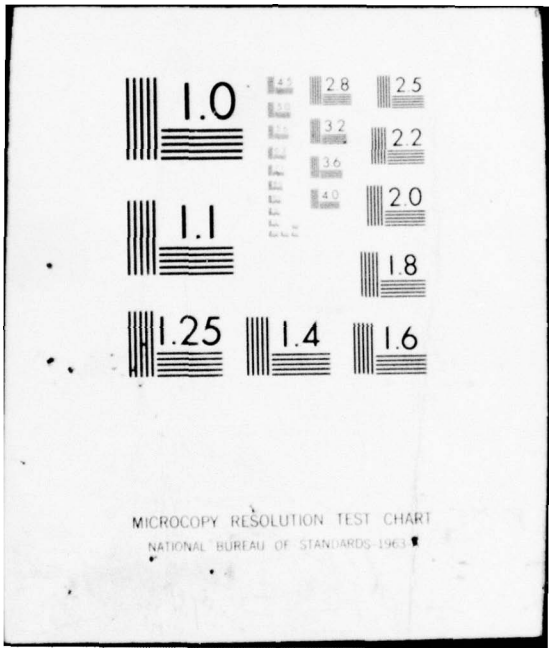
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A STUDY OF RELATIONSHIPS AMONG SELECTED ORGANIZATIONAL VARIABLES IN SYSTEM PROGRAM OFFICES DURING THE WEAPON SYSTEM ACQUISITION PROCESS

Donald L. Haddox, Major, USAF
Neal A. Long, Major, USAF

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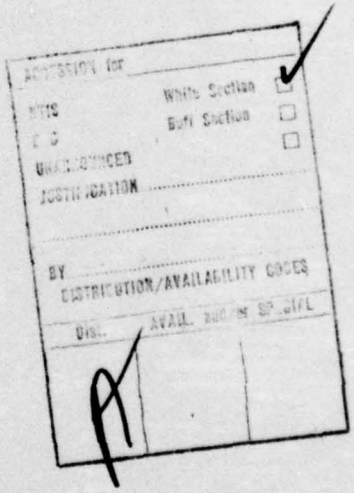
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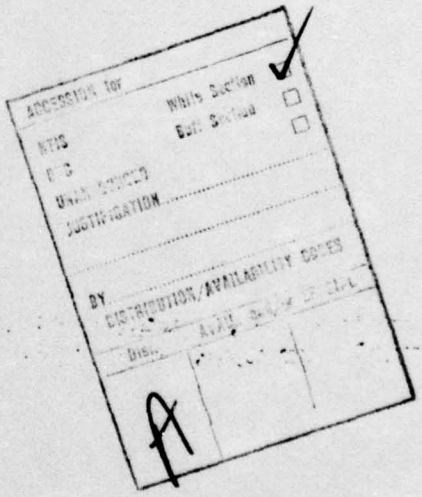
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The purpose of the study was to determine whether certain organizational variables would affect job satisfaction and perception of organizational climate among managers in System Program Offices (SPOs). In general, the research hypotheses were that the organizational variables were related to job satisfaction and organizational climate, and that satisfaction and climate were related. Correlation and one-way analysis of variance statistical techniques were used to test the hypotheses. Fifteen specific hypotheses were investigated and support was found for three. The results of the research indicated that perception of organizational climate differed among SPOs of different sizes, among managers performing duty at different organizational levels, and among SPOs in different phases of the weapon system acquisition process. No support was found for hypotheses concerned with job satisfaction.



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A STUDY OF RELATIONSHIPS AMONG SELECTED ORGANIZATIONAL VARIABLES IN SYSTEM PROGRAM OFFICES DURING THE WEAPON SYSTEM ACQUISITION PROCESS

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management

By

Donald L. Haddox, BS
Major, USAF

Neal A. Long, BS
Major, USAF

September 1976

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This thesis, written by

Major Donald L. Haddox

and

Major Neal A. Long

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN LOGISTICS MANAGEMENT

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Stephen E. Barndt

COMMITTEE CHAIRMAN

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Chapter 1

STATEMENT OF THE PROBLEM

Since the advent of the industrial revolution, educational levels and standards of living have increased. Most workers now enjoy greater leisure, with availability of entertainment and recreation vastly increased. In the majority of cases, workers' basic physiological and economic needs have been met and there is an increasing demand by employees that work be satisfying rather than frustrating, interesting rather than dull, and gratifying rather than destructive to the ego (3:57-60). This subtle shift of employee focus from lower level needs to higher level needs challenges managers to seek a greater understanding of factors that contribute to organizational effectiveness.

The ever increasing operational costs within the Department of Defense requires that managers actively seek means whereby organizational effectiveness can be maintained with fewer resources. Within the Department of Defense, one of the major areas of expenditures is in the acquisition of weapon systems (20:2). The Air Force utilizes the concept of project management through the establishment of System Program Offices (SPO). Project management, according to Butler (1:85), is a management concept to provide sustained,

intensified, and integrated management of complex ventures. Since SPOs are responsible for a large share of the Air Force budget, it is important that managers within the SPOs be aware of the factors that contribute to organizational effectiveness. Two factors that may contribute to organizational effectiveness are job satisfaction (16:284) and employee perception of organizational climate (16:506). However, a review of the literature has shown that little is known about the relationships between job satisfaction, organizational climate, and other organizational variables within the Department of Defense (DOD). The advent of project management and the SPO within DOD has produced a new organizational structure. Because of the unique character of this new structure, it is important that DOD managers understand the relationships that may exist between variables within these organizations, and the potential effect of these relationships on the organization's effectiveness and efficiency.

BACKGROUND

Organizational Climate

Litwin and Stringer defined organizational climate as

> . . . a set of measurable properties of the work environment, perceived directly or indirectly by the people who live and work in this environment and assumed to influence their motivation and behavior [10:1].

The concept of organizational climate has evolved out of attempts to apply theories of motivation to behavior in organizations. It provides a method of describing effects of organizational life on motivation of individuals within organizations (10:5). Litwin and Stringer (10:6) suggested that the manager, through his leadership style and performance, was one of the major determinants of climate. Litwin initiated the first explicit studies in the 1930s and he perceived that climate was an essential functional link between the person and the environment (10:37)

Recent organizational theories and studies have continued to suggest a strong relationship between organizational climate and motivation. Litwin and Stringer (10:43) outlined a subjective model of the determinants of motivating behavior in organizations. This model included "perceived organizational climate" as a filter through which objective phenomena pass. This model is illustrated in Figure 1.

Payne and Mansfield examined the relationships between organizational climate and various dimensions of organizational structure in 14 different work organizations varying in size from 262 to 4,580 employees. The effect of hierarchical level on perceptions of organizational climate showed significant variations by level. The results tended to support the idea that individuals higher in the organizational hierarchy perceive their organization as (1) less

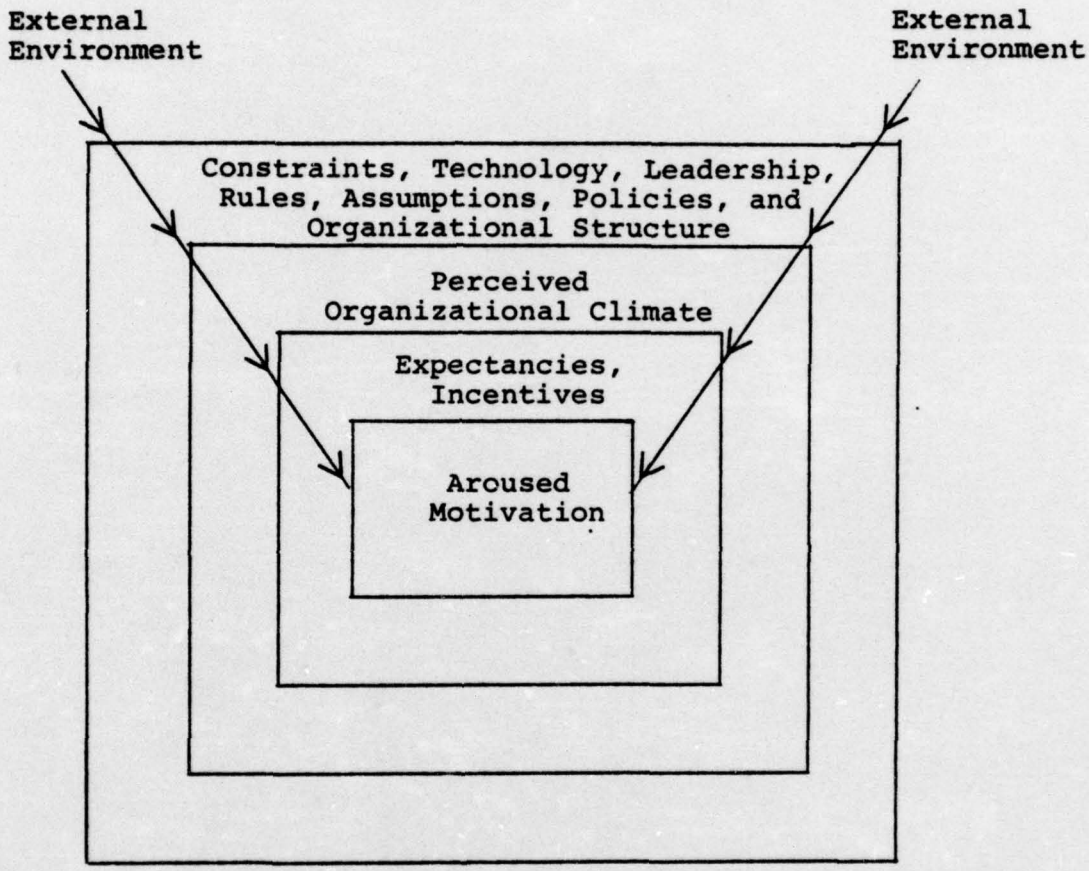


Figure 1

Model of the Determinants of
Motivated Behavior in Organizations [10:43]

authoritarian, (2) providing greater work interest, (3) being more friendly, and (4) more ready to innovate (15:515-526).

Gilmer's studies (4:202) revealed that needs not only varied from one person to another, but sometimes varied from group to group. This idea was further supported by Ellis and Welch (2:80) who found differing perceptions of goals by military and civilian personnel in a SPO. Research by Larson and Ruppert (9:56) indicated that personnel employed in different phases of the Air Force weapon systems acquisition process had significant variations in their perception of organizational climate. Organizational climate provides theorists with a conceptual link between the organizational system and the determinants of individual behavior. It further provides managers with a link between organizational procedures and the needs of workers. By studying their own organizational climates, managers may learn to appreciate the subtle relationships between their own behavior and the behavior of the work force (10:44).

Job Satisfaction

Job satisfaction may be defined as a condition of employment that fulfills the needs, expectations, wishes, or desires of employees (5:1265). A review of the literature reveals conflicting concepts concerning factors affecting job satisfaction in organizations. Taylor's "scientific management" school contended that motivation

factors were economic in nature (18:31). The "human relations" advocates, in the 1930s, shifted emphasis from economic to non-economic factors such as "climate" and "satisfaction" (16:53).

