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AN ANALYSIS OF THE FACTORS  
AFFECTING THE CAREER  
ORIENTATION OF FEDERAL  
CIVILIAN ENGINEERS

Benjamin J. Roberts  
Kenneth W. Thomas  
Mark E. Davis

July 1990

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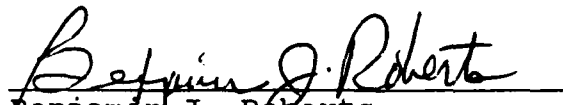
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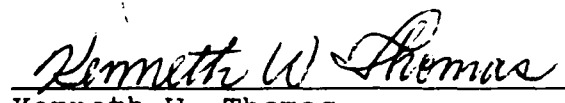
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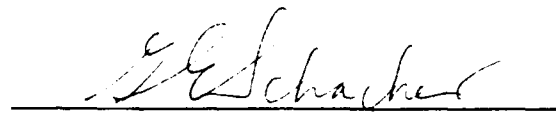
  
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AFFECTING THE CAREER  
ORIENTATION OF FEDERAL  
CIVILIAN ENGINEERS**

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PREPARED BY

DEPARTMENT OF ADMINISTRATIVE SCIENCES  
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FOR

NAVAL AVIONICS CENTER  
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## EXECUTIVE SUMMARY/ABSTRACT

This study was conducted to analyze the factors that affect the career orientation of federal civilian engineers at the Naval Avionics Center in Indianapolis, Indiana. One hundred and sixty-seven scientists and engineers from several engineering divisions were surveyed regarding turnover intentions. Based on literature reviews in the area of turnover with this particular population, a model was developed containing several factors related to intent to remain in the organization. These factors were categorized as biodemographics, tenure, satisfaction with family and job, and expectations.

These factors were modeled against intent to remain with the organization, using correlations and multivariate regressive techniques. Results indicated that this model predicts the turnover intention with 87.5 percent accuracy. Findings are interpreted in light of ongoing efforts on an organization-wide basis to introduce change in the Center's culture through a quality management program.

## I. INTRODUCTION

Personnel turnover has become a major concern to those who have an interest in organizational behavior. Turnover results in considerable costs to individuals as well as organizations. Consequently much research concerning the phenomena of turnover has been done, including studies on both civilian and military communities. [Ref. 1]

The loss of experienced personnel creates "holes" in the organizational structure that must be filled by enticing an additional experienced individual to remain with, or join, the organization. Attrition also has a "domino effect" on initial recruiting and retention of personnel, because upper level vacancies move down the organizational hierarchy as personnel are promoted upwards to fill them. This practice exacerbates the training problem by creating more vacancies, which requires more training of personnel to fill them, which costs money and involves a substantial amount of administration. Eventually, the vacancy reaches the bottom of the hierarchy, where it is then filled by a fresh recruit. Civilian organizations can fill vacancies using lateral entry replacements who may already possess the skills required for the position to be filled. Of course some amount of attrition is necessary and expected; however to minimize manpower costs,

the attrition of dedicated experienced personnel should be minimized.

This study focuses on the retention decision process and the factors that influence career choice among federal civilian engineers . The "employee" who eventually decides to leave must base his decision on some factor(s) that supports his decision, and it would be useful to know not only what they were, but how they affect the decision as well. The study will attempt to identify the factors that support this decision process, and explore how they interact.

Specifically, this study attempts to study the retention decision process using correlation and multivariate analysis based upon previous research and original assumptions. The retention decision is modeled against several measures of job satisfaction, life satisfaction, biodemographics, and career experience.

#### **A. THE NAVAL AVIONICS CENTER**

The Naval Avionics Center is located in Indianapolis, Indiana. As of March 1989, the Naval Avionics Center employed 3,320 permanent civilian personnel, 1149 of which were degreed scientists or engineers. The vast majority of these personnel are found in one of four of the nine departments that comprise the Center's organization. (A basic organization chart is provided as Appendix A.) These departments are "200"

(Manufacturing Technology), "400" (Product Integrity and Assurance), "800" (Systems and Technology), and "900" (Engineering). As civil servants, they are salaried employees who are paid on standard regional government GS/GM pay scales.

The Center's mission is "to conduct research, development, engineering, material acquisition, pilot and limited manufacturing, technical evaluation, depot maintenance, and integrated logistic support on assigned airborne electronics (avionics), missile, spaceborne, under sea and surface weapon systems and related equipment" [Ref. 2]. It is a subordinate command of the Naval Air Systems Command and is typical of many large military industrial facilities, in that it has a small military staff (13 in this case) responsible for a large civilian labor force. Although it is technically a government facility, the Center competes for much of its work using the standard competitive bidding procedures for government contracts. Those departments that are "light-loaded" may even accept outside work. In these respects, the Center is much like any privately operated industrial activity.

As part of an organizational effectiveness study of the Naval Avionics Center being conducted by the staff of the Naval Postgraduate School Administrative Science Department, the issue of turnover, particularly of engineers and

scientists, was identified as a concern. As expressed in the Center's own overview statement

the Center invests in a strong personnel training program designed to foster technical and managerial skills especially attuned to addressing the Navy's airborne electronics issues of today and tomorrow. In order to stay abreast of new philosophies in the systems acquisition process and the rapid advances in avionics technologies, the Center continually invests in the upgrading of its personnel's capabilities.

As a result of these resource investment strategies, the Center has assembled an impressive array of professional and skilled personnel combined with well-equipped physical facilities. [Ref. 2]

In light of this personnel philosophy, which involves substantial investments in training and experience, turnover has an especially devastating effect on the Center's ability to stay abreast of technology and exploit the very strategy that it is attempting to build upon.

