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(6) A STUDY OF JOB CHARACTERISTICS AND JOB ATTITUDES AT A TACTICAL AIR COMMAND FIGHTER AIRCRAFT MAINTENANCE COMPLEX.

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A STUDY OF JOB CHARACTERISTICS AND JOB ATTITUDES AT A TACTICAL AIR COMMAND FIGHTER AIRCRAFT MAINTENANCE COMPLEX

THESIS

Presented to the Faculty of the School of Engineering

of the Air Force Institute of Technology

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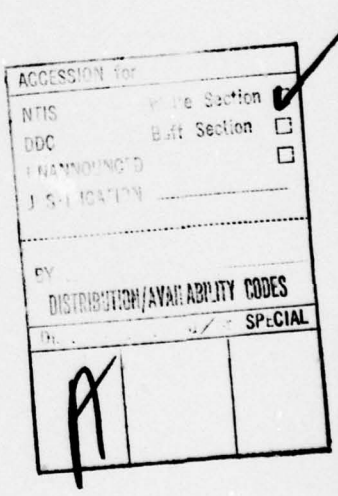
in Partial Fulfillment of the

Requirements for the Degree of

Master of Science



by

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Graduate Systems Management

September 1977

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Preface

This study was inspired by six years of exposure to the work environment characterizing tactical fighter maintenance organizations. This research effort was designed to identify those aspects of the work and work environment which are most closely associated with and predictive of job attitudes and career intent. Hopefully, the study results will provide some insight into the determinants of job satisfaction that will be of use to Air Force management personnel in determining the direction and nature of future Air Force "people" policies. Additionally, the author hopes that the review of management thought and theory, their application to the Air Force work environment, and the insights presented in this paper will prove beneficial to lower level supervisors who are truly interested in their people and who would like to see them stay on for a career in the Air Force.

The majority of the observations and conclusions are logically derived from the data analysis using generally accepted statistical procedures. In some situations, the author has deviated from pure observation and strict mathematical interpretation of the analysis results; however, he has tried to identify these occurrences with such warnings as "in the opinion of the author", "the author hypothesizes", etc. Any errors accompanying these speculations are most likely philosophical in nature, and they result from the author's false perceptions developed over the six years of exposure to the aircraft maintenance personnel's work environment. Therefore, I accept full liability for any and all errors which may have resulted from personal bias.

Acknowledgements

I would like to express my appreciation to Dr. T. Roger Manley whose guidance, constructive criticism, and genuine friendship were largely responsible for the completion of this research effort. I would also like to thank Drs. Charles McNichols and Saul Young for their assistance and guidance in this endeavor.

My sincere appreciation is extended to all those maintenance personnel who candidly responded to the survey and made this thesis possible. Also, I would like to express my appreciation to all supervisory and support personnel who showed great interest in this study and actively supported the administering of the survey.

Walter J. Guthrie

Contents

	Page
Preface	ii
List of Figures	vii
List of Tables	viii
Abstract	x
I. Introduction	1
Statement of the Problem	1
Purposes of the Study	4
Scope	5
Assumptions	7
General	7
Methodology	8
Sample Population	9
Statistical Analysis	10
Limitations	10
Summary	14
II. Man, Motivation, and Work	15
Background of Job Design Theory	15
Classical Theory	16
Human Relations Theory	17
Behavioral (Modern Management) Theory	20
Organizational Structure and Motivation (Argyris' Theory)	21
The Role of Theory "X"/Theory "Y" in Management	24
Human Needs and Motivational Theory: Background for Job Design	28
Maslow's Hierarchy and Motivation	29
Herzberg's Motivation-Hygiene Theory	34
Vroom's "Expectancy Theory" Model of Motivation	38
Summary	43
III. Job Redesign: The Application of Motivation Theory	45
Job Design: An Overview	46
Proposed Benefits of Job Enrichment Programs	48
Basic Guidelines for Enriching Jobs	49
Herzberg's Job Enrichment Model	51
Hackman and Oldham's Job Characteristic Model	56
Hackman and Oldham's Principles for Enriching Jobs	62

		Page
	Forming Natural Work Units	64
	Combining Tasks	65
	Establishing Client Relationships	66
	Vertical Loading	67
	Opening Feedback Channels	68
	Implications for Decision Making	70
	Summary	74
	Conclusions	76
IV.	Methodology	77
	Study Group	77
	The Survey Instrument	78
	Demographics	79
	Core Job Dimensions (Job Factor Variables)	79
	JDS Description	80
	Concepts Measured by the JDS	80
	Instrument Validity	82
	Diagnostic Use of JDS	83
	Step 1. Are Motivation and Satisfaction Problematic?	83
	Step 2. How Much Motivating Potential Does the Job Exhibit?	85
	Step 3. What Specific Aspects of the Job Are Causing the Difficulty?	86
	Step 4. Are the Employees Willing to Support a Job Redesign Program?	86
	Analytical Analysis	88
	The Analysis Plan	88
	Preliminary Analysis	89
	Two Sample T-Test	90
	Correlation Analysis	91
	Least Squares Regression Analysis	93
V.	Data Analysis and Results	98
	Introduction	98
	Job Satisfaction	99
	Comparison of Overall Job Satisfaction Mean Scores	101
	Comparison of Job Characteristic Mean Scores	104
	Skill Variety	104
	Task Identity	105
	Task Significance	106
	Autonomy	107
	Feedback	109
	Career Intent	112
	Analysis of Job Attitudes	116
	Correlation Analysis	116
	Regression Analysis	120
	Job Satisfaction	121
	Career Intent	125

Page

Diagnostic Examination of Jobs Performed By FMS and OMS Personnel 130
Step 1. Are Motivation and Satisfaction Problematic? 130
Step 2. Is the Job Low in Motivating Potential? 134
Step 3. What (If Any) Aspects of the Job Are CAusing the Difficulty? 135
Step 4. How "Ready" Are the Employees for Change? 135
Step 5. What Special Problems and Opportunities Are Present in the Existing Work System? 135

VI. Overview, Conclusions, and Recommendations 137

Summary of Theory Synthesis 137
Discussion of Analysis Results 139
Factors Effecting Job Satisfaction 142
Factors Effecting Career Intent 144
Enrichment Potential by Work Environment 144
Conclusions 145
Recommendations for Further Research 147

Bibliography 148

Appendix A: *Job Attitude Survey (Job Diagnostic Survey Form and Hoppock Job Satisfaction Blank)* 152

Appendix B: Scoring Key for the Short Form of the Job Diagnostic Survey 168

Appendix C: Job Diagnostic Survey Instrument Validity 172

Appendix D: Means and Variances of JDS Scales 178

Appendix E: Means of Job Dimensions By Equal Employment Opportunity Commision (EEOC) Categories 180

Appendix F: Survey Population Characteristics and Baseline Data for Job Satisfaction and Job Characteristic Measures for FMS and OMS Jobs 182

Vita 186

List of Figures

Figure		Page
1	Factors Affecting Job Attitudes	35
2	Relative Effects of the Motivation-Hygiene Factors on Satisfaction/Dissatisfaction and Performance	36
3	A Diagram of Vroom's Motivational Model	42
4	The Relationships Among the Core Job Dimensions, the Critical Psychological States, and on-the-Job Outcomes	57
5	The Moderating Effect of Employee Growth Need Strengths	61
6	Theory of Job Enrichment Based on the Job Characteristic Model	63
7	Flow Chart Showing the Sequential Job Diagnostic Plan	84
8	Illustration of Job Diagnostic "Job Profile"	87
9	The JDS Diagnostic Profile for Maintenance Jobs (FMS and OMS)	131
10	The JDS Diagnostic Profile for FMS Jobs	132
11	The JDS Diagnostic Profile for OMS Jobs	133

List of Tables

Table		Page
I	Comparative Reenlistment Statistics	3
II	Questionnaire Response Rates	78
III	Job Satisfaction Mean Scores by Work Environment and Comparison Analysis of Sample Means (Enlisted Personnel)	102
IV	Mean Scores for Skill Variety by Work Environment and Comparison Analysis of SAmple Means (Enlisted Personnel)	105
V	Mean Scores for Task Identity by Work Environment and Comparison Analysis of Sample Means (Enlisted Personnel)	106
VI	Mean Scores for Task Significance by Work Environment and Comparison Analysis of Sample Means (Enlisted Personnel)	107
VII	Mean Scores for Autonomy by Work Environment and Comparison Analysis of Sample Means (Enlisted Personnel)	108
VIII	Mean Scores for Feedback by Work Environment and Comparison Analysis of Sample Means (Enlisted Personnel)	110
IX	Summary Table of Hypothesis Testing Performed on the Five Core Job Dimensions (Enlisted Personnel)	111
X	Career Intent Responses to Job Attitude Surveys	113
XI	Role of Jobs on Career Intent	114
XII	Interrelationships Among Job Characteristics and Attitude Indices (Maintenance Personnel)	117
XIII	Interrelationships Among Job Characteristics and Attitude Indices Field Maintenance Personnel)	118

Table		Page
XIV	Interrelationships Among Job Characteristics and Attitude Indices (Operational Maintenance Personnel)	119
XV	Job Satisfaction Regression (Maintenance Personnel	122
XVI	Job Satisfaction Regression (FMS Personnel)	123
XVII	Job Satisfaction Regression (OMS Personnel)	124
XVIII	Percentage Variance in Job Satisfaction Explained by Regression Models	125
XIX	Career Intent Regression (Maintenance Personnel)	127
XX	Career Intent Regression (FMS Personnel)	128
XXI	Career Intent Regression (OMS Personnel)	129
XXII	Realibilities of the JDS Scales	175
XXIII	Interrelations Among JDS Scale Scores (Across 658 Respondents)	176
XXIV	Interrelations Among JDS Scale Scores (Across 62 Jobs)	177

Abstract

This study investigates the job attitudes of enlisted maintenance personnel (FMS and OMS) serving in a Tactical Air Command fighter aircraft maintenance complex. The overall objective of the study was to determine if a job enrichment program might hold potential for improving individual motivation and organizational effectiveness. The analysis consisted of measuring job satisfaction levels, using the Hoppock job satisfaction measure, and measuring satisfaction with the various dimensions of the work and work environment, using the "Job Diagnostic Survey", developed by Hackman and Oldham.

Compared with sample populations (all ranks and enlisted only) drawn from the total Air Force population, the study group exhibited a "lower" degree of job satisfaction. Data analysis indicates that work environment factors are most highly associated with the dissatisfaction displayed. Overall, growth satisfaction (a measure of how much challenge a job provides, opportunity for accomplishment, potential to exercise responsibility, and potential for personal growth and development) was found to be the primary determinant of job satisfaction for this study group. Demographic variables were found to be of little importance in determining job satisfaction.

Career intent disclosures of the maintenance personnel surveyed show that only 25 percent of the individuals definitely plan to remain in the Air Force. Forty-three (43) percent of the individuals who did not express definite positive career intent listed their job as the major factor effecting their decision. Expressed career intent was found to be influenced by

job satisfaction and the perceived satisfaction with the work environment factors. Low job satisfaction mean scores and the lack of personnel commitment to a military career coupled with analysis of these dimensions appear to indicate that the work environment is problematic.

Diagnostic analysis of the work itself indicates that an all-inclusive job enrichment program is unwarranted in either maintenance organization. Autonomy within the OMS activities is the only dimension which appears to be a deficient area.

A STUDY OF JOB CHARACTERISTICS AND JOB ATTITUDES AT A TACTICAL AIR COMMAND FIGHTER AIRCRAFT MAINTENANCE COMPLEX

I. INTRODUCTION

> Military people have received several well earned pay raises in the last eight years. However, we firmly believe that monetary incentives in themselves will not achieve our goals--the ultimate key is job satisfaction. We know we must provide opportunity and challenge for our young people. Each member needs to feel that he is afforded the chance to contribute to the best of his ability.
>
> Former Secretary of the Air Force, Robert C. Seamans, Jr. ("Attracting and Keeping the People We Need", 1972).

STATEMENT OF THE PROBLEM

Human resources are the United States Air Force's most valuable assets. With respect to these valuable resources, the Air Force faces two major challenges. The immediate challenge is one of managing and motivating individuals to do better and more efficient work in a time of austere budgets. More long run in nature is the challenge to build a highly professional force characterized by stability, motivation, efficiency, and dedication to mission objectives at all levels of command. To successfully execute these challenges, the Air Force must be able to attract quality personnel and to retain a higher percentage of these personnel than is the case today.

Before the Air Force can effectively meet either the immediate or long range challenge, an indepth analysis of human behavior must be performed in an attempt to determine what motivates individuals and what provides individual job satisfaction. With implementation of an all-volunteer force concept, the Air Force can no longer expect "unlimited" substitution of people into the system. Instead, the Air Force must recruit and retain top talent by maintaining an attractive organizational climate and by providing jobs that are challenging and meaningful within the context of present day values.

In March 1975, the Air Force Management Improvement Group (AFMIG) was established and was given the task of making "... a good service better; by examining the organization and management of the Air Force as they relate to or impact on the human resource; and by developing initiatives which enhance both the quality of leadership in the Air Force and the well-being of Air Force people" (Ellis, 1975). Studies conducted by this group have addressed job satisfaction in the Air Force in a broad sense; however, no studies have been conducted which specifically address job satisfaction and career intent within the Air Force maintenance career field (Murphy, 1977). This particular job was selected for study because it is one where a retention problem appears to exist (See Table I) and because AF/DPXHMM personnel expressed a strong desire to have satisfaction information for maintenance career field personnel.

Several factors may account for the reduced reenlistment rates. First, the general economic climate of the Nation can

significantly influence reenlistment rates. When jobs are plentiful and pay is high in the civilian market, a decline in reenlistment rates can be anticipated. Within the past five years, measurements have been made comparing military with civilian pay, and military pay scales (based on an eight hour, five day work week) have been found to be quite competitive with civilian pay scales. The author hypothesizes that pay is a significant factor in reenlistment decisions not from the standpoint of comparable pay for comparable work, but from the standpoint of overtime requirements (12 hour work days) with no increase in compensation. A second influential factor is changing social values. The author hypothesizes that people are now less receptive to the traditional authoritarian management of the military, and therefore seek more personal satisfaction from the work and work environment.

Table I

Comparative Reenlistment Statistics

Reenlistment Rates		FY 76	FT 77	Through 2nd Qtr FY 77
TAC Maintenance Career Field	1st Term	40.8	30.7	35.9
	2nd Term	59.7	38.7	63.7
	Career	96.1	97.5	94.1
AF-Wide Maintenance Career Field	1st Term	46.1	45.5	49.5
	2nd Term	66.1	72.7	72.3
	Career	92.2	95.4	96.6
TAC All AFSCs	1st Term	33.4	35.6	34.6
	2nd Term	57.5	36.4	61.2
	Career	95.4	96.2	93.1
AF-Wide All AFSCs	1st Term	37.3	38.1	46.1
	2nd Term	67.4	73.9	72.2
	Career	91.1	94.7	95.3

Source: Hq TAC/DPPC, Langley AFB, VA
AFMPC/DPMMAR, Randolph AFB, TX

Civilian industry accomodations to these changing social values tend to make civilian jobs more attractive alternatives to military service. An example of an accomodation by private industry to changing values has been job redesign. This practice has enhanced employee motivation and job satisfaction, increased productivity and efficiency, and improved retention rates. The author believes that application of this industry experience to maintenance jobs in the Air Force will help alleviate current personnel and cost problems. Therefore, this study is designed to investigate how these principles of motivation and job enrichment can be applied to the maintenance career field.

PURPOSES OF THIS STUDY

This study has several interrelated purposes. First, an attempt will be made to synthesize the most widely accepted and employed motivation, job satisfaction, and job enrichment theories and principles. A review of the voluminous body of literature written on these subject areas has led the author to select Maslow's, Argyris', McGregor's, Herzberg's, Vroom's, and Hackman and Oldham's theories as being those most relevant for this study.

A second purpose is to analyze the stated principles of motivation and job enrichment, and to investigate the possibility of applying these principles to the maintenance technician career field. Specific objectives are to determine

which work/work environment factors are most likely to enhance motivation and enrichment potential, and to determine the relative degree of association between job satisfaction/career intent and each identified variable. These factors will be used to determine if job enrichment can be applied within the constraint of current USAF maintenance policy. Analysis will not be limited to these factors alone but will consider the nature and complexity of the specific job.

Assuming that a need for job redesign will be indicated and is feasible, a third purpose is forwarded. This purpose is to make recommendations regarding what changes might be effected in order to promote more effective use of USAF maintenance technicians' talents. These recommendations will be based solely on the analysis of the sample populations perceptual disclosures.

Finally, since no job satisfaction studies have been conducted on the aircraft maintenance career field, this study will establish baseline measurements for the various job dimensions. This information may be useful in evaluating effects of any future changes in maintenance concepts and/or organizational job definitions.

SCOPE

The purpose of this research is to investigate job attitudes of personnel currently performing duty within the aircraft maintenance career field. Although the author hypothesizes that similar results are attainable from maintenance

organizations Air Force wide, this study is based solely on job attitude data collected within a Tactical Air Command Fighter Wing maintenance complex. An attempt will be made to present those factors and recommendations that would have the widest applicability in all tactical fighter units.

This study will address those elements of job satisfaction which can be achieved through job redesign and improvements within the work environment. This pragmatic approach to job enrichment is aimed at providing tools which will aid supervisors in motivating their personnel and increasing the satisfaction which these individuals derive from their daily tasks. No attempt is made to formulate and forward an entirely new maintenance concept. If the results indicate a need for such a major reorganization, recommendations for such a program will be made for Air Force planners' future use. The intent of this thesis is to propose changes which can be made within the framework of the current maintenance concept and still promote personnel motivation and individual job satisfaction.

Job satisfaction theory as synthesized by Hackman and Oldham provides the framework within which this analysis is made. However, this study is for descriptive and recommendatory purposes and is not intended to prove or disprove any motivation or job satisfaction theory.

ASSUMPTIONS

The imperfect nature of this type of research combined with the lack of total information about the selected sample population require that certain assumptions be made. Although these assumptions may limit and condition the research results and conclusions, they are necessary and are not considered to adversely affect the research findings.

General. The assumptions which apply to the overall conduct of this study are as follows:

1. The underlying assumption for this study is that the principles of motivation and job enrichment apply equally to jobs within the Air Force as they do within the civilian institutions in which they were developed. This assumption is given support by the results of the Air Force study New View, published in 1967, as well as by experience recently gained at Air Logistics Center at Ogden, Utah.

2. There exists withir the Air Force, and more specifically within the maintenance career field, a need to identify motivational dimensions which may influence job performance levels.

3. The work and work environment dimensions examined in this study are vital to individual job satisfaction and self-actualization. Although this listing is not exhaustive, the chosen dimensions are significantly predictive and influential in determining job satisfaction.

4. While trend data would make this study more valuable, the collection of data on a one time basis can still be usefully analyzed.

5. The Air Force will continue to train maintenance personnel to the same level of proficiency and job diversification in the future as it does now.

Methodology. The assumptions which condition the methodology used in this study are as follows:

1. The methodology employed by the author provides an effective and validated method of identifying and ranking motivational dimensions.

2. The researcher assumes that the survey instrument which is composed of the Job Diagnostic Survey (Hackman and Oldham, 1974a:63-73) and the Hoppock Job Satisfaction Blank, as modified for use in the USAF work environments (Manley, 1976) is a valid instrument for measuring job satisfaction levels within the USAF maintenance complexes. Changes to the original Hoppock Job Satisfaction stems are so minor that validity, based on over forty years of use, is upheld (Manley, et al, 1976).

3. The reliabilities of the JDS scales are more than satisfactory since the instrument was used to obtain average scores of groups of more than five individuals who work on the same job (Hackman and Oldham, 1975:169). Reliabilities for each JDS scale are given in Appendix "C", "Job Diagnostic Survey Validity".

4. The sample responses are unbiased.

5. The guarantee of anonymity and the impersonal nature of the questionnaire preclude most defensive reactions. That is, the survey methodology encourages the participants to respond according to the way they really feel instead of answering in the way they think they are supposed to feel.

Sample Population. The following assumptions are made about the characteristic behavior of the sample population:

1. The total sample population follows a normal distribution.

2. Basic to this research is the assumption that despite individual perculiarities, taken as an aggregate group, men are very similar. That is, while maintaining individualism, men display "common features" in their behaviors and activities. The researcher assumes that when randomly sampled, a sample size $N > 200$ provides an objective cross-sectional analysis of the work and the work environment necessary to establish these "common features".

3. Man's needs and associated need satisfiers are relatively universal. Stated simply, man will exercise self-direction and self-control in the service of objectives to which he is committed.