Maslow's work concerning satisfaction has been very influential. He implied that needs are arranged in a hierarchy that must be satisfied from lowest to highest level (11:Ch.5). He theorized that a satisfied need is no longer motivating; therefore, the kinds of things that motivate individuals may change as their careers progress. Maslow's need hierarchy is illustrated in Figure 2.

Herzberg (7:53-62) contended, in his two-factor theory, that employee motivation is determined by factors that are intrinsic to the job. Some of these intrinsic, or "motivator," factors are recognition, achievement, responsibility, and personal growth. He separated these factors from extrinsic factors such as policies, working conditions, and pay. The latter factors were categorized as "hygiene," and he stated that hygiene factors determine the degree of dissatisfaction but do not produce satisfaction. Satisfaction must be a result of the "motivator" factors.

Job satisfaction may be related to the length of time an individual has held a particular job (4:199-200). In general, job satisfaction is high among recently employed workers, but tends to go down during the first few years of employment. Initial enthusiasm for work is apparent among the younger group, but any failure to get

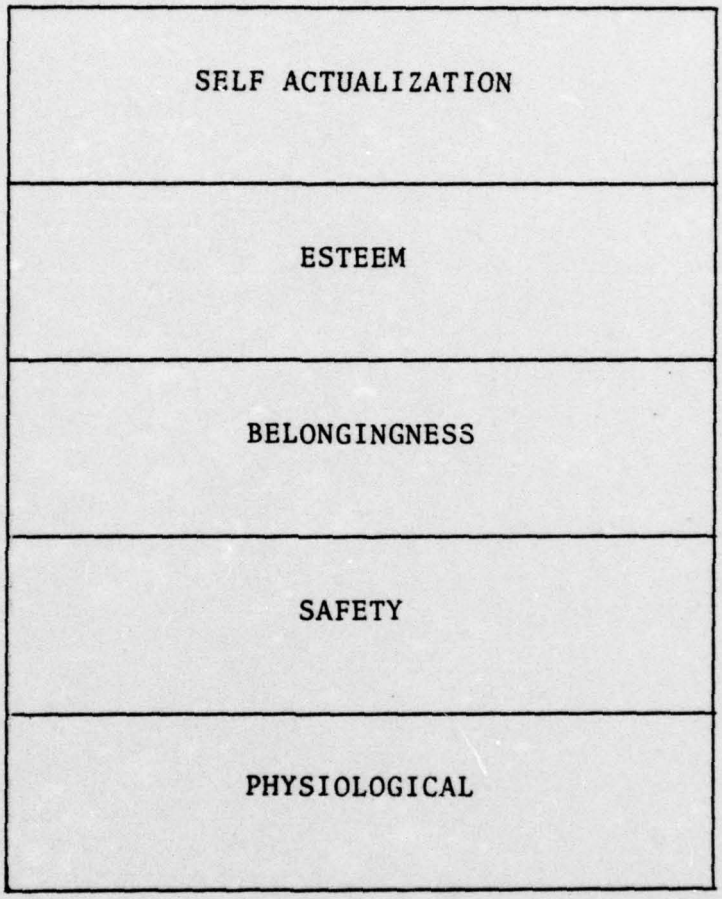


Figure 2

Maslow's Need Hierarchy [11:Ch.5]

ahead lowers job satisfaction (12:516). Size of an organization may also be related to an individual's attitude and behavior (16:250). Porter (16:251) cited six studies that showed that large organizational size had a negative effect on job satisfaction.

Project Management

In recent years, a number of organizations, particularly those dealing with aerospace and military weapons production, have utilized structural arrangements referred to as "project" or "program" management (16:255). These structures tend to cut across both the vertical and horizontal lines of responsibility within the organization. A project manager is assigned full responsibility for the achievement of project objectives, subject only to an overall project plan approved by top management (1:85). Project management structures have come about because of pressures created by accelerating technology and short lead times (16:255). This structure seems to permit greater focus of resources on meeting specified target outcomes. There may be problems, however, of integrating across projects, and integrating the projects with other ongoing work of the organization.

Butler stated that project management

> . . . tends to violate established managerial practice with respect to: hierarchial authority and responsibility; procedural arrangements and accommodations; departmentation specificity; incentive systems; unity of command and direction; span of control; resource-allocation patterns; and establishment of relative priorities [1:90].

Butler suggested that conflicts arise when professionals and nonprofessionals, or professionals of diverse disciplines, are forced to work together as a team (1:91). He further suggested that research to date has failed to confirm a positive relationship between employee satisfaction and organizational performance in project or non-project organizations (1:88).

The authority for the Air Force to engage in project management is contained in DOD Directive 5000.1. This directive states that,

> The development and production of a major defense system shall be managed by a single individual (program manager) who shall have a charter which provides sufficient authority to accomplish recognized program objectives [23:1].

The Program Manager, given this authority, assembles a team from various functional areas into a System Program Office (SPO). The SPO's only reason for existence is to guide a unique weapon system through the various phases of the weapon system acquisition process (23:1). When a weapon system is retired, the SPO associated with that system is dissolved. An overview of the Air Force Weapon System Acquisition Process is contained in the following section.

The Weapon System Acquisition Process

The Air Force Systems Command identifies five phases of development during the weapon system acquisition process. They are: conceptual, validation, full-scale development, production, and deployment.

The purpose of the conceptual phase is the identification and selection of those concepts generated by requirements of operational capability which appear most promising for further development. The initial SPO cadre is formed, cost/schedule estimates and analyses are made, and the various procurement and management alternatives are analyzed. Finally, a basic management and advanced procurement plan, together with a Request for Proposal, is presented to the Defense System Acquisition Review Council. The package is then presented to the Secretary of Defense for approval. The project then moves to the validation phase (19:1-2).

The validation phase consists of further analysis and refining of the goals of the project. It is a "zeroing-in" process to define the final product. Specifications are set and various designs are tested and evaluated. The SPO is formalized, and the Program Management Plan is formulated (19:2-3).

The third phase, full-scale development, is then entered. In this phase the prototype systems are produced and tested. The goal of this phase is to determine if the system, with its support and subsystems, can meet the required operational capabilities and do so within established budgetary limitations (22:3-25).

During the production phase the complete system, including spares, training equipment, operational facilities, etc., is put into production and prepared for

delivery to operational units. The fifth, or deployment phase, often runs concurrently with the production phase (19:5).

The deployment phase consists of the actual turnover of the system to the using command or unit. Further operational testing and evaluation continues, however, until the system is retired (21:2).

RESEARCH OBJECTIVE

The research examined the relationships between certain organizational variables and both job satisfaction and organizational climate in Air Force System Program Offices which were in different phases of the weapon system acquisition process. Specifically, the research attempted to identify the relationship of each of certain organizational variables to job satisfaction and organizational climate. Specifically, the research attempted to determine if job satisfaction and organizational climate differ as the organizational variables take on different values. Specifically, the organizational variables are:

(1) Organizational Level
(2) Grade
(3) Tenure
(4) Employment Status
(5) Assignment Status
(6) Organizational Size

In determining the relationship to organizational climate, job satisfaction was considered as an independent variable. In determining the relationship to job satisfaction, organizational climate was also considered as an independent variable.

RESEARCH HYPOTHESES

1. Job Satisfaction:

a. Differs among different phases of the weapon system acquisition process.

b. Differs among different organizational levels within System Program Offices.

c. Differs between military and civilian personnel.

d. Differs between assigned and co-located personnel.

e. Is related to the tenure of personnel in the System Program Offices.

f. Differs among personnel from SPOs of different sizes.

g. Differs among personnel of different grade.

h. Is related to an individual's perception of organizational climate.

2. Perception of organizational climate:

a. Differs among different phases of the weapon system acquisition process.

b. Differs among different organizational levels within the SPOs.

c. Differs between military and civilian personnel.

d. Differs between assigned and co-located personnel.

e. Is related to the tenure of personnel in the SPOs.

f. Differs among personnel from SPOs of different sizes.

g. Differs among personnel of different grades.

Chapter 2

RESEARCH METHODOLOGY

Introduction

The data base for this study was created by two prior research projects. These projects examined job satisfaction and perception of organizational climate in selected System Program Offices. A brief review of the methodology used in creating the data base follows.

Universe

The universe "consisted of all managers and specialists performing duties in System Program Offices in the United States Air Force [9:24]."

Population

The population was limited by confining the study to civilian and military managers performing duty in SPO's of Air Force Systems Command's Aeronautical System Division. Further limitation was accomplished by selecting only those SPO's that dealt with a single product, and which could be identified as being in a single phase of the weapon system acquisition process. A total of thirteen SPO's were selected (9:24).

Sampling Method

The five phases of the weapon system acquisition process were grouped into three categories. Category I consisted of the conceptual and validation phases. Category II contained only the full-scale development phase, and Category III combined the production and deployment phases (9:24).

The conceptual and validation phases were combined for two reasons. First, the evaluation report from the SPO Director to the Defense System Acquisition Review Council treats these two phases as one (19:14). Second, both phases share a common goal: to determine the technical feasibility of a program within given monetary constraints (23:1-4). The assumption could then be made that management tasks in the two phases can be viewed as similar (19:1-4). The production and deployment phases were combined due to their overlapping nature. It is often difficult to state with certainty whether a particular SPO is operating in the production phase or the deployment phase (19:4).

The final grouping within the three categories is shown in Table 1 (9:25).

TABLE 1

GROUPING OF SYSTEM PROGRAM OFFICES

CATEGORY I		CATEGORY II		CATEGORY III	
Conceptual/ Validation		Full-Scale Development		Production/ Deployment	
SPO#	Managers	SPO#	Managers	SPO#	Managers
1	11	1	169	1	42
2	19	2	49	2	30
		3	63	3	46
		4	194	4	90
				5	67
				6	104
				7	206

Sampling Instrument

A sampling instrument was sent to all managers in Category I, and to 100 randomly selected managers from both Category II and Category III (9:26).

The instrument used was composed of three distinct parts. The first part was a simple questionnaire designed to gather demographic data. The second section, Likert's "Profile of Organizational Characteristics" (short form), was used to measure individual perceptions of organizational climate (9:27). To determine the reliability of the Likert portion,

> . . . an ANOVA using the computer program OMNITAB II (10) was computed on the 18 items of the questionnaire within each category. With the results of the ANOVA the Spearman-Brown test was then performed to compute an index of reliability [9:31].

Reliability indexes for each weapon system acquisition category was computed with results as shown:

(a) Category I - .72

(b) Category II - .95

(c) Category III - .90

The final portion of the instrument was the Job Diagnostic Survey, short form. It was used to measure job satisfaction in general as well as specific aspects of job satisfaction (1:16-17). The specific satisfaction concepts included, but were not limited to (17:18):

General Satisfaction
Internal Work Motivation
Pay Satisfaction
Security Satisfaction
Social Satisfaction
Supervisory Satisfaction
Growth Satisfaction

The Job Diagnostic Survey was deemed to be a valid instrument based on the history of its use and the validity and reliability of past tests of a similar nature (17:18).

Finally, a bias check was performed on all late responses to insure an unbiased sample (9:29). The bias check was based on a procedure developed by Oppenheim (14:34). This procedure allows the assumption that non-respondents have not biased the sample if no differences exist between on-time and late responses.

