%	162	1.74%	0.72	21
EP-3	18	1.51%	250	2.69%	1.78	32
TAC	11	0.92%	315	3.39%	3.67	40
HS	46	3.87%	540	5.82%	1.50	69
HSL	147	12.35%	1119	12.05%	0.98	143
HC	31	2.61%	684	7.37%	2.83	88
HM	24	2.02%	132	1.42%	0.71	17
Total	1190	100.00%	9285	100.00%		1190

Note: Tabled data reflects a total of 13 non-responses to this survey question.

b) Sample Population by Age

Similar tables were also compiled for age. Counts of U.S. Marine Corps and Navy subjects are shown in Table 3.3 relative to actual manning levels by age. Weights associated with each age group and proportionate counts are again shown.

Table 3.3. Cross-tabulation of Survey Counts by Manning Levels and Age Group, tabled separately by Service. Manning data provided by CMC (MA) and DoN (Bupers).

Age	Count	%	Manning	%	Proportionate Weight	Survey counts
			U.S. Marine Corps (n=466)			
Less than 26	13	2.79%	820	16.38%	5.87	76
26-30	249	53.43%	1751	34.97%	0.65	163
31-35	132	28.33%	1192	23.81%	0.84	111
36-40	49	10.52%	693	13.84%	1.32	64
41-45	22	4.72%	469	9.37%	1.98	44
0ver 46	1	0.21%	82	1.64%	7.63	8
Total	466	100.00%	5007	100.00%		466
			U.S. Navy (n=1203)			
Less than 26	69	5.75%	2235	20.32%	3.53	244
26-30	582	48.54%	4374	39.77%	0.82	477
31-35	393	32.78%	2001	18.20%	0.56	218
36-40	119	9.92%	1326	12.06%	1.21	145
41-45	34	2.84%	883	8.03%	2.83	96
0ver 46	2	0.17%	178	1.62%	9.70	19
Total	1199	100.00%	10997	100.00%		1199

Note: Tabled data reflects 4 U.S. Navy non-responses to survey question.

c) Weighting Factors

From the above results, a two-dimensional matrix of weighting factors was developed as the outer product of Aircraft Community and Age weight vectors. This method is less precise than deriving the weights from actual data, a method that would have been used if data of that detail were available. However, it will be assumed that the weights developed are sufficiently accurate for the purpose for which they are intended. Weights are provided in Table 3.4. As mentioned before and as evidenced by Table 3.4, junior and senior aviators are underrepresented in the sample due to the nature of the survey. Certain aircraft communities are under-represented in the sample due to ongoing changes in force structure (see Appendix C, VAM community).

Table 3.4. U.S. Marine Corps and Navy sample data weighting factors by Aircraft Community and Age Group, tabled separately by Service.

Community	less than 26	26-30	31-35	36-40	41-45	0ver 46	Average
			U. S. Marine Corps				
AH-1W	3.897	0.434	0.558	0.874	1.317	5.066	0.664
AV-8B	6.433	0.717	0.921	1.442	2.174	8.363	1.096
CH-46	14.198	1.583	2.033	3.183	4.799	18.458	2.419
CH-53	5.735	0.639	0.821	1.286	1.938	7.456	0.977
EA-6B	9.080	1.012	1.300	2.036	3.069	11.804	1.547
F/A-18	4.141	0.462	0.593	0.929	1.400	5.383	0.705
KC-130	3.370	0.376	0.482	0.756	1.139	4.380	0.574
UH-1N	12.396	1.382	1.775	2.779	4.190	16.115	2.112
Average	5.871	0.654	0.840	1.316	1.984	7.632	
			U. S. Navy				
VFA	1.379	0.320	0.217	0.475	1.106	3.790	0.391
VF	6.552	1.520	1.030	2.254	5.253	18.002	1.855
VAM	22.405	5.198	3.522	7.707	17.964	61.561	6.344
VAQ	2.335	0.542	0.367	0.803	1.872	6.415	0.661
VS	3.216	0.746	0.506	1.106	2.579	8.836	0.911
VAW/VRC	3.030	0.703	0.476	1.042	2.429	8.326	0.858
VP/VPU	4.842	1.124	0.761	1.666	3.882	13.305	1.371
ES-3	2.528	0.587	0.397	0.870	2.027	6.947	0.716
EP-3	6.286	1.459	0.988	2.163	5.040	17.273	1.780
TAC	12.962	3.007	2.037	4.459	10.392	35.614	3.670
HS	5.313	1.233	0.835	1.828	4.260	14.599	1.505
HSL	3.445	0.799	0.542	1.185	2.763	9.467	0.976
HC	9.987	2.317	1.570	3.436	8.007	27.441	2.828
HM	2.489	0.578	0.391	0.856	1.996	6.840	0.705
Average	3.532	0.819	0.555	1.215	2.832	9.704	

While the spread of sample group weights for Marine Corps aviation communities is less than that of Navy communities, it bears mention that these spreads parallel those reflected by values for 'Inventory as Percent of Billets' (see Appendix C). Appendix C and data will be discussed later in greater detail.

d) Contrast between Age and Rank

During the course of this study, it was sometimes deemed more appropriate to analyze the sample population relative to rank, rather than age. A cross-

tabulation of the sample by both age and rank (see Table 3.5) shows a high degree of correlation between these two variables. The result of this comparison is that age and rank can be used interchangeably in the analysis although in certain cases it may be desirable to use one of the variables over the other when drawing conclusions about other variables in the data set.

Table 3.5. Cross-tabulation of Sample Population by Age and Rank, tabled separately by Service.

Rank	O-1		O-2		O-3		O-4		O-5		O-6		
Age	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Total**
					U. S. Marine Corps (n=466)								
less than 26	0	0.0%	13	25.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	13
26-30	0	0.0%	37	71.2%	212	68.8%	0	0.0%	0	0.0%	0	0.0%	249
31-35	0	0.0%	2	3.8%	92	29.9%	38	48.1%	0	0.0%	0	0.0%	132
36-40	0	0.0%	0	0.0%	4	1.3%	39	49.4%	6	23.1%	0	0.0%	49
41-45	0	0.0%	0	0.0%	0	0.0%	2	2.5%	19	73.1%	1	100.0%	22
0ver 46	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	3.8%	0	0.0%	1
Total	0	0.0%	52	100.0%	308	100.0%	79	100.0%	26	100.0%	1	100.0%	466
					U.S. Navy (n=1203)								
less than 26	12	63.2%	56	36.1%	1	0.1%	0	0.0%	0	0.0%	0	0.0%	69
26-30	6	31.6%	94	60.6%	482	67.2%	0	0.0%	0	0.0%	0	0.0%	582
31-35	1	5.3%	5	3.2%	221	30.8%	166	68.9%	0	0.0%	0	0.0%	393
36-40	0	0.0%	0	0.0%	12	1.7%	69	28.6%	38	58.5%	0	0.0%	119
41-45	0	0.0%	0	0.0%	1	0.1%	6	2.5%	27	41.5%	0	0.0%	34
0ver 46	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	100.0%	2
Total	19	100.0%	155	100.0%	717	100.0%	241	100.0%	65	100.0%	2	100.0%	1199

Note: Data table reflects 4 Navy non-responses to survey question.

e) Rank and Source of Commission

A tabulation of the survey sample population was performed to determine the composition of the data by rank and source of commission, separately for each service. A Chi-square goodness-of-fit test was conducted on this table and determined that there was evidence of significant dependence among these two variables for both services (USMC: χ^2=28.76, p=0.004; USN: χ^2=58.78, p=0). The data table is provided below as Table 3.6.

Table 3.6. Cross-tabulation of Sample Population, by Commissioning Source and Rank tabled separately by Service.

Rank / Source	O-1 Count	O-1 %	O-2 Count	O-2 %	O-3 Count	O-3 %	O-4 Count	O-4 %	O-5 Count	O-5 %	O-6 Count	O-6 %	Total
U. S. Marine Corps													
Academy	0	0.0%	17	32.7%	43	14.0%	8	10.1%	7	26.9%	0	0.0%	75
OCS	0	0.0%	23	44.2%	168	54.5%	39	49.4%	8	30.8%	0	0.0%	238
Other	0	0.0%	7	13.5%	56	18.2%	14	17.7%	5	19.2%	0	0.0%	82
ROTC	0	0.0%	5	9.6%	41	13.3%	18	22.8%	6	23.1%	1	100.0%	71
Total	0	0.0%	52	100.0%	308	100.0%	79	100.0%	26	100.0%	1	100.0%	466
U. S. Navy													
Academy	6	31.6%	50	32.3%	221	30.7%	58	24.1%	23	34.8%	0	0.0%	358
OCS	6	31.6%	35	22.6%	176	24.4%	102	42.3%	25	37.9%	0	0.0%	344
Other	3	15.8%	10	6.5%	30	4.2%	8	3.3%	5	7.6%	1	50.0%	57
ROTC	4	21.1%	60	38.7%	293	40.7%	73	30.3%	13	19.7%	1	50.0%	444
Total	19	100.0%	155	100.0%	720	100.0%	241	100.0%	66	100.0%	2	100.0%	1203

f) Level of Job Performance

Since this study focuses on work aspects of aviator job satisfaction, the next area of analysis deals with quantifiable levels of job performance – specifically, average monthly flight hour and simulator hours. By service and aircraft type, data was collected and analyzed by rank for the sample population and relative to total historical trends. The historical service-wide trends in flight hours, by community, are provided in Table 3.7. Figures 3.1 and 3.2 graphically depict the declining service-wide trend in the average number of flight hours attained by each service (average flight hours are unweighted by the number of aircraft per community). The general trend for each service is a drop of roughly 3 flight hours per month per aviator over the 10-year period. All communities have experienced either a negative or flat trend in flight hours except KC-130, SH-60F and S-3B/ES-3A (an increase greater than 1 hour/month/aviator over the 10-year period).

Table 3.7. Historical Flight Hour attainment by Aircraft Community; actual executed hours (FY89-97) and budgeted hours (FY98), tabled separately by Service. Data provided by DoN(N88F).

Community	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	Budgeted FY98	10-year slope
U.S. Marine Corps											
AV-8B	19.3	17.4	15.7	18.2	18.7	17.1	17.9	15.9	12.5	12.6	-0.57
CH-46E	25.5	21.9	21.9	20.6	23.5	23.0	22.4	20.2	18.2	20.8	-0.51
CH-53A/D/E	22.1	21.4	23.4	17.6	18.3	19.6	19.2	15.9	15.8	16.5	-0.59
KC-130F/R	24.9	23.6	31.1	26.2	29.3	29.6	29.7	29.2	23.3	24.3	0.11
AH-1/UH-1	27.2	25.5	22.8	20.1	20.0	19.9	21.4	19.6	17.1	21.0	-0.77
F/A-18A/C/D	22.8	23.3	26.2	22.2	24.6	25.0	24.8	23.0	20.0	22.8	0.01
EA-6B	21.9	30.4	23.1	20.5	24.2	24.8	29.1	26.7	15.5	22.5	-0.10
Average	23.4	23.4	23.4	20.8	22.7	22.7	23.5	21.5	17.5	20.1	-0.34
U.S. Navy											
A-6E/KA-6D	24.4	20.9	23.2	20.9	19.9	19.0	18.0	22.7	10.4	0.0	NA
F/A-18A/C	22.6	20.5	24.8	20.1	19.6	19.3	21.2	22.1	20.0	22.4	0.02
F-14A	20.9	20.8	22.2	19.7	20.3	20.6	21.6	19.8	18.1	21.2	-0.10
E-2C	34.9	34.0	42.9	33.3	33.6	34.8	38.5	34.7	32.2	37.0	0.00
EA-6B	24.6	23.0	26.5	25.4	28.6	21.7	24.7	24.0	21.1	23.0	-0.17
SH-3H/SH-60F	27.4	25.1	29.3	26.3	28.5	26.4	25.1	33.8	30.4	26.4	0.21
S-3B/ES-3A	26.5	27.0	27.3	28.5	26.8	25.1	29.4	29.2	26.8	28.5	0.13
SH-2F/SH-60B	24.8	23.8	26.1	24.4	23.9	23.7	24.6	24.3	21.8	26.6	0.06
P-3B/C	42.2	41.3	44.2	44.6	44.1	43.2	41.5	42.3	40.4	43.3	0.09
Average	27.6	26.3	29.6	27.0	27.2	26.0	27.2	28.1	24.6	25.4	-0.15

Note: 10-year slope implies the trend in monthly hours/month/aviator over the complete period. For example, the KC-130 community has experienced an average annual increase of 0.1 flight hours/ month/aviator over the period FY89-97.

Certain model series of aircraft have been phased out of inventory over the past ten years. To parallel these changes, Table 3.7 data has on occasion consolidated some aircraft communities by type of aircraft and/or within budgeted groups of common aircraft types. For example, the SH-60F aircraft has displaced the SH-2F aircraft while the AH-1 and UH-1 aircraft fall within the same budgetary group.

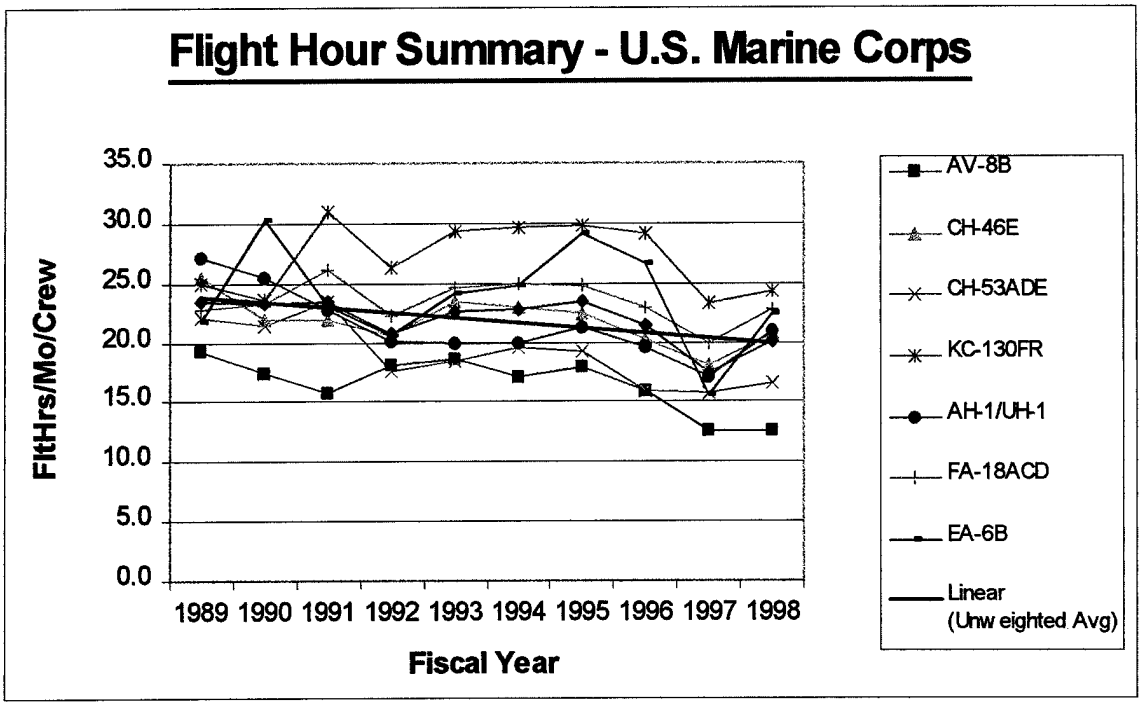

Figure 3.1. Historical summary of U.S. Marine Corps flight hour attainment: actual (FY89-97), budgeted (FY98), by community. Data provided by DoN(N88F).

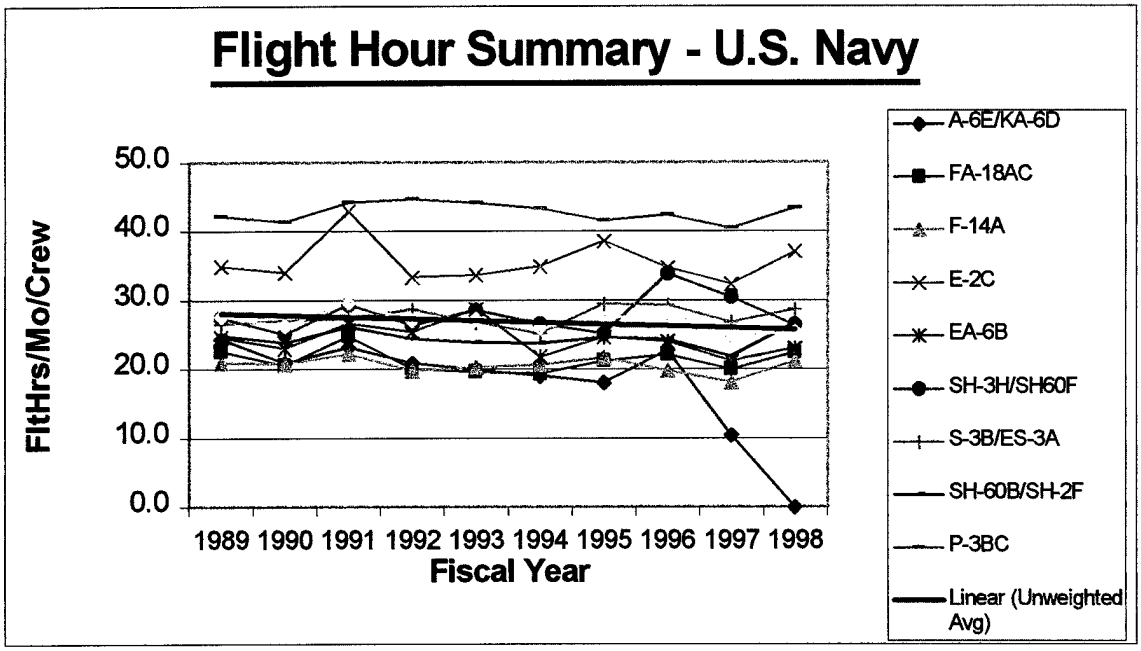

Figure 3.2. Historical summary of U.S. Navy flight hour attainment: actual (FY89-97) and budgeted (FY98), by community. Data provided by DoN(N88F).

U.S. Marine Corps aviator responses translate into an average of 18 flight hours and 2.5 simulator hours per month, and an average ratio of 0.14 (simulator hours to flight hours). Meanwhile, U.S. Navy aviator responses translate into an average of 19 flight hours and 4.5 simulator hours per month (average ratio 0.24). Table 3.8 provides a synopsis of the number of sampled aviators by their reported flight hour attainment.

Table 3.8. Tabulation of Sample Population responses of attained average monthly numbers of Flight Hours and Simulator Hours, by Community and Service.

	Average Flight Hours					Average Simulator Hours				
Community	**4.5**	**15**	**25.5**	**35.5**	**45**	**1**	**4**	**6**	**8.5**	**12**
				U.S. Marine Corps						
AH-1W	1	42	26	4	0	52	12	8	2	2
AV-8B	7	36	0	0	0	11	18	13	1	1
CH-46E	0	27	8	2	2	34	1	1	3	0
CH-53E	9	43	14	1	0	54	8	5	1	0
EA-6B	3	12	3	0	0	3	3	8	3	1
F/A-18	5	84	33	1	0	97	23	6	0	0
KC-130	8	23	23	4	0	22	18	12	3	2
UH-1N	0	2	14	0	0	15	1	0	0	0
Total	33	269	121	12	2	288	84	53	13	6
				U.S. Navy						
A-6E	0	2	2	0	0	2	2	0	0	0
E-2C	36	31	34	5	0	38	12	15	8	33
EA-6B	20	62	43	2	1	68	32	15	4	13
EC-130	1	0	0	0	0	1	0	0	0	0
EP-3	4	1	3	3	6	10	3	4	0	0
ES-3	23	5	0	1	0	18	4	4	3	0
F-14	14	21	19	6	0	26	8	10	8	8
F-18	9	166	71	41	0	135	72	30	36	14
H-3	2	6	7	1	0	15	0	1	0	0
H-46	0	12	14	1	1	17	10	1	1	0
MH-53E	3	9	11	1	0	7	9	7	1	0
P-3C	16	64	74	13	17	44	29	33	31	48
S-3	16	37	30	10	0	38	30	20	5	2
SH-2	0	4	1	0	0	3	2	0	0	0
SH-60B	11	67	50	5	0	26	36	30	19	24
SH-60F	2	25	16	1	0	21	16	5	2	0
Total	157	512	375	90	25	469	265	175	118	142

Note: Survey responses, recorded by aviators as one of five interval levels, are tabulated by column. Column headers are derived as the numerical average of interval values for convenience. For example, a response of "less than 10" flight hours is translated into a value of 4.5 hours.

It is also illustrative to analyze levels of job performance relative to rank. Table 3.9 shows average monthly flight hours, average monthly simulator hours and the resultant ratio of simulator to flight hours reported by members of the sample population. Ratios exceeding 1.0 refer to sampled sub-groups that attained more simulator hours than actual flight hours per month.

Table 3.9. Cross-tabulation of Sample Population responses regarding average monthly number of Flight Hours and Simulator Hours by Rank and Community, tabled separately by Service. Resultant ratios of these figures also provided.