4. All respondents tend to strive for self-actualization and fulfillment.

5. Each respondent used his individual perceptions to provide honest responses to all questions involving attitude and work environment aspects. Since the JDS provides the respondent an opportunity to describe both existing and desired

characteristics of his/her job, the researcher assumes that the responses describing existing work conditions are not influenced by the individual's perceptions of the "ideal" work environment.

Statistical Analysis. All assumptions which condition the statistical analyses are included in Chapter IV within the discussion of each statistical procedure used in the study.

LIMITATIONS

As with most research efforts, there are limitations that must be considered and understood before any meaningful generalizations and/or conclusions may be formulated from the results. Probably the most constraining factor is the nature of the survey instrument. The questionnaire is highly structured which limits the scope of the data obtained to specific aspects. Any functional relationships that can not be measured in terms of the specific dimensions tapped are ignored.

This study is based on the responses to a questionnaire designed to measure the overall job satisfaction/dissatisfaction for each individual and the degree of satisfaction that each individual experiences with the various job factors defined by Hackman and Oldham (See Appendix "A"). Although the list of job factors considered is quite extensive, there still remains the possibility that there are some "untested" job factors that could "reflect" job satisfaction/dissatisfaction better than those chosen for the study. When the results of this study are restricted to "explaining" Hackman and Oldham's job

satisfaction theory as it applies to Air Force maintenance organizations, the effect of this limitation is minimized. However, if the results of this study are used to hypothesize new job satisfaction theories or if the results are extrapolated to "untested" dimensions, serious deficiencies may result.

Since this study involves people in a fairly flexible environment, the element of time can greatly affect the results and conclusions formulated from the study. People's perceptions about their jobs and their work environment can change drastically within a short period of time. Due to the guarantee of respondent anonymity, no additional or clarifying data are available to document possible changes in job satisfaction/dissatisfaction levels or changes in the ranking of job satisfaction/dissatisfaction determinants. If this limitation was relaxed, a better insight into personal job satisfaction might be obtained.

A minor limitation which may affect this research effort stems from the use of questionnaires in general. Many times, individuals are barraged with questionnaires, but they seldom see written results nor experience any favorable changes in organizational policies and/or procedures. As a result, individuals are reluctant to participate, or they employ a "game-like" response pattern which yields unreliable data. In an attempt to minimize this behavior, the researcher personally administered the survey, briefed the survey population on the purpose of the study and the methodology used in the study, and assured all respondents that they would have access to the study results and recommendations.

A limitation which could impair the validity and the usefulness of the collected data is that the JDS is readily fakable (Hackman and Oldham, 1974a:36). However, since the instrument was not administered for job selection or replacement purposes, and since responses will be held in the strictest confidence, the researcher assumes that this effect is negligible.

Although the author believes that man's needs are universal, the unique mission of the Air Force places different demands upon its personnel. Even though this study encompasses all the jobs within the FMS and OMS complexes, the researcher realizes that not all jobs lend themselves to job enrichment. To the extent that job designs are tied directly to expensive or complex equipment, little in the way of meaningful job exchange can occur. However, all work aspects of the maintenance operation are investigated in an attempt to formulate as broad a job enrichment program as possible. Another limiting factor in formulating a job enrichment program is that not all people want their jobs enriched (Penzer, 1973:22). Some people will always prefer jobs that do not require any emotional or mental commitment to the job environment.

Although this study was based on the data collected in only one maintenance complex, the discussion will occasionally be in general terms since the work environment of the maintenance personnel are very similar in all organizations by location and type of operation; e.g., combat or training; southeast or southwest. The author attempts to differentiate between work environment and geographical environment factors and to present

those work environment factors that would have the widest applicability in all tactical fighter units. The researcher anticipates that many of the findings will have applicability to other Air Force jobs; however, one must realize that adjustments may be required in these cases.

Numerous theories have been forwarded regarding the determinants of job satisfaction; however, no one theory has proven to be more effective in quantifying job satisfaction levels than another. Although there are volumes of information on job satisfaction, there are so many combinations of variables which can be used to measure job satisfaction levels that it is impossible to compare empirical results. Even when the same theory is used in several studies, differences in the survey population, the survey technique, the instrument construct, and methods of analysis make it difficult to compare/contrast results unless the researcher has complete knowledge of the circumstances surrounding each study. This is to say that there is no true baseline from which to judge job satisfaction levels. Therefore, one can not make definitive statements about job satisfaction scores. The researcher can only make completely valid comparative evaluations between scores which were obtained under the same conditions.

One final limitation results from using Hoppock's general job satisfaction blank and the various stems used in the JDS to measure job satisfaction (Appendix "A", Section 3, Numbers 2, 4, and 6). Job satisfaction, being a subjective "feeling", is not

readily quantifiable on an absolute scale. Since each participant responded according to his own feeling of satisfaction, there is no way to judge the relative job satisfaction between two individuals or any two groupings of the sample population members. This to say that an individual who has a job satisfaction index of 15 may conceivably be more satisfied in some absolute sense than a respondent who has a job satisfaction index of 25.

SUMMARY

To remain effective, the Air Force must recruit highly qualified young people and do everything possible to encourage them to make the Air Force a career. More specifically, the Air Force must create a working environment that will not only attract but will also retain good aircraft maintenance technicians, or the flying mission will be placed in jeopardy. To meet this challenge, supervisors at all levels of command must show each individual respect, recognize his individual needs and aspirations, and allow him to develop his capabilities. To attain this objective, emphasis must be placed on a thorough examination of the field of human relations. Focus of this examination must be on the ways that supervisors can achieve higher levels of motivation and increase job satisfaction for their people, and at the same time increase output through better utilization of available personnel. This study was designed to meet these challenges as they apply to the aircraft maintenance technician career field.

II. MAN, MOTIVATION, AND WORK

> The release of human potential, the enhancement of individual liberty, the liberation of the human spirit--those are the deepest and truest goals to be conceived by the hearts and minds of the American people.
>
> John Gardner (Sharbaugh, 1971:416)

This chapter examines some of the thought which attempts to explain the relationship that must exist between the worker and his job in order to produce job satisfaction. Maslow's theoretical "hierarchy of prepotency" provides an insight into the needs and need strengths of the individual; McGregor's and Argyris' theories of man, when extrapolated to the management arena, provide the concept of a "proper" organizational environment. This "proper" environment affords the individual the opportunity to simultaneously contribute to the fulfillment of both his own higher level needs and the organization's goals. However, if the individual is to accomplish this, he must be motivated. How does this motivation occur? The motivation and job design theories of Herzberg and Hackman and Oldham suggest an avenue of approach to this problem.

BACKGROUND OF JOB DESIGN THEORY

In order for one to view present-day behavioral theory in proper perspective, it is necessary to review the contributions made by the classical and human relations theorists. Historically, the beginning of creative job structuring dates back to the 1800's when industrial management was concerned

primarily with how much physical work a man could perform in a specified period of time (Smith, 1968:478). To meet the conditions of an untrained, uneducated labor force, jobs were simplified to the "nth" degree so that they could be learned quickly and workers could perform their tasks effectively. Man was looked upon as a "tool of production" and physical demands on these "tools" became the most important factor in job design.

Classical Theory. In the early 1900's, the first extensive investigation into the ties between the worker and his work was performed by Frederick W. Taylor, the "father of modern management" (George, 1968:143). Taylor's work evolved into the development of the "scientific management" school which concentrated on the physical aspects of the work and contended that workers were motivated only by monetary rewards (Porter, et al, 1975:275-276).

Taylor's approach to management laid the groundwork for the highly rational classical theories. Taylor's approach is characterized by four basic principles: (1) development of the "best" method for each task, (2) scientific selection and training of workmen for each task, (3) development of a close working relationship between managers and workers with an equal distribution of work between each "party", and (4) development of a healthy monetary incentive program designed to increase production through worker motivation (Taylor, 1911:36). Classical theory which evolved from Taylor's principles can be summarized

as "....employees were motivated to work by money and other economic things and there was no logical reason, therefore, for raising wages above the subsistence level. The practice of human relations was a matter of establishing a wage which could allow the necessities of life and the replenishment of the work force" (Sanford, 1973:25).

Throughout the early 1900's, improvements in productivity and economic performance were stressed by extending design studies to the instruments of production, i.e. tools, equipment, and work space; yet, the human element of production was ignored. Although significant advances had been made in the physical aspects of production, the early 1930's were characterized by low productive output and severe employee morale problems. Factors which contributed to these outcomes were the growth in education and the non-stimulating jobs accompanying the advent of automation (Porter, et al, 1975:278). For all the gains that industry received from the application of scientific management theories, the changes in people and the changes in technology indicated that managers needed to take another look at the design of jobs. The interest in employees and job design signalled the beginning of the "human relations" era in which emphasis was placed on the role of the human element in the work plan.

Human Relations Theory. Whereas the scientific management movement sought to increase productivity by rationalizing it, the human relations movement sought to increase productivity

by "humanizing" it (Filley and House, 1969:17-19). It was during this period that most of the principles of modern management thought and theory developed (Porter, et al, 1975:22).

Human relations theory as it is known today is considered to have begun in 1927, with the Hawthorne studies which shifted the focus of human relations from an economic emphasis to a socio-psychological emphasis. These studies demonstrated the importance of "worker attitudes and sentiments in determining the results of a change in a job situation" (Filley and House, 1969:21). Classical theory held that "a physical change directed toward greater efficiency would automatically bring about the desired result"; however, the Hawthorne studies indicated that "workers react to change in terms of the meaning change has for them" (Filley and House, 1969:21) That is, employee productivity would increase only if changes in human relationships within the organization produced, or were perceived to produce, greater social and psychological satisfaction. Therefore, the practical problem of the human relation theorists was to determine how social and psychological satisfaction could be enhanced.

Attempts to increase social satisfaction took many diverse approaches ranging from advocating greater socialization on and off the job to increasing employee services and benefits. Many of the theorists of this period held that the key to increased productivity was "participative" management. It was held that worker participation in managerial decision activities would

result in greater need satisfaction which in turn would result in better performance and higher productivity (Sanford; 1973:35).

Although the basic assumptions of the human relations approach were valid, there was a wide divergence between theory and practice. Two serious misconceptions accompanied implementation of the concepts, the first being that the objective of human relations programs was to make the employees "happy". The second was that a "happy" group is always productive and that the "happiness" is attained through "participative" management. The Hawthorne studies demonstrated that "good" management can not capitalize on making a work group happy and reap high productivity, but instead they must seek a balance between morale and efficiency that provides the best combination of the two (Filley and House, 1969:22). Happiness, and need satisfaction, and the entity of which it is a part - job satisfaction - are not the same. Employee happiness and satisfaction can be independent of productivity or performance. Furthermore, participation must be aimed at achieving something worthwhile if job satisfaction and productivity are to complement each other. Participation programs designed to make the worker feel useful and an important part of the overall effort will only serve as a "lubricant which oils away resistance to formal authority" (Sanford, 1973:35-36).

Probably the most significant contribution of the Hawthorne studies to the human relations movement was a realization that "a human solution requires human data and human tools" (Filley and House, 1969:23). It was this interest in human data that spurred the behavioral scientists into action.

BEHAVIORAL (MODERN MANAGEMENT) THEORY

In contrast to the classical and human relations theories which proposed that the primary motivators of man are respectively money and "happiness", the behavioralists hold that workers are motivated by the desire to satisfy a diversity of needs and that monetary incentives can only satisfy the "lower" level needs in this need hierarchy. Many theories have been advanced which attempt to explain the source and operation of these motivational forces; however, the author believes that the work of McGregor, Argyris, Maslow, and Herzberg most directly account for these intrinsic motivational forces.

McGregor's Theory "X"/Theory "Y" addresses the effect of leadership style on individual behavior within an organization. Individual motivation is greatly affected by how one is treated within the organization; the treatment within the organization follows directly from whether a manager holds Theory "X" or Theory "Y" assumptions about his people (Porter, et al, 1975: 36). Argyris' work addresses the conflict between man and organization with emphasis centering on the lack of congruency between the needs of healthy employees (independence) and those of the formal organization (dependence). Maslow's contribution was to describe a hierarchy of human needs which runs the gamut from basic physical drives (thirst, hunger, safety) to higher order psychological needs (self-esteem, self accomplishment). According to him, as one level of the hierarchy is reasonably satisfied, the next level becomes the more potent motivator (Porter, et al, 1975:42-43). Herzberg's theory, drawing

heavily upon Maslow's hierarchy of needs, was designed to determine the kinds of things which make people happy and satisfied on their jobs or unhappy and dissatisfied, and relates these factors to the fulfillment of individual needs. The author believes that each of these theories is relevant to the aircraft maintenance technicians' work and work environment.

Organizational Structure and Motivation (Argyris' Theory). In 1957, Chris Argyris published Personality and Organization in which he defined the effects of the formal organization on human behavior. The framework for this analysis was the "immaturity-maturity" theory of human behavior which has as its basic tenet, "from infancy to adulthood, there is a tendency for the 'healthy' personality to develop along a continuum from immaturity to maturity by moving from being passive to being active; by moving from dependence to independence; by growing from a lack of awareness of self to awareness and control over self" (Argyris, 1959:50). Argyris contends that the basic properties of the formal organization tend to keep individuals immature and mediate against self-actualization (Wren, 1972:446).

The total Air Force environment is characterized by a formal organizational structure. According to Air Force Manual 25-1,

USAF Management Process (1964:12):

> The basic principles underlying the structural organization are: unity of command, span of control, homogenous assignment, and assignment of responsibility with accompanying delegation of authority. Although this is not a hard and fast rule, equally

> applicable to all situations, in the vast majority of structures these principles of organization are vital to the development of a strong, workable organization.

Whereas Air Force management views these principles of management as necessary and sufficient for effective and efficient operation, personnel often perceive these principles as a source of conflict of interests. This conflict of interest arises from the incongruence between the needs of the organization and its people. Argyris proposes that this conflict and incongruency is seated in four basic properties of the formal organization.

First, task specialization limits individual initiative, provides little opportunity for expression of one's abilities, and inhibits self-actualization which is desired by a healthy personality. Second, the chain of command assumes that concentration of power and authority at the top of the hierarchy of authority is necessary and sufficient for effective and efficient operation of an organization. The incentive and control systems of this structural arrangement make the individual dependent upon and passive toward the leader. Third, the unity-of-direction principle can produce problems if the individual is not permitted to participate in goal setting or defining methods of attaining stated objectives. Finally, the span-of-control limits the amount of self-control and reduces the time perspective of people at the bottom of the chain-of-command. Reduction in span-of-control facilitates closer control, which presupposes individual immaturity (Wren, 1972:447). Based on his research, Argyris proposed that the formal organization creates feelings

of failure and frustration, short time perspective, and conflict within a healthy individual. Defensive reactions stemming from these feelings and nonfulfillment of individual needs can range from regression, aggression, noninvolvement, and restricted output, to removal from the conflict situation (Argyris, 1957:77).

Management, faced with the reactions of the worker, also reacts by using more autocratic, directive leadership, by tightening organizational controls, and by adopting a pseudo-human relations approach designed to rationalize the work situation instead of trying to eliminate the causes of employee discontent (Wren, 1972:447-448).

Argyris' work was not aimed at removal of the management controls which characterize the formal organization, but his writings were directed toward proper administration of management controls, and designing organizational activities so that there was goal congruence between management and the individual. Argyris' proposal for attaining goal congruence considered job enlargement, participative management, dispersal of responsibility, and "reality-centered" leadership. By increasing the number of tasks performed, an individual is given a greater opportunity to use more of his abilities and is given a greater sense of power and control over his work. Employee centered management reduces dependence and submissiveness which aids the individual in achieving self-actualization while furthering the goals of the organization. Challenge through responsibility and reliance on employee self-direction and self-control are

considered prerequisites for organizational design. Argyris contends that "...through awareness, understanding, and modification of organizational practices that the healthy individual can be nurtured in a healthy organization and that both can achieve their goals and needs. Harmony...is not sweetness and light but the maturation of people in enlightened organizations" (Wren, 1972:448).

The Role of Theory "X"/Theory "Y" in Management. Management of human resources is far from being an exact science. All principles of management are based upon man's conceptions and beliefs; therefore, managers and supervisors must operate on the basis of certain assumptions about human nature and human behavior. McGregor contends that these managerial assumptions are all-important in determining the manager's style of operation (McGregor, 1968:35). Since the level of control is a function of managerial style, individual motivation and satisfaction can be greatly influenced by managerial assumptions about man. Traditional assumptions about human behavior are typified by McGregor's Theory "X" which leads to tight control over the employee at work.

The underlying assumption of Theory "X" is that individuals have an inherent dislike for work. The average worker is viewed as one who shuns responsibility, prefers to be led, exhibits little if any ingenuity and ambition, and is adamantly opposed to change. Therefore, if organizational goals are to be achieved, management must constantly coerce, direct, and control workers at all activity levels (Porter, et al, 1975:36).

This kind of management is commonly described as "getting things done through people; however, in reality it can be described as "getting things done in spite of people". This type of manager can be effective in the short term, but in contemporary times with lower order needs basically satisfied, he will experience high turnover in personnel. An alternative approach to this often self-defeating type of management is summed up in McGregor's Theory "Y" management concept.

Contrary to McGregor's Theory "X" is his Theory "Y" which is based on the following assumptions (McGregor, 1968:48-56).

1. Expenditures of physical and mental effort by individuals is a natural act. Furthermore, assumption is made that individual and organizational objectives are congruent.

2. The average worker's talents and potentials are only partially utilized. Given the chance, individuals can and will employ imaginative and creative methods in meeting personal and organizational objectives.

3. Man will exercise self-direction and self-control in the service of objectives to which he is committed.

Theory "Y" infers that there is nearly an unlimited potential in most people. Its presence is not a function of management activities other than simply providing an outlet whereby people are able to recognize and develop their potentials for themselves. This entails providing individuals with increased responsibility, greater delegation of authority, and opportunities to do demanding, challenging work. These ends are most efficaciously reached through the job itself.

Although these sets of assumptions about human behavior may appear to be exhaustive categories, McGregor conceived them as the extremes of a continuum along which any individual

may place himself at any given time. McGregor's thesis is not that man exemplifies either Theory "X" or Theory "Y" assumptions in total. Instead, his implication is "...that to the extent that one adopts and practices Theory "Y" assumptions, the people with whom he interacts will exhibit motivated behavior" (Maher, 1971:12).

Using these characteristics as a framework for analysis, the author believes that traditional or Theory "X" assumptions about human behavior are most prevalent in the style of leadership, supervision, and direction experienced by the Air Force member, especially at the lower levels in the hierarchial structure. Any legal order given by an Air Force member in a position of authority is backed-up by the threat of punishment for non-compliance which is embodied in the Uniform Code of Military Justice. Further, the Code itself is written in a positive manner to compel persons to do certain things (such as obey lawful orders) under threat of punishment for failure to comply. The Air Force system of personnel evaluation (effectiveness and performance reports) carries an inherent threat of punishment for failure to measure up to an ambiguous standard which is in the mind of the evaluator. Furthermore, in the author's opinion, coercion and the threat of punishment is inherent in the class structure of the military rank system. Whether the directive style of leadership is necessary to maintain discipline or developed because the services have been manned largely by non-volunteers is not within the scope of

this research. The writer intends to merely point out its possible implications to the concept of worker motivation and satisfaction.

There are two possible explanations for the lack of motivational force within the military structure. The first is that the underlying assumptions of Theory "X" are valid and that Air Force selection processes fail to screen out these types of individuals. The second is that Theory "X" is true and the highly defined and structured organizational policies and practices have not allowed full realization of individual potential. The author believes that both factors are complementary in producing an overall negative behavior pattern; however, he submits that the latter factor is more relevant. Command elements tend to view management in terms of disciplining for failure to follow written procedures and practices, instead of reinforcing efficient and effective performance.

According to Robert C. Miljus (1970:37), management practitioners and behavioral researchers conclude that managers and supervisors can no longer simply compel their subordinates to perform in a desired manner and reap long-range benefits such as retention. In the past, management has utilized authoritarian means to attain their objectives; however, changing social values, more and better educational opportunities, and a more receptive labor market have made negative motivational methods obsolete.

If the military organization is to remain an effective and efficient operation, the management approach must be made more flexible in order to deal with the better educated and more independently minded workforce. Objectives and standards must be maintained, but flexibility in procedures and methods must be allowed.

If managers perceive the workforce in terms of Theory "X", then their methods of management will be very structured and limited in scope so as to exercise a high degree of control and discipline. This method will generate little if any motivation to perform and could adversely affect mission accomplishment. On the other hand, employment of Theory "Y" assumptions will most likely stimulate motivation resulting in more innovation, greater resourcefulness, and more effective performance. A Theory "Y" manager will most likely see his overall task as being that of using his talents and position to create an environment necessary for self-motivation and self-direction (McGregor, 1969:11-12).