Although the Center does administer "leaver surveys" to departing employees, this data is not systematically retained and analyzed in any files. As a result, there is little or no useful historical data for use as a reference to determine the basic reasons for turnover or retention at the Center. This also makes it next to impossible to determine the demographics of those leaving the Center, in terms of age, experience, and training. Figures on overall turnover are available, and they indicate that in the first two quarters of fiscal year 1989, attrition of engineers and scientists was running at 6.1 percent, 63 percent of which was due solely to voluntary

resignation. Recruitment to replace those personnel leaving the Center is done on a piecemeal basis, with recruits being procured as vacancies occur. In other words, there appears to be no annual recruiting program or recruit quota system based upon a forecasting model or other methodology.

#### **B. THE TURNOVER DECISION**

Turnover is a complex subject. To say that the decision to stay or leave a particular workplace can be explained or predicted by the relationship between one or two variables is simply avoiding evidence that states otherwise. The literature supports the contention that turnover is related to age (or tenure), demographic, economic, satisfaction, and commitment factors, as well as expectations concerning alternative employment and certain aspects of one's current job. In addition, it appears that the decision is not truly an individual one, since the perceptions of family members (or significant others), and peers, can influence the process. This further complicates the picture, since it is difficult to model or measure the effects of such influences.

The majority of the research surrounding civilian turnover focuses on the relationship between satisfaction or commitment and turnover, as moderated by tenure, phase of life, or economic conditions. Little mention is made regarding the influence of biographical factors such as

marriage or number of dependents. It is likely that these factors do influence the civilian turnover decision. In fact, the Navy has found

... the decision to leave or stay may ultimately hinge on the member's perceived quality of life. In addition, today it is often difficult to draw the line between individuals and their families in any personnel decision. [Ref. 3:p. 28]

In contrast to military personnel, civilians are generally not likely to be subject to the same type of constraints when it comes to family stability and benefits, and one would think, are able to exhibit more freedom in the job market. Their skills are more readily transferrable from job to job, and they are more able to tap regional labor markets for employment, whereas naval officers are assigned based upon "the needs of the Navy." From a purely economic standpoint, this allows the married civilian the opportunity for his spouse to gain long term employment, thus improving family earnings flow as well as level of financial security. This effect has been shown to influence the turnover decision [ref 4].

The turnover decision then, is similar for civilians and military officers, however; there are differences in the magnitude of the various factors that affect it. Based upon the literature, these factors can be modeled against intent to remain with the organization, and then using correlations and multivariate regressive techniques, the magnitudes can be

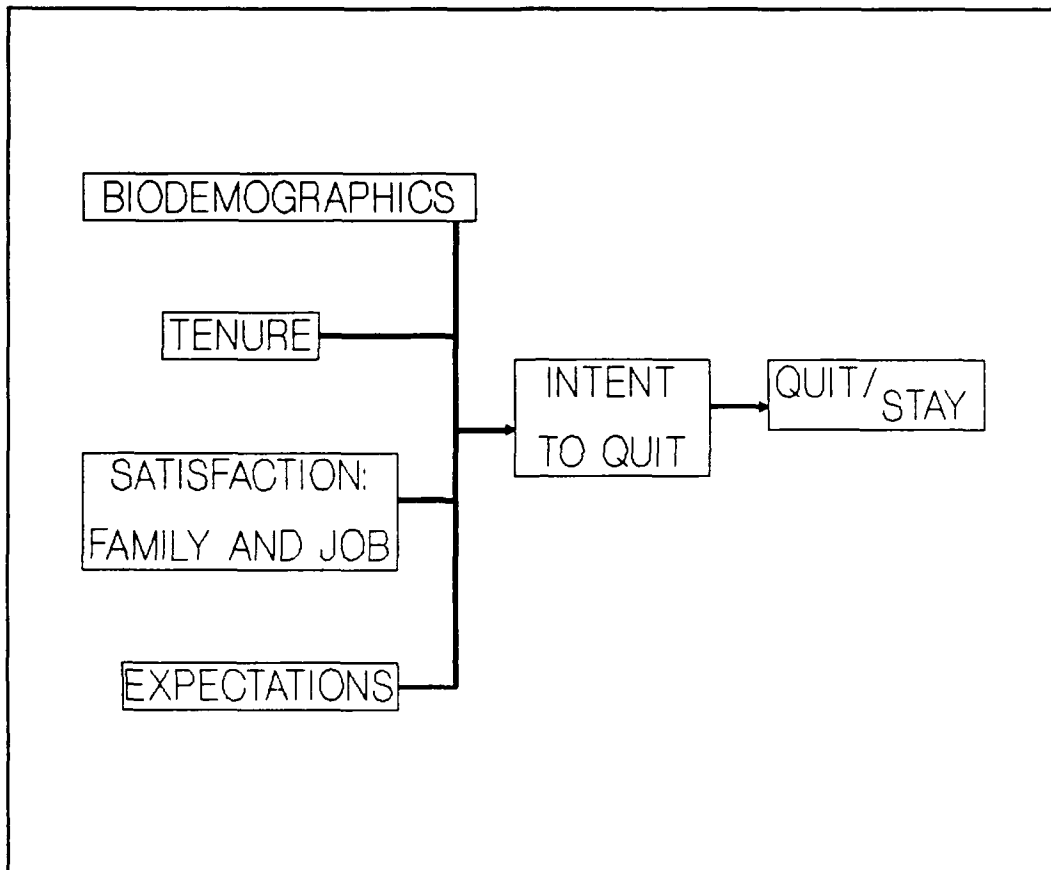
determined. The subsequent analysis of results can then be used to help predict turnover. The following chapters will discuss this methodology, and then apply it in order to study the career intent and the factors affecting the scientist and engineer communities at NAC.