	0-1			0-2			0-3			0-4			0-5/0-6		
Community	**Reg**	**Sim**	**Ratio**	**Reg**	**Sim**	**Ratio**	**Reg**	**Sim**	**Ratio**	**Reg**	**Sim**	**Ratio**	**Reg**	**Sim**	**Ratio**
U.S. Marine Corps															
AV-8B	NA	NA	NA	NA	NA	NA	13.4	4.3	0.32	13.7	3.6	0.26	9.8	6.0	0.62
CH-46E	NA	NA	NA	15.0	1.5	0.10	21.0	2.6	0.12	22.5	1.5	0.07	17.1	1.5	0.09
CH-53ADE	NA	NA	NA	13.2	19.9	1.51	16.6	2.5	0.15	18.2	2.0	0.11	15.0	1.5	0.10
KC-130FR	NA	NA	NA	12.1	4.1	0.33	19.8	4.2	0.21	24.1	2.7	0.11	25.3	3.8	0.15
AH-1/UH-1	NA	NA	NA	19.5	4.6	0.23	20.2	2.2	0.11	23.2	2.0	0.08	25.5	4.0	0.16
F/A-18ACD	NA	NA	NA	20.3	3.8	0.19	17.0	2.2	0.13	17.6	2.1	0.12	20.7	2.1	0.10
EA-6B	NA	NA	NA	12.4	7.3	0.59	15.9	5.4	0.34	15.0	3.8	0.25	NA	NA	NA
U.S. Navy															
A-6E/KA-6D	NA	NA	NA	NA	NA	NA	15.0	4.0	0.27	25.5	1.5	0.06	25.5	1.5	0.06
F/A-18AC	NA	NA	NA	17.7	8.2	0.46	20.6	3.6	0.17	20.5	3.3	0.16	20.0	2.8	0.14
F-14A	4.5	11.0	2.44	11.8	8.9	0.75	21.5	3.9	0.18	15.0	2.1	0.14	15.0	2.3	0.16
E-2C	5.7	9.6	1.67	6.6	10.2	1.54	21.2	4.3	0.20	14.3	4.2	0.29	25.3	2.8	0.11
EA-6B	NA	NA	NA	11.1	6.6	0.59	18.1	3.1	0.17	18.8	4.1	0.22	20.7	2.5	0.12
SH-3H/SH-60F	NA	NA	NA	13.5	3.5	0.26	18.9	2.5	0.13	21.5	3.6	0.17	25.5	1.5	0.06
S-3B/ES-3A	25.5	11.0	0.43	17.9	3.5	0.20	17.4	4.0	0.23	12.3	2.9	0.24	14.0	2.7	0.19
SH-60B/SH-2F	NA	NA	NA	16.5	7.7	0.46	20.5	5.7	0.28	17.8	5.4	0.30	9.8	1.5	0.15
P-3BC	NA	NA	NA	26.7	7.0	0.26	22.7	6.5	0.29	17.6	4.9	0.28	12.4	2.6	0.21

Note: Tabled values of "NA" imply no member of the sample population in specified rank and community.

Although the number of flight hours and simulator hours attained is one of the primary aviator job performance measures, one's overall performance usually includes execution of a number of collateral duties within the squadron. While time expended in this area was not measured in this study, general aviator attitudes on collateral duties are discussed later in more detail.

g) Time Away from Home

The retention survey asked two separate questions about the amount of time an aviator spends away from home: (1) at sea time, and (2) TAD/TDY (both months in the past two years). Appendices E and F respectively tabulate time away from home for Marine Corps and Navy aviators. From this data, we can see that aviators in pay grade O-3 report spending the most amount of time at sea and considerably more than the sample average (USMC 3.65 months, avg. = 2.90; USN 6.27 months, avg. = 5.29). The influence of the deployment cycle on the amount of time away is evident in the distribution of the total sample count whose response was between 6 to 12 months at sea. As one might expect, time at sea averages are considerably less for sample aviators in pay grades O-1, O-2, and O-6. The tempo of operations (OPTEMPO) other than going to sea (short training detachments, schools, conferences) is shown in the second half of these appendices. From this data, we see that sample aviators in pay grades 03, 04 and 05 from both services report greater than average TAD/TDY time away from home. Interestingly, in each of these three ranks USMC rather than USN aviators report the greater level of OPTEMPO.

h) Marital Status

Since the percentage of married service members has been on the rise in recent years, it has become increasingly important to analyze the composition of service members by marital status. Further, since families have grown more reliant on dual incomes, a spouse's level of education, which increases the potential for a substantial second income, has no doubt had an impact on an aviator's attitude towards their incomes and jobs. Table 3.10 provides a comparison of marital status among sampled aviators.

These figures are within 1 percent of published Office of Assistant Secretary of Defense (OASD) figures for total service married officer members (70.6% married officers, both services).

Table 3.10. Cross-tabulation of Sample Population, by Rank and Marital Status tabled separately by Service.

	O-1		O-2		O-3		O-4		O-5		O-6		
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Total
U.S. Marine Corps (n=466)													
Married	0	0.0%	30	57.7%	218	71.5%	71	89.9%	25	96.2%	1	100.0%	345
Unmarried	0	0.0%	20	38.5%	72	23.6%	4	5.1%	1	3.8%	0	0.0%	97
Divorced	0	0.0%	2	3.8%	13	4.3%	4	5.1%	0	0.0%	0	0.0%	19
Other	0	0.0%	0	0.0%	2	0.7%	0	0.0%	0	0.0%	0	0.0%	2
Total	0	0.0%	52	100.0%	305	100.0%	79	100.0%	26	100.0%	1	100.0%	463
U.S. Navy (n=1203)													
Married	8	42.1%	64	41.3%	496	69.1%	211	87.9%	61	92.4%	1	50.0%	841
Unmarried	11	57.9%	89	57.4%	192	26.7%	18	7.5%	2	3.0%	0	0.0%	312
Divorced	0	0.0%	2	1.3%	28	3.9%	11	4.6%	2	3.0%	1	50.0%	44
Other	0	0.0%	0	0.0%	2	0.3%	0	0.0%	1	1.5%	0	0.0%	3
Total	19	100.0%	155	100.0%	718	100.0%	240	100.0%	66	100.0%	2	100.0%	1200

Note: Tabled data reflects 3 each Marine Corps and Navy non-responses to survey question.

The final demographic factor analyzed in this study was a spouse's educational status. The level of education of sampled aviator spouse's came as somewhat of a surprise (see Table 3.11). Overall, the percentage of total spouses with a high school diploma or less was less than four percent in both services. Meanwhile, rates for spouses holding college degrees was well above half (USMC aviator spouses 52.8%; USN aviator spouses 53.8%) and rates of spouses with some post-graduate education was roughly 20 percent (USMC spouses 19.8%; USN spouses 21.1%). These numbers were surprising due to the low OASD rates reflected for dual-service officer marriages (4.5% in both services) in which case the spouse generally must be college educated. Table 3.11 also suggests that the level of education among aviator spouses may be increasing (as evidenced by a greater rate of O-5 spouses holding post-graduate degrees). As already

mentioned, this high level of education may correlate to high earning potential and hence a lower level of aviator job satisfaction when a military family is eventually relocated and must do without the spouse's income for a prolonged period.

Table 3.11. Cross-tabulation of the Sample Population, by Rank and Spouse's Level of Education, tabled separately by Service.

	O-1		O-2		O-3		O-4		O-5		O-6		
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Total
U.S. Marine Corps (n=466)													
High School or less	0	0.0%	1	3.3%	6	2.7%	4	5.6%	2	8.0%	0	0.0%	13
Some college	0	0.0%	8	26.7%	50	22.1%	18	25.0%	8	32.0%	0	0.0%	84
College graduate	0	0.0%	17	56.7%	123	54.4%	37	51.4%	9	36.0%	1	100.0%	187
Post-graduate	0	0.0%	4	13.3%	47	20.8%	13	18.1%	6	24.0%	0	0.0%	70
Total	0	0.0%	30	100.0%	226	100.0%	72	100.0%	25	100.0%	1	100.0%	354
U.S. Navy (n=1203)													
High School or less	3	37.5%	3	4.8%	10	2.0%	10	4.7%	1	1.6%	0	0.0%	27
Some college	1	12.5%	13	20.6%	105	21.3%	53	24.9%	12	19.7%	0	0.0%	184
College graduate	4	50.0%	39	61.9%	272	55.1%	104	48.8%	32	52.5%	1	100.0%	452
Post-graduate	0	0.0%	8	12.7%	107	21.7%	46	21.6%	16	26.2%	0	0.0%	177
Total	8	100.0%	63	100.0%	494	100.0%	213	100.0%	61	100.0%	1	100.0%	840

Note: Tabled data excludes 112 Marine and 363 Navy responses to survey question (primarily unmarried survey respondents).

2. Responses to Likert-scaled Questions

Responses to all 27 Likert-scaled survey questions relating to various aspects of satisfaction are tabled by service and provided in Appendix E. In addition to the frequency distribution of responses to each of these independent variables, average and sample standard deviation figures are provided. Several individual questions of interest are further analyzed below.

a) Level of Job Fulfillment/Challenge

The survey question eliciting the highest levels of positive feelings from both services was question 28, ones rating of satisfaction with their "Level of Job

Fulfillment/Challenge". Over 75 percent all of aviators felt either somewhat or very satisfied with this aspect of their jobs (USMC 84.8%; USN 75.9%). This question also reflects the lowest levels of variation in responses (SD = 0.89, USMC; SD = 1.08 USN). Table 3.12 suggests that a problem exist with this issue across levels of pay grade.

Table 3.12. Cross-tabulation of Question 28 responses by Pay Grade and level of question response (1 through 5), tabled separately by Service.

Response Level	O-1 Count	O-1 %	O-2 Count	O-2 %	O-3 Count	O-3 %	O-4 Count	O-4 %	O-5 Count	O-5 %	O-6 Count	O-6 %	Total
U.S. Marine Corps (n=466)													
1	0	0.0%	22	44.0%	115	37.5%	35	45.5%	17	65.4%	1	100.0%	190
2	0	0.0%	21	42.0%	136	44.3%	36	46.8%	8	30.8%	0	0.0%	201
3	0	0.0%	5	10.0%	29	9.4%	3	3.9%	1	3.8%	0	0.0%	38
4	0	0.0%	1	2.0%	23	7.5%	3	3.9%	0	0.0%	0	0.0%	27
5	0	0.0%	1	2.0%	4	1.3%	0	0.0%	0	0.0%	0	0.0%	5
Total/Avg.	0	0.00	50	1.76	307	1.91	77	1.66	26	1.38	1	1.00	461
U.S. Navy (n=1203)													
1	6	31.6%	68	44.2%	214	30.0%	88	36.8%	37	56.1%	1	50.0%	414
2	6	31.6%	60	39.0%	299	41.9%	102	42.7%	23	34.8%	1	50.0%	491
3	5	26.3%	10	6.5%	80	11.2%	23	9.6%	1	1.5%	0	0.0%	119
4	2	10.5%	14	9.1%	90	12.6%	20	8.4%	3	4.5%	0	0.0%	129
5	0	0.0%	2	1.3%	30	4.2%	6	2.5%	2	3.0%	0	0.0%	40
Total/Avg.	19	2.16	154	1.84	713	2.19	239	1.97	66	1.64	2	1.50	1193

Note: Response levels 1 through 5 equate to survey labels: "Very Satisfied", "Somewhat Satisfied", "Neutral", "Somewhat Dissatisfied", and "Very Dissatisfied", respectively.

From Table 3.12 one can see that aviators in pay grades O-2 and O-6 are concentrated in the "Very Satisfied" level of response while aviators in pay grades 03 and 04 are generally only somewhat satisfied. One should question why aviators, at this level in their careers felt that they were less challenged than novice aviators in pay grade 02 from either service. Since aviators in these ranks are overwhelmingly at the stay/leave decision points in their careers this issue may have a negative impact on intentions to leave which will be analyzed further.

b) Length of Working Hours (Ashore/In Garrison)

Both services responded with extreme dissatisfaction regarding question 33: "Length of Working Hours (ashore/in garrison)" (USMC avg. = 4.13; USN avg. = 4.02). These responses also possessed the least variation (SD = 0.97, Marine Corps; SD = 0.96 Navy). As shown in Table 3.13, over 80 percent of aviators from both services in pay grades O-3, O-4, and O-5 collectively are either somewhat or very dissatisfied with this issue. This leads one to speculate that Work Satisfaction factors should surface in the predictive equation of turnover intent.

Table 3.13. Cross-tabulation of Question 33 responses by Rank and level of question response (1 through 5), tabled separately by Service.

Response	O-1		O-2		O-3		O-4		O-5		O-6		
Level	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Total
U.S. Marine Corps (n=466)													
1	0	0.0%	1	2.0%	4	1.3%	2	2.6%	0	0.0%	0	0.0%	7
2	0	0.0%	4	8.2%	24	7.8%	4	5.2%	1	3.8%	1	100.0%	34
3	0	0.0%	15	30.6%	22	7.1%	6	7.8%	2	7.7%	0	0.0%	45
4	0	0.0%	20	40.8%	115	37.3%	29	37.7%	15	57.7%	0	0.0%	179
5	0	0.0%	9	18.4%	143	46.4%	36	46.8%	8	30.8%	0	0.0%	196
Total/Avg.	0	0.00	49	3.65	308	4.20	77	4.21	26	4.15	1	2.00	461
U.S. Navy (n=1203)													
1	1	5.3%	6	4.0%	10	1.4%	1	0.4%	0	0.0%	0	0.0%	18
2	2	10.5%	25	16.6%	57	8.1%	10	4.2%	2	3.1%	0	0.0%	96
3	5	26.3%	30	19.9%	81	11.5%	19	7.9%	2	3.1%	0	0.0%	137
4	9	47.4%	66	43.7%	301	42.7%	108	45.2%	29	44.6%	1	50.0%	514
5	2	10.5%	24	15.9%	256	36.3%	101	42.3%	32	49.2%	1	50.0%	416
Total/Avg.	19	3.47	151	3.51	705	4.04	239	4.25	65	4.40	2	4.50	1181

Note: Response levels 1 through 5 equate to survey labels: "Very Satisfied", "Somewhat Satisfied", "Neutral", "Somewhat Dissatisfied", and "Very Dissatisfied", respectively.

c) Adequacy of TAD/TDY Compensation/Reimbursement

The question on "Adequacy of TAD/TDY compensation/reimbursement" yielded the second highest degree of aviator discontent. As shown earlier, USMC aviators report spending more time TAD/TDY on average than USN contemporaries (see Appendices E and F). Hence the lower average level of satisfaction, as well as a lower

variance, is likely attributable to service policies on this issue rather than the frequency or amount of temporary time away. Table 3.14 provides tabled question responses.

Table 3.14. Cross-tabulation of Question 44 responses by Pay Grade and level of question response (1 through 5), tabled separately by Service.

Response Level	O1 Count	O1 %	O2 Count	O2 %	O3 Count	O3 %	O4 Count	O4 %	O5 Count	O5 %	O6 Count	O6 %	Total
U.S. Marine Corps (n=466)													
1	0	0.0%	4	8.5%	21	6.8%	6	7.6%	3	12.0%	1	100.0%	35
2	0	0.0%	10	21.3%	80	26.0%	12	15.2%	7	28.0%	0	0.0%	109
3	0	0.0%	13	27.7%	43	14.0%	16	20.3%	6	24.0%	0	0.0%	78
4	0	0.0%	11	23.4%	88	28.6%	25	31.6%	4	16.0%	0	0.0%	128
5	0	0.0%	9	19.1%	76	24.7%	20	25.3%	5	20.0%	0	0.0%	110
Total/Avg.	0	0.00	47	3.23	308	3.38	79	3.52	25	3.04	1	1.00	460
U.S. Navy (n=1203)													
1	0	0.0%	3	2.0%	16	2.3%	4	1.7%	0	0.0%	0	0.0%	23
2	5	26.3%	17	11.1%	61	8.7%	23	9.6%	3	4.7%	0	0.0%	109
3	9	47.4%	36	23.5%	74	10.5%	29	12.1%	4	6.3%	0	0.0%	152
4	2	10.5%	53	34.6%	150	21.3%	52	21.8%	12	18.8%	1	50.0%	270
5	3	15.8%	44	28.8%	404	57.3%	131	54.8%	45	70.3%	1	50.0%	628
Total/Avg.	19	3.16	153	3.77	705	4.23	239	4.18	64	4.55	2	4.50	1182

Note: Response levels 1 through 5 equate to survey labels: "Very Satisfied", "Somewhat Satisfied", "Neutral", "Somewhat Dissatisfied", and "Very Dissatisfied", respectively.

d) Current Value of Eventual Retirement Benefits

The issue with which Navy aviators were least satisfied was the perceived current value of eventual retirement benefits (Avg. = 4.18; SD = 0.99). This also proved to be the second most dissatisfying issue among Marine aviators (Avg. = 3.91; SD = 1.11). Table 3.15 depicts responses for the sample population.

Again, consistently high rates of discontent exist on this issue. However, there exists nearly a 10% difference between services in the degree of dissatisfaction in pay grades O-3 through O-5 (SD and VD: USMC 69.5%; USN 78.6%). This leads one to speculate that Pay Satisfaction factors should appear in the predictive equation of turnover intent, but this issue is of greater concern regarding Navy aviator retention.

Table 3.15. Cross-tabulation of Question 45 responses by Pay Grade and level of question response (1 through 5), tabled separately by Service.

Response	O-1		O-2		O-3		O-4		O-5		O-6		
Level	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Total
U.S. Marine Corps (n=466)													
1	0	0.0%	1	2.0%	4	1.3%	5	6.7%	3	11.5%	1	100.0%	14
2	0	0.0%	5	10.2%	22	7.2%	11	14.7%	6	23.1%	0	0.0%	44
3	0	0.0%	14	28.6%	53	17.4%	16	21.3%	4	15.4%	0	0.0%	87
4	0	0.0%	11	22.4%	96	31.5%	21	28.0%	8	30.8%	0	0.0%	136
5	0	0.0%	18	36.7%	130	42.6%	22	29.3%	5	19.2%	0	0.0%	175
Total/Avg.	0	0.00	49	3.82	305	4.07	75	3.59	26	3.23	1	1.00	456
U.S. Navy (n=1203)													
1	0	0.0%	2	1.3%	4	0.6%	1	0.4%	0	0.0%	0	0.0%	7
2	1	5.9%	11	7.2%	49	6.9%	28	11.8%	7	10.8%	0	0.0%	96
3	9	52.9%	26	17.0%	78	11.0%	39	16.5%	10	15.4%	0	0.0%	162
4	5	29.4%	41	26.8%	167	23.6%	83	35.0%	32	49.2%	2	100.0%	330
5	2	11.8%	73	47.7%	411	58.0%	86	36.3%	16	24.6%	0	0.0%	588
Total/Avg.	17	3.47	153	4.12	709	4.31	237	3.95	65	3.88	2	4.00	1183

Note: Response levels 1 through 5 equate to survey labels: "Very Satisfied", "Somewhat Satisfied", "Neutral", "Somewhat Dissatisfied", and "Very Dissatisfied", respectively.

e) Level of Camaraderie/Esprit de Corps

Another satisfaction issue generating an even wider degree of difference was: "Level of camaraderie/Esprit de Corps." This issue produced the second highest levels of job satisfaction for Marine aviators (Avg. = 1.99; SD = 1.06). It was rated the fourth most satisfying factor, but high variance, among Navy aviators (Avg. = 2.60; SD = 1.27). Analyzing responses from aviators in pay grades O-2 through O-5, we see that 77.1% of the USMC and 54.9% of USN sample population are either very or somewhat satisfied with this issue (see Table 3.16).

Table 3.16. Cross-tabulation of Question 53 responses by Pay Grade and level of question response (1 through 5), tabled separately by Service.

Response Level	O1 Count	O1 %	O2 Count	O2 %	O3 Count	O3 %	O4 Count	O4 %	O5 Count	O5 %	O6 Count	O6 %	Total
U.S. Marine Corps (n=466)													
1	0	0.0%	18	36.0%	119	38.8%	27	34.2%	18	69.2%	1	100.0%	183
2	0	0.0%	20	40.0%	113	36.8%	34	43.0%	7	26.9%	0	0.0%	174
3	0	0.0%	4	8.0%	34	11.1%	8	10.1%	0	0.0%	0	0.0%	46
4	0	0.0%	7	14.0%	34	11.1%	8	10.1%	0	0.0%	0	0.0%	49
5	0	0.0%	1	2.0%	7	2.3%	2	2.5%	1	3.8%	0	0.0%	11
Total/Avg.	0	0.00	50	2.06	307	2.01	79	2.04	26	1.42	1	1.00	463
U.S. Navy (n=1203)													
1	3	16.7%	35	22.9%	151	21.2%	49	20.6%	26	39.4%	0	0.0%	264
2	4	22.2%	57	37.3%	237	33.3%	75	31.5%	19	28.8%	0	0.0%	392
3	6	33.3%	26	17.0%	110	15.5%	42	17.6%	7	10.6%	0	0.0%	191
4	5	27.8%	31	20.3%	130	18.3%	54	22.7%	13	19.7%	1	50.0%	234
5	0	0.0%	4	2.6%	83	11.7%	18	7.6%	1	1.5%	1	50.0%	107
Total/Avg.	18	2.72	153	2.42	711	2.66	238	2.65	66	2.15	2	4.50	1188

Note: Response levels 1 through 5 equate to survey labels: "Very Satisfied", "Somewhat Satisfied", "Neutral", "Somewhat Dissatisfied", and "Very Dissatisfied", respectively.

3. Responses to Open-ended Satisfaction Questions

The previous Methods chapter discussed how responses to open-ended questions were categorized by theoretical factors (see Appendix B) and aggregated into the survey data base as new independent measures of satisfaction. A table resulting from an analysis of this data is provided as Appendix F. This appendix shows a matrix of values depicting the level of each first-order factor present for each of three open-ended survey questions (numbers 18, 21, and 22). Further, this appendix provides a cross-tabulation of average level of response with an indication of the trend by rank. Each open-ended question response that fell within the framework of Appendix B is tallied in a particular cell within this matrix. An analysis by first and second-order factors (more general to more specific) by survey question follows.

a) Reasons for Becoming an Aviator

When posed the question: "Why did you decide to become a Naval Aviator?" the responses provided were consistent across the two services. Both Marine Corps and Navy aviators stressed reasons categorized as Work and Organization Satisfaction as their chief motivation for joining and there is an increasing trend by rank. In fact, 20% of those sampled from each service responded with at least two Work Satisfaction reasons while 10% of those sampled cited at least two Organization Satisfaction reasons. All other first-order factors were cited considerably less often and exhibit declines in relative priority by rank. Among both first-order responses, the distribution of second-order (more definitive) responses was again similar for both services. Of those citing Work Satisfaction as a reason for becoming an aviator, over half of all sampled respondents specifically mentioned the prospects of *an exciting/fun job* as their reason (54.3% USMC; 67.6% USN). *To be challenged by their job* was the only other prominent Work Satisfaction response (25.5% USMC, 23.7% USN). Among Organization Satisfaction reasons, almost half of all respondents (42.1% USMC, 45.0% USN) cited the *prestige or stature attained from serving* as a reason for joining. A distant second response was *an opportunity for career growth or development* (9.9% USMC, 11.8% USN). This data provides strength to the earlier argument that aviators are primarily job-oriented and not significantly motivated in their career choice by other first-order Job Satisfaction factors (pay, leisure, or family).

b) Reasons that Aviators Leave the Service

Answers from the sample population to "why Aviators are leaving the Service" yielded a broader range of first-order responses. At least 20% of respondents

from each service cited Family, Work, Pay, Organization or Supervisor Satisfaction first-order factors as one of their four reasons for leaving. (Less than 10% of the sample cited a reason categorized as Leisure or Co-worker Satisfaction among their 4 responses.) However, within this diverse group of responses, Work Satisfaction reasons again stood out as definitive factors (over 25% of aviators citing at least two such reasons). Furthermore, as aviators progress through the ranks, these issue become more important.