HUMAN NEEDS AND MOTIVATIONAL THEORY: BACKGROUND FOR JOB DESIGN

> People come to an organization because they expect it will satisfy some of their wants. (Supplement to the Air Force Policy Letter to Commanders, 1971:23)

Social scientists have long recognized that human needs motivate human behavior (Porter, et al, 1975:40). Basic to the understanding of human behavior within an organizational setting is a knowledge of what an individual needs from that organization. The traditional approach to describing human needs has been to

define them in terms of material incentives such as money and better living and working conditions. Although these factors have a place in the Air Force's effort to motivate and retain needed personnel, the answer lies primarily in the promotion of human need satisfaction that will contribute to job satisfaction, and thus to satisfaction with an Air Force career. If the USAF is to play an effective role as a need satisfier, it is paramount that supervisors at all levels understand the psychological needs of the individual. This discussion will look at the full range of individual needs--concentrating primarily on those which supply psychological compensation.

Maslow's Hierarchy and Motivation. McGregor and Argyris explain differences in men in terms of behavioral characteristics exhibited within the work area. Despite these widespread individual differences, men display certain common characteristic needs. Because of these observable common factors in human behavior, many attempts have been made to identify and classify the needs which influence the level or intensity of individual motivation to engage in some form of behavior (Porter, et al, 1975:42). The idea that needs motivate behavior suggests that people are motivated when they are dissatisfied with their current state of existence. That is, they are pushed to engage in some form of behavior because of some felt deficiency.

The most universally accepted statement about the nature and workings of human needs has been forwarded by Maslow. According to Maslow's basic theory, people have five broad classes of needs (listed hierarchically): (1) physiological,

including hunger and thirst; (2) safety, both physiological and psychological; (3) social or love; (4) self-esteem; and (5) self-actualization, or the need to fulfill oneself (Porter, et al, 1975:42-43). The latter four categories comprise man's psycho-social needs.

Maslow's primary contribution has been to establish a "hierarchy of prepotency" for these needs, implying that one level of needs only becomes important after the levels beneath it have been largely satisfied. Individuals are assumed to move upward in the hierarchy as long as environmental factors do not prevent him from satisfying lower-order needs (survival and physical safety). Failure to satisfy a dominant need can cause anxiety and frustration which leads to defensive behavior often resulting in employee turnover (Katz, 1960:63).

Another important assumption of the theory suggests that a satisfied need does not motivate (Porter, et al, 1975:43). This statement should not be interpreted as meaning that the more one has of something, the less he will be motivated to obtain more of the item. It is only when total need satisfaction is attained that motivation becomes a dormant factor (Cummings, 1973:25).

Within the Air Force, realignment of pay scales in recent years has essentially permitted all personnel to satisfy their physiological needs. As a result of restructuring and stabilizing of career fields and eligibility requirements, most personnel have been able to develop realistic security. Prime emphasis on value engineering and safety programs have virtually

made the Air Force a safe environment in which to work. As such, organizational rewards such as money and the prospect of increased job security (reinforcers which presumably satisfy lower-order needs) most often do not motivate personnel to greater organizational effort (Leadership in the Air Force, 1974: 3-9 and 3-10).

Although most people are able to fulfill their basic needs of identifying with the organization, the volumes of checklists, regulations, and policy procedures tend to stifle individual innovation and motivation. McGregor states that most times management recognizes the importance of social needs but tends to consider them a threat to the organization. He states that this remains so although studies have demonstrated that the tightly knit cohesive work groups are usually more effective than an equal number of separate individuals in achieving organizational goals. Because of management's fear of group hostility to its own objectives, it often goes to extremes to control and direct human efforts which are directly opposed to the natural group tendencies of human beings. The consequence is that man's social needs and perhaps his safety needs are thwarted, and he may become resistant, antagonistic, and uncooperative toward organizational objectives (McGregor, 1960:37-38). The only alternatives are to be content with fulfillment of lower-order needs or to seek outside involvement to fulfill their needs for meaningful accomplishment. It is from this aspect that work schedules could greatly influence need fulfillment and individual satisfaction.

Maslow states that the need or desire for an objective evaluation of self, for self-respect, or self-esteem, and for esteem of others exists in all people within our society (with a few pathological exceptions). These esteem needs can be divided into two subsets. The first of the subsets is the desire for strength, for achievement, for adequacy, for mastery and competence, and for independence and freedom. The second subset is the desire for reputation or prestige (respect from other people), status, recognition, attention, importance, and appreciation. Satisfaction of these needs leads to feelings of self-confidence, worth, capability, and of being useful and necessary in the world. On the other hand, thwarting of these needs produces feelings of inferiority, weakness, and of helplessness (Maslow, 1959:90-91). Within the hierarchy, the esteem needs are of the greatest significance to management, but they are most rarely satisfied. McGregor infers that the typical organization offers few opportunities, at lower levels, for satisfaction of these esteem needs. He also states that the potential for fulfillment of these needs can exist at this level; however, the organizational patterns and practices of scientific management contribute much to the thwarting of these esteem needs (McGregor, 1960:38).

The need for self-actualization is vague; however, it is primarily viewed as the need to develop one's full potential. This need is not readily apparent in most people because the deprivation they experience with respect to lower-level needs

diverts their energies into the struggle to satisfy those needs, and self-actualization needs tend to remain dormant (McGregor, 1960:39). Rigid organizational patterns, detailed work instructions, and the routine nature of most jobs (as currently designed) characterizes the maintenance technicians' environment as one where this need is not actively pursued.

If the Air Force is to attain new levels of personnel dedication, professionalism, productivity and job satisfaction, avenues must be opened whereby individual motivation will be stimulated and higher-order needs can be fulfilled. Argyris (1957:76) asserts "that at all levels, particularly the lower ones, healthy individuals will tend to have their self-actualization blocked or inhibited because of the demands of the formal organization"; however, changes within the formal structure could provide for fulfillment of the four lower categories of needs.

Presently, various Air Force organizations are initiating programs under the general concept of job enrichment aimed at motivating individuals through job satisfaction. Within the past two decades, many behavioral scientists and management theorists have attempted to identify those work centered factors which motivate people and lead to job satisfaction. While no single theory to date fully describes this complex psychological phenomenon, the most popularized and most influential theory regarding work redesign has been the Herzberg Two-Factor Theory of motivation and job satisfaction (Herzberg, et al, 1959:13).

Herzberg's Motivation-Hygiene Theory. The classic approach to motivation, prior to Herzberg's Two-Factor Theory, was concerned primarily with the work environment. Herzberg asserts that this factor is necessary, but it is not sufficient, within itself, for effective motivation. A more important set of factors which a manager must consider is the work itself (Herzberg, 1959:40-45).

In essence, the theory proposes that the "motivators", those factors conducive to employee satisfaction, are intrinsic to the work itself and to the rewards that flow directly from performance of that work. Furthermore, the most potent of these factors are those that fulfill higher-order needs by fostering a sense of personal growth and self-fulfillment (See Figure 1 for listing). Dissatisfaction, on the other hand, is seen as being caused by a separate and distinct set of factors which are extrinsic to the work itself (See Figure 1). These aspects of the work environment are called "hygiene" factors and are most influential in satisfying an individual's lower-order needs.

Although a sense of satisfaction may be experienced through a sense of achievement only, Herzberg concluded that higher-levels of satisfaction are experienced when achievement is accompanied by recognition. Recognition which produces good feelings about the job does not necessarily have to come from supervisors. Recognition from peers, "customers", or subordinates may be as effective as that from one's supervisor. "Where recognition and achievement are viewed as leading to possible growth, the chances are two-to-one that there will be increased positive feelings toward the job" (Filley and House, 1969:363-364).

FIGURE 1

FACTORS AFFECTING JOB ATTITUDES

Environment (Hygiene) [1]	Work Itself (Motivators) [2]
Organizational policies and administration	Feeling of achievement
Supervisory style	Pride in work accomplished
Working conditions	Recognition for accomplishment
Interpersonal relations	Increased job responsibility
Money, status symbols, security	Opportunity for growth and development

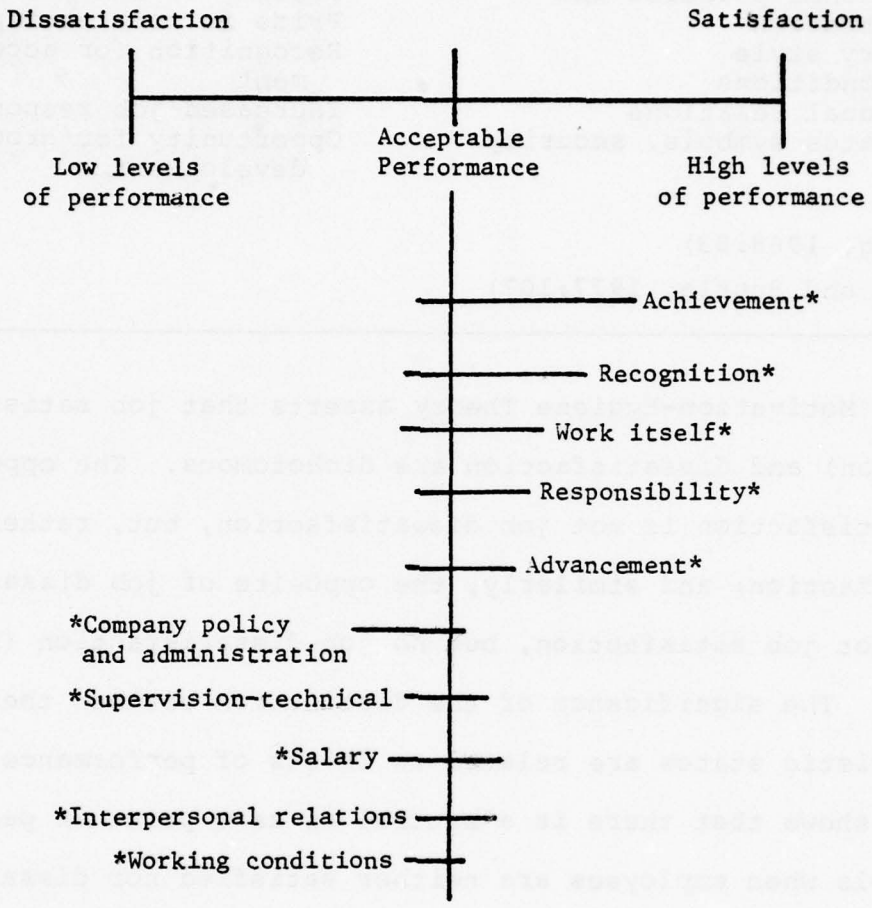
[1] (Herzberg, 1968:53)

[2] (Hackman and Suttle, 1977:107)

The Motivation-Hygiene Theory asserts that job satisfaction (motivation) and dissatisfaction are dichotomous. The opposite of job satisfaction is not job dissatisfaction, but, rather, no job satisfaction; and similarly, the opposite of job dissatisfaction is not job satisfaction, but no job dissatisfaction (Herzberg, 1959:60). The significance of the distinction between these two characteristic states are related to levels of performance. Figure 2 shows that there is a neutral or zero point in performance levels when employees are neither satisfied nor dissatisfied with their jobs. When an individual experiences this state, he will perform at the minimal acceptable level necessary to maintain his job and employment (Sanford, 1973:174).

[1]FIGURE 2

Relative Effects of the Motivation-Hygiene Factors on Satisfaction-Dissatisfaction and Performance



[1](Sanford, 1973:179)

Job satisfaction and dissatisfaction are primarily affected by different sets of factors, and therefore, each has different effects upon employee motivation and performance (see Figure 2). The "hygiene" factors tend to affect dissatisfaction and performance below acceptable levels; whereas, the "motivators" tend to

affect job satisfaction, motivation, and performance above acceptable levels (Sanford, 1973:174-175).

The Motivation-Hygiene Theory does not necessarily imply that motivating factors are more important than the hygiene factors; it merely implies that the two sets of factors affect motivation and performance in different ways and to different degrees. One must realize that the "hygiene" factors are a priori in that they must be adequately provided for before the satisfying factors become effective determinants of job behavior. Unfortunately, Herzberg contends, there is little effort on the part of management to focus on the higher order needs.

There has been and continues to be much criticism of Herzberg's theory with most of it centering around the research methodology and the general validity of the theory (House and Wigdor, 1967:372-375). First, Vroom hypothesizes that defensive behaviors of the respondents condition the sources of satisfaction and dissatisfaction (Vroom, 1964:12). That is, people may be more likely to attribute the causes of satisfaction to their own achievements and accomplishments on the job. On the other hand, they may be more likely to attribute their dissatisfaction not to personal inadequacies but to factors in the work environment. The second criticism is that the theory is a gross oversimplification of the true nature of employee motivation. Based on their research, Dunnette, Campbell, and Hackel (1967:147) conclude that motivator and hygiene factors serve both as satisfiers and dissatisfiers.

Although there are reservations about the universality of Herzberg's Two-Factor Theory, there is consensus that the underlying tenets of the theory are basically valid (but not all inclusive) and that the structuring of the job itself may hold the key to worker satisfaction. Although the theory is essentially unverified, the Air Force's position is that the Two-Factor Theory is a workable theory (New View, 1967) and is currently being employed in numerous organizations. In the words of Evans (1970: 34), another critic of the theory, "... on the whole these suggestions, provide useful guidelines for management action. Our quarrel is not with these suggestions, but with the underlying theoretical position, and the way in which it was derived." Therefore, when applying the theory, managers should realize that the theory is not a "cure-all, do-all" approach to their motivational problems.

Based upon his dual-factor theory of motivation, Herzberg has postulated his prescription for a motivated work force. This technique is termed job enrichment, and it will be discussed in Chapter III, "Job Redesign: The Application of Motivation Theory".

Vroom's "Expectancy Theory" Model of Motivation. Throughout the past two decades, extensive research has been conducted on organizational and job configuration in an attempt to stimulate productivity through worker motivation. Technological and physical environment factors have been identified as major determinants of effective organization and job design, and thus they have received prime emphasis. However, recently the

"social" or "human relations" environment has been researched in an effort to establish the effect of management personnel behavior on worker attitudes. These research findings have been characterized by a series of shortfalls since they are based on the assumption that all people react and behave in a common characteristic way. From the standpoint of individual satisfaction, researchers are finding that not all people view rewards in the same manner, and that people react to stimuli differently based on their individual preference ordering. Victor H. Vroom has done extensive research on the motivational and need dimensions resulting from individual differences, and he has forwarded the most commonly accepted model of individual motivation (Davis, 1972:60). Vroom's theory is basically ahistorical in form; however, it parallels the earlier work of Lewin (1938) and Tolman (1930's) (Porter, et al, 1975:56).

Vroom's theory links motivation to the perceived desirability of various outcomes; the probability of these outcomes occurring, as perceived by the individual; and the individual's perception of his ability to influence the outcomes. That is, an individual exhibits preferences among the various outcomes which can be influenced by his own actions, and that individual motivational level is a function of both how much personal value an outcome holds and the degree to which the individual feels that he can influence that particular outcome (Vroom, 1964:15-16). The motivational relationship is expressed as:

Valence X Expectancy = Motivation

Valence, the anticipated satisfaction, can be defined as the relative strength of individual preference for a given outcome when grouped with all possible outcomes. Expectancy, the perceived probability, is a measure of belief that a preferred outcome will result from a chosen action. These two factors determine the rate of response to engage in a given behavior (Davis, 1972:60).

Vroom points out that it is necessary that the valence of an outcome to a person not be confused with the value of an outcome to that person. "An individual may desire an object but derive little satisfaction from its attainment--or he may strive to avoid an object which he later finds to be quite satisfying. At any time there may be a substantial discrepancy between the anticipated satisfaction from an outcome (i.e., its valence) and the actual satisfaction that it provides (i.e., its value)." (Vroom, 1964:15).

At first observation, the relationship between preference patterns, value judgements, and behavior patterns appears very simple. To better understand the interrelationships, it is necessary to consider the concept of "instrumentality", the belief that a particular initial outcome will or will not be followed by some second level outcome. That is, the thought of valence applies to both the first and the second level outcomes.

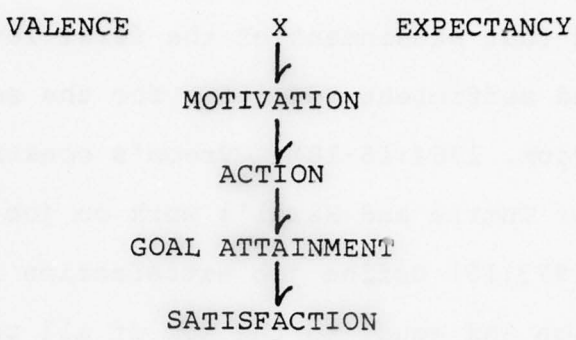
Expectancy is an action-outcome relationship (a probability) ranging from a zero measure indicating that there is no perceived outcome for a given action to a value of one indicating that there is a perceived outcome associated with a given action. Instrumentality, on the other hand, is an outcome-outcome relationship (a correlation). Instrumentality can take on either positive or

negative values ranging from minus one (-1), indicating a belief that only the second level outcome is for certain, to plus one (+1), indicating that both first and second level outcomes are possible and that attainment of the first level outcome is a necessary and sufficient condition for the second level outcome to occur (Vroom, 1964:15-18). Vroom's construct provided the basic structure for Tuttle and Hazel's work on job satisfaction. Tuttle and Hazel (1973:16) define job satisfaction in terms of valence within the job and equal to the sum of all possible second level outcomes experienced in a job times the instrumentality for each individual outcome. That is, job satisfaction is a function of all perceived job outcomes, good or bad, and the satisfaction expected from each of the possible outcomes.

Vroom's motivational model (Figure 3) shows the relationship between the basic theory concepts and the feeling of satisfaction within the worker. Work and work environment factors which are conducive to individual need fulfillment, complemented by congruency between worker actions and outcomes, fosters motivation which leads to a particular action. Theoretically, this action is directed to satisfying goals which in turn provide individual satisfaction.

[1]FIGURE 3

A Diagram of Vroom's Motivational Model



[1](Davis, 1972:61)

Based on the model, there are two ways that people can be motivated. First, the positive value of the outcomes (valence) may be strengthened through better communication about the "true" value of the outcomes or by actually increasing the outputs as a result of increasing individual rewards. Second, it is necessary that the outcome be made more highly correlated with the work activities. Either the actual probability of expected outcomes must be increased or, in the absence of knowledge of the actual outcome, communication (i.e., feedback) must be improved (Davis, 1972:60).

Vroom's model is not a behavioral theory but one of motivation only. Motivation will not enhance performance if ability or role perceptions are inaccurate. What Vroom's model does is, it explains how goals influence effort.

SUMMARY

This chapter has provided an examination of the interrelationships between man, work, and motivation that may lead to a job satisfied individual. These concepts illustrate the nature of man and provide an insight into how he may be motivated by and within the work environment. Man has insatiable needs, and he will continually use his energy to satisfy these needs. Needs interact with the environment to produce on-the-job wants which both management and workers try to satisfy. Incongruency in organizational goals and worker needs greatly influence on-the-job performance. These wants vary from time to time, and an employee effectively "satisfies" them according to his perceptions of reality rather than maximizing them. If the individual aspirations are to be maximized, the tangible outcomes must coincide with the perceived outcomes, not only in content but also in probability of occurrence. Furthermore, these wants are given direction and stimulus by the motivational and hygiene factors existing within the work environment.

The Motivation-Hygiene concept has demonstrated that those things which cause dissatisfaction, when eliminated, do not significantly enhance job satisfaction, but rather only achieve the absence of dissatisfaction. Therefore, to improve the work environment and to enhance individual satisfaction, primary attention must be given to the "motivators". Although there are reservations about the universality of Herzberg's motivational concept, there is a consensus that structuring of the job itself, based on the division of satisfaction/dissatisfaction factors, may hold the key to worker satisfaction.

Finally, it is evident that a supervisor manages his people based on the way he perceives the nature of man. As a supervisor, it is important to realize this phenomenon and discipline one's self accordingly.

III. JOB REDESIGN: THE APPLICATION OF MOTIVATION THEORY

> The greatest motivation is achieved when the employee perceives his work and output as having meaning, worth, dignity, and status.
> (Leon C. Megginson) (Sanford, 1973:381)

> The employee must be provided more "power" over his own work environment and therefore he must be given responsibility, authority, and increased control over the decision making that affects his immediate work environment. (Argyris, 1972:70).

One element of industrial or service life that persists as a major concern for management is the attention to productivity. No matter what "state" an organization is in, management continually tries to draw a better return on its capital investments. When viewed in terms of the human portion of the organization's capital, management is faced with an ever constant problem, that of employee motivation.