## II. METHODOLOGY

Several studies have noted direct relationships between stated intention to quit and turnover behavior. Based upon this research, this study assumes that career intention is closely related to turnover behavior and uses it as a proxy for actual turnover. Additional studies have identified various economic, satisfaction, and biodemographic factors that influence the turnover process. Based upon the studies of turnover summarized in the literature, the turnover process can be depicted as a decision based upon several factors, as shown in Figure 1. The process involves consideration of most, if not all of these factors, although the magnitude of the effects will vary between individuals. The model depicted in Figure 1 considers the various factors which have been shown to influence the individual turnover decision. In addition to demographic, tenure, and pure job satisfaction measures, measures of satisfaction with certain aspects of family environment, and expectations regarding the military and job alternatives are included.

It was felt that job satisfaction was too narrow a construct to use as the sole satisfaction related variable explaining turnover, since the job itself has such an impact on the way of life. Therefore, inclusion of some measure of family satisfaction or well-being was included as a factor affecting the turnover decision process. Expectations

regarding transfers, promotions, and alternative employment opportunities have been correlated to turnover in previous studies, and they are included in the model as well.



**Figure 1**  
Hypothesized Turnover Model

Source: Authors

Inclusion of these factors is consistent with the model proposed by Ashcraft [Ref. 5], which relates career orientation to tenure, perception of civilian job opportunities, cognitive affective orientation (satisfaction),

family financial resources, and biodemographic factors. In fact, the model used for this analysis includes factors similar to those in both the Ashcraft and Schmidt [Ref. 5, 6] models, however it avoids the "economic" well-being factor associated with family financial resources, since the research indicates that economic effects have minimal impact on the turnover decision process.

The model's key difference from previous attempts to explain the turnover decision is that it includes separate variables for expectations about promotions; specifically: how the respondent feels about his expectations regarding his chances are for promotion to the next paygrade. It is felt that these factors significantly influence the intention to search for a new job, particularly in the case of personnel that are approaching the window for promotion or reassignment, and are consciously involved in the turnover decision process (at the point where costs of leaving are weighed against benefits of staying).

In order to study projected turnover and its determinants at the Naval Avionics Center, a survey was administered to a representative sample of the population. (A copy of the survey is provided as Appendix B.) The survey was developed using the 1985 DOD Survey of Officer and Enlisted Personnel and the Naval Personnel Research and Development study Prediction of Turnover Intentions Among Civilian Engineers Employed at Navy Industrial Facilities [Ref. 7] as a basis for

constructing questions to measure those factors deemed relevant by the literature. In most cases the questions were taken word for word from the references, however, there were some questions that were reworded so that references to the military were avoided. Another difference in the survey developed for administration at the Center is that in all questions requiring scaled answers, the respondents used a five point or seven point Likert type scale for their response. The DOD Survey used five point, seven point, and ten point scales, which often seemed confusing. In the interest of ease and consistency, as well as the absence of any requirement for finer measurement in the responses, the five and seven point scales were used throughout the survey. In addition, in order to ensure consistent answers, some questions were asked in two different ways. The answers were checked for consistency and no deviations were found.

The survey sample was chosen by the staff at the Naval Avionics Center. The only requirement asked of the Center was that respondents possess at least two and not more than 14 years of federal service at the Center, and that the sample be selected randomly, and representative of the distribution of engineers and scientists at the Center. The Center attempted this by first determining the number of engineers and scientists in each department, and then proportionally allocating 200 surveys throughout the organization. The result was a stratified random sample. The surveys were

administered through representatives in each department, and collected either by the researchers on the site or by the personnel office. The survey was completely confidential. No identifying marks were requested or used, and to ensure confidentiality, the respondents were provided with a large manila envelope and asked to return the survey inside the sealed envelope.

Of the 200 surveys disseminated, 167 were returned, which equates to a response rate of 83.5 percent. The survey was administered to male and female respondents for future research purposes, although female responses were not utilized for this research effort. Responses were manually entered into a computer database for analysis.

#### A. PRELIMINARY ANALYSIS FOR NAVAL AVIONICS CENTER DATA

The survey administered at the Center provided data for 39 variables, (some of which were not relevant to this analysis).

##### 1. Variable construction

The demographic variables were taken from questions assessing the education level (beyond a Bachelor's degree), marital status, number of dependents, employment status of the respondent's spouse, and whether the respondent had looked for a job or been offered a job in the past year. The variables are listed in Table 1.

Theoretical expectations are that postgraduate education might lead to greater job market flexibility, particularly for younger employees, and greater turnover intent. Marital

**TABLE 1**

**DEMOGRAPHIC VARIABLES**

<u>Variable name</u>	<u>Variable Description</u>
ED	Education level (B.S. is base case)
MARRIED	Marital status (single is base case)
DEP	indicates presence of dependents (no dependents is base case)
WIFEWORK	indicates whether wife is employed in a full time position
JOBOFFER	indicates job offer in past year
JOBLOOK	indicates whether sought job in past year

Source: Authors

status could have varying effects, depending upon the employment status of the respondent's wife. A spouse employed outside the home might increase the propensity to leave by providing a financial 'parachute' while seeking a new job. The reverse case is that a spouse with a satisfying and financially rewarding job may be reluctant to relocate if the respondent finds an acceptable alternative that is geographically incompatible with the wife's place of employment. Also, marriage involves an obligation to provide for the spouse, and therefore, job security may take on more importance to married employees and reduce their likelihood of

leaving. The presence of additional dependents is likely to reinforce this notion.