Similar to responses to why aviators are joining the service, the distribution of second-order responses for what aviators considered were the most significant reasons for leaving the service were again fairly consistent for both services. Of those citing Work Satisfaction as a reason for becoming an aviator, roughly one fifth of all respondents cited *Work Dissatisfaction* (in general) as a reason why aviators are leaving (20.8% USMC; 18.7% USN). Corroborating earlier analysis of the decline of monthly flight hours per aircrewman, the strongest specific negative Work Satisfaction response was seen for *low flight hours* (or an inappropriate amount of work) (34.1% USMC, 25.7% USN). Other frequently cited second-order Work Satisfaction responses included: *inadequate resources (aircraft, parts, manning, etc.) to complete work* (14.8% USMC, 25.4% USN), and *unfavorable mix of flying versus collateral duties* (26.2% USMC, 13.3% USN). Clearly, the negative sentiments regarding a lack of resources could be attributed to the aging of the fleet or the wholesale elimination of certain communities. Meanwhile, the perception that a greater proportion of time is spent performing desk-bound duties rather than flying induced the unfavorable 'work mix.' To further examine the issue of aviators significantly responding that they were experiencing low flight hours, Table 3.17 tabulates this sample population sub-group by pay grade and

service. Oddly, USMC grades O-2 and O-4 and USN grades O-1 and O-3 have relatively higher proportions than the other sub-groups.

Table 3.17. Tabulation of Sample Population responding that *Low flight Hours* was a significant reason why aviators are leaving the military, by Pay Grade and Service.

	O-1		O-2		O-3		O-4		O-5		O-6		Total	
Service	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
USMC	0	0.0%	25	48.1%	94	30.5%	32	40.5%	7	26.9%	1	100.0%	159	34.1%
USN	6	31.6%	34	21.9%	195	27.1%	61	25.3%	13	19.7%	0	0.0%	309	25.7%

Note: Percentages refer to the fraction of tabled counts relative to the total sample population.

Among Family Satisfaction reasons, over a quarter of all respondents (28.3% USMC, 30.4% USN) cited an *unreasonable amount of time away from home* as one of the four reasons why aviators generally would leave the service. In addition, 10% of aviators from each service responded that Family Dissatisfaction in general would be a primary reason for leaving the military. Since this second-order factor dominated most other reasons for leaving a table was generated to analyze this sub-group of the sample population (Table 3.18). As this table and the decreasing trend in Appendix F shows, aviators appear to grow accustomed to this inconvenience or younger aviators are less tolerant of family dissatisfaction.

Table 3.18. Cross-tabulation of Sample Population responding that *Time away from Home* was a significant reason why aviators are leaving the service, tabled by Pay Grade and Service.

	O-1		O-2		O-3		O-4		O-5		O-6		Total	
Service	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
USMC	0	0.0%	20	38.5%	87	28.2%	20	25.3%	4	15.4%	1	100.0%	132	28.3%
USN	9	47.4%	52	33.5%	220	30.6%	67	27.8%	18	27.3%	0	0.0%	366	30.4%

Note: Percentage values refer to the fraction of tabled counts relative to the total sample population.

Where Pay Satisfaction was an issue, most aviators reported *levels of job-specific incentives and bonuses* (15.2% USMC, 23.0% USN) as one of their four

significant reasons for leaving the military. Roughly equal numbers from each service (18.0% USMC, 21.4% USN) also cited general 'Pay Dissatisfaction' as one of their reasons for leaving. Among older aviators, there appears to be a slight decline in the importance of this issue.

Among Organizational Satisfaction reasons, no single factor dominated the categorized responses. However, 13.1% of USMC aviators (8.3% USN) cited *political correctness of rules or policies* and 9.6% of USN aviators (6.7% USMC) cited *low opportunities for career growth or development* as one of the four reasons why aviators are leaving. Lastly, aviators frequently cited dissatisfaction with supervisors as a significant reason why an aviator would leave the service and this trend increases as aviators accrue tenure. No second-order factor dominated responses; however, poor leadership in general was cited by many respondents as a reason for leaving (12.2% USMC, 18.0% USN).

c) Reasons that Aviators Stay in the Service

Responses from the sample population to the survey question that asked for four significant reasons why aviators are leaving the service parallel those already mentioned. Analyzing categorized responses by first-order satisfaction factors, Work, Organization and Co-worker Satisfaction factors were the most frequent responses to this question. As Appendix F shows, the frequency of respondents specifically citing at least two Work and Organization Satisfaction reasons, as well as an increasing trend given tenure, shows how prevalent these issues are as major factors behind aviator retention.

Further analyzing all Work Satisfaction responses by the second-order factors from which they are comprised reveals consistent responses by each service

similar to those evidenced as reasons for joining the service. The most prominent responses were seen as being the desire for *fun and exciting work* (39.5% USMC, 44.1% USN), *challenging work* (12.4% USMC, 11.1% USN) and *rewarding and worthwhile work* (17.4% USMC, 9.3% USN). Clearly, an increase in flight hours is desired by today's aviators, yet the time aloft needs to be challenging and rewarding to be a positive motivator. The narrow range in rates given in Table 3.19 shows that this attitude is shared fairly consistently across both services and all pay grades.

Table 3.19. Cross-tabulation of Sample Population responding that *Exciting and fun work (flying)* was a significant reason that aviators would stay in the service, tabled by Pay Grade and Service.

	O-1		O-2		O-3		O-4		O-5		O-6		Total	
Service	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
USMC	0	0.0%	18	34.6%	124	40.3%	31	39.2%	10	38.5%	1	100.0%	184	39.5%
USN	7	36.8%	62	40.0%	315	43.8%	110	45.6%	34	51.5%	2	100.0%	530	44.1%

Note: Percent values refer to the fraction of tabled counts relative to the total sample population.

Similar to reasons for joining, aviators cited Organizational Satisfaction second-order factors as being critical retention motivators. The most prominent responses were desires for the service to provide *prestige and stature* (22.1% USMC, 33.1% USN), *job security or stability* (19.3% USMC, 29.4% USN) and *opportunities for career growth or development* (15.9% USMC, 10.1% USN). Concerned about a second drawdown, many aviators are troubled about their continued future in career service.

Lastly, aviators commonly identified satisfaction with their co-workers as a significant reason why they would stay in the service. The rates were comparable by service (25.1% USMC, 24.2% USN) and roughly double the rates of those declaring this a "reason for joining" (8.6% USMC, 12.6% USN). Over time, this issue might have a bearing on one's desire to remain in the service and it is informative to determine

whether this trend prevails across all pay grades. Table 3.20 compares the second-order factor of an aviator's desire for *a sense of camaraderie or esprit de corps* across all pay grades. The tabled rates and the Appendix F trend analysis indicate that while the need is fairly consistent across USMC grades, Navy aviators are more compelled by this issue once they attain greater seniority.

Table 3.20. Cross-tabulation of sampled aviators responding that *Camaraderie* was one of their significant reasons why one would stay in the service, tabled by Pay Grade and Service.

	O-1		O-2		O-3		O-4		O-5		O-6		Total	
Service	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
USMC	0	0.0%	13	25.0%	77	25.0%	20	25.3%	5	19.2%	1	100.0%	116	24.9%
USN	1	5.3%	29	18.7%	158	21.9%	68	28.2%	24	36.4%	0	0.0%	280	23.3%

Note: Percent values refer to the fraction of tabled counts relative to the total sample population.

d) Question 18 versus Questions 21 and 22 Factor Correlation

An analysis of the variables (first-order factors) derived from categorized responses for reasons for joining the service and reasons for leaving and staying in the service was conducted to determine their degree of correlation. As discussed earlier, it was anticipated that an aviator who joined the service to fulfill certain job satisfaction needs would consider staying or leaving the service depending on whether that need was, or was not, being met. This relationship translates to a statistical dependence between variables of the same type first-order factor between questions 18 and 21 or questions 18 and 22 respectively. The correlation matrices that are provided in Appendix G show that, for most factors, there is no evidence of statistical dependence. Correlations between variables Q18WS and Q21WS, and Q18WS and Q22WS show, however, that some dependencies do exist. This confirms, to some degree, that aviators who identify Work Satisfaction as their reason for joining would also be swayed in their retention decision

by this factor. A similar, but weaker, relationship exists for Organization Satisfaction factors. By itself or in combination with other satisfaction factors, higher Work Satisfaction correlations allude to the greater relative importance of this particular factor in the retention equation. The sample data shows that a slight correlation (0.2979) exists among aviators who say that they joined for reasons of Work Satisfaction but would consider staying for Organizational Satisfaction reasons. A preliminary conclusion is that aviators' satisfaction with their units roughly equates to their attaining initially identified workplace needs. An analysis of the sample data separately by service revealed the same set of relationships discussed above.

4. Dependent Measure

Following an analysis of significant independent measures, it is enlightening to scrutinize the dependent measure relative to certain of these measures. From the survey responses, a sizeable 68.0% of the total sample population (61.3% USMC, 70.6% USN) assert that they are considering leaving the military. Given this disparity between services, the data was analyzed separately. The first independent measure analyzed in relationship to intent to leave was with respect to commissioning source (Table 3.21). The results shown in this table indicate no clear pattern in expected retention behavior based on commissioning source alone relative to service total figures.

Table 3.21. Cross-tabulation of the percentage of the Sample Population expressing intent to leave by Commissioning Source, tabled separately by Service.

	Academy	OCS	ROTC	Other	Total
USMC	50.0%	63.6%	58.0%	68.4%	61.3%
USN	71.4%	70.8%	72.2%	51.8%	70.6%
Total	67.7%	67.9%	70.2%	61.5%	68.0%

The next independent measures analyzed in relationship to intent to leave were Age and Pay Grade. As shown in Table 3.22, the highest concentration of aviators expressing intent to leave is found in grade O-3 and between 26-35 years of age in both services. This response appears more pronounced in pre-Baby Boomers (age 26-30).

Table 3.22. Cross-tabulation of the percentage of the Sample Population expressing intent to leave by Age and Pay Grade, tabled separately by Service.

Age	O-1	O-2	O-3	O-4	O-5	O-6	Total
			U.S. Marine Corps				
less than 26	NA	33.3%	NA	NA	NA	NA	33.3%
26-30	NA	48.6%	74.4%	NA	NA	NA	70.7%
31-35	NA	0.0%	62.1%	43.2%	NA	NA	55.6%
36-40	NA	NA	50.0%	43.2%	33.3%	NA	42.6%
41-45	NA	NA	NA	100.0%	47.4%	0.0%	50.0%
0ver 46	NA	NA	NA	NA	0.0%	NA	0.0%
Total	0.0%	42.9%	70.5%	44.7%	42.3%	0.0%	61.3%
			U.S. Navy				
less than 26	75.0%	45.5%	NA	NA	NA	NA	50.8%
26-30	0.0%	48.4%	83.3%	NA	NA	NA	76.7%
31-35	0.0%	40.0%	80.4%	54.3%	NA	NA	68.6%
36-40	NA	NA	66.7%	59.4%	52.6%	NA	58.0%
41-45	NA	NA	0.0%	66.7%	73.1%	NA	69.7%
0ver 46	NA	NA	NA	NA	NA	100.0%	100.0%
Total	47.4%	47.1%	82.1%	56.1%	61.5%	100.0%	70.6%

Note: "NA" entries imply no such sample respondent within a particular cell. Conclusions should not be drawn regarding 0% or 100% entries due to small sample sizes (see Table 3.5).

Subsequently, analysis focussed on the dependent measure relative to levels of workload, by aircraft community. A complete tabulation of this result is provided in Appendix H. This analysis revealed that, in general, as simulator hours increased intent to remain decreased (for both services). (An increasing trend exists, however, in the USMC CH-53 and F-18 communities). As actual flight hours increased, however, USN aviators (except the SH-60F community) express a slightly increased intent to leave while the rate for USMC aviators remains essentially constant. This increased desire to leave the military, despite the attainment of flight time perhaps addresses the quality of the

flight time attained (high OPTEMPO, yet not the desired challenging or rewarding experience).

Next, responses to the question of intention of stay were compared against responses provided to months at sea or TDY over the past two years. In subsets for which there were a sufficient number of data points, a regression line was fitted to the sample data to determine the trend of intent to leave over the range of months away. The results show a general positive trend in expected change in retention. The slope of each regression line (percent change per additional month away) is provided in Table 3.23.

Table 3.23. Expected change in rate of Intent to Leave given a monthly increase in time away from home, tabled by Pay Grade and Service.

Percent change per additional:	**U.S. Marine Corps**				**U.S. Navy**			
	O-2	**O-3**	**O-4**	**O-5**	**O-2**	**O-3**	**O-4**	**O-5**
Month at Sea	NA	1.9%	3.6%	NA	1.9%	0.1%	2.1%	1.5%
Month TAD/TDY	NA	1.7%	1.8%	NA	2.2%	0.6%	3.1%	NA

Note: "NA" reflects that sample data was insufficient for regression computation.

Following the review of change due to increased time away from home was an analysis of potential impact on the dependent variable given an aviator's marital status. Table 3.24 reflects a mixed result seemingly indicating that this variable itself is not well suited for predicting intent to remain. Even though the rate of intent to remain for divorced aviators is 7 percent above the average in both services, this sub-group represents less than 5 percent of the sample from either service. The majority of married aviators expressed an intent to leave on par with the sample average.

Table 3.24. Expected change in rate of Leave Intent given a monthly increase in time away from home (at sea or TAD/TDY), tabled by Service and Pay Grade.

Marital Status	U.S. Marine Corps						U.S. Navy						
	O-2	O-3	O-4	O-5	O-6	Total	O-1	O-2	O-3	O-4	O-5	O-6	Total
Married	41.4%	70.7%	42.7%	44.0%	0.0%	60.1%	25.0%	52.4%	82.9%	55.5%	60.0%	100.0%	71.4%
Unmarried	44.4%	68.1%	50.0%	0.0%	NA	62.1%	63.6%	44.3%	79.5%	55.6%	100.0%	NA	67.4%
Divorced	50.0%	69.2%	75.0%	NA	NA	68.4%	NA	0.0%	82.1%	72.7%	100.0%	100.0%	77.3%
Other	NA	100.0%	NA	NA	NA	100.0%	NA	NA	100.0%	NA	0.0%	NA	66.7%

Note: "NA" implies an insufficient number of data points for regression computation.

Aside from marital status, the retention survey collected data on the educational level of each aviator's spouse. While the status itself does not appear to correlate with one's intent to leave, the opposite is true for this variable. As Table 3.25 shows, given increased levels of spousal education one's intent to leave also increases. This trend confirms to the importance of increased spousal earnings potential and one's desire to not remain in the service when that additional income is put at risk due to high OPTEMPO or frequent changes in duty station assignments. The 46.7% rate for post-graduate spouses of Navy aviators in pay grade 04 goes against the trend in the below table; however, this sub-group represents less than 4 percent of the sample population.

Table 3.25. Percentage of Sample Population intending to leave based on spouse's Educational Status, tabled by Service and Pay Grade.

Spouse's Education	U.S. Marine Corps						U.S. Navy						
	O-2	O-3	O-4	O-5	O-6	Total	O-1	O-2	O-3	O-4	O-5	O-6	Total
HS or less	100.0%	0.0%	25.0%	0.0%	NA	15.4%	0.0%	33.3%	90.0%	50.0%	100.0%	NA	59.3%
Some college	12.5%	74.0%	35.3%	37.5%	NA	56.6%	0.0%	61.5%	76.2%	54.7%	66.7%	NA	67.9%
College grad	50.0%	73.0%	40.0%	33.3%	0.0%	61.9%	50.0%	44.7%	86.4%	60.2%	56.3%	100.0%	74.2%
Post-graduate	50.0%	76.1%	61.5%	83.3%	NA	72.5%	NA	75.0%	80.8%	46.7%	60.0%	NA	69.8%

Note: "NA" implies that sample data was insufficient for regression computation.

Subsequently, the dependent variable was analyzed relative to responses from survey questions 28 and 53 which were skewed positively on the Likert satisfaction scale, and questions 33, 44 and 45 which were negatively skewed. Appendix I provides tabular

results of the rates for intent to leave as they correlate with levels of each of these questions. On Question 28, sampled aviators who are very satisfied with their job fulfillment or challenge (41% USMC, 37% USN) are much less likely to consider leaving (8% below sample average USMC, 10% below sample average USN). Those who are somewhat satisfied with this issue (43% USMC, 41% USN) expressed a slightly below average intent to leave. For Marine Corps aviators, similar results were seen in Question 53. Strong positive feelings about camaraderie in similarly sized sub-groups yielded well- or slightly-below average rates for intent to leave. Among Navy aviators, however, these sub-groups comprise 55% of the sample and expressed only average intent to leave indicating that increasing camaraderie in Navy units may not have as positive an effect on improving retention as raising levels of work satisfaction (e.g. fulfillment or challenge).

For sampled aviators who were very dissatisfied with the length of working hours ashore (41% USMC, 37% USN), intent to leave was well above average (USMC: 11% above, USN: 8% above). Pay satisfaction issues also yielded strong negative feelings coupled with greater than average intent to leave. For sampled aviators who were very dissatisfied with the value of eventual retirement benefits (38% USMC, 50% USN), intent to leave was 8% and 12% respectively above the sample average. Aviators in the Navy, and to a lesser degree in the Marine Corps, showed less moderation in their intent to leave on the issue of adequacy of TAD/TDY compensation. Sampled aviators who were very dissatisfied with this issue (24% USMC, 53% USN) expressed an intent to leave 1 and 8 percent respectively above the sample average.

5. Principal Components Analysis

A principal components analysis was useful at this stage of the analysis for two reasons. First, a key reason for using principal components techniques is to reduce the number of independent measures used in the eventual retention model. (Recall that the categorization of open-ended survey responses generated a set of 21 new independent measures of facet satisfaction.) Also, the 27 Likert-scaled questions potentially lend themselves to data reduction. Secondly, it was anticipated that this technique would confirm the existence of a linkage between expressing a particular type of satisfaction as a reason for becoming an aviator and the same type of satisfaction being indicated as a reason for staying in or leaving the military. For a detailed explanation of principal components analysis see Hamilton (1992).

Principal component factor scores could essentially be interpreted as the strength of the relationship between identified needs and the relative importance of satisfying those needs. Factor scores developed for Likert-scaled questions might have shown that a similar issue (cluster of like survey questions) predominated as an explanation for variance in the dependent measure (whether an aviator intended to leave). A principal components analysis yielded inconclusive results regarding existing facet satisfaction relationships or clustering of question variables.

a) Open-ended Question Variables

The objective of this portion of analysis was to use principal components methods to derive the minimum number of factors that would explain a majority of the variance inherent to the 21 variables associated with open-ended survey question responses. If these factors were to be significant to the eventual retention model,

accounting for the majority of the variability would be necessary. Appendix J shows that 3 factors in the case of the USMC data subset (54.99% of cumulative variance) and 4 factors for the USN data subset (55.46% of the cumulative variance) accomplished this requirement. Four principal components were ultimately used for each data subset given the composition of coefficient values and component loadings. Accounting for the most variability in the 21 measures (32.8% USMC, 23.75% USN), the first factor is composed of a similar loadings on satisfaction components for each service. A high value for this factor results from individuals who expressed Work Satisfaction reasons for joining and similar reasons for staying in and leaving the military (variable correlation provided in Appendix J). This factor alone cannot adequately model the dependent measure; however, a logistic regression of the dependent variable modeled by this component's factor score alone yields a significant t-value (–4.533 on 1 degree of freedom) for Marine aviators. Performing this same test on the Navy aviator data subset showed the opposite relationship and a much weaker likelihood (t-value = 1.195, 1 df) that the Work Satisfaction factor would be a useful predictor of the dependent measure by itself. The second factor derived from the USMC data subset resembles the third factor derived from USN data. This factor is heavily loaded on Work Satisfaction responses as significant reasons for staying in the military. Similarly the principal component loadings for the third factor for USMC aviators resembles the second factor derived from USN data. This factor is distinguished by aviators who provided Work Satisfaction responses as significant reasons for leaving the service. The fourth component contributed only 8% to the explanation of cumulative variance and because it was comprised of a different combination of coefficients for each service a total of 4 principal components were

ultimately used to tailor the initial 21 variables. In the case of USMC aviators, this last factor loads heavily for individuals responding that Organization satisfaction (prestige/stature) were their reasons for joining the military. For Navy aviators, this factor loads in the opposite direction on Organization Satisfaction but also loads heavily on responses provided for both Pay and Supervisor Satisfaction as one's reasons for leaving the military. Through matrix multiplication, factor loadings and the 21 independent variables produce 4 factor scores for each aviator (F1, F2, F3 and F4) that were used to develop eventual retention models.

b) Likert-scaled Question Variables

Performing a principal components analysis on the subset of Likert-scaled question variables provided a less promising result. In this case, the first component accounted for much less variability in each data subset and six components were necessary to account for the majority of the variability in the 27 question variables. Appendix J provides tabled results of this analysis. For both service data subsets, the coefficients for the first component are all positive in sign and nearly equal in weight. This factor can be viewed as the average of scores provided to the questions themselves. This balanced composition of loadings shows that the existing DoN Retention Survey is basically a useful tool. However, Appendix J cumulative variance figures and individual question loadings show that no singular issue stands out as significant. With all but the first principal component accounting for so little variance, the use of these factors in lieu of the actual variables was without merit. As a result, the question responses themselves, rather than principal factor scores derived from the responses, were used in model development.

6. Aviator Retention Models

Using demographic variables, factor scores and satisfaction question scores, the task now becomes constructing an optimal parametric and non-parametric representation of an individual's "intent to leave" response to help determine significant factors that influence the dependent measure. Classification and regression tree (CART) techniques as well as logistic regression methods are each used for the purpose of generating separate, yet complimentary, results.

a) Classification Trees

Since the dependent measure is a factor variable, CART methods generate classification trees by splitting the data to account for the maximum deviance in the dependent measure at each successive branch in the tree. The eventual tree model classifies individuals according to observed variable measures at each successive branch in the tree until one is classified as intending to leave (value = 1) or not leave (value = 0) at a terminal node, or leaf, on the tree. Low misclassification rates at each node signal which factors, or level of variables, credibly predict one's actual response. For additional discussion of CART methodology see Venables & Ripley (1994).