At the worker level, productivity difficulties have been attributed to the practice of maximizing task specialization, that is, attaining efficiency through the establishment of fractionalized, repetitious, and programmed jobs. This type of job design leads to dissatisfaction with the work performed and, by and large, instills within the worker a just-get-by attitude (Gallagher and Einhorn, 1976:358).

Recognition of these motivational problems in the late 1940's led management away from specialization and an industrial engineering (time and motion) focus on job design toward an employment philosophy designed to elicit intrinsic rewards (i.e., feelings of self worth, accomplishment, and satisfaction) from

the work effort. The new work-motivation viewpoint is manifested in job redesign efforts commonly labeled as job enlargement and job enrichment.

This chapter describes these major job design approaches, specifically those forwarded by Herzberg and Hackman, et al, examines the motivational assumptions upon which these concepts are based, and describes the processes involved in applying each technique. Additionally, the implications of both theory and practice which aid decisions of whether or not to implement a job design program are discussed.

JOB DESIGN: AN OVERVIEW

Job design is defined as "the specification of the contents, methods, and relationships of jobs in order to satisfy technological and organizational requirements as well as the social and personal requirements of the job holders" (Rush, 1971:5). Throughout the nineteenth and twentieth centuries, management theory centered almost exclusively on the technological and organizational requirements of business. However, the Hawthorne studies begun in 1927 were instrumental in shifting the emphasis toward research into the worker's social and ego-related needs and to how the job environment can fulfill these needs.

This research has led to the evolution of two major types of job design efforts both aimed at engaging the motivational forces of workers' egoistic needs through the establishment of job characteristics which enhance intrinsic rewards. The first category involves job enlargement, job extension, and job rotation.

This design concentrates upon increasing employee motivation by adding variety in tasks whereby related types of activities are added to a central task (also commonly known as "horizontal loading").

Closely related to the enlargement approach is job rotation. This concept is designed to give a worker a broader perspective of his activities in the overall operation and entails rotating an employee through a series of supporting jobs centered around a core job. The intended effect of this concept as with job enlargement, is to enhance worker motivation by eliciting greater intrinsic awards through a more varied and supposedly more interesting job (Rush, 1971:13).

The second type job design, job enrichment, is aimed at enhancing worker motivation by "...giving the worker more of a say about what he is doing, including more responsibility for deciding how to proceed, more responsibility for setting goals, and more responsibility for the excellence of the completed product" (Gooding, 1970:162). The intended motivational method is to have the employee assume more of the planning and evaluation aspects of his job. These types of activities raise the level of difficulty and complexity of the job thereby providing challenge and growth potential; dimensions which are highly correlated with satisfaction of higher order needs and worker productivity.

Although both job design concepts may enhance individual motivation, the author concludes that the concept of job enrichment is more inclusive in that it provides methods whereby higher

order needs can be fulfilled while also attaining the objectives of job enlargement and job rotation concepts. Therefore, the discussion of job design theory is limited to job enrichment concepts.

PROPOSED BENEFITS OF JOB ENRICHMENT PROGRAMS

Applying job enrichment is basically the process of providing supplementary motivational aspects to a job in order to make the work meaningful. Rather than merely increasing the size of the job, job enrichment increases the scope and complexity by offering greater responsibility and challenge, and the opportunity for growth and achievement. The primary benefit which management hopes to achieve through job enrichment is increased employee motivation which in turn will increase the individual's productivity, satisfaction, and commitment to his job.

Job enrichment can also help bring the job up to the level of challenge commensurate with the skill that was hired. One of the most frequent worker complaints is that they are not being used to their full potential (Sheppard and Herrick, 1972:192). Also, by enhancing the employee's capabilities and increasing the scope of his responsibility, the supervisor is released from many of the tasks which are not directly related to his role as supervisor. Job enrichment is most applicable at the lower-level jobs; however, introduction of such a program will most likely set off a chain reaction which would easily result in enrichment of supervisory jobs, thereby releasing them so that they can devote their time to matters of greater importance to the organization.

An effective job enrichment program may also be a key factor in helping solve the personnel retention problem. Studies on worker motivation consistently indicate that personnel turnover is inversely related to the amount of job satisfaction experienced. The Air Force study, New View (1967:141), showed that personnel working in jobs characterized by only a few active motivational factors are much more likely to have unfavorable career intentions than people in jobs where the motivational factors are actively employed.

Unlike many of the areas of human relations in which research and managerial practice have not developed specific methods and techniques for applying the theory, somewhat systematic approaches to the practical application of motivation theory have been developed. These job enriching techniques are manifested in three basic guidelines for redesigning jobs.

BASIC GUIDELINES FOR ENRICHING JOBS

Dr. Herzberg, and other theorists, have validated three basic guidelines for enriching jobs so that they provide motivation and encourage top performance. These three guidelines, as enumerated by H. Robert Sharbaugh, President of the Sun Oil Company (1971: 415), are summarized below.

First, the theorists have established that workers are motivated by jobs that provide challenge, growth, advancement, and the opportunity to achieve. Therefore, if a worker is to become motivated, the job should be designed such that the individual is permitted to make maximum use of his skills and talents. The worker should be given a module of work which has built-in personal

responsibility. The individual should be given the opportunity to participate in decisions about how the work will be done, and he should be provided with immediate feedback on how the work is progressing. Finally, each job should be designed so that the individual may become more involved as his skills develop.

Second, research has shown that the need to participate is a basic drive in man (Davis, 1967:615); therefore, workers are more receptive to proposed change if they are involved in the design process from the beginning. Basically, people want to participate because when they do, it involves their whole being, thus giving a dimension of meaningfulness to their work. Work which is only responsive in nature leads to boredom and low motivation (Hulin and Blood, 1968:42).

Finally, authoritarian supervision stifles creativity and the feeling of responsibility. As noted by Renis Likert (1967: 367), permissive supervision tends to be associated with higher productivity while close supervision is associated with lower productivity. To quote Dr. Herzberg (1959:74), "As managers, we start having positive control of the job only when we stop concentrating on trying to control people". The key to a highly motivated workforce is effective communication and an atmosphere of mutual trust; not pressure to work harder, toe the line, and obey the rules and regulations.

Using these guidelines as a framework, two conceptual approaches to work redesign that attempts to specify the conditions under which positive work motivation can be generated and maintained have been developed. These approaches are

applications of Herzberg's orthodox job enrichment model based on his Motivation-Hygiene Theory and Hackman and Oldham's job characteristic model based on their core job dimension theory.

HERZBERG'S JOB ENRICHMENT MODEL

The Motivation-Hygiene Theory, previously discussed, established the theoretical foundation upon which Herzberg constructed his orthodox job enrichment technique. The key element upon which the technique was built was acceptance of the "motivation through the work itself concept". That is, scientific application of job enrichment involves an in-depth analysis of the job content dimensions. More specifically, Herzberg contends that any attempt to apply job enrichment principles must focus upon the motivational aspects associated with the work itself. (See Chapter II, page 35. Ford (1971:212) summarized the "work itself" concept as an "...attempt to help a family of supervisors systematically restructure a job (work itself) to allow the employee opportunity for maximum motivation and involvement in his work". Herzberg's approach to job restructuring was to change the basic nature of the work that the individual performs in order to make simple, meaningless work more rewarding and satisfying (Sanford, 1973: 396). Herzberg's technique of job restructuring does not deny the potential benefits of specialization, it only points out that "as jobs become more and more specialized and fragmented, they require less and less of individuals' total abilities, and it becomes harder and harder for workers to see any intrinsic meaning and value in their work" (Sanford, 1973:386). Therefore, the best

approach to better performance is motivation through job restructuring so that the jobs require greater ability and skill and are, therefore, more meaningful.

Dr. Herzberg (1974:71) has suggested several ingredients that help to enhance motivation and job satisfaction. These factors are direct feedback, a client relationship, a learning function, individual opportunity to schedule and evaluate his own work, direct communication, and personal responsibility.

These factors were designed into a "vertical job loading" job design concept forwarded by Herzberg in 1968. This vertical loading gives the worker access to some of the motivating elements that allow him to perpetuate his motivation from accomplishment of the task itself. This concept can be summarized into three broad principles.

1. Create a meaningful slice of work for each worker. Avoid excessive fragmentation of work by structuring jobs so that each worker is given a natural grouping of tasks that he will perceive as a whole, complete function.

2. Remove some control but increase the accountability of individuals for their own work. Recognize good work through performance feedback and identify deficiencies directly to the responsible individual and make him accountable for corrective action. Reward good performance with additional responsibility and more job freedom.

3. Assign tasks commensurate with employee development and encourage professionalism in specific areas of interest and aptitude. That is, allow and encourage advancement within a given job and within a given profession (Herzberg, 1968:59-61).

Herzberg was also instrumental in providing a basic pattern to be followed in implementing job restructuring. Although the actual step-by-step procedure is not rigid, any job enrichment program should consider at least the following steps (Herzberg, 1968:61-62).

1. Set up a controlled experiment in the initial stages of job enrichment. This involves identifying two equivalent control groups--one which will experience no change in job structure (criterion for evaluation) and the other which will experience systematic introduction of motivators over a period of time. Hygiene factors should be allowed to follow their natural course for each group. Pre- and post-testing should be limited to "motivator items" so that the results will not be contaminated by hygiene induced feelings of the workers.

2. Jobs should be selected in which (a) investment in engineering and technology will not make job changes too expensive, (b) poor attitudes and performance exists, and (c) motivation has the potential of making a difference in performance. Once identified, suppress the feeling that the content of the job is sacrosanct. Approach the job with the conviction that it can be changed.

3. Use first and second level management to brainstorm a list of possible changes which may enrich the job. This should be accomplished without regard for proposed change practicality.

4. Screen the list of proposed changes eliminating those that (a) involve hygiene factors, (b) portray glittering generalities such as "give them authority commensurate with responsibility", or result in horizontal loading.

5. "Avoid direct participation by the employees whose jobs are going to be enriched." Herzberg warns that this participation gives only "a sense of making a contribution" and that their direct involvement, although a valuable source for recommended change, "contaminates the process with human relations hygiene..." Herzberg contends that it is the job content which "will produce the motivation, not attitudes about being involved or the challenge inherent in setting up the job" (Herzberg, 1968:62).[1]

The principles of job enrichment stated here are not necessarily all the applicable principles nor is the listing of steps toward job enrichment all-inclusive; however, they are some of the more important ones. For a more comprehensive explanation of the principles and the process, one is referred to The Motivation To Work by Frederick Herzberg, 1959.

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[1]The author believes that the restricted participation of employees at this stage of job restructuring indicates that Herzberg's approach tends to be method bound. Although this approach may be valid in some situations, reported benefits from employee participation throughout the enrichment process are widely documented.

Managers are cautioned that although the principles presented by Herzberg are closely related, not all of them are complementary. There are probably very few cases where all the principles can be applied. On the other hand, there are very few jobs to which none of the principles apply. The question is not really whether the principles apply to a specific situation or not; the question is which principles will provide the greatest motivation with the least amount of difficulty (Sanford, 1973:389).

"...What the Herzberg theory does, and does well, is point attention directly to the enormous significance of the work itself as a factor in the ultimate motivation and satisfaction of employees. And because the message of the theory is simple, persuasive, and directly relevant to the design and evaluation of actual organizational changes, the theory continues to be widely known and generally used by managers of organizations in this country" (Hackman and Suttle, 1977:108).

Despite their considerable merit, Herzberg's Motivation-Hygiene Theory and approach to job enrichment fails to consider the objective characteristics of the particular job and the differences in how responsive people are likely to be to enriched jobs (Hackman and Suttle, 1977:108-109). Herzberg's failure to operationally define the motivating factors leads to difficulties in using the theory to plan and implement actual changes in jobs. That is, the significance level of the motivational factors is so dependent on the dynamics of the organizational setting that it is impossible to systematically diagnose the status of jobs prior to change or to measure the effects of job enrichment after the change.

Additionally, Herzberg's approach to job design was based on the assumption that the motivating factors had the potential to increase the work motivation of all employees. Research by Kaplan, Tansky, and Bolavia (1969) substantiated the fact that lack of concern for the individual differences in a major weakness of job enrichment on the basis that it did not address itself to "...differential interpretation which workers may attach to particular job situations, the varying degrees and aspirations of different levels of workers, differences in values among workers, and differing degrees to which jobs lend themselves to enrichment programs" (Kaplan, et al, 1969:793). They go further in their criticism and say that application of job enrichment without regard for these possible differences among workers may in fact alienate the group of workers that it was intended to motivate. The criticism is not aimed at discounting the validity of the approach; it only indicates that the approach is not all-inclusive in its treatment of motivation and job design theory. The model has been and is presently being successfully employed in many organizations. Although the technique has its limitations, it provides a good "first-cut" attempt at enhancing motivation and productivity.

In 1974, a job design model was proposed by Hackman and Oldham which examines how job characteristics and individual differences interact to affect the satisfaction, motivation, and productivity of individuals at work (Hackman and Oldham, 1974b: 8). The model builds on and complements the previous work of

Herzberg, but for the first time it provides a set of tools for diagnosing existing jobs and establishes a procedure for translating the results into specific steps for change.

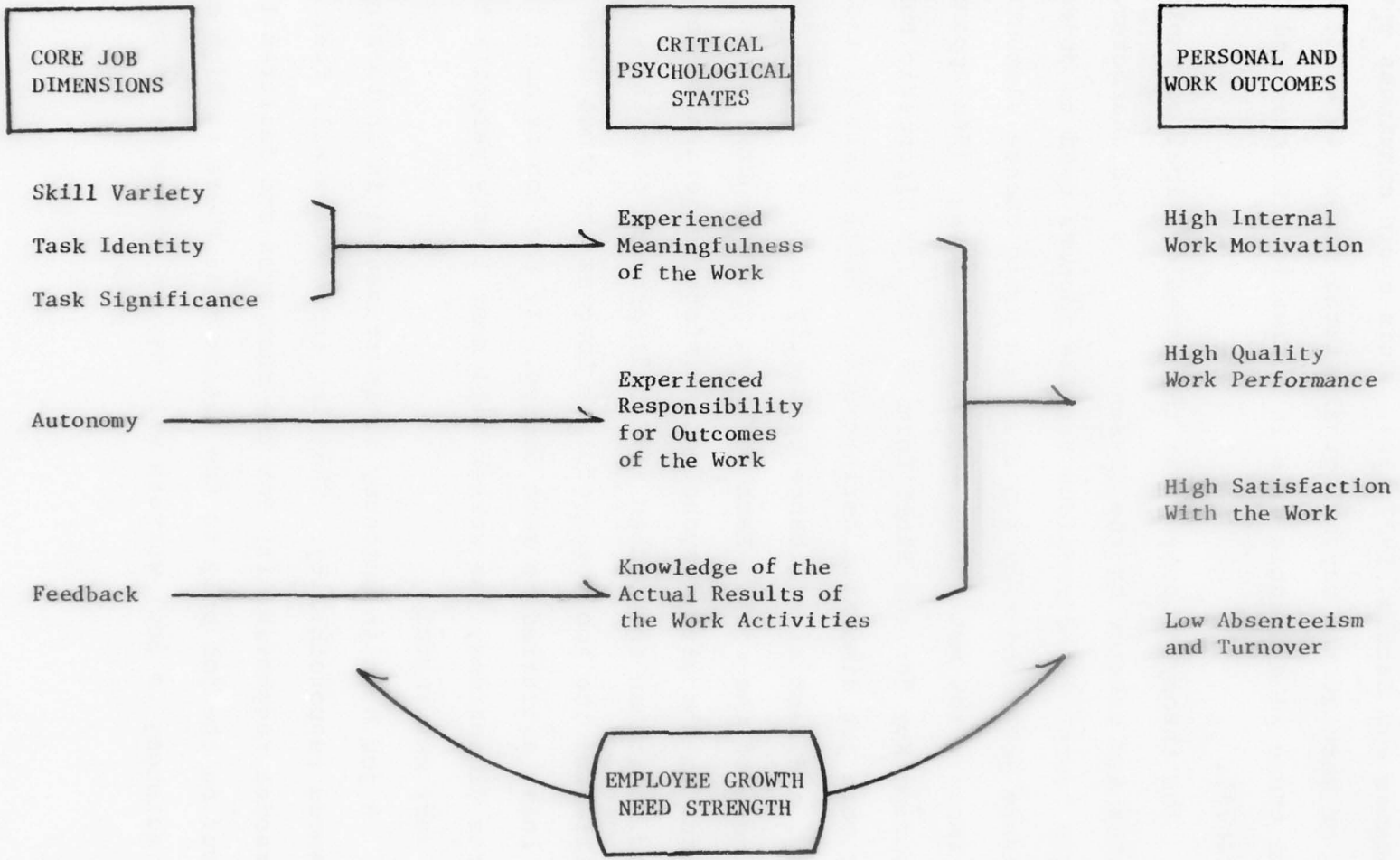
HACKMAN AND OLDHAM'S JOB CHARACTERISTIC MODEL

The basic job design model proposed by Hackman and Oldham is shown in Figure 4. The model proposes that five core job dimensions create three critical psychological states which in turn satisfy different individual and organizational objectives. The effectiveness and efficiency of the model is moderated by individual growth need strength (Hackman and Oldham, 1974b:7,8).

Professor Hackman and his associates at Yale University (Hackman and Oldham, et al, 1974b:2) have identified three psychological states which are critical in determining personal motivation and job satisfaction. These states are : (1) experienced meaningfulness, which deals with perceiving the job as worthwhile; (2) experienced responsibility, which fixes personal accountability for work outcomes; and (3) knowledge of results or a determination that work outcomes are satisfactory. When these states are present within an individual, he tends to display good feelings about himself which in turn encourages him to continue to improve his level of performance so that he will earn more positive feelings. This condition is commonly referred to as "internal motivation" because the positive internal feelings generated by doing well provide the motivation to work effectively. "The net result is a self-perpetuating cycle of

[1]FIGURE 4

The Relationships Among the Core Job Dimensions,
The Critical Psychological States, and On-the-Job Outcomes



[1](Hackman, et al, 1974b:3a)

positive work motivation powered by self-generated rewards" (Hackman and Suttle, 1977:130). This cycle continues until one or more of the psychological states ceases to exist at which time there is a drastic drop in motivation (Hackman and Oldham, 1974b:3).

The theory proposes that the three critical psychological states are enhance by the presence of five job characteristics. These "core" job dimensions are the factors used to objectively measure jobs, and they are also the basic change elements employed to improve the motivating potential of jobs. (See Appendix "B". "Scoring Key for the Short Form of the Job Diagnostic Survey", for core job dimension definitions.) Skill variety, task identity, and task significance primarily enhance experienced meaningfulness of the work. Each of these job characteristics is an avenue to the given psychological state, experienced meaningfulness. Hackman and Oldham (1974b:5) propose that the worker may still find the job meaningful as long as the three dimensions are at least satisfied to some degree. If the job is high in all three dimensions, the worker will most likely perceive the job as very meaningful.

A job high in autonomy is instrumental in increasing experienced responsibility. That is, individuals will feel strong personal responsibility for the successes and failures that occur on the job only to the extent that there is high autonomy. If autonomy is low, workers will have a strong tendency to rely

on his supervisor for instructions or rely heavily on job procedure manuals for instruction (Hackman and Oldham, 1974b:15).

Knowledge of results is enhanced when a job is high on feedback. Although useful feedback can come from co-workers or any level of management, the most powerful feedback is that which emanates from the work itself. Effective feedback is fostered by giving a worker accountability as well as holding him responsible for the work (Hackman and Oldham, 1974b:5).

The theory diagrammed in Figure 4 proposes that all core job dimensions, through the three critical psychological states, collectively produce the depicted individual and work outcomes. Following this theory, it is possible to combine the five core job characteristic scores into a single index which reflects the overall potential of the job to prompt internal work motivation within the workers. Arithmetically, the score is the product sum of the critical psychological states (Hackman and Oldham, 1974b:6).

$$MPS = \frac{(\text{Skill Variety} + \text{Task Identity} + \text{Task Significance})}{3} \times \text{Autonomy} \times \text{Feedback}$$

Examination of the formula shows that autonomy and job feedback core dimensions are most significant in eliciting positive work motivation. In cases where only one dimension leading to experienced meaningfulness is present, there is still a high probability that positive work motivation will be present.

Although the motivating potential of a job may be high, not everyone can become internally motivated in his work. Hackman, et al, cautions that the theory will not "work" with equal

effectiveness for all individuals. The degree to which positive work motivation may be solicited from an employee depends upon his psychological needs. Hackman, et al, propose that indivivual growth needs have the power to moderate the relationship between the characteristics of jobs and the work outcomes as depicted in Figure 5. Workers who exhibit high growth needs will become "turned-on" to jobs which rate high on the core dimesnsions; however, workers who do not value personal growth and accomplishment may find such a job aniety arousing and too demanding (Hackman and Oldham, 1974b:6).