The result of the bias check showed no significant difference existed between on-time and late responses, indicating that the sample was not biased.

Definition of Variables

1. Job Satisfaction was divided into seven variables as follows:

a. General Satisfaction - Overall measure of degree to which employee satisfied and happy with job.

b. Internal Work Motivation - Degree to which employee self motivated to perform effectively.

c. Pay Satisfaction - Degree employee satisfied with pay and other compensation.

d. Security Satisfaction - Degree employee satisfied with job security.

e. Social Satisfaction - Degree to which employee satisfied with peer and coworker relationships.

f. Supervisory Satisfaction - Degree to which employee satisfied with behavior of supervisor.

g. Growth Satisfaction - Degree to which employee satisfied with opportunity for personal growth and development.

These variables were assumed to be interval level data and were measured by scores generated by the use of the Job Diagnostic Survey (short form)(6).

2. Organizational Climate was assumed to be interval level data and was measured by scores generated

by the use of Likert's "Profile of Organizational Characteristics," (short form) (9:27).

3. Grade refered to the pay grade of respondents. Grade was considered a dichotomous variable. Category one included Lieutenants, Captains, and civilians through the grade of GS-11. Category two included Majors and above, and GS-12's and above. This data was assumed to be ordinal level data.

4. Organizational Level refered to the managerial level at which an individual was employed. Each respondent was identified as working in one of four organizational levels. This data was assumed to be ordinal level data.

5. Tenure refered to the length of time an individual had been performing duties in his present position. This data was measured to the nearest month and was treated as interval level data.

6. Employment Status was a dichotomous variable referring to an individual's status as either military or civilian. This data was considered nominal level data.

7. Assignment Status was a dichotomous variable that refered to whether or not an individual was administratively assigned to the SPO in which he was working. This data was considered nominal level data.

8. Organizational Size refered to the number of individuals employed in the SPO. This variable was divided into three categories as follows: 0-39, 40-99,

more than 100. This variable was treated as ordinal level data.

Statistical Analysis

General. Two statistical methods were used: The correlation model and the one-way analysis of variance (ANOVA). The correlation technique was used when determining relationships between two variables that were both measurable at the interval level of data. Correlation was chosen because this technique determines the relative strength of a linear relationship between random variables, and this was the desired result. Further, a dependency of one random variable on another could not be assumed, therefore correlation was the strongest test which could be applied.

The ANOVA technique was used because it would directly determine whether a statistically significant difference in organizational climate and job satisfaction scores existed between categories of the nominal and ordinal level variables. The scores themselves were measurable at the interval level of data, and thus met the requirement for employment of the ANOVA.

Correlation procedures. One-on-one correlations were computed by the time-sharing computer program STAT12 (8:St-181). The output from this program was a correlation matrix indicating the values of r (an estimator of population ρ).

The r values were then tested for statistical significance at an alpha level of .05. The statistical hypotheses tested were:

H_o: $\rho = 0$ (No Linear Relationship)

H_1: $\rho \neq 0$ (Linear Relationship)

The test statistic used was:

$$t_o = \frac{r}{\sqrt{\frac{1-r^2}{n-2}}}$$

where: r = correlation coefficient

n = number of observations

The critical "t" value was:

$t_{\alpha/2}$ with n-2 degrees of freedom.

Statistical significance existed if $t_o >$ t-critical.

Table 2 indicates the correlations that were computed to determine if the linear relationships exhibited were of statistical significance. The correlation program used also determined the strength of the linear relationships (correlation coefficients). These correlation coefficients, if statistically significant, were subjected to criteria tests to determine if the research hypotheses were supported. The criteria tests are described in Chapter 3, and the "r" values obtained are shown in Appendix B.

TABLE 2

CORRELATIONS TESTED FOR STATISTICAL SIGNIFICANCE

VARIABLE	CLIMATE	TENURE
Satisfaction Measures *		
1. General Satisfaction	X	X
2. Internal Work Motivation	X	X
3. Pay Satisfaction	X	X
4. Security Satisfaction	X	X
5. Social Satisfaction	X	X
6. Supervisory Satisfaction	X	X
7. Growth Satisfaction	X	X
TENURE	X	

*NOTE: Correlations were also computed between the various measures of satisfaction. Although not specifically related to this research, the results are included in Appendix F.

One-way ANOVA procedures. One-way ANOVAs were computed by the time-sharing computer program (STAT 13) (8:St-183). The program computed the calculated "F" test statistic and its associated probability value. The "F" test statistic computed was:

$$F_o = \frac{SS_R/r-1}{SS_E/\Sigma(n-1)}$$

where:

SS_R = Sum of Squares Due to Rows

SS_E = Sum of Squares Due to Error

r = Nr. of Rows

n = Nr. of Observations/Row

The statistical hypothesis to be tested was:

H_o: $\mu_1 = \mu_2$ (No statistically significant difference existed in population mean scores based on nominal/ordinal categories)

H_1: $\mu_1 \neq \mu_2$ (Statistically significant difference existed in population mean scores based on nominal/ordinal categories)

A statistically significant difference existed if:

Probability Value of $F_o < .05$

Table 3 indicates the ANOVAs that were computed. Entries in the table display the weapon system acquisition phase(s) for which ANOVAs were computed.

TABLE 3

ANOVAs TESTED FOR STATISTICAL SIGNIFICANCE

Specific Satisfactions	ORG SIZE	ORG LVL	GRADE	EMPLOYMENT STATUS	ASSIGNMENT STATUS	WEA. SYS. ACQ. PH.
Climate	4	1·2·3·4	1·2·3·4	1·2·3·4	1·2·3·4	4
Tenure	4	1·2·3·4	1·2·3·4	1·2·3·4	1·2·3·4	4
General	4	1·2·3·4	1·2·3·4	1·2·3·4	1·2·3·4	4
Motivation	4	1·2·3·4	1·2·3·4	1·2·3·4	1·2·3·4	4
Pay	4	1·2·3·4	1·2·3·4	1·2·3·4	1·2·3·4	4
Security	4	1·2·3·4	1·2·3·4	1·2·3·4	1·2·3·4	4
Social	4	1·2·3·4	1·2·3·4	1·2·3·4	1·2·3·4	4
Supervisory	4	1·2·3·4	1·2·3·4	1·2·3·4	1·2·3·4	4
Growth	4	1·2·3·4	1·2·3·4	1·2·3·4	1·2·3·4	4

Key:

1. Performed in Conceptual/Validation Phase
2. Performed in Full Scale Development Phase
3. Performed in Production/Deployment Phase
4. Performed with phases combined

The assumptions necessary to support the validity of the statistical analyses follow.

ASSUMPTIONS

1. The thirteen SPOs studied were predominately in a single phase of the Weapon System Acquisition Process and comprised the entire population that could be identified as being in a single phase.

2. Individuals who identified SPOs as being in a single phase were qualified to do so.

3. The managers surveyed were a representative sample of program and functional managers found within the thirteen selected SPOs.

4. The population dealt with, in performing statistical analyses was normally distributed with equal variance.

5. Managerial tasks in the conceptual and validation phases were similar.

6. The Job Diagnostic Survey short form was an accurate and valid instrument for measuring job satisfaction.

7. Honest responses were given on the questionnaire and they accurately reflected the job satisfaction of the respondents.

8. Non-respondents did not bias the data-producing sample.

9. The Job Diagnostic Survey and Profile of Organizational Characteristics scores used in the sample had the characteristics of interval level data.

LIMITATIONS

The following limitations will be considered with regard to the results of this research.

1. The study was confined to the data previously gathered from thirteen SPOs in the Aeronautical Systems Division of AFSC.

2. Application of study results are restricted to the population as described. They cannot be generalized to the universe.

Chapter 3

DATA ANALYSIS

Explanation of Techniques

In all cases the methodology as described in Chapter 2 was followed in testing for statistical significance. The results of these tests are summarized in tabular form in Appendices B and C. For this study, the confidence level was set at 95%. This was reflected by choosing an alpha level of .05, which was consistent with prior research efforts.

After subjecting the data to the appropriate statistical tests, those relationships and differences between variables which showed statistical significance were subjected to criteria tests. The purpose of the criteria tests was to determine if support was provided for the research hypotheses.

Criteria Tests

Statistically significant relationships between, and differences among, variables were examined in a subjective manner to determine if they were important with regard to the research hypotheses. Because of the two distinctly different statistical techniques employed, two separate criteria tests were developed. The criteria

tests for the hypotheses tested through correlation and ANOVA are discussed individually in the following sections.

Correlation Criteria Test

After tabulating the correlation coefficients generated through the STAT 12 program, it was necessary to subjectively determine the minimum value for the correlation coefficient that would be considered of sufficient strength to support the research hypotheses. For the purposes of this research, a correlation coefficient of less than .60 was deemed to be of little practical importance; therefore, correlations which exhibited statistical significance were further subjected to the following criterion:

Was the correlation coefficient at least $\pm$ .60?

If the criterion was met, the results were considered to be of sufficient strength to support the research hypotheses. A pilot correlation was computed using the selected program to insure that the data and the program were compatible and would output data in the desired format. The initial correlation, its output and associated tests, are shown below to illustrate (1) the application of the statistical methodology to the research data, and (2) the subsequent subjecting of these results to the criteria test to determine support or non-support of research hypotheses.

Pilot Correlation

The initial correlation was run to determine the strength of the linear relationship between tenure in months and organizational climate scores generated by the Likert instrument. For the pilot program, the conceptual and validation phase was chosen because of the relatively small number of observations; and, consequently, the relative ease with which the data could be entered. The data entered and the results are shown below.

DATA ENTERED

Observation	Tenure in Months	Climate Score
1	11	545
2	15	546
3	11	588
4	13	589
5	14	594
6	15	583
7	15	601
8	13	625
9	18	599
10	4	543
11	36	548
12	9	537
13	9	581
14	7	625
15	14	389
16	10	528
17	7	521
18	15	587
19	12	543
20	12	603
21	6	637
22	43	301

RESULTS PRODUCED

Mean	Variance	Standard Deviation	Correlation Coefficient
14.045	80.998	8.999	-.5656

The results showed a negative correlation coefficient, indicating an inverse relationship between the two variables tested. The test statistic, t_o, was calculated to be -3.070. The critical "t" value with 20 degrees of freedom was $\pm$ 2.086; therefore, statistical significance was established, (t_o > t critical), a linear relationship was shown to exist.

After confirming statistical significance of the correlation coefficient, the criteria test was applied. Since the computed correlation coefficient was less than the pre-determined value (.60) necessary to indicate the desired strength of the relationship, no support was indicated for the research hypotheses.

The pilot correlation demonstrated the feasibility and relevance of the research methodology. This methodology was, therefore, applied to all correlations computed in the research effort.

ANOVA Criteria Test

The ANOVA technique indicated whether or not differences existed between variable categories; therefore, statistical significance was the first necessary criteria in determining support for research hypotheses. The ANOVA

technique did not indicate the magnitude of these differences, however. ANOVA results that were statistically significant were subjected to the following criterion of importance.

Did subjective evaluation of observations indicate a large difference?

The results of this second criterion established the basis for the strength of support for research hypotheses.