For each subset of service data, classification trees were constructed using the following identical criteria. Initially, all independent variables were included in the model generation process. This resulted in low misclassification rates (9.8% USMC; 6.4% USN) but overly complex models (21 variables and 29 leaves USMC; 28 variables and 55 leaves USN). Cross-validation was preformed on the initial trees using random portions of the data set (a tree was built using 75% of the data to predict on the remaining 25%) to determine which variables would be most accurately used in any less complex

tree. A cost-complexity approach (Venables & Ripley, 1994) reduced the tree model in size at the expense of higher misclassification rates. The objective was to prune the size of the tree until the final misclassification rate would be half that of a naive guess of the dependent measure (an arbitrary objective point). Since a naïve guess of the dependent measure would be wrong for an average 38.7% of USMC aviators or 29.4% for USN aviators, misclassification rates of less than 19.3% for USMC and 14.7% USN. The results were the viable and reasonably-sized models shown in Figures 3.3 and 3.4. Additionally, these models identified the subset of Likert-scaled questions that could be effectively used in logistics regression equations. In addition to from being uncomplicated depictions of the dependent measure, as modeled by a sufficiently small number of independent measures, these tree models perform extremely well at classifying portions of the data set. Analyzing variables used in the USMC tree model, one finds that the central issue for classification occurs involves the *quality and competence of leadership / management* (question 29). Looking at the root node in the tree, most Marine aviators are satisfied on this issue (n=148) and consider themselves "stayers" (although the model is likely to be wrong 70 out of 148 times at this stage). Of those who are neutral or dissatisfied with this issue (n=98), the model would misclassify only 20 aviators. The rate of correct classification improves with each subsequent node and branching by the value of a new variable. Of interest, junior Marine aviators (age level b; 26-30 years of age) who are also displeased with leadership represent a quarter of those in the model (n=49) and would be mislabeled as "leavers" only 4 times (half the average misclassification rate). However, of USMC aviators in age groups c and d who feel the same way about this issue, and whose source of commission was 'other' (PLC, MECEP,

etc.), the model misclassifies none of the 11 predicted to be "leavers." Important for its absence from this model is the variable *aircraft type*. This shows that retention behavioral patterns are consistent across all USMC aviation communities. While not prominent in the model, the variable F1 (Work Satisfaction factors) is present. Lastly from this model, a spouse's opportunity to pursue a career (Q39) is a key issue appearing on both main branches of the tree.

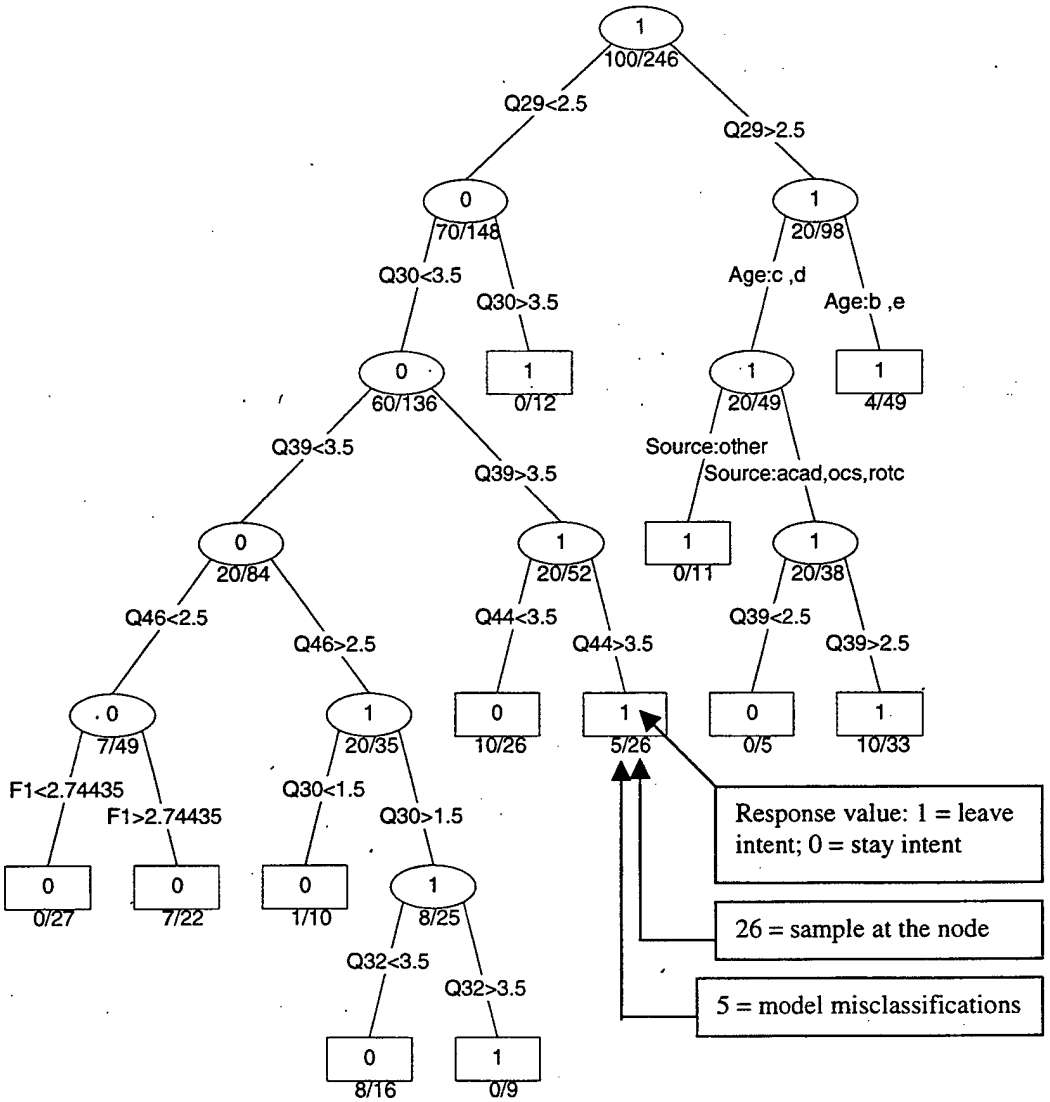

Figure 3.3. Classification tree of Marine Corps aviators (n=466). Model omitted 220 data points due to "NA" values provided to questions used in model generation. Variables used in construction: 9. Terminal nodes: 12. Misclassification rate: 19.9%.

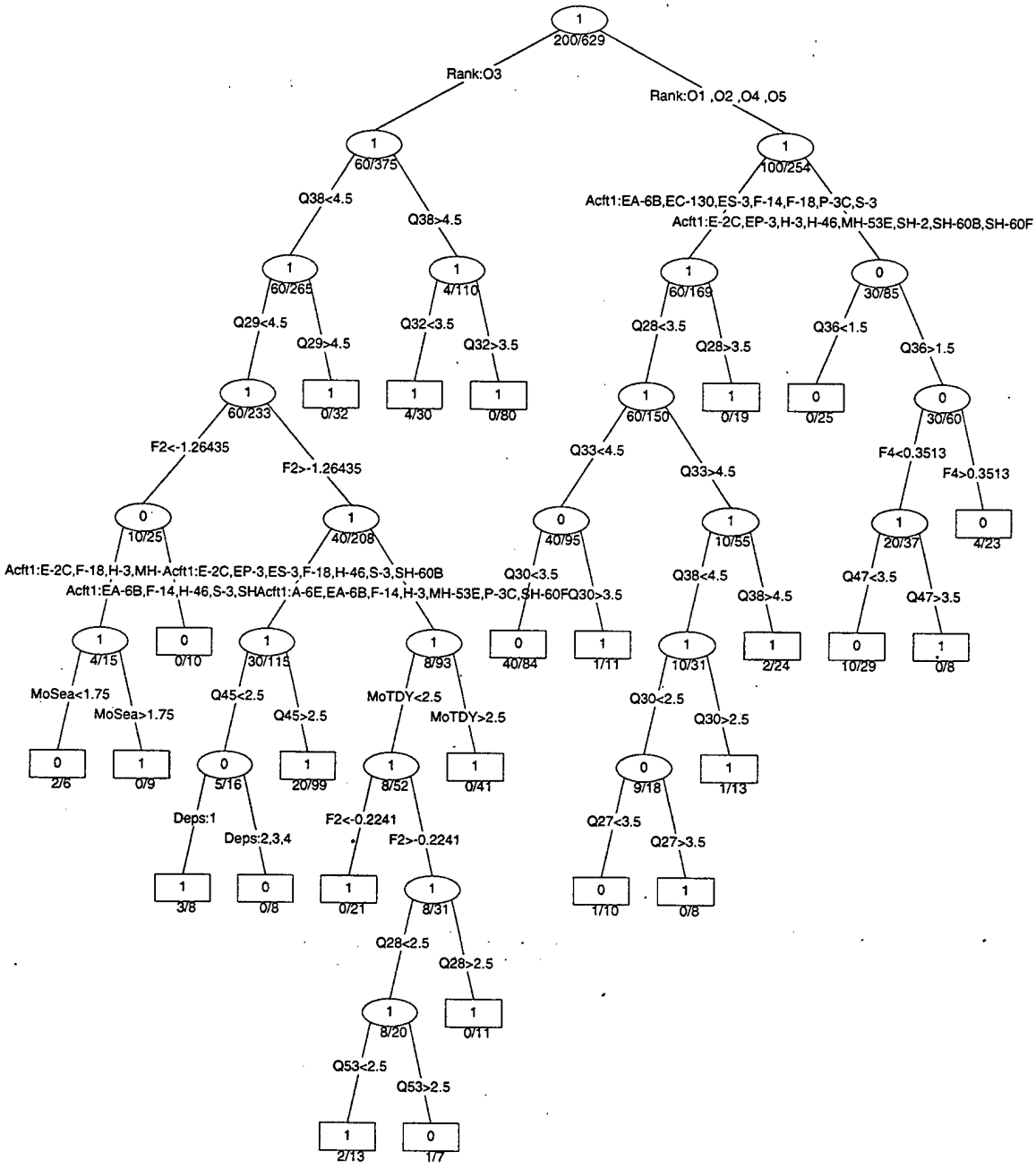

Figure 3.4. Classification tree of Navy aviators (n=1203). Model omitted 574 data points due to "NA" values provided to questions used in model generation. Variables used in construction: 18. Terminal nodes: 25. Misclassification rate: 14.6%.

From the Navy tree model (Figure 3.4), pay grade is shown to be the prevalent discriminating factor of retention behavior. Following this initial branch, the retention behavior of pay grade O-3 USN aviators is most readily classified based on the amount of time (other than sea time) they are separated from their families (Q38). In grades other than O-3, aircraft type is the prime factor which delineates "leavers" from "stayers;" however, misclassification occurs more often than a naïve guess unless other variables used to classify one's intent. Among non-O-3's who primarily fly rotary aircraft, the model shows the largest group of correctly classified "stayers" (provided of course that they are very satisfied with living conditions ashore, Q36 < 1.5). The model is able to correctly classify only small sub-groups of Navy aviators as "intending to stay." This model does, however, delineate several large groups who are correctly predicted as indicating they intend to leave the military (such as the 80 O-3s who are very dissatisfied with time away (Q38) and feel dissatisfied with personnel manning levels (Q32)). Another large cluster of aviators (n=41) accurately classified as saying they intend to leave are O-3s who cite Work Satisfaction reasons for leaving (principal component F2) and are from aviation sub-communities which are undermanned and/or declining in structure (A-6E, EA-6B, F-14, H-3, MH-53, P-3C, SH-60F). If, for the moment, classifications which occurs after the node branching on *months TAD/TDY* are overlooked, the model is shown to misclassify only 8 out of 93 O-3 aviators (a misclassification rate much better than a naïve guess).

The same CART methods used on the full sample from each service can also be applied to subsets of each service sample. For example it is illustrative to determine the differences, if any, in retention reasons between those aviators who are generally still

serving their initial military service obligation and those who have opted to remain beyond that point (the cutoff being attainment of age 30 in most cases). For either 'tenured' (age > 30) or 'non-tenured' (age < 31), Marines or Navy aviators, results of CART analysis (of comparable complexity as described above) include many different variables to arrive at the best models (Figures 3.5-3.8). A summary of variables included in all models (ordered by relative importance) is provided in Table 3.26 below. The different predictor variables used in the four separate models follow a common pattern. Work Satisfaction issues are common across the spectrum of models while Pay, Organization and Supervisory Satisfaction issues appear to be more frequently used to model juniors aviators.

Table 3.26. Independent measures used to generate CART models; listed in descending order of importance to classifying sub-group deviance in dependent measure.

Model	Figure	Model variables
All USMC	3.3	Q29, Q30, Q39, Q46, F1, Q32, Q44, Age, Source
- Non-tenured only	3.5	Q29, Q30, Q44, Q50, Q39, Source, Q27, F4, MoTDY, F1
- Tenured only	3.6	Acft, Q46, Q34, MoSea, Q37, Q52, Q45, F4, Q35
All USN	3.4	Rank, Q38, Q29, F2, Acft, MoSea, Q45, Deps, MoTDY, Q28, Q53, Q32, Q33, Q30, Q27, Q36, F4, Q47
- Non-tenured only	3.7	Rank, Acft, Q35, Q43, F4
- Tenured only	3.8	Q51, Acft, Q38, F4, F3, MoTDY, Q45, Q27, Q37, Q43 Q36, F1

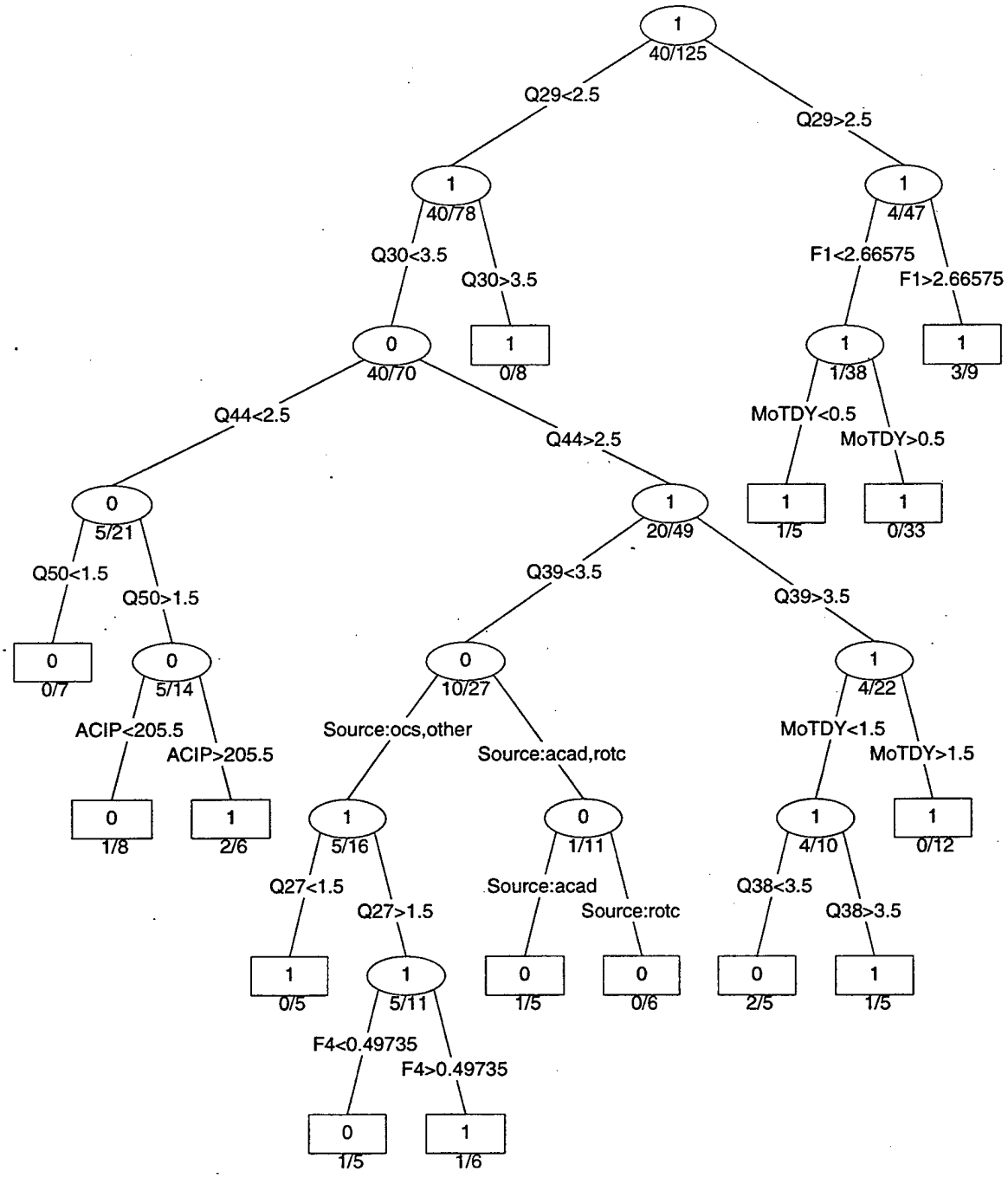

Figure 3.5. Classification tree of 'non-tenured' Marine Corps aviators (n=263). Model omitted 138 data points due to "NA" values provided to questions used in model generation. Variables used in construction: 10. Terminal nodes: 11. Misclassification rate: 12.8%.

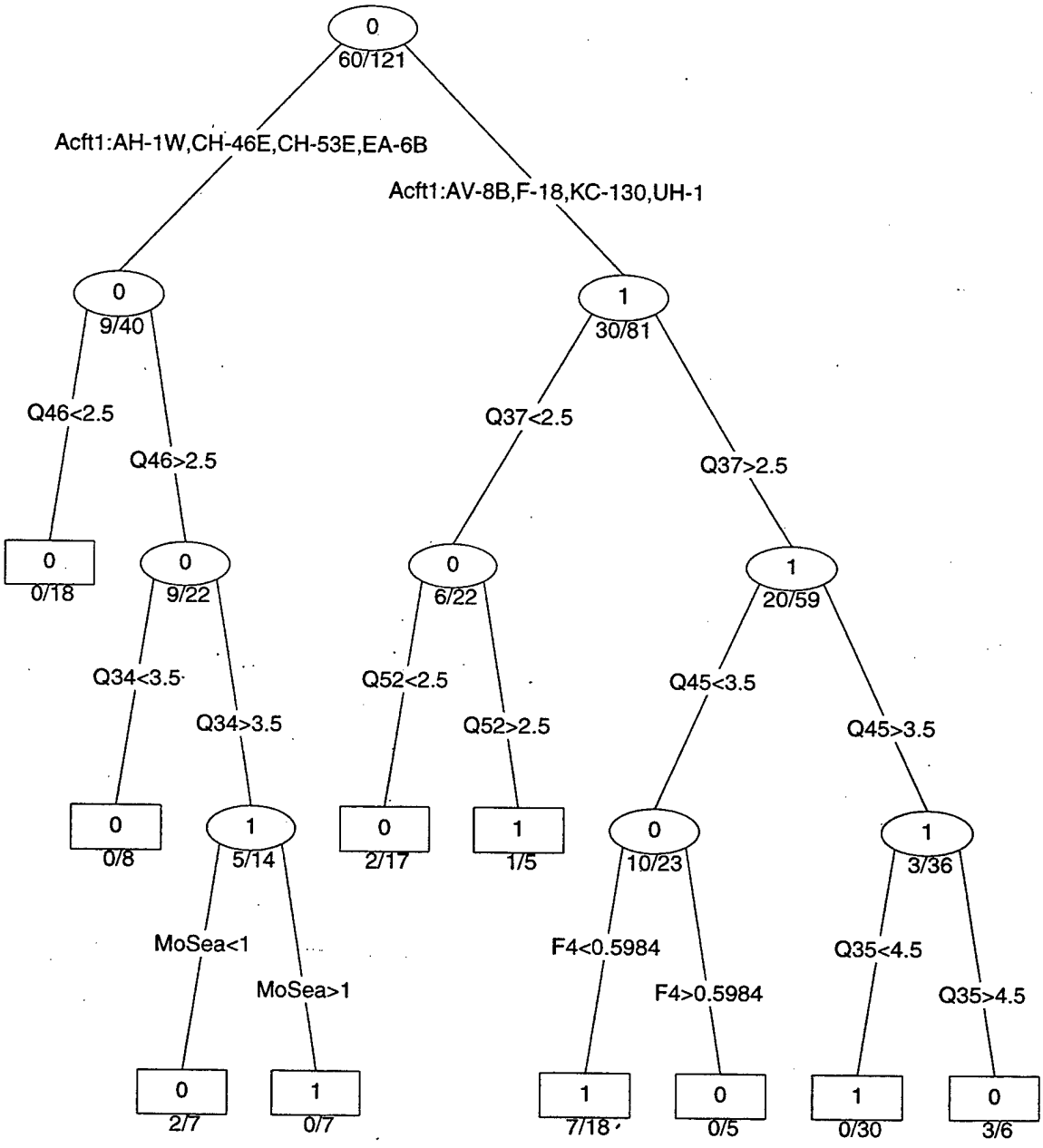

Figure 3.6. Classification tree of 'tenured' Marine Corps aviators (n=203). Model omitted 82 data points due to "NA" values provided to questions used in model generation. Variables used in construction: 9. Terminal nodes: 10. Misclassification rate: 12.4%.