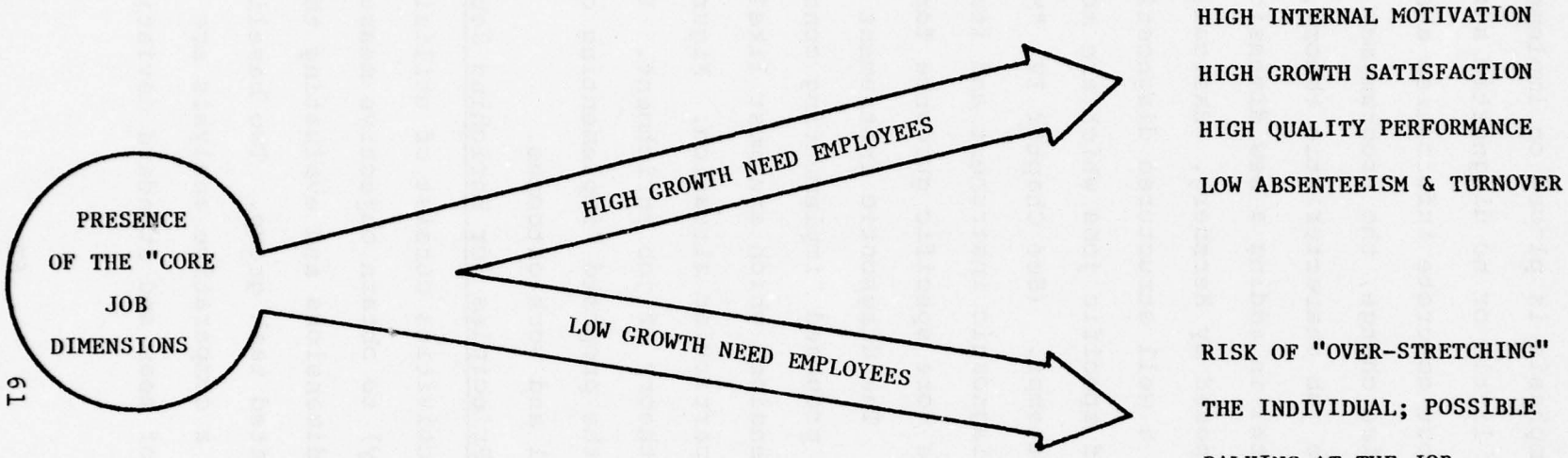
Unquestionably, everyone exhibits some level of need to grow and develop; however, "...unless that spark is pretty strong, chances are it will get snuffed out by one's experience in typical organizations" (Hackman and Oldham, 1974b:6). That is, senior employees may find it difficult or impossible to become motivated when given the opportunity.

Hackman, et al, propose that such cases are the results of the organizational structure and/or policies, and therefore that the organizations are liable for actions designed to eliminate this effect. Their suggestion for eliminating this inability is to place the worker in a job where he is "stretched beyond his reach" in an effort to rekindle the fire for the good of the individual and the organization.

Many job enrichment program failures are directly attributable to inadequate diagnosis of the target job and worker reaction to it (Hackman and Oldham, 1974b:7). Job enrichment is oftentimes viewed as the panacea for all behavioral problems,

[1]FIGURE 5

The Moderating Effect of Employee Growth Need Strength



[1](Hackman, et al, 1974b:6a)

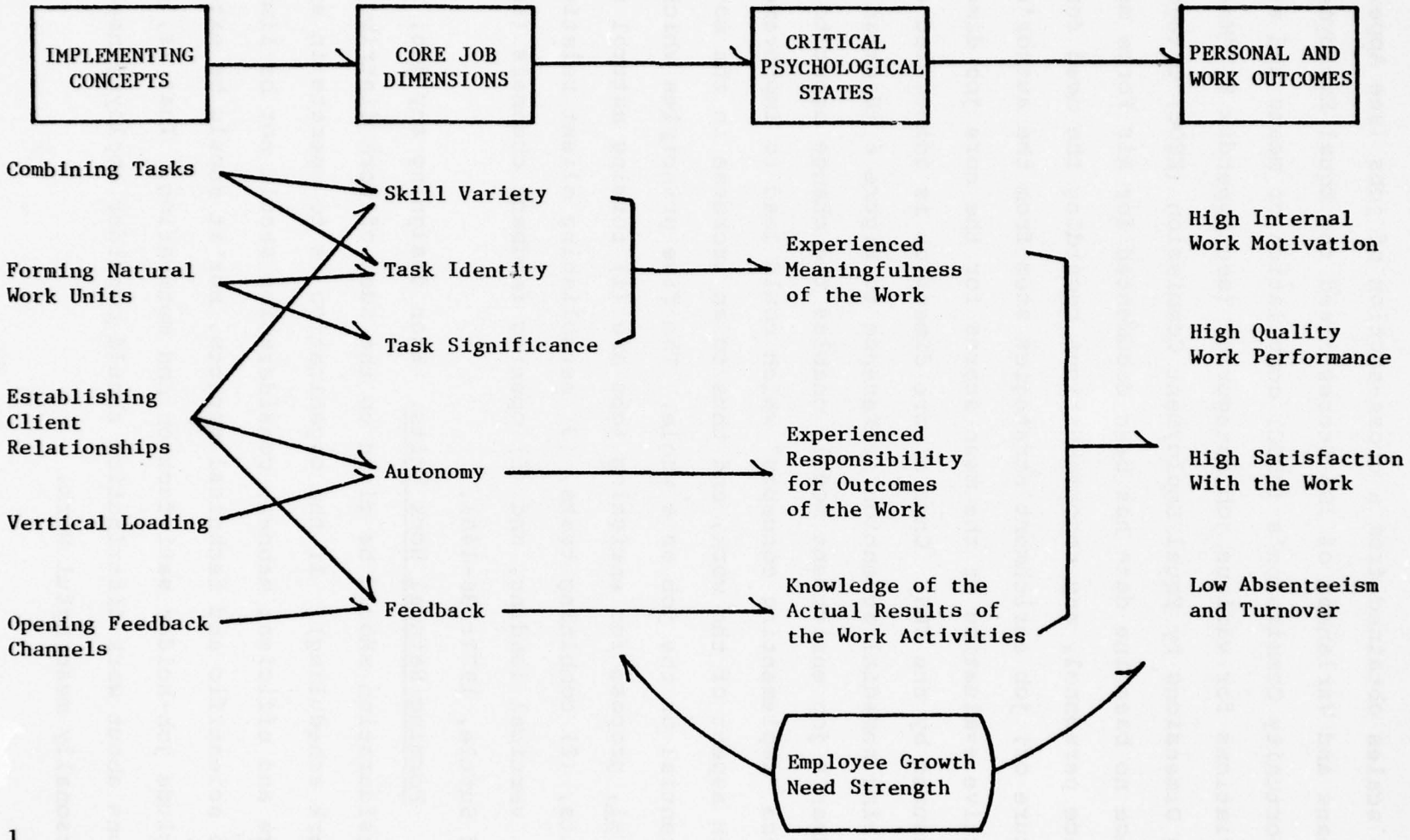
and therefore prime emphasis is placed on implementing the technique even though little or no diagnostic activity has been performed. Without concrete information about what aspects of the job require change, the program may be doomed to failure. Based on the job characteristic theory, Hackman and Oldham were instrumental in adding a new dimension to the job enrichment theory proposed by Herzberg. Basically, the technique involved use of a well structured diagnostic tool for identifying aspects of specific jobs which are most critical to a successful change attempt. (See Chapter IV, "Methodology" for a discussion of the diagnostic instrument and its use.) Additionally, they propose more specific guidance for implementing the proposed changes. The diagnostic instrument (Job Diagnostic Survey, JDS) ties the proposed "implementing concepts" directly with the core job dimensions which are most likely to have the greatest impact in a particular situation. Figure 6 illustrates Hackman and Oldham's theory of job enrichment. It depicts the relationship between the proposed "implementing concepts" and the resulting personal and work outcomes.

Hackman and Oldham's Principles for Enriching Jobs

Job diagnostic activities consist of utilizing the JDS (Job Diagnostic Survey) to obtain objective measurements for each of the core job dimensions and evaluating them using baseline data for the related task group. Two baseline data files which may be used for a comparative analysis are Hackman and Oldham's compilation of mean and standard deviations of the

[1]FIGURE 6

THEORY OF JOB ENRICHMENT BASED ON THE JOB CHARACTERISTIC MODEL



[1]Hackman, et al, 1974b:12a

JDS scales obtained from a cross-section of jobs (see Appendix D, "Means and Variances of JDS Scores") and the Equal Employment Opportunity Commission's (EEOC) compilation of means and standard deviations for various job categories (see Appendix E, "Means of Job Dimensions by Equal Employment Commission (EEOC) Categories"). Since no baseline data has been documented for Air Force maintenance personnel, any recommendations regarding the need for (and nature of) job enrichment strategies stem from the author's subjective evaluation of the mean scores for the core job dimensions measured by the JDS. Once a core dimension is identified as requiring remedial attention, reference to Figure 6 (Hackman and Oldman's job enrichment model) enables the change agent to identify those "implementing concepts" which could lead to improvements in each aspect of the work, and thus to an increase in the motivating potential of the job as a whole. The five principles which Hackman, et al, propose for enriching jobs are (1) forming natural work units, (2) combining tasks, (3) establishing client relationships, (4) vertical loading, and (5) opening feedback channels (Hackman and Suttle, 1977:136-140).

Forming Natural Work Units. When designing any job, special consideration should be given to the idea of work distribution (work scheduling). If the organization is to operate in an effective and efficient manner, consideration should not be limited to the scientific and technical aspects, but it should be extended to include job-holder satisfaction and motivation. That is, decisions about work distribution should consider employee needs for personally meaningful work.

Random assignment of tasks to a specialist results in worker inability to identify with the given "piece" of work or the benefiting agency, and therefore no feeling of accountability is experienced by the worker. On the other hand, a feeling of "ownership" and meaningfulness of the work is fostered by creating natural work units. A preliminary step in creating natural work units is identification of the basic work items. Once identified, these items are grouped into natural and meaningful categories. In the case of the maintenance crew chief, he might be assigned continuing responsibility for all relevant maintenance performed on a given aircraft. However, such procedures do not negate the requirement to distribute the workload equitably. The crux of the approach is that it entails dovetailing task assignment procedures so that an employee's work results in an identifiable and meaningful whole.

The ownership fostered by the "natural units of work" concept can instill within the worker a feeling of meaningfulness and reward rather than a feeling of irrelevance and boredom. The opportunity to perform a job in its entirety directly enhances skill variety and task identity. Ownership of "a larger piece of the pie" will foster a greater sense of how significant the given work really is (i.e., task significance) (Hackman, et al, 1975: 63).

Combining Tasks. Fractionalization of jobs, such as assembly-line work, is commonly justified by its efficiency in terms of direct production costs; however, this type of job

structuring can lead to hidden costs such as high absenteeism, high turnover, and extra supervisory requirements. One possible method for improving an organization's cost-effectiveness is that of combining related tasks. The principle of combining tasks involves putting existing and fractionalized tasks together to form new, larger modules of work.

In some cases, a job made meaningful will involve such a large module of work that an individual can not do all the work by himself. In such circumstances, consideration should be given to aggregating the tasks into the new, larger task and assigning it to a small team of workers, who are given great autonomy for its efficient completion. A team approach such as a squadron maintenance concept is an example of the application of this principle.

Combining tasks enhances experienced meaningfulness of the work by expanding the task identity characteristics of the job. Here, a maintenance worker or maintenance team can identify with an end product, an operationally ready aircraft, rather than seeing his job only as a "means of attaining the end product". Additionally, the larger number of tasks that are combined into a worker's job, the greater the variety of skills the worker must exercise in performing the task. Therefore, task combination also leads to greater experienced meaningfulness by expanding the skill variety core dimension (Hackman, et al, 1975:63-64).

Establishing Client Relationships. Traditional management principles virtually eliminated the opportunity for the worker to consider or contact the ultimate user of the products of the

workers labors. However, "modern" management techniques provide for and encourage workers to establish direct relationships with their "customers". This action can simultaneously improve jobs in three ways. The activities required to develop and maintain a personal relationship enhances skill variety because it is necessary to utilize an entirely new set of skills, i.e., interpersonal and management skills. Feedback increases because the worker has a greater opportunity to receive direct praise or criticism of his work outputs. Most often, this feedback will be more favorably accepted if received directly than if continually received through one's supervisor. In the case of the aircraft maintenance technician, the aircrews should be the other significant "party" in the worker-user relationship. Autonomy can increase; however, only to the degree to which the workers are given direct responsibility for managing the relationship with the "product" user (Hackman and Suttle, 1977:138).

Vertical Loading. Vertical loading is a reverse application of specialization that attempts to make motivation inherent in work by closing the gap between the performance and planning, controlling functions within an organization. That is, an attempt is made to make the work more meaningful by giving the workers some of the responsibilities and controls that were formerly reserved for management personnel. Some vertical loading strategies are:

1. Remove some of the day-to-day control over individuals. This process may entail giving the worker greater discretion in setting work schedules, deciding on work methods, and performing evaluation on personal work.

2. Increase personal authority and accountability. By allowing workers to deviate from formal authority lines, the work schedules may be shortened and the increase in authority and accountability will increase employee's responsibility and provide recognition for their abilities.

3. Allow individuals to become specialists. Specialization in a particular task is not to be confused with specialization that results in the performance of minute parts of tasks. This technique involves specialization in terms of natural units of ability rather than specialization in terms of simple parts of complex tasks.

The ultimate result of vertical loading is increased internal motivation brought about through increased feelings of responsibility and accountability (Hackman and Suttle, 1977:138-139; Hackman, et al, 1975:64-65).

Opening Feedback Channels. Among the various sources of performance appraisal information, the most informative and beneficial source is from the job itself. Specific advantages of job-provided feedback are (1) it is immediate and private, (2) it is non-threatening in that it eliminates the probability of experiencing interpersonal "clashes" when the worker is directly confronted by his supervisor, and (3) it increases the worker's feelings of personal control over his own work.

Although there is no universal method for providing feedback, there are some general strategies which enhance feedback mechanisms so that the worker is not isolated from naturally occurring data about his performance. Hackman and Oldham identify some ways in which existing management systems may be modified whereby "natural" feedback is made available to the worker.

Some of these methods are:

1. Application of the design principles of establishing client relationships helps break down the barrier between the worker and natural external sources of appraisal or criticism of his work.

2. By making quality control functions part of the worker's daily activities, the quality and quantity of data about his performance will foster a tendency for the worker to think quality rather than considering it as "someone else's business".

3. Within a formal organization, the traditional approach to performance appraisal dictates that the evaluation reports be kept by a supervisor and coordinated upward in the hierarchial chain. Many times, this information is either withheld from the organizations members or communicated to them in the form of "blanket" statements and the responsible worker is not provided definitive feedback on his performance. Many times, feedback on performance is also denied when supervisors covertly perform corrective action. Such practices deny the very information that could enhance individual internal work motivation and technical adequacy. One way of providing the feedback necessary to foster motivation and worker capability is to conduct performance reviews with each worker on a more frequently scheduled basis than the annual review cycle. No feedback throughout the review period coupled with an unfavorable report at the end will tend to alienate a worker. Timely, objective feedback, based on well-known performance standards, when properly communicated can be a very effective motivator to improve performance (Hackman, et al, 1975:65-66).

The principles for redesigning jobs as proposed by Hackman, et al, are not exhaustive; however, they are perceived as covering the most important ones. The significance of the principles listed is that they can be directly related to a specific aspect of the job so that a major restructuring program does not have to be undertaken in order to improve motivation, satisfaction, and performance. Job diagnostic efforts can be effective in determining and limiting the extent of the restructuring program (based on the motivational model presented). Other strategies for enriching jobs, although very similar to the job characteristic model approach, can be found in the work of Ford (1969), Glaser (1975), and Katzell and Yankelovich (1975) (Hackman and Suttle, 1977:140).

IMPLICATIONS FOR DECISION MAKING

A review of the applications of job enrichment in industry indicates that job enrichment programs have achieved varying levels of success. No specific reason can be universally identified as the single "causitive" factor; however, most failures (partial or total) have resulted from poorly structured change programs stemming from inadequate diagnostic efforts or from disenchantment with the overall program because it did not serve as a panacea for all of managements' behavioral problems. Before any decision is made to implement a job enrichment program, the manager must be aware of some of the implications accompanying such a program.

The success of any job redesign program depends upon what results management expects and demands. One of the major factors affecting "success" is establishment of success criteria. A determination must be made as to whether emphasis will be placed on quality or quantity of output. A series of studies by Lawler between 1950 and 1966 document that job enrichment programs are more effective in increasing quality of performance, with increases in output quantity being a by-product in approximately fifty percent of the cases (Gallagher and Einhorn, 1976:371).

Conceptually, this loading on the quality dimension can be explained in two ways. First, due to the acceptance of more tasks and control functions, workers undergoing job enrichment changes are often required to exert more effort just to meet pre-enrichment production levels. Management should anticipate no change in production quantity or possibly even a decrease in production quantity during the short-run adjustment period. However, the introduction of more tasks accompanied by more responsibility tends to have only positive effects on the quality of the work performed. The key point is that just because production quantity does not immediately improve, the job enrichment program should not be viewed as ineffective.

Second, the increased responsibility and authority characterizing job enrichment applications enhance feelings of accomplishment and self actualization. Generation of these intrinsic rewards brings on a realization of success which will in turn be reflected in greater involvement in, and more enthusiasm being displayed toward the work. The presence of these

factors will tend to be reflected in higher quality work (Gallagher and Einhorn, 1976:371-372).

Although the mechanism underlying the quality/quantity difference has not been established, studies by Hackman and Lawler (1960's) provide some confirmation of the theoretical concepts previously described. The practical implication of the dichotomy for management decision making is that "...job design changes enjoy a greater probability of success in effecting performance improvement when quality, rather than quantity of output, is of interest" (Gallagher and Einhorn, 1976:371-372).

Another relevant factor to job design decisions is that some individuals are either incapable or unwilling to assume responsibility or to perform enriched jobs under any circumstances. Job enrichment programs can not compensate for incompetence nor can it unseat deeply ingrained fear or dislike of responsibility. Studies conducted by Hulin (1971:159-188) indicate that management can not indiscriminately apply job design programs and expect success. A proposed enrichment program can not be planned and evaluated in isolation. Consideration must be given to the nature of the target work population.

Maslow's need hierarchy holds a possible explanation for the failure of enrichment programs to show positive results. Individuals whose lower order needs are not sufficiently satisfied, will have a tendency to direct their efforts toward attaining external rewards, and therefore the concept of work for <u>itself</u> may tend to produce alienation. An attempt to increase competence and self-actualization will most likely produce dissatisfaction unless the increased work load is

accompanied by more external rewards. Therefore, the degree to which the current reward system satisfies lower order needs will directly determine the beneficial effect of job enrichment upon the workers' efforts.

Finally, not all jobs lend themselves to enrichment, in total or by element. Some jobs are composed of either very basic or menial tasks which can not be changed to provide increased commitment or motivation. In this case, management must concentrate on the maintenance factors, and at least create an acceptable, non-dissatisfying job environment. However, in jobs which possess both enrichable and non-enrichable elements, management should concentrate on motivation factors on the one hand and maintenance factors on the other so as to create a healthy organizational environment which will stimulate individual commitment, motivation, and satisfaction. Although job enrichment may not be "appropriate" for all Air Force jobs, there is evidence that has shown that more jobs can be enriched than would be considered possible at first glance.

One of the primary requirements for successful application of job enrichment programs is the direct support of management personnel. Introduction of a program does not require total consent of the management structure; however, if a program is to "take roots", the immediate supervisory level (and preferably higher) must support the program. Upper level management opposition to an enrichment program is not necessarily critical in the early stages of implementation; however, higher level support is normally a must if an enrichment program is to succeed.

Additionally, once an enrichment program is implemented, it can not be allowed to "run its course". Continuous surveillance and refinement must accompany the application of job enrichment principles if the program is to succeed.

SUMMARY

To date, no single approach to job enrichment has provided the solution to all the "work-related" problems in society and more specifically in the Air Force. Fortunately, however, all the knowledge obtained through research applications of the philosophies of job enrichment have been cumulative. Today, we are better equipped to apply the most up-to-date methods to behavioral problems faced by Air Force personnel.