Pilot ANOVA

A pilot ANOVA was computed to insure that the Computer Program (STAT 13) and the research data were compatible and would output data in the desired format. The initial ANOVA, its output, and associated tests are shown below to (1) illustrate the application of the statistical methodology to the research data and (2) illustrate how the criterion test was applied to statistical results to determine support or non-support of research hypotheses.

The pilot ANOVA depicted below is a comparison of organizational climate scores for the two categories of employment status (military and civilian) within the conceptual/validation phase of the weapon systems acquisition process. This comparison determined whether or not there was a statistical difference in the climate scores.

DATA

Military Observations	Civilian Observations
545	589
546	594
588	583
601	625
599	543
537	548
581	389
625	528
521	543
587	603
637	
301	

The computer program produced a calculated "F" value of .0012004 with an associated probability value of .971. Since .971 > .05, the data did not produce a statistically significant difference in organizational climate scores. Had the difference shown statistical significance, the data would have been subjected to the ANOVA criteria test, a subjective evaluation of the importance of the difference. A subjective evaluation of the above data revealed no major difference. Because no difference existed in the climate scores, no support was gained for the research hypotheses. The pilot ANOVA showed the feasibility of the research methodology. This two-step testing process to determine support of hypotheses was applied to all data in the research effort.

The following chapter presents the results of tests of the research hypotheses.

Chapter 4

RESULTS

In this chapter, each research hypothesis is examined individually with respect to the statistical and criteria tests performed to determine support or non-support of that particular hypothesis. A statement of support or non-support is then made for each. Results for all hypotheses tested are then summarized at the end of the chapter. Individual correlation coefficients and probability values are contained in Appendices B and C respectively.

Hypothesis 1a: Job Satisfaction Differs Among Different Phases of the Weapon System Acquisition Process.

To determine whether support existed for this hypothesis, seven one-way ANOVAs were performed. These ANOVAs examined each specific measure of job satisfaction separately, using scores obtained from the JDS. The scores for each specific satisfaction were categorized and compared by weapon system phase. None of the seven F-RATIOS exhibited statistical significance. Because of this lack of statistical significance, criteria tests were unnecessary and no support could be assumed. Therefore, Hypothesis 1a was not supported.

Hypothesis 1b: Job Satisfaction Differs Among Different Organizational Levels Within System Program Offices

This hypothesis was first examined within each phase of the weapon system acquisition process. For each phase, seven ANOVAs were performed. The scores for each specific measure of job satisfaction were categorized according to the organizational level of respondents. The scores for each level were compared to determine if differences existed among the four levels. No statistically significant differences were found to exist among organizational levels in any of the three phases of the weapon system acquisition process.

The hypothesis was next examined without regard to weapon system acquisition phase. The scores for each specific measure of job satisfaction for all respondents were categorized by organizational level, and ANOVAs were performed to determine if differences existed among levels. Statistical significance was found to exist in the scores of two specific measures: Pay Satisfaction (prob. value = .007) and Security Satisfaction (prob. value = .033). The scores for pay and security were subjectively examined to determine if the differences were of sufficient magnitude to be of interest. This examination revealed a relatively large difference, and consequently was assumed to be of practical importance. However, support of the research hypothesis with respect to these two instances was not considered sufficient grounds to infer support for Hypothesis 1b in general. Hypothesis 1b was not supported.

Hypothesis 1c: Job Satisfaction Differs Between Military and Civilian Personnel

This hypothesis was examined in a manner similar to that used for Hypothesis 1b. First, the three weapon system phases were examined individually, then scores were combined for an overall evaluation. A total of twenty-eight ANOVAs were performed with statistical significance shown only when comparing growth satisfaction scores within the full scale development phase. A subjective evaluation, however, revealed that this difference was of little practical importance with regard to this hypothesis. Based on the above results, the hypothesis was not considered to be supported.

Hypothesis 1d: Job Satisfaction Differs Between Assigned and Co-located Personnel

Again, this hypothesis was examined in a manner similar to Hypotheses 1b and 1c. The satisfaction scores were categorized by assignment status. Twenty-eight ANOVAs were performed with two exhibiting statistical significance. Both concerned internal work motivation scores; one within the full scale development phase, and one with all phases combined. Further evaluation failed to produce evidence of practical importance. Based on these results, no support could be inferred for the research hypothesis.

Hypothesis 1e: Job Satisfaction is Related to the Tenure of Personnel in System Program Offices

To determine if support existed for this hypothesis, twenty-eight correlations were performed. The hypothesis

was first examined within each phase of the weapon system acquisition process. For each phase, correlations were computed between tenure (in months) and respondent scores for each of the seven measures of job satisfaction. None of the correlation coefficients were statistically significant. When scores were combined without regard to weapon system phase, overall results still failed to produce correlation coefficients of statistical significance. Because of the negative results, it was concluded that no support existed for the research hypothesis.

Hypothesis 1f: Job Satisfaction Differs Among Personnel From SPOs of Different Sizes

To examine this hypothesis, it was necessary to combine scores for all weapon system acquisition phases because not all individual phases contained at least one observation from each category of organizational size. ANOVAs were performed to determine if differences in scores existed among organizational sizes for each specific satisfaction. None of the seven ANOVAs produced statistically significant results, and support for the research hypothesis could not be inferred.

Hypothesis 1g: Job Satisfaction Differs Among Personnel of Different Grades

This hypothesis was first examined within each weapon system acquisition phase. Scores for each measure of job satisfaction were classified according to the grade of the respondents. Seven ANOVAs were performed in each

phase to determine if differences in satisfaction scores existed among grade levels. The hypothesis was then examined by combining job satisfaction scores for all respondents regardless of weapon system phase. A total of twenty-eight ANOVAs were performed with two resulting in statistical significance. The significant differences were found among growth satisfaction scores of personnel performing duty in program offices in the full scale development phase and among growth satisfaction scores of personnel in all program offices. Further evaluation did not warrant support for the research hypothesis.

Hypothesis 1h: Job Satisfaction is Related to an Individual's Perception of Organizational Climate

To determine if support existed for this hypothesis, twenty-eight correlations were performed in a manner similar to that under Hypothesis 1e. Statistical significance was found to some degree in all phases. In the conceptual/validation phase, significant correlation was shown only with growth satisfaction. In the full-scale development phase, all correlations showed statistical significance with the exception of internal work motivation. In the production and deployment phase and the combined phases, all correlation coefficients were statistically significant. In this case, because of the high number of statistically significant correlation coefficients, the limiting factor in determining support for the research hypothesis was the criteria test; i.e., correlation

coefficient (r) must be greater than or equal to .60 to be considered of sufficient strength to support the hypothesis. When this test was applied, no support was indicated because all "r" values were less than .60. This hypothesis, therefore, was not supported.

Hypothesis 2a: Perception of Organizational Climate Differs Among Different Phases of the Weapon System Acquisition Process

To determine whether support existed for this hypothesis, organizational climate scores for the three phases were compared by the ANOVA technique. The resultant probability value of .00005 showed statistical significance. Subjective evaluation of the variable means caused the authors to conclude that the research hypothesis had been supported.

Hypothesis 2b: Perception of Organizational Climate Differs Among Different Organizational Levels Within the SPOs

This hypothesis was first examined within each phase of the weapon system acquisition process. For each phase, one ANOVA was performed. That is, climate scores for each organizational level were compared to determine if differences existed among the four levels. In all three phases the ANOVAs failed to support statistical significance. The hypothesis was then examined without regard to specific phase. The climate scores of all respondents were categorized by level and a fourth ANOVA was performed. This ANOVA produced a statistically significant probability value of

.003. Subjective examination of the differences in variable means indicated importance among the organizational climate scores. Because the combined ANOVA contained all observations, its importance was more heavily weighted in determining support or non-support of the research hypothesis. Hence, based on the statistical test and subjective criteria test, the research hypothesis was considered to have been supported.

Hypothesis 2c: Perception of Organizational Climate Differs Between Military and Civilian Personnel

This hypothesis was examined in a manner similar to that used with Hypothesis 2b. First, climate scores were categorized by employment status of respondents tested for differences in each phase. The scores were then combined for an overall comparison. A total of four ANOVAs were performed, with no statistically significant results. Because of the lack of positive results, no support could be assumed for the research hypothesis.

Hypothesis 2d: Perception of Organizational Climate Differs Between Assigned and Co-located Personnel

To determine if support existed for this hypothesis, climate scores were categorized by assignment status of respondents. ANOVAs were performed for each weapon system acquisition phase and with the scores of all phases combined. None of the four ANOVAs produced statistically significant results, therefore no support could be inferred for the research hypothesis.

Hypothesis 2e: Perception of Organizational Climate is Related to the Tenure of Personnel in the SPOs

To determine if support could be assumed for this hypothesis, correlation coefficients were computed between tenure in months and respondent's scores reflecting their perception of organizational climate. The correlations were computed for each individual phase and with climate scores for the three phases combined. Statistical significance existed within the conceptual/validation phase but did not exist in the other three correlations. The significant correlation produced a negative coefficient indicating an inverse relationship. When subjected to the criteria test, the one significant correlation coefficient was considered to be of insufficient magnitude to provide support for the research hypothesis.

Hypothesis 2f: Perception of Organizational Climate Differs Among Personnel From SPOs of Different Sizes

To examine this hypothesis, it was necessary to combine climate scores for all phases of the weapon system acquisition process because not all individual phases contained at least one observation from each category of organizational size. A single ANOVA was performed comparing organizational climate scores among each category of size. The resulting probability value of .002 indicated a statistically significant difference existed among those categories. A subjective analysis of the differences in variable means caused the authors to conclude that the research hypothesis had been supported.

Hypothesis 2g: Perception of Organizational Climate Differs Among Personnel of Different Grade

This hypothesis was examined in a manner similar to Hypothesis 2b. First, climate scores were classified by grade of respondent and tested for differences in each phase. Scores were then combined for an overall comparison. A total of four ANOVAs were performed with no statistically significant results. Because of the lack of positive results, no support could be inferred for the research hypothesis.

Summary

Table 4 summarizes the overall results of the tests performed to determine support or non-support of all research hypotheses.

The testing of the research hypotheses revealed relationships that may aid managers within System Program Offices in understanding how certain variables may impact on perception of climate and job satisfaction within his organization. These relationships, other implications, and recommendations for possible future research efforts are discussed in Chapter 5.

TABLE 4

RESEARCH HYPOTHESES RESULTS

Variable	HYP	Job Satisfaction	HYP	Climate
Acquisition Phase	1a	Not Supported	2a	Supported
Organizational Level	1b	Not Supported	2b	Supported
Employment Status	1c	Not Supported	2c	Not Supported
Assignment Status	1d	Not Supported	2d	Not Supported
Tenure	1e	Not Supported	2e	Not Supported
Organizational Size	1f	Not Supported	2f	Supported
Grade	1g	Not Supported	2g	Not Supported
Organizational Climate	1h	Not Supported		

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

Limiting Considerations

In addition to the statistical limitations presented in Chapter 2, other factors may have influenced the research results. These factors should be considered by the reader when drawing conclusions based on this research.