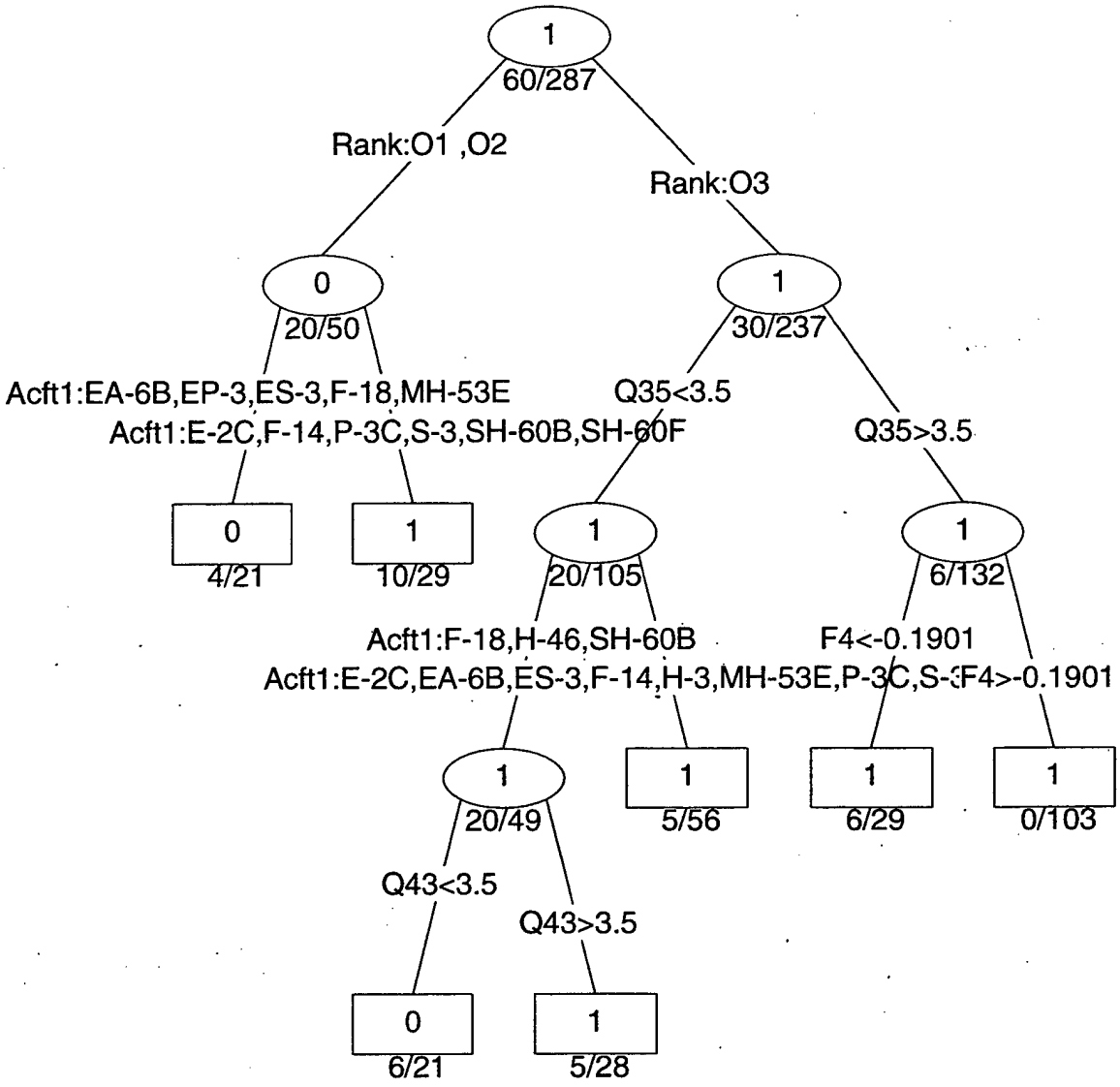

Figure 3.7. Classification tree of 'non-tenured' Navy aviators (n=652). Model omitted 365 data points due to "NA" values provided to questions used in model generation. Variables used in construction: 5. Terminal nodes: 7. Misclassification rate: 12.5%.

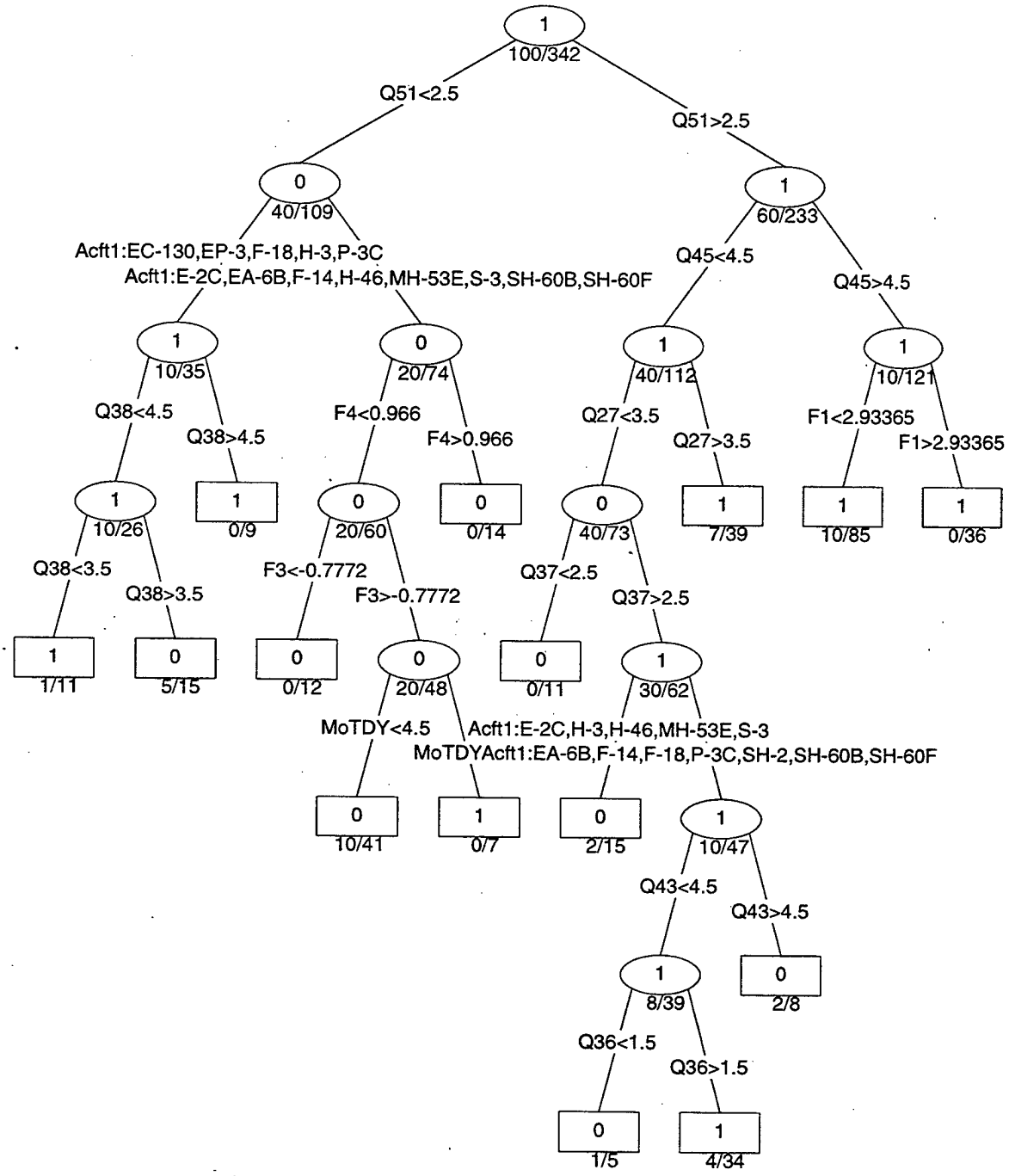

Figure 3.8. Classification tree of 'tenured' Navy aviators (n=551). Model omitted 209 data points due to "NA" values provided to questions used in model generation. Variables used in construction: 12. Terminal nodes: 15. Misclassification rate: 14.3%.

b) Logistic Regression Models

Since many surveys included non-responses to specific questions, tree models did not generate unbiased, and therefore valid, predictions of the dependent measure. These surveys could not be readily classified by inherent model variables given no response. Following CART modeling, a logistic regression analysis of the "intent to leave" response was modeled using significant satisfaction questions (identified by CART), principal factors and demographic variables as main effects. The objective was to produce parametric equations from the significant variable subset which could provide robust predictive capability for any aviator as well as confirm questions regarding the significance, or lack thereof, of satisfaction measures in the equations. Four separate logistic regression models were developed because the four groups – broken down by branch of service and tenure – were noticeably different.

Using S-plus (Version 4.5) software, each of the four subsets of aviator data was modeled by logistic regression. A basic model of the data was fit using all variables followed by a forwards-backwards deletion of non-significant measures to refine the final model. The refinement process of adding or deleting each non-significant variable from the model is accomplished by iterative looping where convergence is achieved when there is no further improvement to the Akaike Information Criterion (AIC). The AIC is computed as a penalized deviance associated with each successive model. Once final models were derived, they were cross-validated. That is, the process was performed three times using a random two thirds of the data and predicting on the remaining one third of the data using the model. The results of the predictions are shown in Table 3.27. From this table, it can be seen that these models predict the dependent

measure considerably better than a naïve guess of responses recorded in survey questionnaires (14% better USMC; 11% better USN). Furthermore, the rate of accurately predicting improves over 15% overall if the models were tasked to only predict those who say they intend to leave. It is uncertain why the model failed to predict 'stayers' as accurately.

Table 3.27. Cumulative results from predictions of hold-out data logistic regression models. Set of models based on separate Service and Age (tenure) groups.

Non Tenured Aviators			Tenured Aviators		
U.S. Marine Corps					
Total (n)	209		Total (n)	204	
Correctly predicted	157	75.1%	Correctly predicted	154	75.5%
Incorrectly predicted	52	24.9%	Incorrectly predicted	50	24.5%
Predict 'Leave' and correct	120	78.9%	Predict 'Leave' and correct	84	77.1%
Predict 'Stay' and correct	37	64.9%	Predict 'Stay' and correct	70	73.7%
U.S. Navy					
Total (n)	570		Total (n)	375	
Correctly predicted	464	81.4%	Correctly predicted	305	81.3%
Incorrectly predicted	106	18.6%	Incorrectly predicted	70	18.7%
Predict 'Leave' and correct	386	85.4%	Predict 'Leave' and correct	94	84.7%
Predict 'Stay' and correct	78	66.1%	Predict 'Stay' and correct	211	74.6%

The inherent value of the logistic models is in the model coefficients from which inferences can be made about the aviator population as a whole. Appendix K provides tables of model results including: variable coefficients, standard error of each coefficients, t-values and level of significance. These coefficient values are used with equation 3.1 below to calculate an indication of intent to leave. Equation 3.1 shows how logistic regression models the odds of the dependent measure being true. The odds of the

$$P(Y_i = 1) = \frac{1}{1 + \exp(-L_i)} \qquad L = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_m X_{in} \qquad \text{Equation 3.1}$$

i = 1,2,.., n (sample data points)
β_0 = intercept value
m = number of model coefficients

dependent measure being true are given by: P(Y=1)/ [1- P(Y=1)]. Solving the equation for the odds of Y in terms of the probability of Y produces the desired equation.

From Equation 3.1, it becomes apparent that the equation's value increases for positive coefficients and decreases for negative coefficients given increased response levels. To illustrate the use of these equations, four separate examples are provided below, one example representing each subgroup of aviators.

Example 1. Marine pilot (any community) 27 years of age (non-tenured) serving on the west coast. Spent 6 months at sea and 3 months on TAD in the past 2 years. Sourced from OCS. Somewhat satisfied (level = 2) with leadership (Q29) and options for their spouse's career opportunities (Q39):

L_i = Intercept + OCS effect + west coast effect + pilot effect + (6*MoSea effect) + (3*MoTDY effect) + (2*Q29 effect) + (2*(Q39 effect)
= -4.7721+ 0.9932 + 0.6852 - 1.1161 + (6*0.1735) + (3*0.2355) + (2*1.0230) + (2*1.0431)
= 1.6699

$P(Y_i)$ = 1 / (1 + exp(-1.6699)) = 0.8416

Example 2. Marine CH-53 pilot 35 years of age (tenured) serving on the west coast. Sourced from ROTC. Spouse is a post-graduate. Spent 7 of the past 24 months at sea. Earns $650 ACIP per month. Neutral (level = 3) regarding the impact of excessive collateral duties (Q25). Somewhat dissatisfied (level = 4) with retirement pay (Q45), job security (Q46) and the performance evaluation system (Q52). Says that aviators: join for the fun flying (Q18WS), leave due to poor retirement pay (Q21PS) plus a lack of flight time (Q21WS) and are staying due to prestige in serving the country (Q22OS); components of F3:

L_i = Intercept + ROTC effect + west coast effect + Seduc effect + pilot effect + Acft effect + (7*MoSea effect) + ($650*ACIP effect) + (3*Q25 effect) + (4*Q45 effect) + (4*Q46 effect) + (4*Q52 effect) + (F3 factor score*F3 effect)
= -3.0469+ 0.0142+ 1.1570 + 1.2628 + 1.7997 + 0.7008 + (10*0.1742) + (650*-0.0070) - (3*1.3210) + (4*0.4539) + (4*0.8970) + (4*0.8225) + ((-0.3805-0.4117+0.6923–0.3505) * -2.0528)
= 4.7348

$P(Y_i)$ = 1 / (1 + exp(-4.7348)) = 0.9913

Example 3. Navy F-18 pilot in pay grade 03 and non-tenured serving on the west coast. Sourced from ROTC. Spent 12 of the past 24 months at sea and 3 on TDY. Received ACP in FY98. Very dissatisfied (level = 5) with the impact of excessive collateral duties (Q25). Somewhat dissatisfied (level = 4) with long hours ashore (Q32), living conditions at sea (Q35), long hours at sea (Q31), and special pay and allowances (Q43). Says that he both joined and would leave for reasons of *the excitement of flying* due to a *lack of flight time* (F1):

L_i = Intercept + rank effect + ROTC effect + Acft effect + (12*MoSea effect) + (3*MoTDY effect) + FY98B effect + (5*Q25 effect) + (4*Q32 effect) + (4*Q35 effect) + (4*Q31 effect) + (4*Q43 effect) + (F1 factor score*F1 effect)
= -8.8818 + 0.9272 + 0.2081- 0.3476 + (12*0.1692) – (3*0.1535) + (5*0.6538) + (4*0.6897) + (4*0.8668) + (4*0.5913) + (4*0.4097) + (0.474+0.495)*-0.9167)
= 6.0865

$P(Y_i) = 1 / (1 + \exp(-6.0865)) = 0.9977$

Example 4. Navy P-3 pilot, 38 years of age, pay grade 04 (tenured), married to a HS graduate, and has 1 child. Serving on the west coast. Sourced from OCS. Spent 7 of the past 24 months at sea and 3 months TDY. Receives $650 per month ACIP and ACP in FY97 and FY98. Flies 20 flight hours per month (on average). Very dissatisfied (level = 5) with the impact of excessive collateral duties (Q25). Neutral (level = 3) with leadership (Q27), living conditions ashore (Q36), time spent at sea (Q37), family separation (Q38), TAD pay (Q45), special pay and allowances (Q43), and duty station assignments (Q51). Says that he both joined (Q18WS) and would leave (Q21WS) for reasons of *the excitement of flying* due to a *lack of flight time*. Says that *competitive outside pay* (Q22PS) would be another reason for leaving (F1- F4 components):

L_i = Intercept + rank effect + OCS effect + Age effect + west coast effect + Deps effect + Seduc effect + pilot effect + Acft effect + (7*MoSea effect) + (3*MoTDY effect) + ($650*ACIP effect) + FY97B effect + FY98B effect + (20*FltHrs effect) + (5*Q25 effect) + (3*Q27 effect) + (3*Q36 effect) + (3*Q37 effect) + (3*Q38 effect) + (3*Q45 effect) + (3*Q43 effect) + (3*Q51 effect) + (F1 factor score*F1 effect) + (F2 factor score*F2 effect) + (F3 factor score*F3 effect) + (F4 factor score*F4 effect)
= 0.6703 - 0.0425 - 8.7887 -0.1222 - 0.0747 + 0.0452 + 0.4700 + 0.9720 + 1.0585 - 0.0696 + (7*0.0453) + (3*0.2845) + (650*0.0019) -0.9297 + 0.2912 - (20*0.0127) – (5*0.3505) + (3*0.3657) + (3*0.1997) + (3*0.9196) - (3*0.2191) + (3*0.6352) - (3*0.2213) + (3*0.5110) + (2*(0.474+0.495)+0.135)*0.1656 + (2*0.773-0.354)* 0.2465 +2*(-0.322+0.169)*0.6717) – (2*(0.303+0.134)+0.456)*0.8216
= -0.2099

$P(Y_i) = 1 / (1 + \exp(-(-0.2099))) = 0.4477$

IV. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A. SUMMARY

As discussed in the background, one's actual on-the-job behavior is strongly linked to stated intentions of that behavior. Numerous studies confirm the fact that a lack of job satisfaction is significantly correlated to thoughts of quitting and ultimately that one's assertion of intent to quit is significantly tied to leaving an organization. Hence, ascertaining those indicative qualities from a representative sample population is an organization's key to unlock a prediction of intended behavior. Organizations often use job satisfaction surveys to gather data from which behavioral aspects are further analyzed. Management can help workers and the organization by making well-informed policy decisions when they more fully understand employee and job characteristics.

Recent Defense Department trends (force reductions, cutbacks in military spending, the widening disparity between military and civilian pay scales, etc.), which have taken place during a long period of post-Cold War economic expansion, have forced most servicemen to consider the future viability in the military even if they joined with career ambitions. Prior to completing their period of mandatory service, most service members have already carefully weighed their career options and most will carry through with their intended behavior. In the course of this study, it was common to interview aviators who could plot trends in promotion opportunity within their respective communities and compute their likelihood of serving out a 20-year career. Often, they also could accurately provide a forecast of the difference in future earnings potential between staying in the service and seeking civilian employment. Until there is a

downturn in the economy, aviators now face little risk of not being able to provide for themselves and family members once resigning their commissions since high-paying civilian jobs are plentiful. One variable that can reasonably effect the outcome in the general retention equation is job satisfaction.

B. CONCLUSIONS

It is possible to analyze survey data by many different means and obtain wide-ranging results. Basic statistics such as mean responses values and their standard deviations can be easily analyzed to determine a population's polarization regarding an issue. Classification tree analysis readily highlights sample population sub-groups that are most accurately classified according to some discrete dependent measure others as well as other sub-groups that are not easily delineated by independent measures contained in the model. Through analysis of branches in these trees one can determine the relative importance of each independent measure to the classification process. Finally, logistic regression provides a means to construct numerical equations to model each independent measure's contribution to the prediction of a dependent measure. For the purposes of this study, logistic regression has quantified the affect on aviator intent to stay that each independent measure has, and at the same time identified important variables which affect one's decision to remain in the military.

Basic statistics convey a good deal of useful information about attitudes of today's aviators. However, there are limits to the utility of these results. On the one hand, the analysis of survey response means and distributions shows that most aviators today are positively motivated by high-level needs such as affiliation (Co-worker Satisfaction) and job fulfillment (Work Satisfaction). Physiological and security needs,

on the lowest level of Maslow's hierarchy of needs, elicit very negative responses from the majority. It could be argued that the basis of job satisfaction has been eroded thereby fusing instability into the needs structure. However, this argument is of limited use since results have not *collectively* been linked to the dependent measure. This was accomplished using regression techniques.

Using CART, it was possible to determine which groups of aviators behave most predictably. This technique, as well as logistic regression, was much more successful than an analysis of survey responses in accurately predicting large cadres of aviators who intend to leave the service. Viewed another way, these techniques tell how the services may 'conditionally' control inadequate levels of retention among certain sub-groups. The term conditionally implies that several variables must usually be analyzed sequentially to determine the final cadres from the total sample.

For junior USMC aviators, positive Supervisor Satisfaction (Q29) best delineates leavers from stayers initially, while Pay and Work Satisfaction issues (F1, Q30, Q44 and Q50) refine the model's predictive capability. For senior USMC aviators, the type of community (rotor or fixed wing) performs best at differentiating this sub-group. Pay and Organizational Satisfaction issues (Q37 and Q45) further conditionally drive many aviator's eventual intention (30 correctly classified as leavers from the initial 121). For junior USN aviators, once in pay grade 03 few variables, in any combination, diminish the intent to leave. However, this decision can be reversed by Pay and Organizational Satisfaction issues (Q35 and Q43) in communities that are manned well and not experiencing declining flight time. For senior USN aviators, the issue of positive Organizational Satisfaction (Q51) best delineates leavers from stayers. Work and

Organizational Satisfaction issues (F1, F3, and F4) best further refine many aviators' decision to stay (all 12 accurately classified out of 342) or leave (all 36 accurately classified). While CART does not measure the significance of variables used to predict intent to dependent measure, the fact that certain variables are used and others (e.g. housing, simulator time, and ACP) are generally not used is extremely important.

One turns to the analysis of deviance results from logistic regression to draw conclusions about the significance of variables used in equations that best model retention behavior. These results provide the most definitive answers to research questions posed by this study. Pay Satisfaction factors were considerably more significant for senior, than for junior, aviators as predictors of intent to remain in the service. Retirement pay concerns lent much greater impact to one's predicted behavior than special pay (ACP/ACIP) considerations. For instance using Example 2 from the results chapter, if all other variables are held constant improving the level of satisfaction in retirement pay from somewhat dissatisfied to neutral increases the retention prediction three-fold over a $50 increase in ACIP. However, these effects are far less dramatic than other predictions resulting from changes in commissioning source or aircraft community.

For senior USN aviators, an increase in the level of retirement pay satisfaction improves the prediction of retention by as much as 15% whereas FY98 ACP eligibility tends to increase one's intent to leave. As anticipated, the issue of the flight bonus has produced a counter-intuitive result. It might be argued that the result is linked to the additional commitment incurred by aviators under the ACP. The impact of the bonus, however, was to dramatically lower intent to leave in the junior USN aviators. Other

than this effect, the impact of Pay Satisfaction factors in models of junior aviator retention is negligible.

Several Organizational Satisfaction issues were indicative of intent to leave and in fact more significantly affected the prediction of the dependent measure than anticipated. The level of concern that *excessive collateral duties hindered maintaining flight qualifications* dramatically affected resultant predictions for senior officers in both services (as much as a 10% change for USMC aviators). These issues have only a slight impact on altering the outcome for junior USN aviators. For instance, using Example 3 and cutting the level of sea time in half (to 6 months) reduces predicted intent to leave by less than 1 percent. As expected, Leisure and Family Satisfaction factors played a minor role in predictive models; however, correlated issues such as time away from one's family (which could be viewed as an Organizational Satisfaction issue) do significantly affect retention predictions. Lastly, issues related to Work Satisfaction played a consistently significant role in predictive equations for all but junior Marine aviators. While one's aircraft community is also very important to the equation (as evidenced by CART and logistic regression models), the fact that one is achieving quality training and both feels challenged and rewarded through that work is reflected in high principal factor scores (F1 – F4) that very significantly reduce intent to leave predictions.