The variables JOBOFFER and JOBLOOK are self-explanatory, providing an indication of possible intent to seek work elsewhere as well as the existence of an alternative.

All of the above variables were coded as dummy variables and with single, no dependents, no postgraduate education, and no job offers or looking for a job in the past year as the base case.

Several variables were formed to measure expectations. These variables are presented in Table 2. The first variable, titled NACXPECT provides an indication of the extent to which individual jobs at the Naval Avionics Center met each employee's expectations. Failure to meet expectations would increase the propensity to leave. The second variable, BETOFF2, provides an indication of the respondent's perception regarding whether or not his family could be better off if he left the Center. A positive response should increase the probability of turnover as well. The third variable, EXPROMO, measured the respondents' expectation regarding promotion to the next higher grade. Assuming that an engineer or scientist can find an acceptable job alternative, respondents with little perceived chance for advancement would likely exhibit a higher propensity to leave. The final variable (JOBALT) indicates the respondent's estimate of his chances of finding a better job. An employee who rates his chances as high is

more confident in his ability to find better work elsewhere and may be more likely to leave. All of these variables are dummy variables as well, with negative expectations regarding job alternatives, and that the family could be better off if the respondent left the Center, and positive expectations regarding promotion and whether the Center met prior expectations as the base cases. All of these variables should relate negatively to turnover.

**TABLE 2**

**EXPECTATION RELATED VARIABLES**

<u>Variable name</u>	<u>Variable Description</u>
NACXPECT	indicates whether employment at the Center met initial expectations
BETOFF2	indicates whether respondent feels that family <u>could</u> be better off if he left the Center
EXPROMO	indicates whether respondent expects to be promoted
JOBALT	indicates whether respondent feels he has a good or better chance of finding a better job outside the Center

Source: Authors

Tenure variables are age (AGE) and length of service (LOS), and are listed in Table 3. These variables were continuous, and should exhibit a positive relationship to turnover. Although one might suspect that these variables

**TABLE 3**

**TENURE VARIABLES**

<u>Variable name</u>	<u>Variable Description</u>
AGE	Age (in years)
LOS	Length of service (in years)

Source: Authors

are highly correlated, the nature of Civil Service employment and retirement systems is such that age may have no bearing on length of service, therefore both variables may be of interest. (In fact, a chi-square test found these variables to be independent and they were only mildly correlated.) In the Civil Service, entry is at the GS-7 level and promotions through GS-9 and GS-11 to GS-12 generally follow within a three year period. This is usually followed, however, by many years spent at the GS-12 level. There is no requirement to be promoted beyond this level.

Satisfaction variables appear in Table 4. They were created to measure satisfaction with life at the Naval Avionics Center, with pay and allowances, with the amount of freedom in the workplace, and with the actual job and work environment. In addition, respondents were asked to rate the level of morale in their department. A final variable, BETOFF, measures the respondents feelings regarding the impact of employment at the Center on his family situation, by asking him to rate whether or not his family would actually be better

off if he left his job at the Center. Theoretical expectations are that dissatisfaction with any of these aspects, or low morale, will increase the likelihood of turnover.

TABLE 4

SATISFACTION VARIABLES

<u>Variable name</u>	<u>Variable description</u>
SATNAC	measures satisfaction with life at the Center
PAYSAT	measures satisfaction with pay
FREEDOM	measures satisfaction with the amount of freedom in the job afforded at the Center
JOBSAT	measures job satisfaction
WORKENV	measures satisfaction with work environment at the Center
MORALE	rates morale in the workplace
BETOFF	indicates whether respondent feels that family <u>would</u> be better off if he left the Center

Source: Authors

The dependent variable, involving turnover intention, termed LIFER in this model, was constructed based upon the response to three separate questions and is a function of the Civil Service retirement system, as well as the Naval Avionic Center's concept of "career". The first question asked the respondent to indicate how many additional years he expected to remain at the Center. If the response was 12 years or greater, the variable assumed the value "1". The variable

could also assume the value "1" when the combination of the actual number of years already served at the Center, added to the expected number of years one expected to remain, was greater than 20 years. Finally, in order to account for those people hired into the Civil Service late in their lives, and who might be eligible for retirement at age 55 or greater with only a few years of service, the LIFER variable assumed the value "1" when the total of age and expected length of service was 55 or greater, Any other responses corresponded to an intended leaver, in which case the variable LIFER assumed the value "0".

Simple correlation analysis was conducted in order to determine the correlates of turnover. The results of this analysis are listed in Table 5 of Chapter III. In addition, multiple regression analysis was conducted; the results are presented in Table 6 of Chapter III. Finally, the partial effect of each variable is presented in Table 7 of Chapter III.

#### B. MULTIVARIATE ANALYSIS

Based upon the model depicted in Figure 1, and the results of the correlation analysis discussed above, variables that exhibit significant individual correlations across samples were used in a multivariate Logistic regression to determine the relative effects of each variable on the turnover decision. The results will be presented in Chapter III.

### III. ANALYSIS OF THE NAVAL AVIONICS CENTER SAMPLE

The following chapter presents the findings of the correlation and resultant multivariate analysis of the data taken at the Naval Avionics Center. It is important to recall that the dependent variable in this case, LIFER, is used. In addition, only 31 of the 136 (23 percent) responses indicated "career intent" at the Center. Based upon expectations, and ease of interpretation, all variables were coded such that age (AGE), length of service (LOS), married (MARRIED), and the presence of dependents (DEP) should be the only variables that exhibit a positively signed correlation to intent to stay.