A factor which may have influenced the findings of this research was the cross-sectional nature of the managerial surveys. It is not certain how job satisfaction and perception of climate may change as a particular SPO advances from one phase of the weapon system acquisition process to another. For example, SPOs in the full scale development phase showed certain characteristics. Will the characteristics of a particular SPO, studied in the Conceptual/Validation phase, change as it progresses into the Full Scale Development phase? Furthermore, will the new characteristics resemble those of SPOs studied in the Full Scale Development phase? Confirmation of changes in research variables as a particular SPO progresses through acquisition phases would ultimately require long term study.

Another unknown effect on the variables studied may have been the influence of the division level staff common

to all the SPOs. If there was a significant influence exerted on all or part of the SPO population by the division staff, then independence among SPOs may not have existed. Dependence among SPOs on this common factor could have caused phases of the acquisition process to exhibit similar characteristics, thereby masking differences that may have been shown by completely independent organizations.

Other factors which may have influenced results to some degree were: (1) the large difference between the number of respondents from the conceptual/validation phase and the other phases, and (2) the ANOVA techniques' inability to indicate magnitude or direction of differences. The possible effect of these factors is unknown.

A limitation that readers should be aware of when considering the conclusions drawn by the authors is that a value other than the .60 used for the criteria tests on correlation coefficients may have resulted in different conclusions. To enable readers to draw conclusions based on different criteria, the correlation coefficients produced by the STAT 12 computer program are shown in Appendix B.

Hypotheses Supported

One hypothesis supported by the research indicated that as a SPO progresses through the various acquisition phases corresponding to the life cycle of that weapon system, differences in climate perception by that SPO's personnel may evolve. Assuming this hypothesis to be true,

it is logical to further assume that there may be underlying causes for these differences other than merely transitioning from one phase to another. A manager who is aware of the possibility that such changes may occur, would be in a better position to correct deficiencies that could cause his organization to be less effective.

Support for the hypothesis that perception of climate differs among organizational levels paralleled, to an extent, the findings of Payne and Mansfield discussed in Chapter 1. Similarities between the findings of the two research efforts tend to indicate that conclusions drawn by Payne and Mansfield can be applied to a military matrix organization. If this comparison is accurate, program managers may be able to utilize this knowledge in attempting to create a more favorable perception of climate throughout the organization.

The last hypothesis supported was that climate differs among SPOs of different sizes. Although the direction of differences was not indicated by the research, past experience has led the authors to believe that personnel in smaller units view their organizations as having a more favorable climate. If further research would show this relationship to exist, SPO managers may be better able to evaluate the effects of perceived unit size on the overall efficiency of the organization.

Other Research Results

In addition to research results which led to support of certain hypotheses, there were other findings which are considered noteworthy. They are:

(1) Internal work motivation scores exhibited a significant difference between assigned and co-located personnel. Although the direction of difference was not shown, it seems logical to the authors that personnel who are "on loan" from other organizations may have less motivating circumstances than those directly assigned. Performance reports for those individuals not directly assigned are normally written by parent organizations. These individuals may feel that their reporting officials will favor those with whom they are working more closely. Furthermore, these individuals may never experience a sense of belonging to the SPO in which they are working.

(2) Correlation of organizational climate scores and tenure indicated an inverse relationship in most cases. This relationship implies that individuals with longer tenure view the climate of the SPO as less favorable than those with shorter tenure. It was beyond the scope of this research to attempt to identify casual factors for this relationship.

Conclusions

This research indicated that changes in certain organizational variables are associated with differing attitudes of many SPO managers towards their working environment. Specifically, perception of organizational climate by these managers varied with the weapon system acquisition phase, the managerial level, and the SPO size in which they were working. This may mean that program managers should anticipate attitudinal changes as their organizations progress through the acquisition process. They should also anticipate changes in attitude as personnel are assigned to different managerial levels. By being aware of the possibility of such changes, the program manager may be in a better position to evaluate the effects of these changes when considering alternative courses of action.

The research suggests that personnel employed in matrix organizations may be influenced by some of the same variables that have been shown to influence personnel in traditionally structured organizations. If this can be supported by further research, many theories presently being applied to traditional organizations may become applicable to military System Program Offices. This would enable program managers to choose from a wider variety of managerial tools and techniques to improve organization efficiency.

Recommendations for Further Research

Limitations on the scope of this research prevented investigation of certain related areas that may be worthy of future research efforts. The areas which the authors believe to be of most interest are:

(1) To enable conclusions to be drawn regarding non-supervisory personnel employed in SPOs, a research effort similar in scope could be initiated with samples from non-supervisory personnel. This would enable comparisons to be made between managerial and non-managerial attitudes.

(2) The relationship between perception of organizational climate and tenure of employees should be further investigated to determine whether an inverse relationship actually exists. If such a relationship does exist, knowledge of the fact indicates that managers should consider, among other things, limiting tenure.

(3) Because of the first limitation discussed at the beginning of this chapter, it is suggested that a long-range study of an individual SPO be accomplished. This study could concentrate on effects of the organizational variables of concern as that particular SPO advances through the phases of the weapon system acquisition process.

APPENDIX A

SURVEY DATA

KEY FOR APPENDIX A TABLES

Column 2:	Scores from Likert Instrument
Columns 3 through 9:	Scores Derived from JDS
Column 10:	Time in Present Position (Months)
Column 11:	1 = 0 to 39 Individuals
	2 = 40 to 99 Individuals
	3 = 100 or more Individuals
Column 12:	Managerial Level 1, 2, 3, 4
Column 13:	0 = Lts, Capts & Civilians through GS-11
	1 = Majors & above, Civilians GS-12 & above
Column 14:	0 = Civilian
	1 = Military
Column 15:	0 = Assigned
	1 = Co-located

APPENDIX A

SURVEY DATA

TABLE 5

SURVEY DATA: CONCEPTUAL/VALIDATION PHASE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
1	545	6	6	5.5	5.5	6	6	5.5	11	1	2	1	1	1
2	546	5.7	6	6	6.5	5.7	5.3	5.25	15	1	2	1	1	1
3	588	6.3	5.25	6	6	5.7	6	6	11	1	2	1	1	1
4	589	6.3	6.25	6	6	6.3	6.3	6.25	13	1	3	1	0	0
5	594	6.3	6.25	6	6	6.3	5.7	6.75	14	1	3	1	0	0
6	583	5.3	6.5	6	6.5	6.7	5.3	6.25	15	1	3	1	0	0
7	601	4.3	6	7	4.5	5.3	6	6	15	1	1	1	1	1

TABLE 5 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
8	625	6	4.5	6	6	6	6	6	13	1	3	1	0	0
9	599	6.7	5.75	7	7	7	7	7	18	1	1	1	1	1
10	543	6.7	7	6	7	6.3	5.3	6.25	4	1	2	1	0	0
11	548	6	6	5.5	6	6	6	6	36	1	3	1	0	0
12	537	6.7	6.5	6.5	6.5	6.3	6	6.5	9	1	3	1	1	1
13	581	5.7	5.25	4	4	4	4	4	9	1	2	1	1	1
14	625	5.7	5.5	6.5	6.5	5.7	6.3	5	7	1	3	1	1	1
15	389	5.3	5.25	5.5	4.5	5.3	5.7	3	14	1	3	1	0	1
16	528	5.7	5.25	6	6	5.7	5.7	5.25	10	1	4	1	0	0
17	521	4.7	6	6	6	6	5.7	5.5	7	1	3	0	1	1
18	587	4.7	5.75	5.5	4.5	6.3	5.3	6.25	15	1	2	0	1	1

TABLE 5 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
19	543	5.7	6	5.5	6	6	6	4.25	12	1	4	1	0	0
20	603	6	6	6.5	5.5	6.3	6.3	6.75	12	1	4	1	0	0
21	637	6.7	6.75	4	5	5.3	4.7	5	6	1	3	0	1	1
22	301	5.7	4.75	5.5	5	4.7	6	5	43	1	4	0	1	1

TABLE 6

SURVEY DATA: FULL SCALE DEVELOPMENT PHASE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
1	587	6.35	6.5	6	5	6	5.66	6	24	3	4	1	1	0
2	614	6.66	5.5	6.5	6.5	5.66	6.33	5.5	6	3	1	1	1	1
3	357	5.66	5.75	4.5	3	5	5.66	5.75	21	3	4	0	1	1
4	356	2.66	5.5	5	5	4.66	6	4.5	27	3	4	0	1	1
5	305	4.66	6.5	5.5	4.5	5.66	5.66	6.25	23	3	4	0	1	1
6	375	5	6.5	4.5	4.5	4.66	5.33	1.25	28	3	4	0	1	1
7	577	5	7	6.5	6	5.66	6.66	5	16	3	4	0	1	1
8	434	5	6	5.5	5	5.33	4.33	4.5	13	3	4	1	0	0
9	382	5	6.5	5.5	6	6	6.66	7	62	3	2	1	0	1
10	415	5	5.25	5.5	5	5.66	5.33	5.5	11	3	4	1	0	0

TABLE 6 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
11	566	5	6	6	6	6	6	5.5	15	3	4	1	0	0
12	324	5	5.5	5.5	5.5	4.33	5	5	15	3	4	0	0	0
13	314	6	6.5	6	5.5	5.33	4.66	5.75	11	3	4	1	0	1
14	407	6	6.5	6	5.5	4.33	6	5	48	2	3	1	1	1
15	381	5	5	4	4	4	5.33	3.75	46	2	2	1	1	1
16	476	5	5	5	4	5.33	4.66	5.5	10	2	4	1	0	0
17	377	3.33	5.75	4.5	4.5	4.66	6.33	4.25	86	3	4	0	1	1
18	377	4	5.5	6	6	5.66	5.66	5.75	48	3	3	1	0	0
19	514	5.33	6.25	5.5	5.5	6	6.33	6.25	12	3	3	1	0	0
20	536	6.33	6.25	6	6.5	6.33	6.33	6.25	25	3	2	1	1	1
21	541	6.66	7	6.5	6	6.33	6	5.4	9	3	2	1	1	1

TABLE 6 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
22	532	6.33	7	7	6.5	6.66	6.66	6.5	9	2	4	1	0	0
23	586	6	6	6	6	6	4.66	5.25	24	2	2	1	0	1
24	586	6.66	6.5	7	6.5	6	6.66	6	7	2	3	1	1	0
25	309	6.66	7	6	2.5	5.66	6.33	5	2	2	3	1	0	1
26	551	7	4.25	6	7	6	6.66	5.75	23	2	2	0	1	1
27	504	6	5.5	5.5	4	4.33	5.33	4	11	2	4	0	0	1
28	417	5.33	6.5	7	5.5	6	5.66	5.25	10	2	3	0	1	1
29	611	6.33	5.75	6.5	6.5	6.33	6.33	4.75	4	2	4	0	0	0
30	484	6	5.25	5.5	6.5	5.33	6.33	6.5	10	2	4	1	0	0
31	370	4.66	6.5	4.5	3.5	6.33	5	3	43	2	3	1	0	0
32	409	7	7	6	7	5	6.66	4.5	19	3	3	0	1	0