C. RECOMMENDATIONS

Even though CART and logistic regression models have been shown to improve our prediction of retention behavior (over a naive guess of one's intent) and the sample population, appropriately weighted to compensate for sampling irregularities, validly represents fleet aviators, much variability in the dependent measure still remains elusive.

Historically, studies have shown that modeling human behavior is fraught with difficulty. Nonetheless, even though effective personnel management actions (e.g., sourcing, grade shaping, and lateral transfer policies) contribute greatly to attaining and regaining appropriate aviator manning levels, models provided in this study did perform well when tasked to predict significant factors behind one's intent to leave. These factors, and their expected change they contribute to any prediction of retention, have been enumerated already in sufficient detail.

Unmentioned to this point are the intangible improvements which may be produced by minor changes which are viewed by a larger audience as good-faith efforts to improve the organization. For example, if ACP program resources (which positively affect the few) were reprogrammed into large ACIP increases (which affect the many) improvements in retention would be made in accordance with ACIP model coefficients at a minimum (given that the model remains valid). Moreover, many aviators who perceive inequity in the ACP program might view this change as an improvement in their attitude regarding the fairness of leadership which would show up elsewhere as an additional improvement in retention (again potentially on a broad scale). Whether ethical differences exist between the types of aviators, baby boomers or Generation X'ers, who populate today's squadrons is the subject for a follow-on comparative study of the changes in attitudes from those measured today.

APPENDIX A. RETENTION SURVEY

1. Rank?
   O 0-1 O 0-1E
   O 0-2 O 0-2E
   O 0-3 O 0-3E
   O 0-4
   O 0-5
   O 0-6

2. Marital status?
   O unmarried
   O divorced
   O married
   O other

3. Commissioning source?
   O ROTC O Naval Academy
   O OCS O Other _____

4. O Regular O Reserve
   O East Coast O West Coast
   Duty Station _____

5. Excluding yourself, number of dependents?
   O none O 3
   O 1 O 4
   O 2 O 5 or more

6. Year group? _____

7. Age?
   O less than 26 O 26-30
   O 31-35 O 36-40
   O 41-45 O over 46

8. If married, spouse's:
   a. Education level
   O HS or less O College grad
   O Some college O Post-graduate
   b. monthly gross take home pay?
   $ _____

9. If married, have concerns about your spouse's career affected decisions you have made in your own career (deferred deployments or PCS moves, career schools, etc.)? O no O yes If yes, briefly explain ____

_____

_____

10. If you have dependents, have concerns about your family's access to schooling, health care, etc. affected your career decisions? O no O yes If yes, briefly explain. _____

_____

_____

11. Aviation classification?
   a. O Pilot O NFO Aircraft type(s)? _____
   b. Qualifications?
   O PQM O HAC/AHC O Section/Div Leader
   O WTI O Top Gun O Instructor

12. In last 2 years, months at sea (OCONUS): _____
   TAD/TDY: _____

13. Currently receive flight pay (ACIP)?
   O no O yes; monthly allowance: _____

14. Participated in ACP in (answer "NA" if ineligible)
   FY94? O no O yes; bonus received: _____
   FY95? O no O yes; bonus received: _____
   FY96? O no O yes; bonus received: _____
   FY97? O no O yes; bonus received: _____
   FY98? O no O yes; bonus eligible: _____

15. In an average month, how many flight hours (non-simulator) do you attain?
   O less than 10 O 21 - 30 O over 40
   O 10 – 20 O 31 - 40

16. Number of simulator hours per month?
   O less than 3 O 5 - 7 O over 10
   O 3 - 5 O 7 - 10

17. Are you considering leaving the military?
   O yes O no

   If yes, are you interested in:
   O continuing in aviation
   O graduate school/re-training
   O other_____

18. List the reasons why you decided to become a Naval Aviator:
   a. _____ c. _____
   b. _____ d. _____

19. Has the current flight pay/bonus system been influential in your choice to remain in the Armed Forces
   O yes O no Regardless, how would you improve existing bonus/flight pay program? _____

_____

_____

20. In order of importance, list up to four initiatives which would **improve retention** among Naval Aviators.
   a. _____ c. _____
   b. _____ d. _____

21. In order of importance, list up to four significant reasons why Naval Aviators are **leaving** the service.
    a. _____
    b. _____
    c. _____
    d. _____
22. In order of importance, list up to four significant reasons why Naval Aviators **stay** in the service.
    a. _____
    b. _____
    c. _____
    d. _____

Choose the **most appropriate response** for the following questions:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
23. If afforded the opportunity, I intend to stay in the service until reaching retirement.	O	O	O	O	O
24. I would rather fly aircraft my entire career than alternate tours in non-flying billets.	O	O	O	O	O
25. Excessive collateral duty assignments hinder maintaining flight qualifications.	O	O	O	O	O

26. List up to four collateral duties that you feel are unnecessary and can be eliminated:
    a. _____ c. _____
    b. _____ d. _____

Based on your military experience, **rate your satisfaction** with the following items:	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied
27. Amount of leadership support received from superiors.	O	O	O	O	O
28. Level of job fulfillment/challenge.	O	O	O	O	O
29. Quality/competence of leadership / management.	O	O	O	O	O
30. Level of recognition for my accomplishments.	O	O	O	O	O
31. Length of working hours (at sea /while deployed).	O	O	O	O	O
32. Length of working hours (ashore / in garrison).	O	O	O	O	O
33. Amount of personnel avail. to support mission accomplishment.	O	O	O	O	O
34. Reliability and availability of aircraft and supporting equipment.	O	O	O	O	O
35. Living conditions at sea/while deployed.	O	O	O	O	O
36. Living conditions ashore/at regular duty station.	O	O	O	O	O
37. Amount of time spent at sea/deployed .	O	O	O	O	O
38. Amount of time separated from family (not including sea time).	O	O	O	O	O
39. Spouse's opportunity to pursue own career.	O	O	O	O	O
40. Frequency of PCS relocations.	O	O	O	O	O
41. Quality and availability of medical/dental care for you /your family.	O	O	O	O	O
42. Current levels of base pay.	O	O	O	O	O
43. Current value of special pay/allowances.	O	O	O	O	O
44. Adequacy of TAD/TDY compensation/reimbursement.	O	O	O	O	O
45. Current value of eventual retirement benefits.	O	O	O	O	O
46. Amount of job security/opportunity for promotion.	O	O	O	O	O
47. Base support & recreational services for unit/family.	O	O	O	O	O
48. Availability of military housing.	O	O	O	O	O
49. Availability and affordability of off-base housing.	O	O	O	O	O
50. Assignment to job offering leadership/professional development.	O	O	O	O	O
51. Control over duty station and job assignments.	O	O	O	O	O
52. Level of fairness in how my performance is evaluated.	O	O	O	O	O
53. Level of camaraderie/Esprit de Corps.	O	O	O	O	O

54. List up to four items which might help improve camaraderie/Esprit de Corps:
    a. _____ c. _____
    b. _____ d. _____
55. Are open messing facilities detracting from prestige of being an officer? O yes O no.
56. Is the work environment? O getting better O staying about the same O getting worse

APPENDIX B. GLOBAL AND SPECIFIC JOB SATISFACTION FACTORS

JDI-based factorization (1)

I. Intrinsic Factors (Job Satisfaction)
- A. Work Satisfaction
- B. Pay Satisfaction
- C. Promotion Satisfaction
- D. Coworker Satisfaction
- E. Supervision Satisfaction
- F. Trust

II. Extrinsic Factors (Life Domains)
- A. Leisure Satisfaction
- B. Marriage Satisfaction
- C. Family Satisfaction

MSQ-based factorization (2) & (3)

I. Satisfaction with Job
- A. Opport. to do challenging work
- B. Time given to complete work
- C. Prestige of my job in this organization
- D. Clarity of info. I receive on how to do my job
- E. Work quality requirements for my job
- F. Amt. of authority I have to carry out responsibilities
- G. Opportunity for independent thought

II. Satisfaction with Work Group
- A. Cooperation from people in my work group
- B. Friendliness among coworkers

III. Satisfaction with Organization
- A. Prestige of my organization
- B. Training I received for my job
- C. Opportunity for growth and development
- D. Opportunity for promotion

IV. Satisfaction with Leader
- A. Support received from supervisors
- B. Respect and fair treatment from supervisors
- C. Opportunity to influence those above me

Study Factors

I. Extrinsic Factors (Life Domains)
- A. Leisure Satisfaction
  - Opportunity to take leave/time off
  - Adequate base facilities/support services
- B. Family Satisfaction
  - Adequate Housing/BOQs (avail/compensation)
  - Time away from family/home
  - Family's needs being met (health care, safety)

II. Intrinsic Factors (Job Satisfaction)
- A. Work Satisfaction (no better than outside opport.)
  - *Challenged* by work
  - Doing *exciting/fun* work (adventurous)
  - Given adequate *time/resources* to complete work
    -- enough: acft, parts, equipment & people
  - Doing *rewarding/worthwhile* work
  - Understand *mission/focus/meaning* behind my work
  - Given *authority* to do work (not micro-managed)
  - Given *approp amount* of work (reasonable work hours)
  - Given *approp type* of work (flying/coll duties)
- B. Pay Satisfaction
  - Levels of base pay/TAD compensation & allowances
  - Job-specific incentives/bonuses (ACIP/ACP)
  - Quality of eventual value/type of retirement benefits
- C. Organization Satisfaction
  - Opport. for Career growth/development/transition
  - Opport. for promotion/advancement
  - *Prestige/stature* of my organization
    -- tradition, reputation, professionalism
  - *Adequate training* was received to perform job
  - Service provides sense of *Job stability/security*
  - Political correctness (women in combat, TQL, etc.)
- D. Coworker Satisfaction
  - Sense of *camaraderie/Esprit de corps*
  - *Enough coworkers* to perform tasks at hand
- E. Supervision Satisfaction
  - Adequate *support* received from supervisors
  - Respect and fair treatment (no double stds, quotas)
  - Leaders listen to concerns (not 'careerist')
  - Appropriateness of rules/policies (flt clothing, X-countrys)

III. Committed (satisfied or not; obligated regardless)

(1) Smith, P.C. (1992). Why Study General Job Satisfaction. (Contains 5 facet measures)
(2) James L.R., & James, L. A. (1992). Psychological Climate and Affect. (Uses 16 of 20 MSQ facet measures.)
(3) Weiss, D. J., et.al (1967). Manual for the Minnesota Satisfaction Questionnaire. (Contains 20 facet measures)

APPENDIX C. AVIATOR REQUIREMENTS AND MANNING OVERVIEW

U.S. Marine Corps

	AH-1W	AV-8B	CH-46	CH-53	EA-6B	F/A-18	KC-130	UH-1N	Total
Aircraft Inventory	108	140	180	128	20	168	36	54	834
GAR Billets *									
0-1/0-2/0-3 - Pilots	307	303	496	378	43	395	213	200	2335
- NFOs					115	132			247
0-4 - Pilots	113	119	193	143	17	162	76	68	891
- NFOs					35	40			75
0-5 - Pilots	30	64	116	65	15	89	39	17	435
- NFOs					19	19			38
Total	450	486	805	586	244	837	328	285	4021
Reqr as % of Total	11.19%	12.09%	20.02%	14.57%	6.07%	20.82%	8.16%	7.09%	
Personnel Levels									
0-1/0-2/0-3 - Pilots	277	253	504	337	50	333	206	182	2142
- NFOs					91	105			196
0-4 - Pilots	97	115	219	147	11	165	55	75	884
- NFOs					53	60			113
0-5 - Pilots	63	39	114	85	11	82	20	46	460
- NFOs					19	35			54
Total	437	407	837	569	235	780	281	303	3849
INV as % of Total	11.35%	10.57%	21.75%	14.78%	6.11%	20.27%	7.30%	7.87%	
INV as % of GAR Billets	97.11%	83.74%	103.98%	97.10%	96.31%	93.19%	85.67%	106.32%	95.72%

Notes: GAR = Grade Adjusted Recapitulation. Report provided by CMC(Manpower Policy & Plans Division; officer planning guidance as of: 10/1/97

U.S. Navy

	F-A-18	F-14	A-6	EA-6B	S-3	E-2C	P-3	ES-3	EP-3	EC-130	SH-60F	SH-60B	H-3/H-46	H-53	Total
Squadrons	24	12	0	15	10	12	14	2	2	2	10	10	2	2	
Aircraft Inventory	256	174	80	52	74	73	127	16	12	16	46	136	62	12	1136
Aggregate Requirement															
JO - Pilots	631	395	0	120	209	261	961	45	104	136	438	969	574	70	4913
- NFOs		417	0	466	478	333	685	46	116	104					2645
LCDR - Pilots	226	96	1	48	58	50	289	12	33	36	145	380	188	25	1587
- NFOs		147	0	199	181	134	270	19	49	43					1042
CDR - Pilots	140	65	0	27	37	37	202	8	23	23	114	228	138	19	1061
- NFOs		126	0	143	148	120	254	15	42	39					887
Total	997	1246	1	1003	1111	935	2661	145	367	381	697	1577	900	114	12135
Aggregate Billets															
JO - Pilots	517	336	0	83	148	201	965	50	148	141	263	938	646	176	4612
- NFOs		354	0	418	423	317	688	57	181	112					2550
LCDR - Pilots	201	94	1	40	51	68	296	14	50	45	106	346	225	64	1601
- NFOs		128	0	172	155	133	273	22	78	48					1009
CDR - Pilots	124	65	1	23	32	35	199	9	34	27	65	224	156	46	1040
- NFOs		109	1	139	140	123	242	19	69	41					883
Total	842	1086	3	875	949	877	2663	171	560	414	434	1508	1027	286	11695
Fleet Squadron & Fleet Support Squadron Billets															
JO - Pilots	237	170	0	31	82	150	449	25	70	80	101	401	276	75	2147
- NFOs		159	0	188	193	144	304	25	82	51					1146
LCDR - Pilots	102	26	0	27	28	43	64	5	13	15	32	89	48	16	508
- NFOs		26	0	40	20	20	44	5	14	8					177
CDR - Pilots	50	14	1	13	11	15	16	2	4	3	10	23	12	7	181
- NFOs		13	1	13	10	11	15	2	6	2					73
Total	389	408	2	312	344	383	892	64	189	159	143	513	336	98	4232
Personnel Levels															
JO - Pilots	616	272	35	119	156	278	836	57	87	135	339	736	502	90	4258
- NFOs		304	44	334	298	227	622	49	100	104					2082
LCDR - Pilots	130	59	19	42	46	34	113	13	12	13	82	171	78	17	829
- NFO		69	16	71	63	66	111	13	17	20					446
CDR - Pilots	150	65	37	24	34	41	139	8	8	12	119	212	104	25	978
- NFOs		114	47	96	78	77	201	22	26	31					692
Total	896	883	198	686	675	723	2022	162	250	315	540	1119	684	132	9285
Inventory as % of Requirement	*90%*	*71%*	*19800%*	*68%*	*61%*	*77%*	*76%*	*112%*	*68%*	*83%*	*77%*	*71%*	*76%*	*116%*	*77%*
Inventory as % of Billets	*106%*	*81%*	*6600%*	*78%*	*71%*	*82%*	*76%*	*95%*	*45%*	*76%*	*124%*	*74%*	*67%*	*46%*	*79%*
FY02 (Proposed)															
No. Squadrons	24	12	0	14	10	10	12	0	0	0	10	10	0	2	
Aircraft Inventory	288	164	16	56	80	69	114	16	12	16	50	112	69	12	

Note: DoN(N88) report as of 10/15/97.

APPENDIX D. AVIATOR TIME AWAY FROM HOME

U.S. Marine Corps

Months at Sea (past 2 years)

	O-2		O-3		O-4		O-5		O-6		
Months	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Total**
0	49	100.0%	122	42.8%	48	65.8%	17	68.0%	1	100.0%	237
1	0	0.0%	9	3.2%	3	4.1%	0	0.0%	0	0.0%	12
2	0	0.0%	13	4.6%	4	5.5%	0	0.0%	0	0.0%	17
3	0	0.0%	6	2.1%	1	1.4%	0	0.0%	0	0.0%	7
4	0	0.0%	5	1.8%	0	0.0%	0	0.0%	0	0.0%	5
5	0	0.0%	1	0.4%	0	0.0%	0	0.0%	0	0.0%	1
6	0	0.0%	67	23.5%	8	11.0%	3	12.0%	0	0.0%	78
7	0	0.0%	19	6.7%	3	4.1%	1	4.0%	0	0.0%	23
8	0	0.0%	14	4.9%	1	1.4%	2	8.0%	0	0.0%	17
9	0	0.0%	12	4.2%	0	0.0%	1	4.0%	0	0.0%	13
10	0	0.0%	3	1.1%	1	1.4%	1	4.0%	0	0.0%	5
11	0	0.0%	4	1.4%	0	0.0%	0	0.0%	0	0.0%	4
12	0	0.0%	6	2.1%	3	4.1%	0	0.0%	0	0.0%	9
13	0	0.0%	1	0.4%	0	0.0%	0	0.0%	0	0.0%	1
14	0	0.0%	2	0.7%	0	0.0%	0	0.0%	0	0.0%	2
15	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
18	0	0.0%	0	0.0%	1	0.0%	0	0.0%	0	0.0%	1
21	0	0.0%	1	0.0%	0	1.4%	0	0.0%	0	0.0%	1
Total	49	100.0%	285	100.0%	73	100.0%	25	100.0%	1	100.0%	433
Averge	0.00		3.65		2.12		2.40		0.00		2.90

Months TAD/TDY (past 2 years)

	O-2		O-3		O-4		O-5		O-6		
Months	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Total**
0	29	58.0%	50	17.7%	11	14.7%	3	12.0%	0	0.0%	93
1	7	14.0%	9	3.2%	4	5.3%	2	8.0%	0	0.0%	22
2	6	12.0%	52	18.4%	12	16.0%	5	20.0%	0	0.0%	75
3	4	8.0%	37	13.1%	7	9.3%	5	20.0%	1	100.0%	54
4	1	2.0%	26	9.2%	3	4.0%	1	4.0%	0	0.0%	31
5	0	0.0%	21	7.4%	3	4.0%	0	0.0%	0	0.0%	24
6	3	6.0%	30	10.6%	12	16.0%	0	0.0%	0	0.0%	45
7	0	0.0%	7	2.5%	1	1.3%	2	8.0%	0	0.0%	10
8	0	0.0%	13	4.6%	7	9.3%	3	12.0%	0	0.0%	23
9	0	0.0%	8	2.8%	4	5.3%	0	0.0%	0	0.0%	12
10	0	0.0%	7	2.5%	4	5.3%	2	8.0%	0	0.0%	13
11	0	0.0%	9	3.2%	1	1.3%	0	0.0%	0	0.0%	10
12	0	0.0%	8	2.8%	2	2.7%	2	8.0%	0	0.0%	12
13	0	0.0%	2	0.7%	1	1.3%	0	0.0%	0	0.0%	3
14	0	0.0%	0	0.0%	2	2.7%	0	0.0%	0	0.0%	2
15	0	0.0%	2	0.7%	0	0.0%	0	0.0%	0	0.0%	2
16	0	0.0%	1	0.4%	0	0.0%	0	0.0%	0	0.0%	1
17	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
19	0	0.0%	1	0.4%	0	0.0%	0	0.0%	0	0.0%	1
20	0	0.0%	0	0.0%	1	1.3%	0	0.0%	0	0.0%	1
Total	50	100.0%	283	100.0%	75	100.0%	25	100.0%	1	100.0%	434
Average	1.06		4.22		5.11		4.52		3.00		4.02

U.S. Navy

Months at Sea (past 2 years)

	O-1		O-2		O-3		O-4		O-5		O-6		
Months	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Total**
0	18	94.7%	103	70.1%	134	19.4%	47	19.7%	20	31.7%	2	100.0%	324
1	0	0.0%	13	8.8%	21	3.0%	7	2.9%	4	6.3%	0	0.0%	45
2	0	0.0%	9	6.1%	25	3.6%	10	4.2%	6	9.5%	0	0.0%	50
3	0	0.0%	4	2.7%	30	4.3%	9	3.8%	4	6.3%	0	0.0%	47
4	0	0.0%	4	2.7%	16	2.3%	15	6.3%	4	6.3%	0	0.0%	39
5	0	0.0%	5	3.4%	15	2.2%	13	5.5%	2	3.2%	0	0.0%	35
6	0	0.0%	5	3.4%	100	14.5%	29	12.2%	6	9.5%	0	0.0%	140
7	0	0.0%	1	0.7%	50	7.2%	17	7.1%	4	6.3%	0	0.0%	72
8	0	0.0%	0	0.0%	54	7.8%	20	8.4%	2	3.2%	0	0.0%	76
9	1	5.3%	0	0.0%	68	9.9%	16	6.7%	4	6.3%	0	0.0%	89
10	0	0.0%	0	0.0%	66	9.6%	25	10.5%	2	3.2%	0	0.0%	93
11	0	0.0%	2	1.4%	32	4.6%	9	3.8%	3	4.8%	0	0.0%	46
12	0	0.0%	1	0.7%	50	7.2%	13	5.5%	2	3.2%	0	0.0%	66
13	0	0.0%	0	0.0%	12	1.7%	4	1.7%	0	0.0%	0	0.0%	16
14	0	0.0%	0	0.0%	7	1.0%	1	0.4%	0	0.0%	0	0.0%	8
15	0	0.0%	0	0.0%	3	0.4%	2	0.8%	0	0.0%	0	0.0%	5
16	0	0.0%	0	0.0%	4	0.6%	1	0.4%	0	0.0%	0	0.0%	5
18	0	0.0%	0	0.0%	2	0.3%	0	0.0%	0	0.0%	0	0.0%	2
22	0	0.0%	0	0.0%	1	0.1%	0	0.0%	0	0.0%	0	0.0%	1
Total	19	100.0%	147	100.0%	690	100.0%	238	100.0%	63	100.0%	2	100.0%	1159
Average	0.47		1.05		6.27		5.85		3.92		0.00		5.29

Months TAD/TDY (past 2 years)