#### A. CORRELATION ANALYSIS

The results of first order correlations with our turnover variable at the Naval Avionics Center are presented in Table 5. (Recall that the "LIFER" variable is coded as intention to remain, so that positive correlations indicate that variables are related to the intention to remain). Education (ED), expectations regarding promotion (EXPROMO), presence of a working spouse (WIFEWORK), satisfaction with pay (PAYSAT), satisfaction with personal freedom in the workplace (FREEDOM), satisfaction with work environment (WORKENV), and marriage (MARRIED) were not significant correlates of turnover at the

ten percent level of significance. All variables exhibited the expected signs with the exception of ED and FREEDOM.

The variable ED, which accounted for postgraduate education, was positively signed, indicating that better educated people intended to remain at the Center. This is counter to expectations based upon the theory that a better educated person would have greater opportunities for alternative employment in the private sector. A possible explanation for this phenomena might be that the education was obtained through a government funded program which required additional obligated service, however the data to substantiate this is not available. This result must be viewed with caution as well, since the number of people possessing graduate degrees was less than ten percent of the sample. A crosstabulation did show that the age and length of service distribution of graduate education was fairly uniform, therefore education and tenure are not correlated.

The positive, but minimal correlation exhibited by the FREEDOM variable is also counter to expectations, and is likely a result of the small number of respondents (nine of 126) that indicated any dissatisfaction with this aspect of the Center. Consequently, this result must be viewed with skepticism.

The failure of promotion expectations (EXPROMO) to be a significant correlate is most likely due to the fact that most

promotions in the civil service system at the Center are relatively "automatic" up to the GS-12 level. As a result, this variable may not have much meaning to persons in the four to twelve years of service category, since they know that promotion beyond this level is difficult and may take several years. It is also possible that an older employee who does not expect to be promoted is probably one who fits into the "beneficial turnover" category and is not a good candidate for retention.

The presence of a working spouse (WIFEWORK) exhibited no correlation with turnover, although 68 percent of the married respondents had working wives. Apparently, the economic "parachute" theory does not apply to this sample, possibly due to the fact that the vast majority of married employees have working spouses, making it difficult to differentiate the effects of the "parachute" for those who have it as compared to those married employees whose spouses are not employed outside the home. Satisfaction with pay (PAYSAT) is not a significant factor affecting turnover in this sample either.

Response to the survey question regarding satisfaction with work environment (WORKENV) was split, with half the respondents indicating dissatisfaction. However, this factor was not correlated to turnover. This might imply that despite dissatisfaction with the actual working environment, employees do not consider it an important deterrent to remaining at

TABLE 5

## RESULTS OF FIRST ORDER CORRELATIONS WITH TURNOVER

NAVAL AVIONICS: n=136

<u>Variable</u>	<u>Pearson Correlation Coefficient</u>
AGE	.41 *
LOS	.29 *
ED	.01
EXPROMO	-.04
JOB OFFER	-.22 *
JOB LOOK	-.22 *
JOB ALT	-.31 *
WIFE WORK	.01
NAC EXPECT	-.19 *
MORALE	-.27 *
PAYSAT	-.04
BET OFF 2 (COULD)	-.28 *
FREEDOM	.07
BET OFF (FAM ENV)	-.20 *
JOBSAT	-.14 (p = .11)
WORK ENV	-.01
SATNAC	-.30 *
MARRIED	.13 (p = .13)
DEP	.17 *

\* p &lt; .05 level of significance

\*\* p &lt; .10 level of significance

Source: Authors

the Center. Of course this dissatisfaction may manifest itself in other variables by contributing to overall dissatisfaction with the Center (SATNAC) or the job (JOBSAT). However, tests of independence between these variables suggested that they are separate measures.

Marital status was not quite significant as a factor affecting turnover, however the presence of dependents tends to reinforce individual intent to remain at the Center. A

possible reason for this is that the long term financial responsibilities associated with dependents may affect the need for job security and moderate the turnover decision, whereas marriage involves merely an implied responsibility, which may be lessened if the spouse is employed.

#### **B. MULTIVARIATE REGRESSION ANALYSIS**

Multivariate Logit analysis was conducted using those variables exhibiting correlation at the  $p < .10$  level of significance. The results are presented in Table 6. The Logit analysis results reveal that the intercept term and the variables AGE, LOS, JOBOFFER, JOBALT, BETTOFF2, SATNAC and DEP are significant at the ten percent level of significance. The variables for job satisfaction (JOBSAT) and expectations regarding how much better off the respondent's family would be if he quit (BETOFF) were insignificant and positively signed. All other variables exhibited the expected signs.

The implication surrounding the resultant sign of the variable JOBSAT is that expressed job dissatisfaction does not significantly affect intent to leave. A similar inference can be drawn from the results concerning the variable BETOFF, which implies that despite strong feelings that the family could be living a much better life if the respondent accepted employment elsewhere, this factor tends to influence him to

stay at the Center. These results must be viewed with caution however, since these variables are not significant.

**TABLE 6**  
**RESULTS OF REGRESSION ANALYSIS**

NAVAL AVIONICS: n=136

R=.503

<u>Variable</u>	<u>Beta Coefficient</u>
INTERCEPT	-5.93 *
LOS	.17 **
AGE	.14 *
JOBOFFER	-1.31 *
JOBLOOK	- .57
JOBALT	-1.96 **
MORALE	+ .02
BETOFF (COULD)	+1.61
BETOFF2 (FAMENV)	-2.18 **
JOBSAT	+ .34
SATNAC	-2.11 *
NACXPECT	- .71
DEP	.92 **

\* p < .05 level of significance  
\*\* p < .10 level of significance

Source: Authors

The issue does become significant when the individual expresses dissatisfaction with current family environment (BETOFF2), indicating that expectations simply do not carry the same weight as the actual experience. It may be easier to rationalize the decision to remain at the Center despite feelings that your family could be better off if you left, as long as you are not experiencing actual dissatisfaction with family environment. However, once this dissatisfaction crops

up, it becomes an extremely strong deterrent to remaining at the Center.