TABLE 6 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
33	394	4.33	5.25	4	5.5	5.33	6	5.25	40	3	3	0	0	1
34	395	5.66	6	6	5	5	6	5.25	23	3	4	1	0	1
36	276	6	6.5	6	5.5	4.66	6	4.25	18	3	4	0	1	1
37	502	6	7	6.5	6.5	5.33	7	5	6	3	2	1	1	1
38	582	6.66	7	6.5	7	6.66	7	6.75	48	2	4	0	1	1
39	527	5.66	5.5	6	2	4.66	5	5.75	27	3	4	1	0	0
40	472	4	6.75	6	6.5	5.33	6.66	4	55	3	4	0	1	1
41	530	7	6.75	6.5	6	6.66	6	6.5	6	2	3	1	0	1
42	134	3	4.75	4	3.5	2.66	6	2.75	35	3	4	1	1	1
43	312	4.33	6.5	6	5.5	3.66	6.33	6	16	3	3	1	0	1
44	309	4.66	6	4	5.5	6	5.33	4	8	3	4	0	1	1

TABLE 6 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
45	261	4.33	6	6	3.5	5.66	4.33	3.75	7	3	4	0	1	1
46	436	5.66	6.75	6	5.5	5.33	5.33	5	6	2	4	0	1	1
47	465	5.66	6	6	6	6	6	6	16	2	4	1	0	0
48	509	6	6	6	6	6	6	6	74	3	3	1	0	0
49	525	6.33	6	6	6.5	6.33	6.33	6.5	26	3	3	1	0	0
50	423	6	5.5	5	5.5	5.66	6	3.75	13	3	3	0	1	0
51	457	6	6	6	6	5	5.66	5.25	15	3	4	0	1	1
52	462	4	6	4.5	5	5.33	4.66	5.5	37	2	3	1	0	0
53	379	5.66	6	5	6	6	6	6.25	50	3	4	1	0	0
54	287	6	5.75	5	4	4.33	5.33	5	4	3	4	1	0	0
55	491	4.66	6.75	5.5	6	6	5.66	4.25	24	3	4	0	1	1

TABLE 6 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
56	583	3.66	7	5	5.5	3.66	5	3.25	28	3	2	0	1	1
57	428	4	5.5	4	3.5	5	4.33	4.75	24	2	4	0	1	1
58	460	5	5	6.5	6	6	6.33	4	34	3	3	1	1	1
59	551	4.66	5.5	6	5.5	5.66	6	6	34	3	4	1	0	0
60	356	6	6.25	6	6	6	5.66	4	12	2	3	1	0	1
61	441	5	6	4	4.5	6	5.33	4	8	3	4	0	1	1
62	311	6	6	4.5	5.5	5.66	5	4.75	15	3	3	1	1	1
63	535	6.66	7	7	7	7	5.66	6.5	22	3	4	0	1	1
64	372	5.66	6	6	5.5	6	6.33	5	34	3	2	1	0	0
65	473	4	4.75	5	5	4.33	5.33	3.75	36	2	3	1	0	0
66	321	2.33	6	4	3	2.66	4.33	4.75	18	3	4	1	1	1

TABLE 6 (Continued)

1 Observation	2 Organizational Climate	3 General Satisfaction	4 Internal Work Motivation	5 Pay Satisfaction	6 Security Satisfaction	7 Social Satisfaction	8 Supervisory Satisfaction	9 Growth Satisfaction	10 Tenure in Months	11 Organizational Size	12 Organizational Level	13 Grade	14 Employment Status	15 Assignment Status
68	493	6	4.75	5.5	4.5	5.66	6	5.75	24	3	4	1	0	0
69	482	6	5.25	5.5	4.5	6	5.66	5.75	13	2	4	1	0	0
70	553	7	5.5	7	6.5	6.66	6.66	6	45	2	2	1	0	1
71	534	3.33	4.75	5.5	5	4.66	4.66	6	24	3	3	0	1	0
73	402	6.33	6.25	6.5	5.5	5.35	5.66	5.5	6	2	3	1	1	1
74	391	4.33	5.75	2.5	6	4.66	4	3	66	3	4	1	0	1
75	431	5.33	5.75	4	4.5	5.66	4.66	5.5	36	3	4	1	0	1
76	428	5	6.5	5.5	5.5	6	5.33	5.75	29	3	3	1	1	1
77	481	5.33	6.25	4	4.5	4	6	3.5	20	3	3	1	0	0
78	221	3	4.75	4	3.5	3.66	4.66	4.25	15	3	4	0	1	1
79	531	7	6.5	6	5.5	6.66	6.66	6.75	35	3	3	1	1	1

TABLE 6 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
80	558	6	6	6	6.5	6.33	6	6.75	14	2	4	1	0	1
81	388	6.33	7	6.5	6	6.33	5.33	5	35	3	4	0	1	1
82	440	5.66	6	5.5	4.5	5	5	5	48	3	4	1	0	0
83	391	4	6	2.5	5	4	5.33	4	10	3	3	1	1	0

TABLE 7

SURVEY DATA: PRODUCTION/DEPLOYMENT PHASE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
1	495	6	6	6	6.5	6.3	6.7	6	36	2	4	0	1	0
2	639	4.7	6	4.5	4.5	6	4.7	6.25	5	2	2	1	1	1
3	408	5.3	6	5.5	6	5.7	6	6.5	10	2	2	1	1	0
4	481	6	5.75	6.5	6	4.7	6.3	5	65	2	4	1	0	1
5	561	6	5.5	6.5	6	6	6.3	6.25	108	2	3	1	0	1
6	522	6.7	6.5	6	6	4.7	6	5	66	2	3	1	0	1
7	569	6.3	5	6	6	6	6	6.25	116	2	4	1	0	0
8	619	7	7	7	7	7	7	7	27	3	3	1	1	1
9	573	6.7	6.75	4.5	5.5	4.3	6	4.75	24	3	4	0	1	1
10	564	5.3	6.25	4	4.5	5.7	4.3	4	60	3	3	1	0	0

TABLE 7 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organiza-tional Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organiza-tional Size	Organiza-tional Level	Grade	Employment Status	Assignment Status
12	624	6.7	7	7	7	7	7	7	27	3	2	0	1	1
13	582	5	5.25	5	4	4.7	5.3	5	22	3	4	1	0	0
14	445	3	6	4.5	4	5.3	4.7	4	14	2	0	1	0	0
15	521	6.7	6.75	6	7	6.7	6.3	6.5	35	3	2	1	1	1
16	277	3.3	7	6	4.5	5	5.7	4.25	16	3	3	1	0	1
17	504	5.7	6.25	6	6.5	5.7	6.7	3.75	18	3	3	0	0	0
18	304	3.3	5.25	3.5	3	3	4.3	3.5	20	2	4	1	0	1
19	467	6.3	6.25	6	5.5	6	4.2	6	17	2	3	1	0	0
20	419	5.7	6.25	6	4.5	6	5	3.75	108	1	3	1	0	0
21	626	7	6.75	7	7	6.7	6.7	6.25	19	3	4	1	0	1
22	457	6	6.25	6	6	6	6	4.5	70	3	4	1	0	1

TABLE 7 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
23	341	5.3	6.5	4	4.5	5.3	4.7	3.25	9	3	4	0	1	1
24	585	6	6	6.5	6	6	6	5.75	24	3	4	0	1	1
25	438	6	6.5	6	6	5.7	4.3	5.25	84	3	4	1	0	0
26	603	4.7	7	6	6	6	6	4.25	66	3	3	0	1	1
27	445	4.7	4.25	4	4	6.3	4.3	5.5	15	2	4	1	0	0
28	350	3.1	3	3.5	3	2.7	4	3	5	2	3	1	0	0
29	502	6.3	5.5	4	3.5	4	5	4.5	13	2	4	0	1	1
30	531	6.3	5	6	6	6.7	6	6.25	14	2	3	1	1	1
31	458	5.3	7	6.5	7	6.3	6.7	6.75	45	1	2	0	1	1
32	553	5.7	6	5.5	4.5	5.3	5	3.75	27	3	4	0	1	1
33	580	5.3	6.75	6.5	5	6.3	6	6.25	13	3	1	1	1	1

TABLE 7 (Ccntinued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organiza-tional Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organiza-tional Size	Organiza-tional Level	Grade	Employment Status	Assignment Status
34	530	6	5.75	7	6	6.3	6.3	5.5	5	2	1	1	1	1
35	416	7	6.75	6.5	7	7	6.7	6.75	5	3	4	1	0	0
36	586	6.3	7	7	6	5.3	6.3	6.5	6	3	3	0	1	1
37	557	5.3	6.25	6.5	6.5	6.3	6.7	5.25	150	3	2	1	0	0
38	441	4.3	5.5	4	3.5	4.3	6	5.25	22	3	4	1	0	0
39	494	6	6.25	6	5.5	5.7	6	5	6	3	2	1	1	0
40	464	3	4.75	5	4	5	5.7	5.75	16	3	4	1	0	1
41	556	6	6	6	6.5	6.7	6.7	6.5	6	2	3	0	1	1
42	446	6	6	6.5	6.5	6.3	6	6.25	96	2	3	1	0	0
43	531	5.3	6	6	5.5	6	6	6	28	2	2	1	0	1
44	330	3.7	3.75	4.5	4	3.3	4.7	5	11	2	4	1	0	0

TABLE 7 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
45	328	4.7	6	6	6	5.7	5.3	5.75	29	3	4	1	0	0
46	385	2	5.75	3.5	2.5	4.7	3.3	5	18	2	4	1	1	1
47	480	4.7	6	5	5.5	6	6	4.75	12	3	4	0	1	1
48	477	6	6.75	4	6.5	6	6.3	4	20	2	2	1	0	0
49	577	6	6	5.5	6	4.7	4.7	5	40	2	2	1	1	1
50	400	4.3	4.75	5	4.5	5.3	5.3	4	42	2	3	1	1	1
51	410	4.7	5.25	6.5	5	5.7	6	3.25	22	2	4	1	0	0
52	550	6.3	7	6.5	6	5.3	5.7	6.75	36	2	4	1	0	0
53	512	7	7	7	7	7	7	7	46	3	2	1	1	1
54	264	4.7	5.5	5	5	6.3	4	5.25	129	1	3	1	0	1
55	433	6.3	6	6.5	6.5	6	6.3	6.25	24	3	2	1	1	1

TABLE 7 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
56	571	6.3	5.75	6	6	6	6	6	40	2	4	1	0	0
57	191	3	3.5	2.5	4	3.7	4	6.25	60	3	4	1	0	1
58	400	6	6	5.5	5.5	5.7	6	6	16	2	4	1	0	0
59	432	6	7	5.5	4	4.7	5.7	1.75	43	3	3	0	1	1
60	384	3.7	5.5	4	3.5	3.7	5	4.25	9	2	2	1	1	1
61	481	6	6.5	6	6	6	5.3	6	10	2	4	0	0	0
62	471	6	5	6.5	5.5	6	6.3	5.5	36	1	3	1	0	0
63	341	3.3	4.75	4.5	3	3.7	5	1.75	5	3	3	0	1	0
64	434	5.7	6.5	6	5.5	6	5.3	5.25	10	3	4	1	1	1
65	531	6	6	6	6	6	6	6	27	3	3	0	1	1
66	332	5.7	5.75	6	6	6.3	6.3	6.25	30	2	3	1	1	1
67	598	6.7	7	6	6	6.7	6	7	10	3	4	1	0	1