Herzberg's approach to job enrichment provides a strong foundation upon which most job redesign strategies have been formulated. Herzberg's approach involves the systematic application of his Motivator-Hygiene Theory to enrich jobs in order that they become more intrinsically meaningful and motivating to the people performing them. The strategy is based on the assumption that all men have some need to work at a meaningful task and that the "larger" a job, the more likely the possibility that latent motivational properties of the work are brought forth. The implication is that the motivational effectiveness of the job is dependent upon the degree to which the "motivators" are present and independent of individual abilities and attributes. Additionally, Herzberg contends that the workers' inputs are not significant factors in promoting job enrichment effectiveness.

Hackman and Oldham's approach to job design, although different, complements Herzberg's work. Whereas Herzberg's approach to job design is based on an intrinsic-extrinsic motivation concept, Hackman's, et al, strategy is based on an expectancy theory approach. They were instrumental in identifying five job characteristics (skill variety, task identity, task significance, autonomy, and feedback) which are assumed to elicit three positive psychological states (experienced meaningfulness, experienced responsibility, and knowledge of results) which are critical to an individual's motivation, satisfaction, and performance on the job. Additionally, the model provides a set of objective measures for diagnosing existing jobs and establishes a procedure for translating the diagnostic results into specific steps for change.

Although job enrichment activities are referred to as programs, the activities do not constitute an entity within themselves. Job enrichment activities and efforts must be viewed as an integral part of the purpose and functions of the Air Force's motivational efforts. Job enrichment must become an organization's "life style". By doing so, the Air Force will realize a far greater return on every manpower dollar invested, and each individual will be able to attain a higher level of achievement than he thought possible.

Retired Chief of Staff, USAF, General John Ryan made the following statements which pretty well sums up the need for job enrichment within all Air Force activities:

> ...we must close the gaps so that the goals of the individual and the goals of the Air Force are compatible and mutually attainable. After all, both revolve around the successful performance of vital, interesting, and challenging work, which in turn is rewarded by experience, proper recognition, pay incentives, and growth. By affording individuals a clear understanding of our objectives and by providing increased opportunity for people to achieve their personal goals, we can overcome the negative influences of today's sociological environment. (McIntire, 1974:20).

CONCLUSIONS

Job design and day-to-day operations must be structured upon a highly integrated theoretical framework of behavioral science. Man has the ability and potential to grow, develop, and self-actualize (McGregor); he has the inherent need to grow, develop, and self-actualize (Maslow); and organizations have the tools to provide employees with an environment in which they can grow, develop, and self-actualize (Herzberg). Air Force personnel possess these inherent abilities, capabilities, and needs. What is needed is for the Air Force to allow its managers authority to exercise flexibility and judgment in designing jobs and structuring tasks. If the Air Force is to become a more effective and efficient organization and fully benefit from the contributions of its qualified personnel, it must recognize the potential represented by its human resources and act accordingly. It must provide opportunities for growth, development, and full utilization of personnel talents. Job enrichment appears to offer one of the best strategies for meeting these demands and fulfilling the goals and objectives of the Air Force.

IV. METHODOLOGY

The purpose of this chapter is to describe how this study was performed. Discussion will encompass the nature and source of the data, the survey instrument, the overall analysis plan, and the analytic tools and how they are used to analyze the relationships between work/work environment factors and job satisfaction and career intent. Specific areas which are analyzed are the various aspects of job satisfaction as described by Turner and Lawrence (1965) and by Hackman and Lawler (1971), the potential of the various maintenance jobs for eliciting positive internal work motivation from the organization members (motivating potential scores, MPS), the degree to which maintenance personnel are satisfied and happy in his/her work, and the areas where maintenance personnel perceive a need for change.

STUDY GROUP

The sample population consists of only enlisted maintenance personnel who perform duty within a Tactical Air Command Fighter Wing Operational Maintenance Squadron (OMS) and Field Maintenance Squadron (FMS). Only those individuals who contribute "directly" to the repair, service, or flight operation activities are included in the study. Administrative and clerical personnel are considered to contribute "indirectly" to the operation.

Although the scope of this study provides for examining only one maintenance complex, the author believes that the characteristics of this single organization are representative of the aircraft maintenance operations throughout the Air Force.

To generate a data sample representative of all maintenance personnel, surveys were administered to individuals performing duty in each work area independent of any specific demographic variable (See Appendix "A", "Demographis" Section). The sample was randomly selected from personnel listings with the sample size for each work activity being proportional to the total number of personnel assigned. A total of 300 questionnaires were distributed to the selected personnel. The overall response rate and individual squadron response rates are shown in Table II. The response rates are considered adequate for this study and for any follow-on studies based on this data collection.

Table II

Questionnaire Response Rates

Organization	Number Distributed	Number Returned	Response Rate (Percent)
FMS	125	95	76.0
OMS	175	107	61.1
Total	300	202	67.3

THE SURVEY INSTRUMENT

The questionnaire used in this research is basically composed of three types of questions: those that measure: (1) demographic characteristics of the survey population; (2) the respondents' degree of satisfaction/dissatisfaction with the various dimensions used to describe their jobs; and (3) the respondents' overall satisfaction/dissatisfaction with their jobs. All questions are

oriented to capturing the individual's perceptions about his/her job.

Demographics. Although previous research findings based on AFMIG data collected in 1975 have shown that demographic variables are not significant factors in describing overall job satisfaction levels (*Thompson*, 1975:74-75), the researcher felt that due to the nature of the work performed by the study group and due to the absence of baseline data for similar groups that an extensive listing of demographic variables was necessary to this study (see Appendix "A"). Preliminary analyses includes these variables, but since Thompson's findings were validated for this study group, this classification of variables was excluded from the more rigorous analyses.

Core Job Dimensions (Job Factor Variables). One of the primary objectives of this study is to identify those key motivational dimensions or groupings which could be most influential in effecting a favorable change in the job performance and retention rates of tactical aircraft maintenance personnel. Although many different methodologies have been used to quantitatively assess job satisfaction, the author chose the Job Diagnostic Survey (JDS) (Hackman and Oldham, 1974a:63-73) as the device for identifying those job dimensions which account for work/work environment dissatisfaction. The Hoppock Job Satisfaction Blank (1935) is used to measure overall job satisfaction. Statistical analyses involving these scores and individual general job satisfaction scores allows the researcher to draw

conclusions and make recommendations which may be effective in improving maintenance personnel internal motivation and job performance.

JDS Description. The JDS is a job satisfaction measuring instrument which has as its theoretical basis the work of Turner and Lawrence (1965) and Hackman and Lawler (1971) (Hackman and Oldham, 1974a:2). The questionnaire itself is based on Hackman and Oldman's synthesis of these two theories. (See Chapter III, "Job Redesign: The Application of Motivation Theory", for discussion of this synthesis.) Two forms of the JDS have been developed: the JDS and the JDS Short Form. The author chose to use the short form for this study since it requires fewer item responses to measure the same objective job dimensions as does the JDS (Hackman and Oldham, 1974a:9). Additionally, a job rating form has been developed for surveying personnel in supervisory positions. Since all items contained in the job rating form are contained in the JDS Short Form and the demographic section of the survey instrument, the JDS Short Form was administered to the total sample population. Distinction between supervisory and non-supervisory personnel is accounted for in the statistical analyses programs.

Concepts Measured By The JDS. The JDS is designed to measure the three psychological states (experienced meaningfulness of the work experienced responsibility for the outcome of the work, and knowledge of the results of the work activities) which Hackman and Oldham identify as critical factors in the development and maintenance of high internal motivation, work

satisfaction, quality performance, and employee retention (Hackman and Oldham, 1974a:2,4). These "critical psychological states" are measured by tapping the scales for each of the various job core dimensions as discussed in Chapter III. The JDS Short Form does not provide specific scales for directly measuring these states; however, the magnitude of the scores for the core dimensions which enhance each psychological state (See Figure 4) gives an insight into the presence or absence of the factors which are characteristic of high motivation, high job satisfaction, and high retention rates. If these psychological states are to be quantified, the JDS, long form, should be used.

The JDS does not measure actual or perceived worker productivity. Instead, the instrument measures worker effective reactions obtained from performance of a given piece of work. The personal "rewards" are measured in terms of general job satisfaction, internal work motivation, and a series of specific satisfactions including job security, pay, social, supervision, and growth satisfaction (Hackman and Oldham, 1974a:6).

Finally, the JDS provides for a measure of individual desire to obtain "growth" satisfaction from his/her work. This measure provides an indication of how well an individual will respond to a job which is high in motivating potential.

Application of the theory, as depicted in Figure 4, allows one to compute a score which reflects the overall "motivating potential" of a job expressed in terms of the core job dimensions (skill variety, task identity, task significance, autonomy, and feedback). The motivating potential score (MPS) reflects the potential of a job for eliciting positive work motivation

from employees who exhibit growth need strength (Barrett, Dambrott, and Smith, 1975:66). The score is the product sum of all psychological states.

$$MPS = \frac{(\text{Skill Variety} + \text{Task Identity} + \text{Task Significance})}{3} \times \text{Autonomy} \times \text{Feedback}$$

Although many different concepts and individual reactions to one's job are measured by the JDS, the responses must be taken collectively to effectively diagnose a given job. A systematic plan for integrating the dimension responses into an overall diagnosis of existing jobs will be discussed later under "Diagnostic Use of JDS".

A sample of the Job Diagnostic Survey Short Form is contained in Appendix "A" (Sections I-V of the "Job Attitude Survey"). Scoring procedures for the short form are contained in Appendix "B". Samples of the Job Diagnostic Survey "Long Form", its scoring key, and the Job Rating Form are contained in The Job Diagnostic Survey: An Instrument for the Diagnosis of Jobs and The Evaluation of Job Redesign Projects by J. Richard Hackman and Greg R. Oldham, May 1974.

Instrument Validity. The substantive validity of the Job Diagnostic Survey for measuring the job characteristic model dimensions is discussed in detail in Appendix "C", "Job Diagnostic Survey Instrument Validity". In general, analyses have shown that the intercorrelations between the job core dimensions and the associated measures of respondents' reactions to his/her job are moderately high, thereby confirming the predictions inherent in the theory describing the model.

Diagnostic Use of the JDS. Although the JDS is a multi-purpose diagnostic instrument, the primary intended use of the JDS is in diagnosing existing jobs to determine if (and how) job redesign might improve worker motivation and productivity (Hackman and Oldham, 1975:159). The overall intent of this study is to use the JDS responses to identify any jobs or any operational conditions which account for marginal individual motivation and job satisfaction. The information obtained from this data is to be used as a basis for recommended policy change or job redesign.

The specific method which the author used to diagnose existing aircraft maintenance jobs is the method suggested by Hackman and Oldham. This procedure involves formulating a sequential analysis plan and investigating the JDS scores for each theory variable (See Chapter III) to establish their usefulness in making each diagnostic determination. The numerical scores for each variable tapped provides the basis upon which conclusions and recommendations are formulated.

A flow chart for the sequential diagnostic plan used in this study is depicted in Figure 7. A discussion of the relationships between the diagnostic activities and the construct of the JDS follows (Hackman and Oldham, 1974b:9-11).

Step 1. Are Motivation and Satisfaction Problematic? Many times, management perceives that sagging organizational productivity stems directly from low internal motivation and low work satisfaction of employees. The immediate reaction is to initiate a job enrichment program aimed at improving employee motivation and productivity when in fact poorly defined

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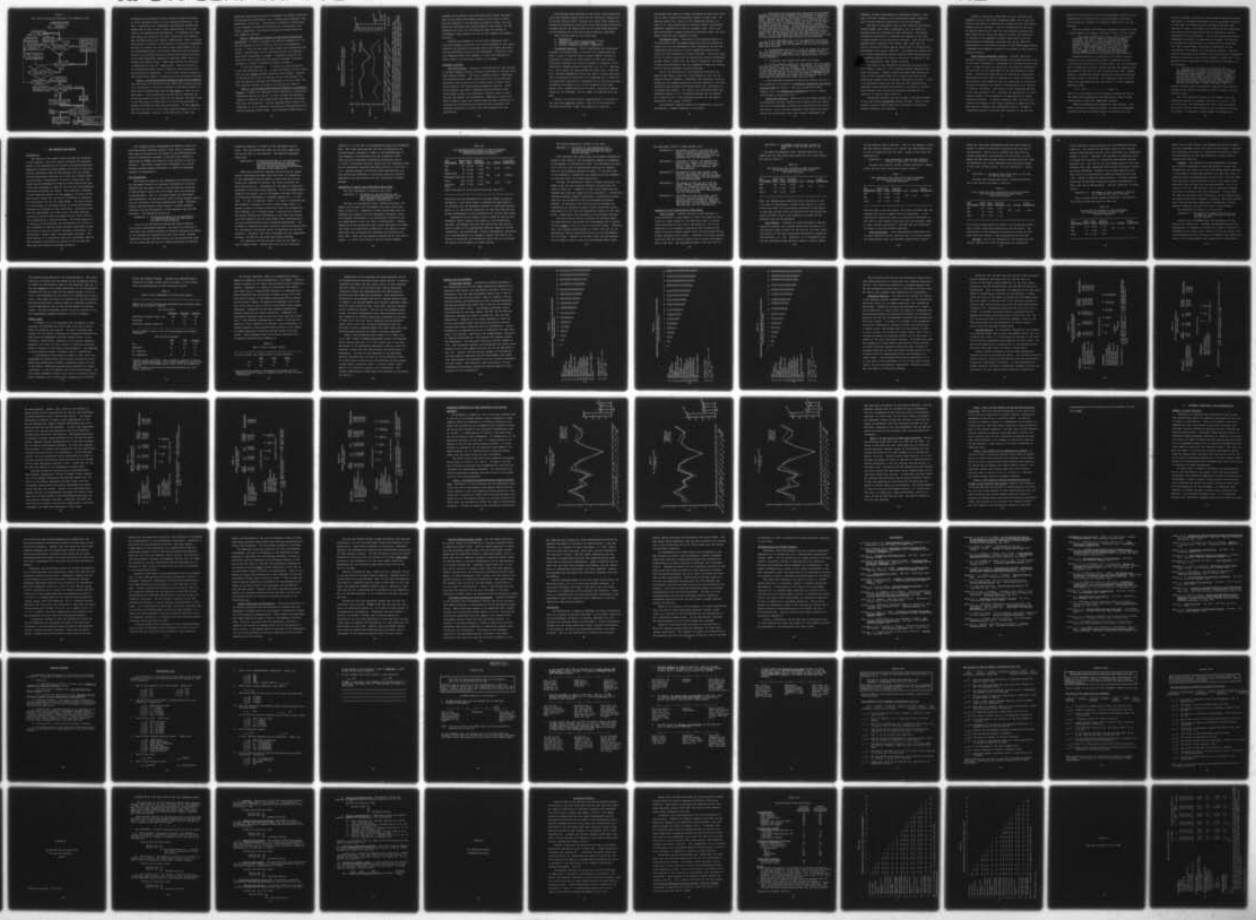
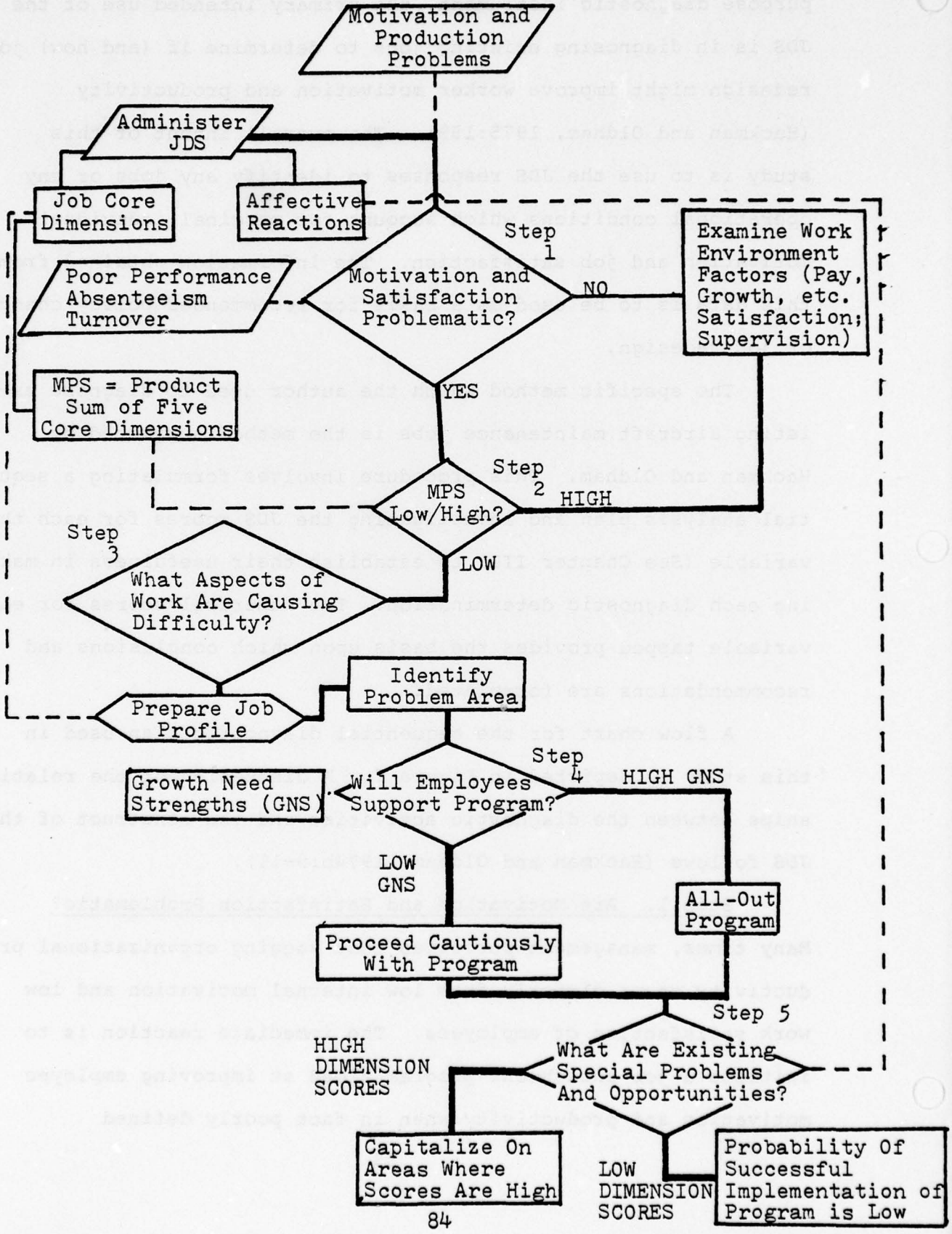


Figure 7

Flow Chart Showing the Sequential Job Diagnostic Plan



procedures and techniques, poorly designed production systems, or faulty equipment account for the degraded performance. The JDS in conjunction with independent organizational performance records may be used to make a quick determination of the real cause of the degraded work performance. By comparing the aggregate scores for motivation and work satisfaction with baseline data collected within the "parent" organization, within a similar organization, or within a cross section of industries, management may gain an insight into the effect which human behavior has on work performance within a particular organizational environment. Results of two studies which may provide some insight are those of the Equal Employment Opportunity Committee (EEOC) Study and Hackman and Oldham's study. These study results are contained in Appendices "D" and "E", respectively. Negative deviations from established norms could be indicative that motivation and satisfaction are problematic. In this case, further analysis of JDS scores may be useful in structuring a job enrichment program.

Step 2. How Much Motivating Potential Does the Job Exhibit? Once motivation and satisfaction are identified as being problematic, the specific job must be examined to determine whether the motivational problem stems from the job itself or from the work environment. This determination may be made by comparing the motivating potential score (MPS) for the specific job under study to the MPS scores of other jobs or to the scores validated by Hackman and Oldham and EEOC research efforts. If the aggregate MPS score for the job is low, more rigorous analysis of the job must be performed. However, if the MPS score is high, the

researcher must examine the work environment for factors accounting for motivational deficiencies (e.g., policies and procedures, pay, supervision, and so on). Indications of problems in these areas can be obtained by examining the scores for job security, pay, social, supervisory, and growth satisfaction aspects which are also tapped by the JDS.