Global satisfaction with the Center (SATNAC) was another important factor influencing turnover intent. Expressed dissatisfaction with the Center has a substantial effect on the probability of remaining at the Center, as do the variables JOBOFFER and JOBALT. Partial effects of each variable, evaluated using a mean length of service of 5.7 years and age of 32.3 years, are presented in Table 7.

The base case probability of an individual demonstrating career orientation at the Center is .39. This represents a single 32 year old male with 5.7 years of service who expresses no dissatisfaction or negative expectations about the relevant factors included in the model. A classification table indicates that this model predicts the proper turnover outcome with 87.5 percent accuracy.

TABLE 7

PARTIAL EFFECTS OF REGRESSION ANALYSIS

NAVAL AVIONICS: n=136

<u>Variable</u>	<u>Partial Effect</u>
LOS	+ .04 # **
AGE	+ .04 # *
JOB OFFER	- .24 *
JOB LOOK	- .12
JOB ALT	- .31 *
MORALE	0
BET OFF (COULD)	+ .37
BET OFF2 (FAM ENV)	- .32 *
JOB SAT	+ .09
SAT NAC	- .32 *
NAC EXPECT	- .15
DEP	+ .23 *

# evaluated for each additional year of service  
 \* p < .05 level of significance  
 \*\* p < .10 level of significance

Source: Authors

### C. SUMMARY AND RECOMMENDATIONS

A multivariate analysis of the correlates of turnover showed that age, length of stay in the organization, and the presence of dependents were positively related to intent to remain at NAC. On the other hand, intending to seek work elsewhere, having alternatives to current work at NAC, feeling better off if one were to work elsewhere because of deteriorating family conditions, and overall dissatisfaction with the Center were found to be negatively related to one's intent to remain at NAC.

Based on the data analyzed in this study, it is recommended that NAC begin a systematic program to analyze the results of "leaver" surveys and interviews. The results could be entered into a data base, and could provide further insight into who is leaving the organization, when they are leaving, and the reasons personnel are leaving. In addition, actual turnover behavior could be used instead of the proxy variable used in this study, turnover intent. This data could be valuable in creating an ongoing effort to increase personnel morale, satisfaction, and retention.

As clearly indicated by the results of this study, responses to survey items which were based on the respondent's actual experience were better predictors of turnover intent. This reinforces the position that some systematic attempt of collecting data on those individuals who leave the Center

would be beneficial in projecting personnel needs as well as in developing ongoing efforts to retain individuals valued by the Center.

As a final note, although many of the factors traditionally associated with predicting turnover intent were not demonstrated in this study, one might consider these findings in light of the ongoing efforts at the Center regarding the Continuous Improvement Council. In this respect, the team-based structure of this quality effort has likely encouraged and bolstered more openness and trust within the organizational climate at the Center. While some individuals may not describe their work and/or working conditions as ideal, demonstrated efforts toward producing meaningful change in the organization may provide optimism for future improvements to current conditions.

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APPENDIX A  
NAVAL AVIONICS CENTER  
ORGANIZATION CHART

COMMAND STAFF  
 SAFETY OFFICER CODE 00C  
 COMMAND EVALUATION OFFICER CODE 00D  
 DEEEO CODE 00E  
 FLEET ADVOCATE CODE 00F

COMMANDING OFFICER CODE 00  
 EXECUTIVE DIRECTOR CODE 01  
 EXECUTIVE OFFICER CODE 02

CONTINUOUS IMPROVEMENT COUNCIL

\* CONDUCT RESEARCH, DEVELOPMENT, ENGINEERING, MATERIAL ACQUISITION, PILOT AND LIMITED MANUFACTURING, TECHNICAL EVALUATION, DEPOT MAINTENANCE AND INTEGRATED LOGISTICS SUPPORT ON ASSIGNED AIRBORNE ELECTRONICS (AVIONICS), MISSILE, SPACEBORNE UNDERSEA AND SURFACE WEAPON SYSTEMS AND RELATED EQUIPMENT

STAFF OFFICES  
 MEDICAL OFFICE CODE S005  
 SAFETY OFFICE CODE S006  
 COMMAND EVALUATION OFFICE CODE S012

SPECIAL ASSISTANTS  
 ASSISTANT TO THE EXECUTIVE DIRECTOR CODE S004  
 ASSISTANT TO THE EXECUTIVE OFFICER CODE S008  
 COUNSEL CODE S007  
 SSO/STILO CODE S011  
 SMALL BUSINESS CODE S009

OPERATIONS

SUPPORT

PLANS AND PROGRAMS DEPARTMENT CODE 070

PRODUCT INTEGRITY ASSURANCE DEPARTMENT CODE 400

ENGINEERING DEPARTMENT CODE 900

COMPTROLLER DEPARTMENT CODE 300

CONTRACTING AND MATERIAL MANAGEMENT DEPARTMENT CODE 600

MANUFACTURING TECHNOLOGY DEPARTMENT CODE 200

SYSTEMS AND TECHNOLOGY DEPARTMENT CODE 800

SECURITY DEPARTMENT CODE 100

CIVILIAN PERSONNEL DEPARTMENT CODE 500

TECHNICAL AND OPERATIONS SUPPORT DEPARTMENT CODE 700

17 JUL 89

APPROVED: *R. H. Henry*  
 CAPT, USN, COMMANDING OFFICER

NAVAL AIR SYSTEMS COMMAND

NAVAL AVIONICS CENTER INDIANAPOLIS, INDIANA

CHART NO. 00

APPENDIX B  
NAVAL AVIONICS CENTER  
DIAGNOSTIC SURVEY

## NAC DIAGNOSTIC SURVEY

The purpose of this questionnaire is to identify issues within NAC concerning job attributes, work group attributes, and career development. It is an opportunity to take stock of NAC as a place to work, to spend a career, and to register your observations, concerns, and satisfactions on a number of topics.