	O-1		O-2		O-3		O-4		O-5		O-6		
Months	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Total**
0	16	84.2%	75	52.4%	172	25.6%	57	25.1%	3	4.9%	0	0.0%	323
1	0	0.0%	20	14.0%	86	12.8%	22	9.7%	2	3.3%	1	50.0%	131
2	1	5.3%	18	12.6%	108	16.1%	36	15.9%	10	16.4%	0	0.0%	173
3	0	0.0%	14	9.8%	86	12.8%	24	10.6%	13	21.3%	1	50.0%	138
4	0	0.0%	5	3.5%	59	8.8%	33	14.5%	13	21.3%	0	0.0%	110
5	0	0.0%	4	2.8%	37	5.5%	17	7.5%	7	11.5%	0	0.0%	65
6	0	0.0%	2	1.4%	48	7.2%	13	5.7%	5	8.2%	0	0.0%	68
7	1	5.3%	1	0.7%	14	2.1%	5	2.2%	1	1.6%	0	0.0%	22
8	0	0.0%	3	2.1%	19	2.8%	7	3.1%	3	4.9%	0	0.0%	32
9	0	0.0%	1	0.7%	12	1.8%	3	1.3%	1	1.6%	0	0.0%	17
10	1	5.3%	0	0.0%	8	1.2%	2	0.9%	2	3.3%	0	0.0%	13
11	0	0.0%	0	0.0%	4	0.6%	2	0.9%	0	0.0%	0	0.0%	6
12	0	0.0%	0	0.0%	8	1.2%	3	1.3%	1	1.6%	0	0.0%	12
13	0	0.0%	0	0.0%	4	0.6%	0	0.0%	0	0.0%	0	0.0%	4
14	0	0.0%	0	0.0%	1	0.1%	1	0.4%	0	0.0%	0	0.0%	2
15	0	0.0%	0	0.0%	2	0.3%	1	0.4%	0	0.0%	0	0.0%	3
16	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
17	0	0.0%	0	0.0%	1	0.1%	0	0.0%	0	0.0%	0	0.0%	1
18	0	0.0%	0	0.0%	2	0.3%	1	0.4%	0	0.0%	0	0.0%	3
Total	19	100.0%	143	100.0%	671	100.0%	227	100.0%	61	100.0%	2	100.0%	1123
Average	1.00		1.33	0.0%	2.97		3.10		4.10		2.00		2.82

APPENDIX E. SAMPLE POPULATION RESPONSES TO RETENTION SURVEY QUESTIONS 27 THROUGH 53, INCLUDING AVERAGE VALUES AND STANDARD DEVIATIONS ASSOCIATED WITH EACH DISTRIBUTION OF QUESTION VALUES (OMITTING NA RESPONSES)

U.S. Marine Corps (n=466)

	Question	1	%	2	%	3	%	4	%	5	%	NA	Avg	SD
27	Amount of leadership support received from superiors.	121	26.3%	188	40.9%	63	13.7%	56	12.2%	32	7.0%	6	2.33	1.19
28	Level of job fulfillment/challenge.	190	41.2%	201	43.6%	38	8.2%	27	5.9%	5	1.1%	5	1.82	0.89
29	Quality / competence of leadership/management.	92	19.9%	202	43.6%	69	14.9%	69	14.9%	31	6.7%	3	2.45	1.16
30	Level of recognition for my accomplishments.	110	23.9%	150	32.5%	127	27.5%	61	13.2%	13	2.8%	5	2.39	1.07
31	Length of working hours (at sea/while deployed).	65	14.5%	111	24.7%	173	38.5%	74	16.5%	26	5.8%	17	2.74	1.08
32	Amount of personnel avail to support mission accomplishment.	40	8.6%	112	24.2%	123	26.6%	127	27.4%	61	13.2%	3	3.12	1.17
33	Length of working hours (ashore/in garrison).	7	1.5%	34	7.4%	45	9.8%	179	38.8%	196	42.5%	5	4.13	0.97
34	Reliability and availability of aircraft and supporting equipment.	21	4.5%	85	18.4%	66	14.3%	165	35.7%	125	27.1%	4	3.62	1.19
35	Living conditions at sea/while deployed.	40	8.9%	99	22.0%	153	34.0%	110	24.4%	48	10.7%	16	3.06	1.12
36	Living conditions ashore/at regular duty station.	102	22.1%	167	36.2%	93	20.2%	67	14.5%	32	6.9%	5	2.48	1.18
37	Amount of time spent at sea/deployed.	24	5.3%	83	18.3%	190	41.9%	103	22.7%	53	11.7%	13	3.17	1.03
38	Amount of time separated from family (not including sea time).	20	4.3%	69	15.0%	169	36.7%	129	28.0%	73	15.9%	6	3.36	1.05
39	Spouse's opportunity to pursue own career.	16	3.7%	71	16.3%	186	42.7%	105	24.1%	58	13.3%	30	3.27	1.01
40	Frequency of PCS relocations.	42	9.1%	120	26.1%	177	38.5%	86	18.7%	35	7.6%	6	2.90	1.05
41	Quality and availability of medical/dental care for you/your family.	52	11.3%	118	25.5%	79	17.1%	104	22.5%	109	23.6%	4	3.22	1.35
42	Current levels of base pay.	45	9.8%	172	37.6%	107	23.4%	105	22.9%	29	6.3%	8	2.78	1.10
43	Current levels of special pay/allowances.	43	9.3%	147	31.7%	89	19.2%	139	30.0%	46	9.9%	2	3.00	1.18
44	Adequacy of TAD/TDY compensation / reimbursement.	35	7.6%	109	23.7%	78	17.0%	128	27.8%	110	23.9%	6	3.37	1.28
45	Current value of eventual retirement benefits.	14	3.1%	44	9.6%	87	19.1%	136	29.8%	175	38.4%	10	3.91	1.11
46	Amount of job security/opportunity for promotion.	64	13.9%	202	43.7%	125	27.1%	54	11.7%	17	3.7%	4	2.48	0.99
47	Base support & recreational services for unit/family.	48	10.4%	155	33.5%	162	35.1%	71	15.4%	26	5.6%	4	2.72	1.03
48	Availability of military housing.	12	2.6%	58	12.7%	209	45.9%	93	20.4%	83	18.2%	11	3.39	1.01
49	Availability and affordability of off-base housing.	23	5.0%	131	28.4%	137	29.7%	129	28.0%	41	8.9%	5	3.07	1.06
50	Assignment to job offering leadership/professional development.	99	21.4%	187	40.5%	99	21.4%	53	11.5%	24	5.2%	4	2.39	1.10
51	Control over duty station and job assignments.	23	5.0%	114	24.8%	155	33.7%	121	26.3%	47	10.2%	6	3.12	1.05
52	Level of fairness in how my performance is evaluated.	87	18.9%	162	35.1%	123	26.7%	67	14.5%	22	4.8%	5	2.51	1.10
53	Level of camaraderie/Esprit de Corps.	183	39.5%	174	37.6%	46	9.9%	49	10.6%	11	2.4%	3	1.99	1.06

Notes: (1) Tabled values 1 through 5 equate to survey responses labeled: "Very Satisfied," "Somewhat Satisfied," "Neutral," "Somewhat Dissatisfied," and "Very Dissatisfied," respectively.

(2) Tabled values for "Avg" and "SD" were computed based on numerical values of all responses other than "NA."

U.S. Navy (n=1203)

	Question	1	%	2	%	3	%	4	%	5	%	NA	Avg	SD
27	Amount of leadership support received from superiors.	140	11.8%	441	37.0%	156	13.1%	293	24.6%	161	13.5%	12	2.91	1.27
28	Level of job fulfillment/challenge.	414	34.7%	491	41.2%	119	10.0%	129	10.8%	40	3.4%	10	2.06	1.08
29	Quality/competence of leadership/management.	91	7.7%	437	36.8%	228	19.2%	305	25.7%	128	10.8%	14	2.95	1.17
30	Level of recognition for my accomplishments.	184	15.5%	419	35.2%	345	29.0%	158	13.3%	83	7.0%	14	2.62	1.11
31	Length of working hours (at sea/while deployed).	67	5.6%	267	22.5%	416	35.1%	277	23.4%	159	13.4%	17	3.16	1.09
32	Amount of personnel avail to support mission accomplishment.	72	6.1%	234	19.7%	268	22.5%	373	31.3%	243	20.4%	13	3.40	1.19
33	Length of working hours (ashore/in garrison).	18	1.5%	96	8.1%	137	11.6%	514	43.5%	416	35.2%	22	4.02	0.96
34	Reliability and availability of aircraft and supporting equipment.	40	3.4%	136	11.4%	131	11.0%	387	32.5%	498	41.8%	11	3.97	1.13
35	Living conditions at sea/while deployed.	47	4.0%	217	18.3%	337	28.4%	359	30.2%	227	19.1%	16	3.44	1.11
36	Living conditions ashore/at regular duty station.	255	21.5%	454	38.2%	210	17.7%	178	15.0%	91	7.7%	15	2.50	1.20
37	Amount of time spent at sea/deployed.	33	2.8%	154	13.0%	419	35.4%	367	31.0%	211	17.8%	19	3.48	1.02
38	Amount of time separated from family (not including sea time).	23	2.0%	101	8.6%	321	27.5%	419	35.9%	304	26.0%	35	3.75	1.00
39	Spouse's opportunity to pursue own career.	38	3.4%	115	10.4%	508	45.9%	257	23.2%	189	17.1%	96	3.40	1.00
40	Frequency of PCS relocations.	91	7.7%	285	24.0%	504	42.5%	208	17.5%	99	8.3%	16	2.94	1.03
41	Quality and availability of medical/dental care for you/your family.	98	8.3%	285	24.0%	228	19.2%	285	24.0%	291	24.5%	16	3.33	1.30
42	Current levels of base pay.	43	3.6%	280	23.6%	249	21.0%	431	36.3%	183	15.4%	17	3.36	1.11
43	Current levels of special pay/allowances.	41	3.4%	227	19.1%	218	18.3%	456	38.4%	247	20.8%	14	3.54	1.12
44	Adequacy of TAD/TDY compensation/reimbursement.	23	1.9%	109	9.2%	152	12.9%	270	22.8%	628	53.1%	21	4.15	1.09
45	Current value of eventual retirement benefits.	7	0.6%	96	8.1%	162	13.7%	330	27.9%	588	49.7%	20	4.18	0.99
46	Amount of job security/opportunity for promotion.	106	8.9%	422	35.5%	295	24.8%	255	21.5%	110	9.3%	15	2.87	1.13
47	Base support & recreational services for unit/family.	109	9.2%	441	37.4%	380	32.2%	167	14.2%	83	7.0%	23	2.73	1.04
48	Availability of military housing.	15	1.3%	89	7.6%	588	50.0%	261	22.2%	224	19.0%	26	3.50	0.93
49	Availability and affordability of off-base housing.	89	7.5%	405	34.1%	367	30.9%	214	18.0%	111	9.4%	17	2.88	1.09
50	Assignment to job offering leadership/professional development.	177	14.9%	491	41.3%	329	27.7%	153	12.9%	38	3.2%	15	2.47	1.00
51	Control over duty station and job assignments.	38	3.2%	271	22.8%	386	32.5%	326	27.4%	167	14.1%	15	3.26	1.06
52	Level of fairness in how my performance is evaluated.	138	11.6%	401	33.7%	356	29.9%	193	16.2%	102	8.6%	13	2.77	1.12
53	Level of camaraderie/Esprit de Corps.	264	22.2%	392	33.0%	191	16.1%	234	19.7%	107	9.0%	15	2.60	1.27

Notes: (1) Tabled values 1 through 5 equate to survey responses labeled: "Very Satisfied," "Somewhat Satisfied," "Neutral," "Somewhat Dissatisfied," and "Very Dissatisfied," respectively.

(2) Tabled values for "Avg" and "SD" were computed based on numerical values of all responses other than "NA."

APPENDIX F. CROSS-TABULATION OF FACTORED OPEN-ENDED RESPONSES

Sample Population by Level of Response

	U.S. Marine Corps (n=466)							U.S. Navy (n=1203)						
	0	1	2	3	4	Avg	SD	0	1	2	3	4	Avg	SD
Survey Question 18 - Reasons for becoming an Aviator:														
Leisure Satisfaction	460	6	0	0	0	0.013	0.113	1169	34	0	0	0	0.028	0.166
Family Satisfaction	465	1	0	0	0	0.002	0.046	1190	13	0	0	0	0.011	0.103
Work Satisfaction	170	183	99	13	1	0.912	0.837	280	623	273	27	0	1.039	0.741
Pay Satisfaction	458	8	0	0	0	0.017	0.130	1155	46	2	0	0	0.042	0.208
Organizational Satisfaction	246	174	44	2	0	0.572	0.676	560	510	121	12	0	0.655	0.698
Coworker Satisfaction	426	40	0	0	0	0.086	0.281	1052	151	0	0	0	0.126	0.331
Supervisor Satisfaction	464	2	0	0	0	0.004	0.066	1195	8	0	0	0	0.007	0.081
Survey Question 21 - Reasons why Aviators are Leaving the service:														
Leisure Satisfaction	463	3	0	0	0	0.006	0.080	1143	60	0	0	0	0.05	0.218
Family Satisfaction	290	170	6	0	0	0.389	0.514	688	487	28	0	0	0.451	0.543
Work Satisfaction	161	161	114	29	1	1.030	0.928	412	480	272	39	0	0.948	0.834
Pay Satisfaction	294	158	13	1	0	0.400	0.556	573	550	79	1	0	0.591	0.615
Organizational Satisfaction	317	131	16	2	0	0.363	0.572	836	315	49	3	0	0.351	0.57
Coworker Satisfaction	445	21	0	0	0	0.045	0.208	1125	76	2	0	0	0.067	0.256
Supervisor Satisfaction	375	86	5	0	0	0.204	0.429	797	352	50	3	1	0.387	0.588
Survey Question 22 - Reasons why Aviators Stay in the service:														
Leisure Satisfaction	459	7	0	0	0	0.015	0.122	1169	34	0	0	0	0.028	0.166
Family Satisfaction	446	20	0	0	0	0.043	0.203	1150	52	1	0	0	0.045	0.211
Work Satisfaction	200	170	83	13	0	0.804	0.827	476	535	183	6	3	0.774	0.735
Pay Satisfaction	402	59	5	0	0	0.148	0.385	1004	187	11	1	0	0.176	0.411
Organizational Satisfaction	254	144	61	7	0	0.617	0.768	447	506	228	22	0	0.855	0.783
Coworker Satisfaction	349	116	1	0	0	0.254	0.441	912	289	2	0	0	0.244	0.433
Supervisor Satisfaction	459	6	1	0	0	0.017	0.146	1176	26	1	0	0	0.023	0.156

Note: The range of possible levels for each respondent to each satisfaction factor within each question was zero through four.

Cross-tabulation of Average Level of Response, by Service and Pay Grade (including trend in the Average by Pay Grade)

	U.S. Marine Corps (n=466)					U.S. Navy (n=1203)					
	0-2	0-3	0-4	0-5	Slope	0-1	0-2	0-3	0-4	0-5	Slope
Survey Question 18 - Reasons for becoming an Aviator:											
Leisure Satisfaction	0.019	0.016	0.000	0.000	0.00	0.053	0.065	0.026	0.012	0.015	-0.02
Family Satisfaction	0.000	0.000	0.000	0.038	0.00	0.000	0.013	0.011	0.012	0.000	-0.18
Work Satisfaction	0.980	0.870	0.987	1.000	0.12	0.895	1.000	1.032	1.054	1.182	0.07
Pay Satisfaction	0.190	0.023	0.000	0.000	-0.09	0.000	0.032	0.043	0.050	0.030	0.02
Organizational Satisfaction	0.711	0.555	0.595	0.462	-0.09	0.579	0.613	0.685	0.635	0.545	-0.25
Coworker Satisfaction	0.096	0.084	0.089	0.077	-0.01	0.211	0.129	0.122	0.120	0.152	-0.05
Supervisor Satisfaction	0.000	0.006	0.000	0.000	0.00	0.000	0.006	0.003	0.012	0.030	0.01
Survey Question 21 - Reasons why Aviators are Leaving the service:											
Leisure Satisfaction	0.000	0.006	0.012	0.000	0.03	0.000	0.065	0.054	0.041	0.015	0.49
Family Satisfaction	0.519	0.377	0.392	0.296	-0.08	0.526	0.464	0.442	0.481	0.394	-0.04
Work Satisfaction	1.000	0.961	1.250	1.230	0.14	0.789	0.748	0.972	1.033	0.894	0.12
Pay Satisfaction	0.654	0.386	0.316	0.307	-0.14	0.579	0.690	0.603	0.519	0.515	-0.07
Organizational Satisfaction	0.346	0.389	0.342	0.154	-0.11	0.421	0.303	0.331	0.411	0.455	0.09
Coworker Satisfaction	0.058	0.039	0.063	0.000	-0.03	0.000	0.039	0.075	0.046	0.121	0.03
Supervisor Satisfaction	0.115	0.182	0.354	0.231	0.12	0.211	0.206	0.390	0.481	0.455	0.09
Survey Question 22 - Reasons why Aviators Stay in the service:											
Leisure Satisfaction	0.000	0.010	0.038	0.038	0.02	0.105	0.019	0.033	0.008	0.045	-0.04
Family Satisfaction	0.077	0.039	0.038	0.038	-0.02	0.000	0.077	0.040	0.041	0.045	0.06
Work Satisfaction	0.711	0.799	0.873	0.846	0.06	0.737	0.716	0.752	0.797	1.045	0.11
Pay Satisfaction	0.154	0.143	0.177	0.115	-0.05	0.053	0.154	0.175	0.220	0.121	0.08
Organizational Satisfaction	0.769	0.523	0.797	0.846	0.25	0.737	0.748	0.843	0.971	0.848	0.08
Coworker Satisfaction	0.250	0.253	0.253	0.231	0.00	0.053	0.187	0.228	0.311	0.364	0.08
Supervisor Satisfaction	0.000	0.023	0.013	0.000	-0.07	0.000	0.032	0.018	0.029	0.045	0.01

Note: Pay grade 06 date excluded from tabled trend analysis due to small sample size.

APPENDIX G. CORRELATION MATRICES OF FIRST-ORDER SATISFACTION VARIABLES; TOTAL SAMPLE POPULATION

Correlation Coefficients for Reasons for *Joining* versus Reasons for *Leaving*

Variable	Q21LS	Q21FS	Q21WS	Q21PS	Q21OS	Q21CS	Q21SS
Q18LS	0.0923	0.0265	-0.0039	0.0484	0.0401	-0.0390	0.0322
Q18FS	-0.0182	0.0727	-0.0198	0.0594	0.0120	0.0041	-0.0202
Q18WS	-0.0089	**0.2002**	**0.3296**	**0.2176**	0.1436	0.0597	0.1717
Q18PS	-0.0031	0.0520	0.0575	0.0668	0.0026	-0.0326	0.0086
Q18OS	0.0415	0.1119	**0.2171**	0.1298	0.1230	0.0430	0.1608
Q18CS	0.0177	0.0212	0.0732	0.0350	0.0805	0.0962	0.0876
Q18SS	0.0254	0.0385	-0.0244	0.0336	0.0199	-0.0193	0.0230

Correlation Coefficients for Reasons for *Joining* versus Reasons for *Staying*

Variable	Q22LS	Q22FS	Q22WS	Q22PS	Q22OS	Q22CS	Q22SS
Q18LS	0.0764	-0.0145	0.0293	0.0123	0.0074	0.0824	0.0035
Q18FS	-0.0146	0.0119	0.0090	0.1082	0.0165	0.0083	-0.0129
Q18WS	-0.0107	0.0215	**0.3527**	0.1102	**0.2979**	0.1766	0.0958
Q18PS	-0.0291	0.0368	-0.0182	0.0802	0.0615	0.0052	-0.0258
Q18OS	0.0115	0.0587	0.1962	0.0561	**0.2661**	0.0953	0.0351
Q18CS	-0.0206	-0.0132	0.0855	0.0133	0.0563	0.1513	-0.0015
Q18SS	-0.0123	-0.0165	0.0426	-0.0132	-0.0186	0.0096	-0.0109

Note: Coefficient values exceeding 0.20 are highlighted in **bold**.

APPENDIX H. CROSS-TABULATION OF PERCENT OF SAMPLE POPULATION EXPRESSING INTENT TO LEAVE BY FLIGHT AND SIMULATOR HOURS ATTAINED, TABLED BY SERVICE.

	Avg Flight Hours per Month						Avg Simulator Hours per Month					
Comm	**4.5**	**15**	**25.5**	**35.5**	**45**	**Comm**	**1**	**4**	**6**	**8.5**	**12**	**Total**
						U.S. Marine Corps						
AH-1W	100.0%	60.0%	50.0%	25.0%	NA	**AH-1W**	58.0%	58.3%	37.5%	100.0%	0.0%	54.7%
AV-8B	71.4%	80.6%	NA	NA	NA	**AV-8B**	90.9%	83.3%	69.2%	0.0%	100.0%	79.6%
CH-46E	NA	48.2%	71.4%	100.0%	0.0%	**CH-46E**	51.5%	100.0%	100.0%	66.7%	NA	53.9%
CH-53E	44.4%	55.8%	71.4%	0.0%	NA	**CH-53E**	51.9%	75.0%	80.0%	100.0%	NA	57.4%
EA-6B	66.7%	50.0%	66.7%	NA	NA	**EA-6B**	66.7%	66.7%	50.0%	33.3%	100.0%	55.6%
F-18	40.0%	69.1%	54.6%	0.0%	NA	**F-18**	63.9%	65.2%	66.7%	NA	NA	63.6%
KC-130	75.0%	61.1%	63.6%	66.7%	NA	**KC-130**	52.4%	68.8%	77.8%	50.0%	100.0%	64.7%
UH-1	NA	50.0%	64.3%	NA	NA	**UH-1**	60.0%	100.0%	NA	NA	NA	58.8%
Total	61.8%	63.0%	59.7%	45.5%	0.0%	**Total**	59.0%	69.9%	65.4%	58.3%	66.7%	
						U.S. Navy						
A-6E	NA	100.0%	100.0%	NA	NA	**A-6E**	100.0%	100.0%	NA	NA	NA	100.0%
E-2C	61.1%	61.3%	81.8%	60.0%	NA	**E-2C**	76.3%	66.7%	85.7%	50.0%	57.6%	68.2%
EA-6B	50.0%	72.1%	69.1%	50.0%	100.0%	**EA-6B**	73.1%	64.5%	66.7%	50.0%	46.2%	67.2%
EC-130	100.0%	NA	NA	NA	NA	**EC-130**	100.0%	NA	NA	NA	NA	100.0%
EP-3	50.0%	100.0%	100.0%	100.0%	33.3%	**EP-3**	50.0%	100.0%	66.7%	NA	NA	62.5%
ES-3	87.0%	100.0%	NA	100.0%	NA	**ES-3**	88.9%	100.0%	75.0%	100.0%	NA	89.7%
F-14	50.0%	66.7%	94.7%	100.0%	NA	**F-14**	73.1%	100.0%	70.0%	75.0%	62.5%	75.4%
F-18	44.4%	73.6%	69.0%	82.1%	NA	**F-18**	78.5%	84.1%	50.0%	70.6%	14.3%	72.7%
H-3	50.0%	83.3%	85.7%	100.0%	NA	**H-3**	86.7%	NA	0.0%	NA	NA	81.3%
H-46	NA	58.3%	30.8%	100.0%	0.0%	**H-46**	37.5%	60.0%	100.0%	0.0%	NA	46.7%
MH-53E	66.7%	77.8%	45.5%	100.0%	NA	**MH-53E**	71.4%	55.6%	71.4%	0.0%	NA	62.5%
P-3C	81.3%	82.8%	83.6%	100.0%	94.1%	**P-3C**	86.4%	93.1%	78.8%	83.9%	87.2%	85.1%
S-3	87.5%	80.6%	80.0%	60.0%	NA	**S-3**	78.4%	83.3%	85.0%	80.0%	0.0%	79.8%
SH-2	NA	50.0%	0.0%	NA	NA	**SH-2**	0.0%	100.0%	NA	NA	NA	40.0%
SH-60B	18.2%	53.9%	49.0%	60.0%	NA	**SH-60B**	42.3%	45.7%	64.3%	57.9%	34.8%	48.5%
SH-60F	100.0%	64.0%	56.3%	0.0%	NA	**SH-60F**	66.7%	56.3%	40.0%	100.0%	NA	62.2%
Total	64.2%	71.1%	70.5%	80.7%	70.4%	**Total**	73.5%	74.1%	69.2%	70.7%	57.5%	

* Totals reflect total percent intending to leave by Community (far right column), or by level of hours (rows).