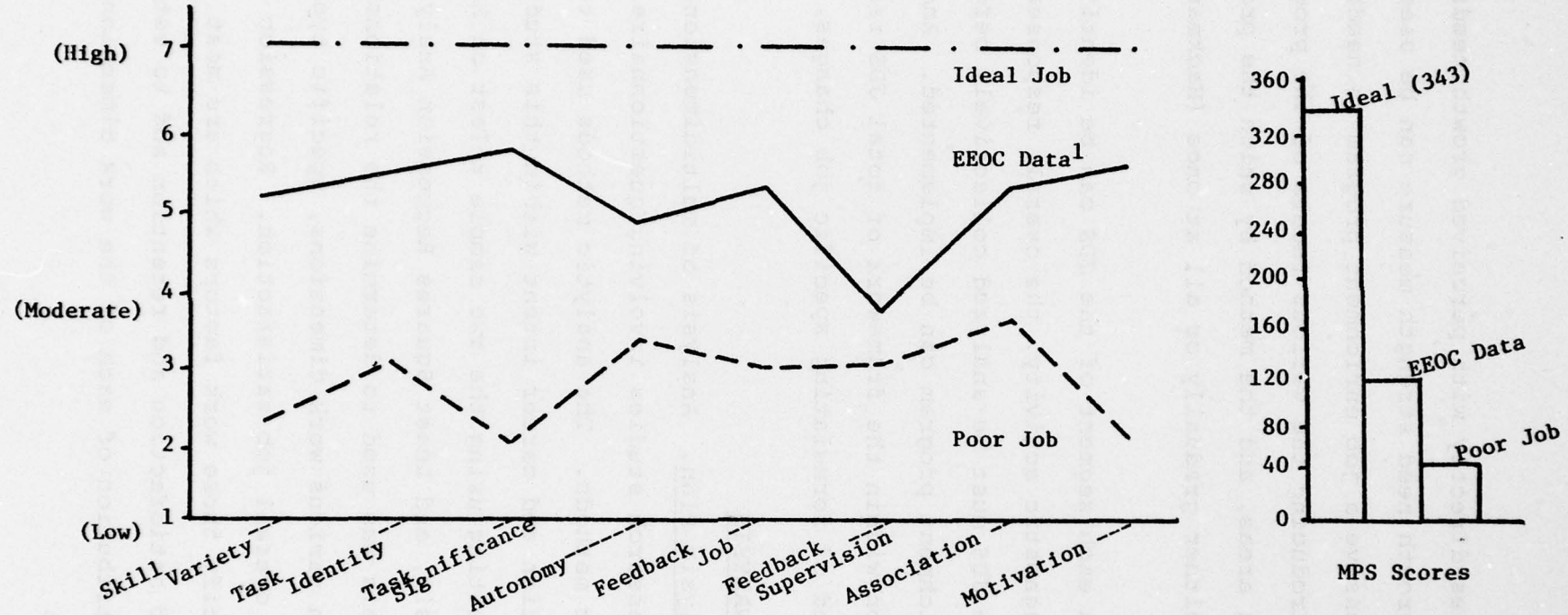
Step 3. What Specific Aspects of the Job Are Causing the Difficulty? In order to pinpoint the specific weakness of a job, one can examine the job in terms of the five core dimensions, Figure 4. Using the JDS seven point scales and corresponding MPS scores, "job profiles" can be constructed which will highlight areas where improvement is needed. Illustrative profiles for jobs which can be identified as "ideally" enriched, "normally" enriched, or "poorly" enriched are shown in Figure 8.

If job core dimension and MPS scores are high and productivity and motivation are low, the work environment factors rather than the work itself probably account for the problem. However, if the MPS score is low, an analysis of the "job profile" will show the specific strengths and weaknesses of the job itself and will highlight factors to examine in planning job redesign.

Step 4. Are the Employees Willing to Support a Job Redesign Program? Although the researcher may be effective in identifying troublesome aspects of the job, he must consider the employees' "degree of readiness" for change before any specific job enrichment plan can be devised. The JDS responses which readily lend themselves to use in planning activities are those measures which identify employee growth needs. Since employee receptiveness to

Figure 8

ILLUSTRATION OF JDS DIAGNOSTIC "JOB PROFILE"
(Dimesnion Scale Scores vs Job Dimensions)



[1]Normalized data for cross-section of jobs performed by skilled craftsmen. EEOC describes this work category as "Occupations in which workers perform jobs which requires special manual skill and a knowledge of the processes involved in the work-acquired through on-the-job training and experience or through apprenticeship or other formal training programs. Includes: mechanic, repairman, electricians, carpenters, heavy equipment operators, skilled machinists, and kindred workers" (Hackman and Oldham, 1974a:84).

redesign varies directly with perceived growth needs, the magnitude of the growth need strength measure can be used to determine how extensive a job enrichment program is needed, the timetable for introducing the various facets of the program into the different wok areas, and the method by which the program is introduced, either gradually or all at once (Hackman and Oldham, 1974b:11).

Although each segment of the JDS can be identified with a given job diagnostic activity, the overall responses to each scale tapped by the JDS must be analyzed collectively before any effective job enrichment program can be implemented. Analysis of each work dimension within the framework of total JDS responses provides a method of formulating specific job changes.

ANALYTICAL ANALYSIS

The Analysis Plan. Analysis of multidimensional data collected through research studies involving questionnaires involves using many analytic methods. The analytic methods used to investigate job satisfaction and career intent within this study group were hypothesis testing using the two sample t-Test on Means, Correlation Analysis, and Least Squares Regression Analysis. Correlation analysis was used to determine the relationships that exist between various work dimensions, specific types of satisfaction, and overall job satisfaction. Regression analysis was used to identify those work factors which are most influential in promoting job satisfaction and retention and to establish the relative contribution of each of the work dimensions to job satisfaction.

Data analyses were performed on the Control Data Corporation (CDC)-6600 computer system utilizing the Statistical Package for the Social Sciences (SPSS) (Version 6.50, April 1976) program developed by Northwestern University and the AID program (University of Texas Version) as adapted from the Air Force Human Resources Lab and modified for local use by Major McNichols (AFIT/ENS).

SPSS routines used for this study were:

1. FREQUENCIES
2. Comparison of Means and Variances (T-Test)
3. Pearson Correlation (PEARSON CORR)
4. Multiple Stepwise Regression (REGRESSION)

Preliminary Analysis. Prior to performing any statistical analyses on the data group, a review of all response data was made in order to identify cases in which "gaming" occurred (a subjective evaluation) or large amounts of data were missing. Individual responses were visually examined to determine if any discernible response patterns prevailed, e.g., all "A" responses, etc., and to check for large amounts of missing data. Additionally, the SPSS FREQUENCIES routine was used to compile statistics used to determine the distribution of responses and to check for any significant deviations in responses for the various groupings. Information provided by this routine consisted of the mean, median, mode, standard deviation, variance, minimum and maximum values for all responses, and the number of responses per category.

Based on the above criteria, approximately 0.50 percent of the input data could be rejected. Most of the discrepancies occurred with Section V data (see Appendix A) where the

individuals were asked to indicate the degree to which they would like to have a given characteristic present in their jobs. Responses ranged from a score of four (moderately desire) to a score of 10 (very highly desire); however, several cases showed numerical responses of 10 for all surveyed items. Due to the small percentage of cases containing "unreliable" data, the total sample responses were accepted as valid.

Two Sample T-Test. Evaluation of the perceived degree of job satisfaction for the sample populations and the comparative analysis of the work performed by each subgrouping involved the formulations and testing of several hypotheses based on both intra- and inter-groupings of survey responses. Since the intent of this initial analysis was to identify and evaluate differences between effects, rather than the effects themselves, two sample t-tests were performed on the two independent sample mean scores for the various dependent variables measured.

Due to the variability in the population from which the samples were drawn, there was a high probability that the two samples would be different. Therefore, the researcher could not assume that the sample populations actually differed in the characteristic being studied just because there was a difference in the sample mean scores. As a result, the researcher could only establish whether or not a difference between the two samples was "indicative of" a true difference between the two sample populations (Nie, et al, 1975:267).

The systematic approach used by the researcher to test for differences in sample responses is as follows:

1. After means and variances were calculated for the sample responses, F-tests were performed on the variances to determine whether or not there was a significant difference in sample variances. Definite values for the Student's t statistic, the statistic used for the two sample t-tests, can be calculated only if the variances for the two sample groups are equal. In the case of unequal variances, only an approximation to the Student's t statistic can be calculated. In the cases where the variances did not statistically differ, the SPSS T-TEST subprogram was used to calculate the t-statistic value and the probability of obtaining two samples that differed by more than the pair actually drawn, that is, the probability that the samples actually did differ. In the cases where the variances did significantly differ, all calculations were performed directly by the researcher.

2. A null hypothesis (H_o) and a corresponding alternative hypothesis (H_1) were formulated. In all cases, the null hypothesis was stated such that the assumption was that the two sample means were the same.

3. A significance level of $\alpha = 0.05$ was chosen for testing H_o. The significance level was the smallest probability that would be accepted as reasonable, i.e., due to chance. This level of significance was chosen due to the subjective nature of the survey responses.

4. T-statistic and probabilities were calculated.

5. If the computed probability were smaller than the chosen significance level, H_o was rejected. Conversely, if the probability were larger, H_o was not rejected. The results of these tests do not imply that there are no differences in the true situation; it only implies that the true situation is not significantly different from that assumed in the null hypothesis. Two-tail probabilities were used where the intent was to establish that one group mean was significantly higher than the other.

A more detailed discussion of hypothesis testing and the t-test mechanics is contained in Statistical Package for the Social Sciences (SPSS) by Norman H. Nie, et al, McGraw-Hill Book Company, 1975, and Mathematical Statistics by John E. Greund, Prentice-Hall Incorporated, 1971.

Correlation Analysis. Before any job enrichment program can be formulated, one must identify the variables which are associated with and presumably influence job satisfaction for a given work group. One of the most frequently used methods for determining the relationships that exist between independent and

dependent variable measurements is correlation analysis. This study involves a measure of job satisfaction/career intent and their related factors as measured by the JDS instrument.

The type of correlation used in this study was the Pearson Product Moment (zero order) correlation (i.e., no control is exercised over the influence of other variables). The Pearson correlation coefficient "r" measures the strength of the relationship between two interval-level variables. Many social science methodologists (Labovitz, 1970; Tufte, 1969) state that the Pearson correlation method applies equally well to ordinal-level measurements (Nie, et al, 1975:276). The researcher assumes that all variable measurements exhibit interval level characteristics. By accepting Labovitz and Tufte's conclusion, the method is considered "appropriate" under either condition.

The value of the correlation coefficient can range from -1 to +1 where a value of -1 (+1) indicates perfect negative (positive) correlation. Perfect correlation means that knowing the value of one variable allows one to predict the value of the associated variable with 100-percent confidence (no error). Negative correlation means that the value for the variable being predicted varies inversely with change in the value of the measured variable, and vice versa for positive correlation. A negative "r" does not mean a bad fit.

Correlation analysis can only be used to determine whether or not one variable influences another variable. That is, correlation analysis results show only the degree of association between variables, not causality.

Pearson's correlation coefficient not only indicates the goodness of fit of the linear regression model, but it also provides an easy means of comparing the strength of the relationship between pairs of variables. This is accomplished by using the correlation matrix as an input for the regression analysis program where the "r" values are used to calculate the proportion of variance in the dependent variable "explained" by various combinations of independent variables (Nie, et al, 1975:280). Determination of the relative strength of the relationship between independent and dependent variables is discussed in the regression analysis section.

Least Squares Regression Analysis. Although correlation analysis is useful in identifying those work related factors which are not most influential in "promoting" job satisfaction and retention, it does not give any insight into the relative contribution of each factor to the measurement of job satisfaction or career intent. Although the magnitude of the correlation coefficients establishes the rank order of importance in terms of "defining" the criterion, the researcher must use other types of statistical analysis to determine the degree of significance of one variable in relation to another. Multivariate linear regression analysis is one such analytical tool. Although job satisfaction is a very complex subject, one may question the applicability of linear regression analysis. In earlier research, Madia (1974:29) concluded that attempts to use linear regression on behavioral type data have not produced very satisfactory results. Automatic Interaction Detection Algorithm (AID) analysis of the data set

shows that 55.8 percent of the total explainable variance in job satisfaction is accounted for by three variables; therefore, linear regression analysis is considered "appropriate" for this data set.

The most commonly used method of regression analysis is that of least squares (Nie, et al, 1975:278). Huang (1970:2) states:

> "The least squares method is but one of the several procedures that can be used in analyzing dependence relations. As such, it will be a mistake to consider regression analysis as solely composed of the least squares analysis. On the other hand; however, the method of least squares is simple to use and is applicable in a very large number of situations, so that the whole area of the literature on regression analysis is almost filled with theories and procedures related to or implied in the methods of least squares."

Regression analysis, as applied to this study, involves defining a linear relationship between a dependent variable (criterion-job satisfaction or career intent) and the significant set of independent variables (predictors-core job dimensions and demographics) such that the sum of squares error (SSE), summed squares of differences between observed and predicted dependent variable values, is minimized. The deviations from the "true" values are represented by the error term "e" in the "classical" regression model

$$Y = B_o + B_1X_1 + \ldots\ldots\ldots\ldots + B_nX_n + e$$

where "Y" is the measure of the criterion variable and "B_n" is the coefficient representing the "explanatory" power of each statistically significant independent variable.

Stepwise regression was selected for this analysis. This method involves an iterative process, in which the independent variable that has the highest partial correlation with the

criterion variable, partialed on the variables which have already been added, is selected and brought into the regression equation. At each step, all combinations of variables which have been selected to "enter" the equation are examined and the combination of variables which minimizes the SSE is retained as the best "explanatory" set of variables. Due to the correlations between independent variables, variables may be "entered" and "deleted" by the selection process until no variables can be found that will make a statistically significant contribution to the "explanation" of variance in the criterion variable. The statistical process by which variable list significance is determined utilizes the partial F-test on each variable at each step. This process is best summarized by Draper and Smith's explanation of the procedure.

> "The partial F-criterion for each variable in the regression at any stage of calculation is evaluated and compared with a preselected percentage point of the appropriate F-distribution. This provides a judgment on the contribution made by each variable as though it had been the most recent variable entered, irrespective of its actual point of entry into the model. Any variable which provides a non-significant contribution is removed from the model" (Draper and Smith, 1966:171).

Another criterion which can be used to terminate the regression process is the number of variables allowed to "enter" into the predictor model.

Due to the subjective nature of the response data, the researcher selected a confidence level of $\alpha = 0.05$ ($F = 3.89$) for this study. The researcher felt that a lower confidence level could restrict the validity of any conclusions which may be reached. In case that a large number of variables are

found to be significant determinants of job satisfaction and career intent, the marginal increase in R^2 at each step of the regression will be used in reducing the equation to the best "n" predictors.

Four characteristic assumptions of regression analysis apply to this study. They are:

1. All independent variables are discrete with fixed values.

2. The error terms are independent (Huang, 1970:33).

3. The expected value of the error term is zero.

4. The error terms are normally distributed with mean zero and variance σ^2 (a constant) (Huang, 1970:24; Draper and Smith, 1966:59).

Since the tests of significance are central to the identification of the variables which account for job satisfaction, the assumption of normality is necessary. Regarding the assumption of normality, Draper and Smith (1966:59) state:

> "An assumption that the errors "e" are normally distributed <u>is not</u> required in order to obtain the estimates of B, but it <u>is</u> required later in order to make tests which depend on the assumptions of normality, such as t- or F- tests, or for obtaining confidence intervals based on the t- and F- distribution."

In making the assumption of normality, one must consider the consequences which could develop. According to Theil (1971: 615), "tests which concern first moments (such as t-tests or partial F- tests for the individual coefficients) are relatively robust; whereas, tests concerning second moments (such as the overall F- test) are much less robust". "Robust" is a term which refers to the insensitivity to departure from assumptions

under which the model was derived (i.e., normality). However, Huang (1970:47) states that such a joint test "...may still be quite good if the distribution of the independent variable approximates the normal distribution".

Regression analyis results are used in two ways. If the SSE for the final equation is small, the equation can confidently be used for predictive or explanatory purposes in defining the criterion variable. That is, the results can be used as a descriptive tool to explain causal theory. Multiple regression techniques can also be used to determine the magnitude of direct or indirect influence of the independent variables on the dependent variable. Providing that the same scale is used to measure each independent variable, the relative importance of each variable can be determined by comparing the coefficients of each variable in the predictor equation. If each independent variable is measured in different units, the variable coefficients can not be used to determine the relative contribution of each variable. In this case, the researcher must examine the standardized regression coefficients (partials).

The variables which are best related to job satisfaction and career intent will be explored and will serve as a "framework" around which a job enrichment program is designed. The "order" of variable importance will aid in structuring the overall redesign program.

V. DATA ANALYSIS AND RESULTS

Introduction

The results of the sample survey analyses are presented in five sections. The first section discusses the perceived degree of job satisfaction for aircraft maintenance personnel. Comparative analyses are made between the degree of job satisfaction perceived by FMS and OMS personnel and also between aircraft maintenance personnel as a group and enlisted personnel performing a cross-section of jobs Air Force wide. The second section addresses the degree to which FMS and OMS jobs differ when described in terms of the five job core dimensions identified by Hackman and Oldham. This analysis is designed to help establish whether the work itself or the work environment factors account for the lack of difference in perceived job satisfaction for the two study groups. The third section is an evaluation of the career intent of aircraft maintenance personnel as reflected by this study group. Comparative analyses are made between this study group, enlisted personnel performing different tasks throughout the Air Force, and Air Force personnel as a collective group. The fourth section is an analysis of job attitudes (job satisfaction and career intent) designed to identify those work/work environment factors which tend to have the greatest influence on motivation, job satisfaction, career intent, and enrichment potential. The fifth section is an analysis of each work environment (FMS and OMS) designed to highlight any aspects of FMS and OMS jobs which may have inherent enrichment potential.

This research effort investigated the degree to which aircraft maintenance personnel perceive their jobs as satisfying their needs and desires and the degree of job satisfaction perceived by maintenance personnel on the five core dimensions identified by Hackman and Oldham as being critical to job satisfaction. The overall purpose was to determine if a job enrichment strategy appears warranted as a means of increasing employee job satisfaction.

JOB SATISFACTION

This study was based on the assumption that motivation and job enrichment theories as previously discussed are valid and indicate that the overall level of job satisfaction perceived by FMS personnel should tend to be higher than that perceived by OMS personnel. That is, the more complex and challenging work performed by the FMS personnel should provide greater opportunity for satisfying individual psychological needs. Therefore, greater need satisfaction should result in greater personal motivation and job satisfaction for FMS personnel than for OMS personnel. The hypothesis tested was:

Hypothesis 1: The perceived degree of job satisfaction is significantly higher for FMS personnel than for OMS personnel.

Since no job satisfaction indices have been documented for aircraft maintenance personnel, the author was restricted from making any finite evaluative conclusions regarding the degree of job satisfaction characterizing this study group. However, comparative analysis was made between the job satisfaction index for the study group and that of a sample population of enlisted

personnel working in a variety of jobs throughout the Air Force. The job satisfaction index for the total sample population was used in this analysis. The specific hypothesis tested was:

> Hypothesis 2: The perceived degree of job satisfaction is significantly higher for the Air Force wide enlisted sample population than for the enlisted aircraft maintenance personnel sample population.

Before any statistical analyses involving the two organizations comprising the study group were made, an examination of the demographic data was made to assure that the two subgroups were composed of personnel who exhibit basically the same characteristics. Frequencies and two sample t-tests were performed on the study group responses. Of all the demographics tapped by the survey, the only biographic variables which showed significant differences in subgroup composition ($\alpha = 0.05$) were: (1) sex, (2) maritial status, (3) number of personnel who had effected a transfer into their current career field, (4) number of years in current career field since the transfer had been effected, and (5) career intent. When the cell sizes of the groups effecting the differences in the first four categories were compared with the total group sizes, differencies in the group characteristics were considered insignificant. Differences in responses on career intent for the two groupings were not considered a significant factor in describing the two subgroupings. Therefore, the author concluded that for comparative purposes, the FMS and OMS groups were equally matched.

All hypothesis testing was done using the two sample t-test on sample means. Significance level for all tests was

chosen as ($\alpha = 0.05$) due to the subjective nature of the response data. The t-test used required that the two population variances be equal; therefore, a check on the reasonableness of this assumption was performed using the parametric F-test. Using the total individual organization populations and an $\alpha = 0.05$, a F-critical value for testing the null hypothesis that the two population variances were equal resulted in F-critical = 1.40. One-way analysis of variance tests indicated that the only significant difference in variances across all variables measured by the JDS occurred with the "association" variable measure.

COMPARISON OF OVERALL JOB SATISFACTION MEAN SCORES

The first hypothesis is stated in null form:

Hypothesis 1: The degree of job satisfaction perceived by maintenance personnel is the same throughout the maintenance complex component organizations.