This questionnaire was custom designed for NAC and its' scientist and engineer communities. A few questions are standard questions addressing issues that are central to the operation of any organization. But, most of the items reflect issues of specific concern to NAC as identified through interviews. These issues were identified as potential problem areas or as success areas. This survey will allow us to see how the scientist and engineer communities feel about these issues.

After the surveys are collected, results will be tabulated and a report will be prepared which summarizes the findings.

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Prof. Benjamin Roberts  
Dept. of Admin. Sciences  
Naval Postgraduate School

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Prof. Kenneth Thomas  
Dept. of Admin. Sciences  
Naval Postgraduate School

LCDR Thomas Lindner  
Master's Degree Student  
Dept. of Admin Sciences  
Naval Postgraduate School

LT Mark Davis  
Master's Degree Student  
Dept. of Admin Sciences  
Naval Postgraduate School

GENERAL INSTRUCTIONS

1. These surveys are meant to be completely anonymous and confidential. Individual responses will not be seen by anyone within this organization. Do not put any identifying marks of any kind on them. When completed, please place the survey in the envelope provided and seal the envelope. Then return the survey and envelope to your departmental/divisional POC.

2. Most of the questions ask that you check one of several numbers that appear on a scale to the right of the item. You are to choose one number that best matches the description of how you feel about the item. For example, if you were asked "How much do you enjoy the weather in this area", and you are generally satisfied with the weather, you would check the number under "satisfied" like this:

	very dissatisfied	dissatisfied	slightly dissatisfied	not satisfied or dissatisfied	slightly satisfied	satisfied	very satisfied
How much do you enjoy the weather in this area? . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)

Note that the scale descriptions may be different in different parts of the survey. For example, they may ask you how much you agree or disagree with something, or how satisfied or dissatisfied you are with something, or whether you think something is likely or unlikely to occur. Be sure to read the scale descriptions carefully for each section before choosing your answers.

\* \* \* \* \*

DEMOGRAPHICS

The following information is needed to help us with the statistical analyses of the data. This information will allow comparisons to be made among different groups of employees.

PLEASE ANSWER EACH QUESTION BY MARKING THE NUMBER NEXT TO THE DESCRIPTION WHICH BEST FITS YOU OR BY WRITING IN THE CORRECT INFORMATION.

1. Are you (check one):  
(0)  Female  
(1)  Male
2. How old were you on your last birthday?  
  
\_\_\_\_\_ years
3. How many years have you worked at NAC?  
  
\_\_\_\_\_ years
4. What is the highest level of education you have attained?  
(1) High school diploma  
(2) Assoc/Jr college degree  
(3) Bachelor's degree  
(4) Master's degree  
(5) Doctoral degree
5. Are you currently married?  
(0)  no  
(1)  yes
6. Do you have dependents? (excluding your spouse)  
(0)  no  
(1)  yes
7. Your department/division is?  
  
\_\_\_\_\_/\_\_\_\_\_
8. Your paygrade is?  
  
GS- \_\_\_\_\_
9. Is your spouse currently employed outside of the home?  
(0)  no  
(1)  yes  
(3)  N/A
10. What was your last performance rating?  
  
\_\_\_\_\_
11. Have you actively pursued alternative employment opportunities within the past year?  
(0)  no  
(1)  yes

YOUR JOB

This section asks you how you think and feel about certain aspects of your job.

	very dissatisfied	dissatisfied	slightly dissatisfied	not satisfied or dissatisfied	slightly satisfied	satisfied	very satisfied
1. How satisfied are you with:							
a. current job overall. . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. fringe benefits you receive. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. coworkers/work group . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. amount of freedom you have on your job . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. opportunities for your own professional learning and growth. . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
f. opportunities to accomplish something worthwhile . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
g. your amount of pay . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
h. the chances you have to take part in decisions . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
i. your job security. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
j. promotion opportunities. .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
k. assignment stability . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
l. opportunities to receive training . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
m. the current bonus system .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
n. opportunities to work with state of the art equipment	(1)	(2)	(3)	(4)	(5)	(6)	(7)
o. career path opportunities.	(1)	(2)	(3)	(4)	(5)	(6)	(7)

2. How much do you agree or disagree with the following:

	strongly disagree	disagree	slightly disagree	do not agree or disagree	slightly agree	agree	strongly agree
a. In general, I like my job .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. I will probably look for a new job in the next year	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. What happens to the organization is really important to me . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. It would be hard for me to leave my job even if I wanted to. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
f. I feel personally responsible for the work I do . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
g. There is poor communication between different parts of NAC . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. I often think of quitting.	(1)	(2)	(3)	(4)	(5)	(6)	(7)

3. How much do you agree or disagree with the following:	strongly disagree	disagree	slightly disagree	do not agree or disagree	slightly agree	agree	strongly agree
a. Management makes it easy to get the job done . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. There is enough variety in my job . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. My job is challenging. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. Considering my skills and effort I put into my work, I am satisfied with pay. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. There is too much stress on my job. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)