TABLE 7 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation	Organizational Climate	General Satisfaction	Internal Work Motivation	Pay Satisfaction	Security Satisfaction	Social Satisfaction	Supervisory Satisfaction	Growth Satisfaction	Tenure in Months	Organizational Size	Organizational Level	Grade	Employment Status	Assignment Status
68	554	4.3	7	5	1.5	6	3.7	6	130	2	2	1	0	1
69	520	5	5.75	5.5	5	5.7	5.3	5.5	21	2	4	0	1	0
70	523	6.3	6	6	6	6	6	5.5	54	3	4	1	0	0
71	458	4	6	5	4.5	6	5.7	6.25	12	3	2	0	1	1
72	481	2	4.5	4.5	4	4.7	5.7	3.25	11	3	4	0	1	1
73	475	4.7	4.25	5.5	5.5	6	6	6.25	23	3	3	0	0	1
74	619	3.7	5.25	5.5	6	4.7	5.3	6.25	10	3	4	1	1	0
75	313	6.7	6.25	6.5	6	6	5.3	5.25	30	3	2	0	1	1
76	569	7	6.5	6.5	6.5	7	5.3	7	7	2	4	1	0	0
77	571	6	5	6	4	5.7	4.7	5.75	4	3	4	0	1	0
78	554	6	5.5	6	6	5.7	6	5.75	60	3	4	1	0	1
79	546	3.33	4.75	5.5	5	4.67	4.67	6	4	3	3	1	1	1

APPENDIX B

CORRELATION COEFFICIENTS

APPENDIX B

CORRELATION COEFFICIENTS

TABLE 8

CORRELATION COEFFICIENTS: INTERVAL LEVEL RESEARCH VARIABLES

		Conceptual/ Validation n = 22		Full Scale Development n = 80		Production/ Deployment n = 78		Combined n = 180	
		Tcrit = ±2.086		Tcrit = ±1.99		Tcrit = ±1.99		Tcrit = ±1.97	
		Climate	Tenure	Climate	Tenure	Climate	Tenure	Climate	Tenure
	Tenure	-.566*	—	-.153	—	.016	—	-.042	—
Satisfactions	General	.169	-.099	.438*	-.206	.459*	.131	.439*	-.004
	Motivation	.332	.355	.119	-.060	.369*	.113	.217*	.044
	Pay	.110	.005	.462*	-.189	.446*	.148	.428*	.026
	Security	.222	-.140	.492*	.090	.375*	.077	.424*	.042
	Social	.363	-.154	.501*	-.159	.413*	.171	.472*	.086
	Supervisory	-.039	.257	.328*	.031	.375*	-.030	.306*	-.022
	Growth	.467*	.026	.410*	.026	.417*	-.039	.438*	-.035

* Statistically Significant Results

APPENDIX C

ANOVA RESULTS

APPENDIX C

ANOVA RESULTS

TABLE 9

ORGANIZATIONAL SIZE WITH ACQUISITION PHASES COMBINED

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	63708.250	9843.585	6.472	.002*
General Sat	3.335	1.254	2.660	.071
Motivation	1.032	.584	1.768	.172
Pay Sat	1.366	.930	1.468	.232
Security Sat	2.026	1.253	1.616	.199
Social Sat	2.184	.809	2.700	.068
Supervisory Sat	.477	.767	.623	.543
Growth Sat	1.715	1.301	1.318	.269

* Statistically Significant Results

NOTE: DF = 2 & 177

TABLE 10

WEAPON SYSTEM ACQUISITION PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	116822.300	9243.427	12.6	.00005*
General Sat	2.263	1.265	1.7888	.168
Motivation	.277	.575	.482	.625
Pay Sat	1.005	.934	1.075	.344
Security Sat	1.870	1.253	1.492	.226
Social Sat	1.977	.811	2.438	.088
Supervisory Sat	.292	.588	.497	.615
Growth Sat	2.639	1.288	2.050	.130

* Statistically Significant Results

NOTE: DF = 2 & 177

TABLE 11

ORGANIZATIONAL LEVEL IN

CONCEPTUAL/VALIDATION PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	6872.083	5739.576	1.197	.339
General Sat	.436	.621	.702	.566
Motivation	.198	.415	.476	.706
Pay Sat	1.135	.460	2.466	.095
Security Sat	.151	.801	.189	.902
Social Sat	.233	.467	.498	.692
Supervisory Sat	.835	.303	2.758	.072
Growth Sat	.655	1.014	.645	.599

NOTE: DF = 3 & 18

TABLE 12

ORGANIZATIONAL LEVEL IN

FULL SCALE DEVELOPMENT PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	22320.710	9620.475	2.320	.081
General Sat	1.895	1.183	1.603	.194
Motivation	.199	.463	.432	.735
Pay Sat	.934	.963	.970	.587
Security Sat	2.838	1.136	2.498	.065
Social Sat	.341	.838	.407	.752
Supervisory Sat	.205	1.222	.167	.918

NOTE: DF = 3 & 76

TABLE 13

ORGANIZATIONAL LEVEL IN

PRODUCTION/DEPLOYMENT PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	5974.417	9438.068	.633	.600
General Sat	.534	1.588	.336	.801
Motivation	1.711	.753	2.273	.086
Pay Sat	1.780	.978	1.820	.149
Security Sat	.993	1.480	.671	.576
Social Sat	1.398	.886	1.579	.200
Supervisory Sat	.792	.724	1.093	.358
Growth Sat	2.719	1.435	1.895	.136

NOTE: DF = 3 & 74

TABLE 14

ORGANIZATIONAL LEVEL WITH

ACQUISITION PHASES COMBINED

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	53916.670	10734.620	5.023	.003*
General Sat	2.278	1.259	1.809	.146
Motivation	.979	.579	1.692	.169
Pay Sat	3.713	.888	4.182	.007*
Security Sat	3.617	1.223	2.959	.033*
Social Sat	2.096	.803	2.610	.052
Supervisory Sat	1.683	.672	2.505	.059
Growth Sat	2.719	1.280	2.124	.097

* Statistically Significant Results

NOTE: DF = 3 & 176

TABLE 15

GRADE IN

CONCEPTUAL/VALIDATION PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	9309.125	5730.975	1.624	.215
General Sat	.696	.433	1.606	.218
Motivation	.004	.403	.010	.919
Pay Sat	1.707	.499	3.419	.076
Security Sat	1.910	.648	2.946	.098
Social Sat	.407	.440	.925	.650
Supervisory Sat	.531	.371	1.430	.244
Growth Sat	.172	1.002	.171	.686

NOTE: DF = 1 & 20

TABLE 16

GRADE IN

FULL SCALE DEVELOPMENT PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	9427.375	9348.825	1.008	.320
General Sat	1.735	1.248	1.390	.240
Motivation	.070	.455	.153	.699
Pay Sat	.128	.970	.132	.719
Security Sat	.035	1.215	.028	.861
Social Sat	.344	.826	.417	.528
Supervisory Sat	.052	.514	.101	.749
Growth Sat	7.410	1.104	6.712	.011*

* Statistically Significant Results

NOTE: DF = 1 & 78

TABLE 17

GRADE IN

PRODUCTION/DEPLOYMENT PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	9278.25	9303.464	.997	.678
General Sat	.331	1.563	.211	.652
Motivation	.926	.797	1.162	.284
Pay Sat	.021	1.022	.021	.881
Security Sat	.024	1.480	.016	.894
Social Sat	.00021	.91743	.00023	.985
Supervisory Sat	1.367	.719	1.903	.168
Growth Sat	3.258	1.459	2.233	.135

NOTE: DF = 1 & 76

TABLE 18

GRADE WITH

ACQUISITION PHASES COMBINED

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prcb. Value
Climate	7854.500	10418.550	.754	.609
General Sat	1.821	1.274	1.429	.231
Motivation	.770	.588	1.310	.252
Pay Sat	.725	.917	.791	.621
Security Sat	.147	1.268	.116	.734
Social Sat	.637	.836	.762	.612
Supervisory Sat	.145	.587	.247	.626
Growth Sat	11.978	1.243	9.639	.003*

* Statistically Significant Results

NOTE: DF = 1 & 178

AD-A032 460 AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHO--ETC F/G 5/1
A STUDY OF RELATIONSHIPS AMONG SELECTED ORGANIZATIONAL VARIABLE--ETC(U)
SEP 76 D L HADDOX, N A LONG

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AD A032460



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TABLE 19

EMPLOYMENT STATUS IN

CONCEPTUAL/VALIDATION PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	7.438	6196.059	.001	.971
General Sat	.193	.459	.422	.530
Motivation	.064	.400	.160	.695
Pay Sat	.064	.581	.110	.742
Security Sat	.733	.707	1.037	.322
Social Sat	.459	.460	.996	.669
Supervisory Sat	.104	.393	.266	.617
Growth Sat	.046	1.009	.045	.828

NOTE: DF = 1 & 20

TABLE 20

EMPLOYMENT STATUS IN

FULL SCALE DEVELOPMENT PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	7081.250	9969.136	.710	.593
General Sat	1.431	1.207	1.186	.279
Motivation	1.075	.445	2.413	.120
Pay Sat	.079	.970	.081	.773
Security Sat	.145	1.214	.119	.731
Social Sat	1.122	.816	1.375	.243
Supervisory Sat	.160	.509	.314	.583
Growth Sat	5.811	1.124	5.168	.024*

* Statistically Significant Results

NOTE: DF = 1 & 78

TABLE 21

EMPLOYMENT STATUS IN

PRODUCTION/DEPLOYMENT PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	21615.750	9141.128	2.365	.124
General Sat	.036	1.567	.023	.874
Motivation	1.289	.762	1.692	.194
Pay Sat	.279	1.019	.274	.608
Security Sat	.276	1.476	.187	.670
Social Sat	.154	.915	.168	.686
Supervisory Sat	.899	.725	1.240	.268
Growth Sat	.090	1.501	.060	.802

NOTE: DF = 1 & 76

TABLE 22

EMPLOYMENT STATUS WITH

ACQUISITION PHASES COMBINED

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	2291.500	10449.81	.219	.645
General Sat	.575	1.280	.449	.511
Motivation	1.831	.578	3.166	.073
Pay Sat	.019	.940	.020	.882
Security Sat	.127	1.274	.099	.752
Social Sat	.627	.824	.761	.612
Supervisory Sat	.649	.583	1.113	.293
Growth Sat	2.140	1.298	1.649	.198

NOTE: DF = 1 & 178

TABLE 23

ASSIGNMENT STATUS IN

CONCEPTUAL/VALIDATION PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	4800.000	5956.431	.806	.616
General Sat	.454	.445	1.020	.326
Motivation	.263	.390	.673	.573
Pay Sat	.163	.576	.283	.606
Security Sat	1.986	.644	3.082	.091
Social Sat	1.547	.378	4.089	.054
Supervisory Sat	.123	.392	.314	.587
Growth Sat	1.789	.928	1.927	.178