APPENDIX I. TABLE OF SAMPLE POPULATION INTENT TO LEAVE BY LEVELS OF RESPONSE TO SURVEY QUESTIONS 28, 33, 44, 45, AND 53

Question 28. Levels of job fulfillment/challenge.

Response	U.S. Marine Corps						U.S. Navy						
Level	O-2	O-3	O-4	O-5	O-6	Total	O-1	O-2	O-3	O-4	O-5	O-6	Total
1	28.6%	62.8%	44.1%	41.2%	0.0%	53.2%	16.7%	32.8%	75.2%	49.4%	61.1%	100.0%	60.6%
2	50.0%	69.0%	42.9%	37.5%	NA	60.9%	33.3%	50.9%	79.5%	49.5%	52.2%	100.0%	67.9%
3	80.0%	93.1%	0.0%	100.0%	NA	84.2%	80.0%	60.0%	89.9%	73.9%	100.0%	NA	83.9%
4	100.0%	86.4%	100.0%	NA	NA	88.0%	100.0%	85.7%	93.3%	80.0%	100.0%	NA	90.6%
5	0.0%	75.0%	NA	NA	NA	60.0%	NA	100.0%	100.0%	100.0%	100.0%	NA	100.0%

Question 33. Length of working hours (ashore/in garrison).

Response	U.S. Marine Corps						U.S. Navy						
Level	O-2	O-3	O-4	O-5	O-6	Total	O-1	O-2	O-3	O-4	O-5	O-6	Total
1	0.0%	50.0%	50.0%	NA	NA	42.9%	0.0%	40.0%	60.0%	0.0%	NA	NA	47.1%
2	33.3%	66.7%	100.0%	100.0%	0.0%	66.7%	0.0%	44.0%	77.4%	40.0%	100.0%	NA	63.0%
3	40.0%	61.9%	16.7%	50.0%	NA	47.7%	60.0%	41.4%	78.2%	57.9%	100.0%	NA	66.9%
4	52.6%	59.1%	39.3%	46.7%	NA	54.1%	44.4%	48.5%	80.4%	49.1%	51.7%	100.0%	67.5%
5	44.4%	82.0%	50.0%	25.0%	NA	72.1%	100.0%	58.3%	87.6%	64.4%	64.5%	100.0%	78.5%

Question 44. Adequacy of TAD/TDY compensation/reimbursement.

Response	U.S. Marine Corps						U.S. Navy						
Level	O-2	O-3	O-4	O-5	O-6	Total	O-1	O-2	O-3	O-4	O-5	O-6	Total
1	25.0%	52.4%	40.0%	33.3%	0.0%	44.1%	NA	33.3%	60.0%	50.0%	NA	NA	54.6%
2	50.0%	69.2%	16.7%	57.1%	NA	60.8%	40.0%	41.2%	70.0%	17.4%	33.3%	NA	51.9%
3	58.3%	73.2%	21.4%	66.7%	NA	60.3%	66.7%	41.7%	75.7%	51.9%	25.0%	NA	61.0%
4	50.0%	75.6%	56.0%	0.0%	NA	67.2%	50.0%	46.2%	77.2%	53.9%	58.3%	100.0%	65.5%
5	22.2%	69.4%	65.0%	20.0%	NA	62.3%	0.0%	55.8%	87.4%	64.1%	68.2%	100.0%	78.6%

Question 45. Current value of eventual retirement benefits.

Response	U.S. Marine Corps						U.S. Navy						
Level	O-2	O-3	O-4	O-5	O-6	Total	O-1	O-2	O-3	O-4	O-5	O-6	Total
1	0.0%	66.7%	20.0%	66.7%	0.0%	38.5%	NA	0.0%	100.0%	100.0%	NA	NA	71.4%
2	40.0%	59.1%	33.3%	16.7%	NA	45.2%	0.0%	40.0%	50.0%	25.0%	57.1%	NA	41.3%
3	42.9%	68.6%	26.7%	50.0%	NA	56.0%	33.3%	23.1%	76.0%	44.7%	80.0%	NA	57.6%
4	54.6%	67.0%	47.6%	62.5%	NA	62.7%	100.0%	53.7%	75.9%	47.6%	54.8%	100.0%	64.4%
5	43.8%	76.0%	63.6%	20.0%	NA	69.6%	50.0%	54.2%	89.2%	76.7%	68.8%	NA	82.3%

Question 53. Level of camaraderie/Esprit de Corps.

Response	U.S. Marine Corps						U.S. Navy						
Level	O-2	O-3	O-4	O-5	O-6	Total	O-1	O-2	O-3	O-4	O-5	O-6	Total
1	38.9%	63.6%	48.2%	38.9%	0.0%	56.0%	33.3%	45.7%	80.1%	58.3%	69.2%	NA	69.8%
2	47.4%	70.5%	34.4%	57.1%	NA	60.1%	75.0%	41.1%	79.8%	47.3%	44.4%	NA	66.2%
3	25.0%	82.4%	75.0%	NA	NA	76.1%	33.3%	53.9%	82.2%	52.4%	71.4%	NA	69.7%
4	50.0%	84.9%	37.5%	NA	NA	72.3%	60.0%	46.7%	82.7%	63.0%	61.5%	100.0%	71.7%
5	100.0%	71.4%	100.0%	0.0%	NA	70.0%	NA	75.0%	91.4%	66.7%	100.0%	100.0%	86.7%

APPENDIX J. PRINCIPAL COMPONENTS ANALYSIS FACTOR LOADINGS

First-Order Satisfaction Variables Derived From Open-Ended Survey Questions

I. Loading scores of each variable on each of the first 4 principal components (PC).

	U.S. Marine Corps				U.S. Navy			
Variable	**PC 1**	**PC 2**	**PC 3**	**PC 4**	**PC 1**	**PC 2**	**PC 3**	**PC 4**
Q18LS	0.0074	-0.0112	-0.0055	0.0081	0.0005	-0.0062	-0.0076	0.0022
Q18FS	0.0009	-0.0028	-0.0026	-0.0024	0.0015	-0.0079	0.0005	0.0073
Q18WS	0.4978	0.0009	-0.3805	-0.5835	0.4735	-0.0957	-0.3225	0.3034
Q18PS	0.0068	0.0126	-0.0128	-0.0052	0.0112	0.0035	0.0187	0.0161
Q18OS	0.2625	-0.0674	-0.0968	0.7384	0.3199	-0.1549	0.2555	-0.4802
Q18CS	0.0376	-0.0176	0.0082	-0.0537	0.0323	-0.0052	-0.0268	-0.0149
Q18SS	0.0003	-0.0023	-0.0007	-0.0007	-0.0007	-0.0040	-0.0072	-0.0002
Q21LS	0.0010	-0.0069	-0.0089	0.0029	0.0021	-0.0066	0.0128	-0.0101
Q21FS	0.1021	-0.0930	-0.2350	0.0318	0.1122	-0.2111	-0.0765	0.3049
Q21WS	0.5700	0.2863	0.6923	-0.0530	0.4950	0.7729	0.1690	0.1338
Q21PS	0.1138	-0.0395	-0.4117	0.0201	0.1354	-0.3544	-0.0319	0.4559
Q21OS	0.1097	-0.1100	-0.1010	0.2332	0.0910	-0.2498	-0.0759	-0.2009
Q21CS	0.0057	-0.0223	0.0022	-0.0278	0.0139	-0.0120	0.0043	-0.0286
Q21SS	0.0734	0.0293	-0.0430	0.0215	0.1484	-0.0596	-0.0773	-0.5069
Q22LS	0.0059	-0.0018	0.0004	0.0105	0.0049	-0.0005	-0.0062	0.0029
Q22FS	0.0092	0.0225	0.0016	-0.0082	0.0068	-0.0046	0.0130	-0.0141
Q22WS	0.4261	-0.7112	0.0708	0.0476	0.3932	-0.0778	-0.6235	-0.2233
Q22PS	0.0562	-0.0047	-0.0372	0.0554	0.0441	0.0046	0.0550	0.0764
Q22OS	0.3486	0.5816	-0.3505	0.2132	0.4486	-0.3526	0.6102	0.0604
Q22CS	0.0985	-0.2110	-0.0076	-0.0138	0.0886	0.0503	-0.1329	-0.0052
Q22SS	0.0050	-0.0112	-0.0152	-0.0181	0.0064	-0.0067	-0.0134	-0.0147

Note: Factor scores computed using PC loading scores equate to variables F1–F4 in the retention models.

II. Tabulation of variance in data associated with first 4 principal components (PC).

	U.S. Marine Corps				U.S. Navy			
Variance	**PC 1**	**PC 2**	**PC 3**	**PC 4**	**PC 1**	**PC 2**	**PC 3**	**PC 4**
Percent	0.3281	0.1149	0.1068	0.0843	0.2375	0.1209	0.1077	0.0886
Cum. Percent	0.3281	0.4431	0.5499	0.6342	0.2375	0.3583	0.4660	0.5546

Likert-Scaled Satisfaction Question Variables

I. Loading scores of each variable on each of the first 4 principal components (PC).

	U.S. Marine Corps				U.S. Navy			
Variable	**PC 1**	**PC 2**	**PC 3**	**PC 4**	**PC 1**	**PC 2**	**PC 3**	**PC 4**
Q27	0.2541	0.3580	-0.1493	0.1194	0.2902	0.2863	-0.1348	-0.4370
Q28	0.1414	0.2022	-0.0093	0.0124	0.1957	0.2558	0.0996	-0.0248
Q29	0.2485	0.3627	-0.0922	0.0699	0.2779	0.2447	-0.0837	-0.3437
Q30	0.2041	0.2116	-0.0688	-0.0845	0.2390	0.2428	0.1413	0.0844
Q31	0.2210	0.0082	0.2626	-0.1267	0.1794	-0.1286	0.4238	-0.0316
Q32	0.2353	0.0317	0.3049	-0.1638	0.1531	-0.2041	0.2887	-0.1394
Q33	0.1320	0.0504	0.2231	0.0342	0.1308	-0.1205	0.0511	-0.1625
Q34	0.1486	0.0046	0.2960	0.1320	0.1573	-0.0167	0.0078	-0.1682
Q35	0.1821	-0.1093	0.0938	-0.0784	0.1938	-0.1286	0.2001	0.0658
Q36	0.2275	-0.1863	0.0893	0.1479	0.2116	-0.2165	-0.1048	0.0018
Q37	0.1967	-0.0444	0.3256	-0.1589	0.1711	-0.1668	0.3448	-0.1360
Q38	0.1862	-0.0337	0.3452	-0.1379	0.1568	-0.2056	0.2721	-0.1038
Q39	0.1268	-0.1437	0.1689	0.0716	0.1302	-0.1161	0.0205	0.1668
Q40	0.1319	-0.1127	0.2126	0.1410	0.1543	-0.0923	0.1449	0.2807
Q41	0.2173	-0.2560	-0.2283	0.5963	0.2372	-0.2532	-0.3460	-0.0113
Q42	0.2143	-0.2822	-0.2133	-0.1946	0.2113	-0.2390	-0.2555	0.0835
Q43	0.2350	-0.3016	-0.2248	-0.2988	0.2092	-0.2372	-0.2372	0.0894
Q44	0.2118	-0.2211	-0.2583	-0.3881	0.1862	-0.1747	-0.1237	-0.2012
Q45	0.1396	-0.0453	-0.1855	-0.1486	0.1682	-0.0798	-0.0792	-0.0230
Q46	0.1839	0.0044	-0.1311	0.0272	0.1690	0.2122	-0.0492	0.3509
Q47	0.1591	-0.1561	0.0232	0.2731	0.1377	-0.1384	-0.1166	-0.0058
Q48	0.1380	-0.1707	0.0094	0.2698	0.1154	-0.0780	-0.1385	0.1308
Q49	0.1624	-0.2141	-0.1271	0.0677	0.1463	-0.0597	-0.2019	0.3041
Q50	0.1818	0.2225	-0.1962	-0.0462	0.1886	0.2215	0.0650	0.2145
Q51	0.1923	0.1114	0.0482	0.0636	0.2156	0.0657	0.1967	0.2589
Q52	0.2434	0.2403	-0.1189	0.0083	0.2279	0.2743	0.0505	0.2413
Q53	0.1731	0.2483	-0.1062	0.0162	0.2118	0.2975	-0.1725	-0.0876

Note: Factor scores computed using PC loading scores equate to variables F1–F4 in the retention models.

II. Tabulation of variance in data associated with first 4 principal components (PC).

	U.S. Marine Corps				U.S. Navy			
Variance	**PC 1**	**PC 2**	**PC 3**	**PC 4**	**PC 1**	**PC 2**	**PC 3**	**PC 4**
Percent	0.2201	0.0945	0.0706	0.0598	0.1919	0.0985	0.0662	0.0615
Cum. Percent	0.2201	0.3146	0.3851	0.4450	0.1919	0.2904	0.3566	0.4180

APPENDIX K. RETENTION EQUATION COEFFICIENTS FROM LOGISTIC REGRESSION MODELING

I. Coefficients developed from non-tenured Marine Corps sample data (** implies p<0.05, * implies p<0.1):

	Value	Std Error	t-value	Significance
(Intercept)	-4.7721	1.7674	-2.7000	**
Source: OCS	0.9932	0.4230	2.3480	**
Source: Other	0.5100	0.3218	1.5850	*
Source: ROTC	0.3207	0.2560	1.2530	
Coast: West	0.6852	0.3620	1.8930	*
Class: Pilot	-1.1161	0.5732	-1.9470	*
Months at Sea	0.1735	0.1011	1.7170	*
Months TDY	0.2355	0.1182	1.9930	*
Q29	1.0230	0.3758	2.7230	**
Q39	1.0431	0.3426	3.0450	**

II. Coefficients developed from tenured Marine Corps sample data:

	Value	Std Error	t-value	Significance
(Intercept)	-3.0469	3.0363	-1.0035	
Source: OCS	-0.9271	0.4739	-1.9564	*
Source: Other	0.9058	0.3839	2.3597	**
Source: ROTC	0.0142	0.2320	0.0612	
Coast: West	1.1570	0.4123	2.8064	**
SEeduc: HS Grad	-1.1506	0.8788	-1.3092	
Seduc: Post-graduate	1.2628	0.4406	2.8661	**
Seduc: Some college	0.3983	0.2269	1.7552	*
Class: Pilot	1.7997	0.5952	3.0238	**
Acft: AV-8B	1.3562	0.7046	1.9248	*
Acft: CH-46	-1.5110	0.6655	-2.2703	*
Acft: CH-53	0.7008	0.3167	2.2127	*
Acft: EA-6B	0.5111	3.9975	0.1279	
Acft: F/A-18	0.9403	0.6829	1.3770	
Acft: KC-130	0.2548	0.4988	0.5108	
Acft: UH-1N	0.5903	0.4129	1.4298	
MoSea	0.1742	0.0976	1.7843	*
ACIP	-0.0070	0.0025	-2.8616	**
Q25	-1.3210	0.5501	-2.4015	**
Q45	0.4539	0.2910	1.5598	*
Q46	0.8970	0.3691	2.4300	**
Q52	0.8225	0.3399	2.4199	**
F3	-2.0528	0.5872	-3.4960	**

III. Coefficients developed from non-tenured Navy sample data (** implies p<0.05, * implies p<0.1):

	Value	Std Error	t-value	Significance
(Intercept)	-8.8818	3.2738	-2.7130	**
Rank: 02	0.6118	0.6721	0.9103	
Rank: 03	0.9272	0.2821	3.2873	**
Source: OCS	-0.1251	0.3703	-0.3377	
Source: Other	-1.0238	0.3943	-2.5964	**
Source: ROTC	0.2081	0.1390	1.4973	*
Acft: E2-C	-4.2842	16.1449	-0.2654	
Acft: EA-6B	-1.8890	5.3825	-0.3510	
Acft: EP-3	-2.0100	2.7120	-0.7412	
Acft: ES-3	-0.4848	1.6550	-0.2929	
Acft: F-14	-0.1683	1.0854	-0.1551	
Acft: F-18	-0.3476	0.7777	-0.4469	
Acft: H-3	0.5346	1.7332	0.3084	
Acft: H-46	-0.5603	0.4944	-1.1332	
Acft: MH-53	-0.0774	0.4038	-0.1916	
Acft: P-3	-0.0100	0.3204	-0.0313	
Acft: S-3	-0.0907	0.2767	-0.3277	
Acft: SH-60B	-0.2070	0.2299	-0.9004	
Acft: SH-60F	0.0192	0.2134	0.0898	
Months at Sea	0.1692	0.0707	2.3944	**
Months TDY	-0.1535	0.0854	-1.7976	*
FY98B	-2.0266	1.0458	-1.9377	*
Q25	0.6538	0.3088	2.1172	*
Q32	0.6897	0.2320	2.9726	**
Q35	0.8668	0.2488	3.4836	**
Q31	0.5913	0.2343	2.5236	**
Q43	0.4097	0.2024	2.0242	*
F1	-0.9167	0.2531	-3.6223	**

IV. Coefficients developed from tenured Navy sample data:

	Value	Std Error	T-Value	Significance
(Intercept)	0.6703	9.1428	0.0733	
Rank:02	0.3070	9.4886	0.0324	
Rank: 03	0.5581	3.1769	0.1757	
Rank: 04	-0.0425	1.5965	-0.0266	
Rank: 05	0.0807	0.9707	0.0831	
Marital: Married	-8.7887	18.3423	-0.4792	
Marital: Other	-0.4282	14.8036	-0.0289	
Source: OCS	-0.1222	0.2933	-0.4166	
Source: Other	-0.3882	0.2960	-1.3117	
Source: ROTC	0.0339	0.1325	0.2562	
Age: 36-40	-0.0747	0.2747	-0.2719	
Age: 41-45	0.1524	0.2666	0.5715	
Coast: West	0.0452	0.3050	0.1483	

IV. Coefficients developed from tenured Navy sample data (cont.):

	Value	Std Error	t-value	Significance
Deps: 1	2.5946	2.9445	0.8812	
Deps: 2	0.4700	0.9901	0.4747	
Deps: 3	0.3502	0.5002	0.7001	
Deps: 4	0.3232	0.3102	1.0419	
Deps: 5	0.5101	0.2572	1.9834	*
Deps: 5+	0.3477	0.3429	1.0142	
SEduc: HS graduate	0.9720	0.5925	1.6403	*
SEduc: Post-graduate	-0.2891	0.2351	-1.2297	
SEduc: Some college	-0.1468	0.1429	-1.0273	
Class: Pilot	1.0585	0.2999	3.5291	**
Acft: E2-C	-3.6644	4.4627	-0.8211	
Acft: EA-6B	-0.9080	1.5033	-0.6040	
Acft: EC-130	2.4445	1.8288	1.3367	
Acft: EP-3	-0.6595	0.6648	-0.9920	
Acft: ES-3	-0.5041	0.4457	-1.1312	
Acft: F-14	-0.4598	0.2946	-1.5605	*
Acft: F-18	-0.4539	0.2255	-2.0127	*
Acft: H-3	-0.1922	0.2217	-0.8669	
Acft: H-46	-0.4114	0.1719	-2.3939	**
Acft: MH-53	-0.3977	0.1602	-2.4816	**
Acft: P-3	-0.0696	0.0980	-0.7101	
Acft: S-3	-0.1668	0.0908	-1.8369	*
Acft: SH-2	-0.1604	0.1274	-1.2594	
Acft: SH-60B	-0.1812	0.0695	-2.6069	**
Acft: SH-60F	-0.1725	0.0694	-2.4849	**
Months at Sea	0.0453	0.0545	0.8316	
Months TDY	0.2845	0.0856	3.3246	**
ACIP	0.0019	0.0017	1.1065	
FY94B	-1.0029	0.5519	-1.8172	*
FY95B	1.7525	0.7897	2.2193	*
FY96B	-1.0139	0.6947	-1.4595	
FY97B	-0.9297	0.5601	-1.6598	*
FY98B	0.2912	0.5350	0.5443	
Flight Hours	-0.0127	0.0255	-0.4967	
Simulator Hours	-0.0096	0.0761	-0.1260	
Q25	-0.3505	0.2039	-1.7190	*
Q27	0.3657	0.1814	2.0158	*
Q36	0.1997	0.2012	0.9924	
Q37	0.9196	0.2845	3.2319	**
Q38	-0.2191	0.2587	-0.8468	
Q45	0.6352	0.2332	2.7236	**
Q43	-0.2213	0.2168	-1.0206	
Q51	0.5110	0.2080	2.4565	**
F1	0.1656	0.2198	0.7538	
F2	0.2465	0.2460	1.0021	
F3	0.6717	0.2646	2.5388	**
F4	-0.8216	0.3118	-2.6349	**

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