4. How likely is it that:	very unlikely	unlikely	neither likely or unlikely	likely	very likely
a. You could find an equal or better job at another organization. . . . .	(1)	(2)	(3)	(4)	(5)
b. You will look for a new job in the next 12 months . . . . .	(1)	(2)	(3)	(4)	(5)
c. You will get a bonus or pay raise if you perform your job particularly well . . . . .	(1)	(2)	(3)	(4)	(5)
d. You will be promoted to the next higher grade . . . . .	(1)	(2)	(3)	(4)	(5)
e. You will remain at NAC for at least five more years . . . . .	(1)	(2)	(3)	(4)	(5)
f. You will receive feedback from your supervisor(s) concerning your performance . . . . .	(1)	(2)	(3)	(4)	(5)
g. Your family would be better off if you took a new job . . . . .	(1)	(2)	(3)	(4)	(5)
h. You will remain at NAC until retirement. . . . .	(1)	(2)	(3)	(4)	(5)

WORK GROUPS

This section asks you what you think about various work groups.

	strongly disagree	disagree	slightly disagree	do not agree or disagree	slightly agree	agree	strongly agree
1. For your <u>department</u> , how much do you agree or disagree with the following:							
a. I feel I am really a part of my work group. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. People who offer new ideas are likely to get "clobbered" . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. Each member has a clear idea of the group's goals . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. Everyone is involved in the decision making . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. My co-workers are afraid to express their real views. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
f. Some of the people I work with have no respect for others. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
g. Everyone's opinions gets listened to in my group . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
h. morale is high. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2. For your <u>division</u> , how much do you agree or disagree with the following:							
a. I feel I am really a part of my work group. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. People who offer new ideas are likely to get "clobbered" . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. Each member has a clear idea of the group's goals . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. Everyone is involved in the decision making . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. My co-workers are afraid to express their real views. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
f. Some of the people I work with have no respect for others. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
g. Everyone's opinions gets listened to in my group . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
h. morale is high. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)

GENERAL

This section asks what you think and feel concerning several areas.

	strongly disagree	disagree	slightly disagree	do not agree or disagree	slightly agree	agree	strongly agree
1. How much do you agree or disagree with the following:							
a. Morale is good at NAC . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. Working environment/conditions are satisfactory . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. I am satisfied with my life at NAC . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. My family could be better off if I left NAC. . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. Working at NAC is about what I expected it would be . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
f. Pay raises/promotions depend on performance . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)

2. Please answer the following:

a. The pay for my present job is:

(1)	(2)	(3)	(4)	(5)	(6)	(7)
less than I really need to live			enough to meet my needs			much more than my needs require

b. How important is pay to you?

(1)	(2)	(3)	(4)	(5)	(6)	(7)
unimportant			moderately important			important

c. Have you received other job offers in the past 12 months?

- (0) \_\_\_\_\_ no
- (1) \_\_\_\_\_ yes

d. How many more years do you intend to work at NAC?

- |           |             |
|-----------|-------------|
| _____ <1  | _____ 10-12 |
| _____ 1-3 | _____ 13-15 |
| _____ 4-6 | _____ 16+   |
| _____ 7-9 |             |

CAREER DEVELOPMENT

This section asks you how you think and feel about various aspects concerning career development.

	very dissatisfied	dissatisfied	slightly dissatisfied	not satisfied or dissatisfied	slightly satisfied	satisfied	very satisfied
1. How satisfied are you with:							
a. the career options available to you . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. the career development program at NAC . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. the amount of information that is available to me concerning career paths . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. the availability of career guidance . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)

2. Please answer the following:

a. to what extent do the career options available at NAC satisfy your career goals?

(1)	(2)	(3)	(4)	(5)	(6)	(7)
career options are inadequate to meet my needs		career options adequate to meet my needs			career options are more than adequate to meet my needs	

b. how familiar are you with the available career options?

(1)	(2)	(3)	(4)	(5)	(6)	(7)
I know little about my career options		I am fairly well informed about my career options			I am very well informed about my career options	

c. Rank the following in order of importance to you (1 = most important, 5 = least important):

My job/career at NAC appeals to me because it allows/ will allow me the opportunity to:

- \_\_\_\_\_ develop and utilize technical skills
- \_\_\_\_\_ develop and utilize managerial skills
- \_\_\_\_\_ develop and utilize creative skills
- \_\_\_\_\_ work in an autonomous setting
- \_\_\_\_\_ have job security

3. The following section asks you questions concerning your knowledge and understanding of, and satisfaction with, your career options at NAC- program manager, line manager, systems engineer, and technical consultant/engineer. If you are already in a "track", then please answer the questions "in hindsight".

	not at all		some what		quite		extremely
a. How knowledgeable are/were you about the career options available to you at NAC?							
(1) program manager . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(2) line manager . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(3) systems engineer . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(4) technical consultant . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. How attainable is/was each career option for you?							
(1) program manager . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(2) line manager . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(3) systems engineer . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(4) technical consultant . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. How desirable is/was each career option for you?							
(1) program manager . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(2) line manager . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(3) systems engineer . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(4) technical consultant . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. To what extent is/would each career option be able to satisfy your career aspirations?							
(1) program manager . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(2) line manager . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(3) systems engineer . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(4) technical consultant . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. To what extent are/were you interested in pursuing a career in each option available to you at NAC?							
(1) program manager . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(2) line manager . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(3) systems engineer . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(4) technical consultant . . . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)

4. Please answer the following questions:

a. What factors do you consider to be the most important in selecting a career path option?

b. Which of the available career paths is most attractive, and why?

c. What improvements could be made in the career development process at NAC?

d. What are the most satisfying aspects of your job and working at NAC?

e. What are the least satisfying aspects of your job and working at NAC?

THANK YOU FOR YOUR COOPERATION IN SPENDING TIME TO ANSWER OUR QUESTIONS.

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