NOTE: DF = 1 & 20

TABLE 24

ASSIGNMENT STATUS IN

FULL SCALE DEVELOPMENT PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	35146.880	9609.322	3.658	.056
General Sat	3.699	10.859	.341	.568
Motivation	1.717	.421	4.078	.044*
Pay Sat	.00003	.974	.00003	.991
Security Sat	.037	1.210	.031	.856
Social Sat	.214	.827	.259	.618
Supervisory Sat	.007	.515	.013	.906
Growth Sat	2.288	1.170	1.957	.162

* Statistically Significant Results

NOTE: DF = 1 & 78

TABLE 25

ASSIGNMENT STATUS IN

PRODUCTION/DEPLOYMENT PHASE

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	2288.500	9395.428	.244	.629
General Sat	.072	1.566	.046	.825
Motivation	1.787	.780	2.291	.130
Pay Sat	.072	1.022	.071	.787
Security Sat	.003	1.480	.002	.962
Social Sat	.047	.917	.052	.815
Supervisory Sat	.505	.730	.692	.587
Growth Sat	.465	1.496	.311	.586

NOTE: DF = 1 & 76

TABLE 26

ASSIGNMENT STATUS WITH

ACQUISITION PHASES COMBINED

Variable	Mean Squares Explained	Mean Squares Unexplained	F-Ratio	Prob. Value
Climate	15579.500	10391.620	1.499	.220
General Sat	.496	1.281	.387	.542
Motivation	2.385	.575	4.145	.041*
Pay Sat	.00024	.943	.00026	.984
Security Sat	.176	1.266	.139	.711
Social Sat	.406	.827	.491	.508
Supervisory Sat	.090	.583	.154	.698
Growth Sat	1.134	1.305	.869	.645

* Statistically Significant Results

NOTE: DF = 1 & 178

APPENDIX D

STAT 12 COMPUTER PROGRAM: CORRELATION

APPENDIX D

STAT 12 COMPUTER PROGRAM: CORRELATION

```
5  REM---STAT12---OCT 27, 1969
1Ø  REM  DESCRIPTION:  COMPUTES THE CORRELATION MATRIX FOR N
2Ø  REM  SERIES OF DATA.
4Ø  REM  INSTRUCTIONS: ENTER DATA STARTING IN LINE 9ØØ IN THE
5Ø  REM  FOLLOWING ORDER: 1) THE NUMBER OF SERIES, 2) THE
6Ø  REM  NUMBER IN EACH SERIES, 3) THEN THE DATA BY GROUP
         (NOT BY SERIES).
7Ø  REM  THIS PROGRAM IS LIMITED TO 25 SERIES, WITH AN
75  REM  ARBITRARY NUMBER IN EACH SERIES.  TO INCREASE THE
8Ø  REM  NUMBER OF SERIES, CHANGE THE DIM STATEMENTS IN
         LINE 1ØØ.
9Ø  READ 0Ø
91  RESTORE
92  IF 0Ø <> 999999 THEN 1ØØ
93  PRINT "LIST LINES 1Ø TO 85 FOR INSTRUCTIONS"
94  STOP
1ØØ  DIM S(25,25),D(25),X(25)
11Ø  READ N, M
17Ø  LET X(Ø) = 1
2ØØ  FOR K = 1 TO M
21Ø  FOR I = 1 to N
22Ø  READ X(I)
```

```
23Ø  NEXT I
24Ø  FOR I = Ø TO N
25Ø  FOR J = I TO N
26Ø  LET S(I,J) = S(I,J) + X(I)*X(J)
27Ø  NEXT J
28Ø  NEXT I
29Ø  NEXT K
3ØØ  REM  HAVING COMPUTED THE SUM-OF-SQUARES MATRIX, WE
          CONTINUE.
3Ø5  PRINT TAB (3);"VARIABLE";TAB(23);"MEAN";TAB(34);
     "VARIANCE";
3Ø6  PRINT TAB(48);"STD. DEV."
31Ø  FOR I = 1 TO N
32Ø  LET M1 = S(Ø,I) / M
33Ø  LET Q = ( M * S(I,I) -S(Ø,I)*S(Ø,I) ) / M / (M-1)
34Ø  LET D(I) = SQR(Q)
35Ø  PRINT I, M1, Q, D(I)
36Ø  NEXT I
6ØØ  REM  NOW WE PRODUCE AND PRINT THE CORRELATION MATRIX...
6Ø5  PRINT
61Ø  PRINT "THE CORRELATION MATRIX"
62Ø  PRINT
63Ø  FOR I = 1 TO N
635  IF I = 1 THEN 67Ø
64Ø  FOR J = 1 TO I-1
65Ø  PRINT " ",
66Ø  NEXT J
```

```
67Ø  FOR J = I TO N
68Ø  PRINT (M* S(I,J) - S(Ø,I)*S(Ø,J))/M/(M-1)/D(I)/D(J),
69Ø  NEXT J
7ØØ  PRINT
71Ø  PRINT
72Ø  NEXT I
73Ø  STOP
9ØØ  DATA 999999
9999  END
```

APPENDIX E

STAT 13 COMPUTER PROGRAM: ANALYSIS OF VARIANCE

APPENDIX E

STAT 13 COMPUTER PROGRAM: ANALYSIS OF VARIANCE

```
5 REM ---STAT13---OCT 27, 1969
1Ø  REM  DESCRIPTION: COMPUTES THE ANALYSIS OF VARIANCE TABLE
2Ø  REM  FOR A ONE-WAY COMPLETELY RANDOMIZED DESIGN.
4Ø  REM  INSTRUCTIONS: ENTER DATA IN LINE 9ØØ AND FOLLOWING.
5Ø  REM  ENTER DATA IN THE FOLLOWING ORDER:
6Ø  REM  1) A, THE TOTAL NUMBER OF OBSERVATIONS
7Ø  REM  2) M, THE NUMBER OF DIFFERENT TREATMENTS
8Ø  REM  3) N(1),...,N(M), WHERE N(J) IS THE NUMBER OF
81  REM     OBSERVATIONS IN TREATMENT J
82  REM  4) AND FINALLY, THE OBSERVATIONS THEMSELVES, FIRST
83  REM     FOR TREATMENT 1, THEN TREATMENT 2, ETC.
85  REM  IF ANY N(J) > 2Ø, CHANGE THE DIMS IN LINE 1ØØ.
86  REM  IF M > 1Ø, CHANGE THE DIMS IN LINE 1ØØ.
9Ø  READ 0Ø
91  RESTORE
92  IF 0Ø <> 999999 THEN 1ØØ
93  PRINT "LIST LINES 1Ø TO 86 FOR INSTRUCTIONS"
94  STOP
1ØØ DIM X(2Ø,1Ø),N(1Ø),T(1Ø),S(1Ø)
11Ø  READ A, M
115  MAT READ N(M)
12Ø  FOR J = 1 TO M
```

```
13Ø  FOR I = 1 TO N(J)
14Ø  READ X(I,J)
15Ø  NEXT I
16Ø  NEXT J
17Ø  FOR J = 1 TO M
18Ø  FOR I = 1 TO N(J)
19Ø  LET T(J) = T(J) + X(I,J)
2ØØ  LET S(J) = S(J) + X(I,J)*X(I,J)
21Ø  NEXT I
22Ø  LET U = U + T(J)
23Ø  LET R = R + S(J)
24Ø  LET V = V + T(J)*T(J)/N(J)
25Ø  NEXT J
26Ø  LET C = U*U/A
27Ø  LET W = V - C
28Ø  LET E = R - V
29Ø  PRINT "ANOVA TABLE:"
3ØØ  PRINT
31Ø  PRINT "ITEM";TAB(25);"SS";TAB(4Ø);"DF";TAB(55);"MS"
32Ø  PRINT
33Ø  PRINT "GRAND TOTAL",R,A
34Ø  PRINT "GRAND MEAN",C,1
35Ø  PRINT "TREATMENTS", W, M-1, W/(M-1)
36Ø  PRINT "ERROR", E, A-M, E/(A-M)
37Ø  PRINT
38Ø  PRINT
39Ø  LET F = (W/(M-1))/(E/(A-M))
```

```
4ØØ  PRINT "F = "F" ON "M-1" AND "A-M" DEGREES OF FREEDOM."
4Ø2  LET G = F
4Ø3  LET N = A - M
4Ø4  LET M = M - 1
4Ø5  GOSUB 8ØØ
41Ø  STOP
8ØØ  REM
8Ø2  LET P = 1
8Ø3  IF G<1  THEN 8Ø8
8Ø4  LET A = M
8Ø5  LET B = N
8Ø6  LET F = G
8Ø7  GO TO 811
8Ø8  LET A = N
8Ø9  LET B = M
81Ø  LET F = 1/G
811  LET A1 = 2/(9*A)
812  LET B 1 = 2/(9*B)
813  LET Z = ABS((1-B1) * F (.333333)-1+A1)
814  LET Z = Z/SQR(B1*F (.666667)+A1)
815  IF B<4  THEN 819
816  LET P=(1+Z*(.196854+Z*(.115194+Z*(.ØØØ344+Z*.019527)))) 4
817  LET P = .5/P
818  GO TO 821
819  LET Z = Z*(1+.Ø8*Z 4/B 3)
82Ø  GO TO 816
821  IF G<1  THEN 823
```

```
822  GO TO 825
823  LET P = 1-P
824  GO TO 825
825  PRINT
826  LET P = INT(1E5*P + .5)/1E5
827  PRINT "EXACT PROB. OF F=";G;"WITH("M;","N;")D.F.IS";P
828  PRINT
829  RETURN
9999  END
```

APPENDIX F

CORRELATION COEFFICIENTS:

SPECIFIC SATISFACTION MEASURES

APPENDIX F

TABLE 27

CORRELATION COEFFICIENTS:
SPECIFIC SATISFACTION MEASURES

Weapon System Acquisition Phase	Satisfaction Measure	Satisfaction Measure: General	Motivation	Pay	Security	Social	Supervisory
Conceptual/ Validation	Growth	.278	.357	.573*	.501*	.714*	.420*
Full Scale Development		.439*	.097	.522*	.345*	.518*	.355*
Production/ Deployment		.424*	.225*	.482*	.539*	.558*	.378*
Combined		.426*	.175*	.499*	.461*	.563*	.367*
Conceptual/ Validation	Supervisory	.136	-.145	.782*	.464*	.558*	
Full Scale Development		.447*	.242*	.524*	.535*	.362*	
Production/ Deployment		.552*	.395*	.677*	.748*	.515*	
Combined		.484*	.298*	.604*	.634*	.445*	
Conceptual/ Validation	Social	.243	.450*	.601*	.706*		
Full Scale Development		.622*	.311*	.556*	.526*		
Production/ Deployment		.614*	.542*	.683*	.674*		
Combined		.602*	.423*	.621*	.611*		

TABLE 27 (Continued)

		General	Motivation	Pay
Conceptual/ Validation	Security	.500*	.331	.540*
Full Scale Development		.430*	.262*	.504*
Production/ Deployment		.723*	.463*	.750*
Combined		.590*	.368*	.630*
Conceptual/ Validation	Pay	-.086	.033	
Full Scale Development		.604*	.343*	
Production/ Deployment		.674*	.513*	
Combined		.617*	.406*	
Conceptual/ Validation	Motivation	.253		
Full Scale Development		.295		
Production/ Deployment		.563*		
Combined		.429*		

* Statistically Significant Results

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