The mean job satisfaction score, standard deviation, and sample size for each work environment and worker status are shown in Table III. Comparison of mean scores shows that the response data supports the null hypothesis; therefore, there is no apparent difference in job satisfaction indices for the two organizations at the 0.05 level of significance. Further, comparison of job satisfaction mean scores (See Table III) shows that there is no significant difference in the degree to which supervisory and non-supervisory personnel are satisfied with their jobs. There are two possible explanations for this equivalency: (1) either the nature of the work itself enhances

Table III

Job Satisfaction Mean Scores by Work Environment and Comparison Analysis of Sample Means (Enlisted Maintenance Personnel)

Work Environment	Sample Size	Mean Score	Standard Deviation	d.f.	t-Value	2,(1)-Tail Probability
OMS	107	16.766	4.199			
				200	-0.38	0.705
FMS	95	16.990	4.155			
Supervisors	99	17.313	3.924			
				200	1.48	(0.0025)
NonSupervisors	103	16.447	4.369			
Total	202	16.871	4.170			
				9758	-2.14	0.035
Air Force Wide*	9558	17.572	4.622			

*Data From Quality of Air Force Life Survey, May 1977

motivation and job satisfaction to the same degree in each organization, a fact which tends to discredit the applicability of motivation and job enrichment theories to these work environments, or (2) the working conditions are such that they are the primary determinants of job satisfaction for the two work groups.

Analyses of the two types of jobs in terms of the job core dimensions (skill variety, task identity, task significance, autonomy, and feedback from the job) and the two work environments in terms of the supplementary measures tapped by the JDS (association, pay satisfaction, security satisfaction, motivation, etc.) were performed in an attempt to explain the lack of difference in perceived job satisfaction levels for the two groups. The results are discussed in a later section.

The second hypothesis is stated in null form:

Hypotheis 2: The degree of job satisfaction perceived by enlisted maintenance personnel and enlisted personnel Air Force wide is the same.

This hypothesis was tested using the weighted satisfaction scores on the "overall" job satisfaction dimension as measured by the Hoppock Job Satisfaction Blank. The hypothesis was tested at the 0.05 level of significance using the two sample t-test for the difference between two means. To use this test, it was necessary to assume that the observations were independent and were drawn from normal populations.

The mean job satisfaction scores, standard deviations, and sample sizes for each enlisted personnel sub-population are shown in Table III. Comparison of mean scores shows that the response data does not support the null hypothesis. Collectively, enlisted personnel appear to experience a significantly higher degree of job satisfaction than the maintenance personnel studied. An analysis of the work and work environment was performed in an attempt to identify those factors most highly associated with the "low" job satisfaction scores for the study group. These results are discussed in the following sections.

The first step in trying to explain the relative degree of dissatisfaction within both work environments was to examine the work <u>itself</u> to see if it was a "causitive" factor. Additionally, this analysis would provide an insight into why the job satisfaction indices characterizing the two work environments did not differ. Analysis of the work itself involved performing two sample t-tests on the job core dimension mean scores.

The hypotheses tested in these analyses were:

Hypothesis 3: The degree to which a job requires the worker to perform activities which challenge his skills and abilities (skill variety) is significantly higher for FMS personnel than for OMS personnel.

Hypothesis 4: The degree to which a job requires completion of a "whole" and identifiable piece of work (task identity) is significantly higher for FMS personnel than for OMS personnel.

Hypothesis 5: The degree to which the job has a substantial and perceivable impact on the lives of other people (task significance) is significantly higher for OMS personnel than for FMS personnel.

Hypothesis 6: The degree to which the job gives the worker freedom, independence, and discretion in scheduling work and determining how it will be performed (autonomy) is significantly higher for FMS personnel than for OMS personnel.

Hypothesis 7: The degree to which the worker, in carrying out work activities required by the job, receives information about the effectiveness of his efforts (feedback from the job) is significantly higher for OMS personnel than for FMS personnel.

Comparison of Job Characteristic Mean Scores

Skill Variety. Although the work of OMS personnel involves performing a large number of tasks, the repetitive and relatively simple nature of the tasks would tend to provide little challenge of one's skills and abilities. Due to the complexity of the equipment serviced by FMS, diagnostic and repair activities require greater skill and maintenance ability thereby enhancing skill variety. Therefore, the author hypothesizes that FMS jobs exhibit greater skill variety requirements than do OMS jobs. The hypothesis stated in the null form is:

Hypothesis 3: The degree to which skill variety is exhibited in OMS and FMS jobs is the same.

The mean job dimension score, standard deviation, and sample size for each study group along with the t-test results are shown in Table IV.

Table IV

Mean Scores for Skill Variety by Work Environment and Comparison Analysis of Sample Means (Enlisted Personnel)

Work Environment	Sample Size	Mean Score	Standard Deviation	d.f.	t-Value	2-Tail Probability
OMS	107	4.474	1.376	200	-1.52	0.131
FMS	95	4.772	1.419			
Total	202	4.614	1.401			

Thus, the response data supports the null hypothesis at the 0.05 level of significance. Based on this result, it can be stated that there is no significant difference in the degree to which OMS and FMS skills and abilities are challenged even-though the mean score on this dimension is higher for FMS personnel than for OMS personnel.

Task Identity. Although the tasks performed by OMS personnel are numerous and directed toward final delivery of an operationally ready aircraft for the aircrew, the final output rest heavily on the major maintenance performed by supporting organizations, i.e., FMS. Therefore, it is hypothesized that the jobs performed by FMS personnel display a greater degree

of task identity than do OMS jobs. That is, the degree to which FMS jobs require completion of a "whole" and identifiable piece of work is higher than for OMS jobs. Stated in null form, the hypothesis is:

Hypothesis 4: Jobs performed by OMS and FMS personnel display the same level of task identity.

The mean task identity scores, standard deviations, sample sizes, and the t-test results are shown in Table V.

Table V

Mean Scores for Task Identity by Work Environment and Comparison Analysis of Sample Means (Enlisted Personnel)

Work Environment	Sample Size	Mean Score	Standard Deviation	d.f.	t-Value	2-Tail Probability
OMS	107	4.511	1.234	200	-3.46	0.001
FMS	95	5.098	1.173			
Total	202	4.787	1.238			

From the test on the mean scores, the author concludes that the response data does not support the null hypothesis. It can therefore be stated that there is a significant difference in the level of task identity associated with the different types of jobs, and more specifically, that FMS jobs are significantly higher in the task identity dimension.

Task Significance. Since OMS personnel effectively have ultimate responsibility for ensuring that all aircraft systems are operationally ready and therefore possess final release

authority, the author hypothesizes that the work of OMS personnel is viewed as being more significant than the work of FMS personnel. This is not to discount the fact that the systems supported by FMS personnel are significant; it only means that OMS jobs are more closely associated with the "user" and therefore have a more substantial and perceivable impact on the lives of other people. The null hypothesis is stated as:

Hypothesis 5: Perceived task significance is the same for OMS and FMS tasks.

The mean task significance scores, standard deviations, and t-test results are shown in Table VI.

Table VI

Mean Scores for Task Significance by Work Environment and Comparison Analysis of Sample Means (Enlisted Personnel)

Work Environment	Sample Size	Mean Score	Standard Deviation	d.f.	t-Value	2-Tail Probability
OMS	107	6.150	1.104	200	1.65	0.101
FMS	95	5.888	1.156			
Total	202	6.026	1.134			

The t-test on means shows that there is no significant difference in task significance measures for the two groups. The significance of the difference is borderline though with OMS jobs being much higher in task significance than FMS jobs.

Autonomy. Due to the complexity of the systems and integration networks for which FMS personnel are responsible,

written regulations serve basically as "troubleshooting" guidelines only. The repetitive and direct nature of the jobs performed by OMS personnel provide little opportunity for independent thought or action. Therefore, FMS personnel can exercise greater freedom and discretion in determining work methods than OMS personnel can. Also, due to the less complex nature of OMS jobs, although vital jobs, checklists which direct the workers' efforts are easily developed. Mandatory use of these checklists provide little or no opportunity to exercise discretion and ingenuity. Based on these job characteristics, the author hypothesized that FMS personnel experience greater responsibility in their jobs than do OMS personnel. The null hypothesis is thusly stated:

Hypothesis 6: The degree to which autonomy is exhibited in OMS and FMS jobs is the same.

Mean autonomy scores, standard deviations, and results of the t-test on means are given in Table VII.

Table VII

Mean Scores for Autonomy by Work Environment and Comparison Analysis of Sample Means (Enlisted Personnel)

Work Environment	Sample Size	Mean Score	Standard Deviation	d.f.	t-Value	2-Tail Probability
OMS	107	3.994	1.167	200	-3.71	0.000
FMS	95	4.649	1.343			
Total	202	4.302	1.292			

Based on the t-test results, the response data does not support the null hypothesis at the 0.05 level of significance. Response data indicates that there is a significant difference in autonomy measurements with FMS jobs displaying a higher level of autonomy than OMS jobs.

Feedback. The complexity and interdependency of systems and interface mechanisms on which FMS personnel perform work, combined with the inability to test the systems within operational environments provides FMS personnel with less than total information about the effectiveness of their work. The only feedback received by these personnel is static test results which come only after the total job has been completed. Due to the nature of the work, OMS personnel receive continuous feedback from their activities as the work progresses. In most cases, OMS jobs are end tasks within themselves, and are characterized by immediate and direct feedback. Therefore, the author hypothesizes that OMS personnel experience a significantly greater degree of feedback from their work than do FMS personnel.

The hypothesis is stated in its null form:

Hypothesis 7: The degree of feedback from the job is the same for jobs performed by both OMS and FMS personnel.

Another type of feedback about job performance is that derived from supervisors. Although the feedback concerns job performance, its presence or absence can be more a function of management style rather than a function of the job itself. The author hypothesizes that the amount of feedback from supervisors does not vary significantly from organization to organization.

The hypothesis stated in its null for is as follows:

Hypothesis 8: The level of supervisor feedback on work performance is the same in OMS and FMS organizations.

The mean feedback dimension scores, standard deviations, and t-test results are shown in Table VIII.

Table VIII

Mean Scores for Feedback by Work Environment and Comparison Analysis of Sample Means (Enlisted Personnel)

Work Environment	Sample Size	Mean Score	Standard Deviation	d.f.	t-Value	2-Tail Probability
(Feedback From the Job)						
OMS	107	4.651	1.162	200	-2.30	0.023
FMS	95	5.039	1.234			
Total	202	4.833	1.209			
(Feedback From Supervisors)						
OMS	107	4.196	1.586	200	0.37	0.711
FMS	95	4.116	1.489			
Total	202	4.158	1.538			

The response data regarding feedback from the job itself does not support the null hypothesis at the 0.05 level of significance. There is a significant difference in the degree to which the two types of work provide feedback and the test indicates that jobs performed by FMS personnel provide more direct feedback than do jobs performed by OMS personnel. The test also indicates that there is no significant difference in the level of feedback on performance originating with the supervisors.

The author concludes that motivation and job enrichment theories are applicable to the activities of these two work groups. For three out of the five job core dimensions, FMS activities were characterized by mean scores which were significantly higher ($\alpha = 0.05$) than those for OMS activities. For the remaining two dimensions, there were no significant differences in OMS and FMS mean scores; however, OMS jobs did score slightly higher on one dimension, task significance, than did FMS jobs. Table IX provides a comparative summary of mean scores for each job dimension and the results of the two sample t-tests.

Table IX

Summary Table of Hypothesis Testing
Performed on the Five Core Job Dimensions
(Enlisted Personnel)

Job Dimension	OMS	FMS	t-Test Results*
Skill Variety	Low	High	Not Significant
Task Identity	Low	High	Significant
Task Significance	High	Low	Not Significant
Autonomy	Low	High	Significant
Feedback From Job	Low	High	Significant
Feedback From Supervisors	High	Low	Not Significant

*Significant at $\alpha = 0.05$ level

Results from the hypothesis testing indicated that FMS jobs, compared to OMS jobs are "richer" in the factors which the behavioralists and psychologists propose as critical elements

for promoting high motivation and job satisfaction. This would lead one to conclude that the degree of job satisfaction should be higher for FMS personnel than for OMS personnel, that is, if the work itself was the primary determinant of job satisfaction. Although this was the case with the Hoppock measure (16.99 vs 16.77), the difference was not found to be statistically significant. This leads the author to conclude that the work environment factors may have a greater effect on individual motivation and job satisfaction than do the various aspects of the work itself. The work environment factors which are referred to are the supplementary measures tapped by the JDS instrument.

CAREER INTENT

In Chapter II, it was suggested that the degree to which personnel are satisfied with their jobs could have a direct effect on retention and turnover. In order to provide some support for this theory, frequency and regression analyses were made using the demographic variable, career intent, as the criterion. Additionally, responses to the question regarding whether or not their job was a factor in individual decisions aided in analysis of the career intent dimension. The responses to these questions appear in Tables X and XI, respectively.

A consideration which should be noted is that, while this measurement of career intent may be highly reliable for those people who already have invested a substantial amount of time in the service (continued presence being indicative of career intentions), it may be unreliable for first term personnel. For the younger personnel, career intent may be a transitory factor, highly dependent on Air Force policy changes and by "outside"

social and economic changes. Although the responses may be indicative of stable career intent attitude, it is advisable that any extrapolations be made with great caution.

Table X

Career Intent Responses to Job Attitude Surveys

"Which one of the following best describes your attitude toward making the Air Force a career?"

Air Force Wide[1]

	Officers	Enlisted	Overall
Definitely Yes/Most Likely Yes	79%	56%	60%
Undecided	12	21	19
Definitely No/Most Likely No	9	23	21

"Do you intend to stay in the Air Force beyond your present commitment?"

OMS and FMS Personnel[2]

	FMS	OMS	Overall
Yes	21%	26%	24%
Undecided	46	52	49
No, retiring	3	3	3
No, separating	30	19	24

[1](Manley, et al, 1977:566) Data is based on results of unionization survey administered to Air Force personnel in April 1976. Data collected using QOAFL Survey (April 1975) show identical results.

[2]Data is based on Job Attitude Survey administered for this study (July 1977).

As the data indicates, there is a substantially smaller number of careerists than noncareerists in the sample. Previous studies conducted on Air Force wide populations show contrasting results. Responses to a "Quality of Air Force Life" survey (May 1975) and to a questionnaire designed to investigate attitudes toward military unionization (Manley, et al, 1977) both show that 60 percent of the sample populations plan on making the Air Force a career, 19 percent are undecided, and 21 percent do not plan to stay in the Air Force beyond their present commitment. Responses for enlisted personnel populations parallel those for the overall population. Responses for maintenance personnel used in this study show that only 24 percent of the personnel surveyed plan to remain in the service. Based on a "yes" response of 57 percent, this constitutes a 52 percent reduction (over previous study results) in the number of people expressing a positive attitude toward a military career. Other response rates for the given population are: 50 percent undecided and 27 percent no.

Table XI

Role of Jobs on Career Intent[1]

"Is your present job a major factor in your decision?

	FMS	OMS	Total
Yes	54%	33%	43%
No	46	67	57

[1]Percentages are based on the subpopulation which did not express a definite intent to pursue a career in the Air Force (n=148/N=202).

Examination of the responses for those personnel who did not express definite positive career intent (n=148), 43 percent indicated that their job was a major factor in their decision. The major aspect of the work which was cited as being the "causitive" factor was dissatisfaction with administrative policies and local operating procedures. More specifically, 26 percent of the personnel who did not express definite plans to remain in the service beyond their present commitment identified the twelve hour work days, shift work, and work overload as the "causitive" factors. From the way the responses were worded, the author hypothesizes that these personnel would be more receptive to existing operational procedures and policies if there was a split pay scale (technical and non-technical career fields) such that increased compensation would be provided for effort expended beyond the normal eight hour workday which administrative and support personnel experience.

Overall job satisfaction mean scores of 16.77(OMS) and 16.99 (FMS) (based on Hoppock measurement scales with possible scores ranging from four (4) to 28) coupled with a very small percentage of the respondents expressing a desire to make the military a career may well indicate that job satisfaction is problematic. Analysis of the responses to the open-ended question indicates that the level of job satisfaction within this study group is low and that the existing work environment is the primary "causitive" factor. Further, career intent appears to be directly related to job satisfaction. More rigorous examination of these ideas are discussed in the following sections.

ANALYSIS OF JOB ATTITUDES

Correlation Analysis. Correlation analyses performed on the response data for the two sample populations supported the conclusion that overall job satisfaction was more a function of satisfaction with the work environment factors than it was of satisfaction with the work itself. That is, overall, the correlation between job satisfaction and the variables describing the work environment was higher than it was for the variables describing the work itself. The Pearson correlation coefficient matrices for the total sample, the FMS, and the OMS subpopulation responses are shown in Tables XII, XIII, and XIV, respectively. Analysis of the survey responses in total and by work environment showed that growth satisfaction was the variable most highly associated with job satisfaction. Growth satisfaction as measured by the JDS is defined as how much challenge a job provides, opportunity for accomplishment, potentiial to exercise responsibility, and potential for personal growth and development. The FMS group correlation was the highest at 0.82. The correlation between job satisfaction and growth satisfaction for the total sample was 0.68, and for the OMS group it was 0.58. Overall, the correlations between job satisfaction and the variables describing the work environment were higher than those between job satisfaction and the variables describing the work itself. Task identity, task significance, and pay satisfaction consistently showed the smallest degree of association with job satisfaction.

TABLE XII

INTERRELATIONSHIPS AMONG JOB CHARACTERISTICS AND ATTITUDE INDICES
(Maintenance Personnel)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Skill		35	32	43	46	33	39	45	37	11	38	44	36	55	05	62	53	25
2. Task Identity			13	37	40	23	04	34	22	16	25	30	32	34	17	54	22	01
3. Task Significance				13	17	18	38	13	32	-09	09	17	00	13	16	32	15	07
4. Autonomy					41	43	33	40	19	16	37	34	41	55	10	82	41	14
5. Feedback From Job						47	27	45	27	08	35	30	36	42	10	78	46	16
6. Feedback From Supervisors							32	35	24	09	30	24	40	46	03	53	43	17
7. Association								21	25	-06	17	25	11	32	17	37	32	13
8. Job Satisfaction (JDS)									34	22	62	51	51	69	15	53	74	31
9. Motivation										05	29	26	19	40	-24	32	39	09
10. Pay Satisfaction											40	23	29	34	-16	15	23	11
11. Security Satisfaction												44	46	56	09	43	56	26
12. Social Satisfaction													59	61	04	41	54	24
13. Supervisor Satisfaction														66	-02	45	52	15
14. Growth Satisfaction															02	59	68	24
15. Individual Growth Need																15	11	08
16. MPS																	51	18
17. Job Satisfaction (Hoppock)																		36
18. Intent																		

1. Decimals are omitted.
2. $r > |.17|$ $p \leq .01$
3. $|.17| \geq r > |.11|$ $.05 \geq p > 0.01$
4. $r \leq |.11|$ $p > .05$
5. Note. n = 202

TABLE XIII

INTERRELATIONSHIPS AMONG JOB CHARACTERISTICS AND ATTITUDE INDICES
(Field Maintenance Personnel)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Skill		24	39	52	40	42	48	44	31	12	54	44	34	62	-06	63	61	34
2. Task Identity			12	42	40	29	01	29	01	13	26	24	29	32	10	53	25	-09
3. Task Significance				19	09	30	32	20	29	14	32	25	11	34	09	34	26	-02
4. Autonomy					40	47	40	34	03	23	37	31	37	53	03	81	45	19
5. Feedback From Job						54	26	28	15	22	34	18	36	35	05	76	37	17
6. Feedback From Supervisor							34	35	24	19	38	24	27	50	16	60	47	18
7. Association								25	13	16	41	24	13	42	12	38	37	13
8. Job Satisfaction (JDS)									33	30	54	42	42	74	16	46	73	20
9. Motivation										16	41	20	10	34	21	17	35	09
10. Pay Satisfaction											46	28	39	45	-15	26	37	19
11. Security Satisfaction												37	40	62	22	47	64	34
12. Social Satisfaction													66	57	05	35	54	10
13. Supervisor Satisfaction														58	-07	44	53	19
14. Growth Satisfaction															-01	59	82	29
15. Individual Growth Need																08	06	09
16. MPS																	53	19
17. Job Satisfaction (Hoppock)																		33

1. Decimals are omitted.
2. $r > |.23|$ $p \leq .01$
3. $|.23| > r > |.20|$ $.05 \geq p > 0.01$
4. $r < |.20|$ $p > .05$
5. Note. n = 95

TABLE XIV

INTERRELATIONSHIPS AMONG JOB CHARACTERISTICS AND ATTITUDE INDICES
(Operational Maintenance Personnel)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Skill		42	28	31	50	26	38	45	43	07	24	44	37	48	15	60	45	20
2. Task Identity			20	24	37	21	20	33	38	13	20	37	32	34	20	50	18	10
3. Task Significance				15	29	07	42	10	37	-25	-06	09	-07	-02	25	40	05	13
4. Autonomy					38	44	45	43	35	01	34	40	43	57	14	80	38	18
5. Feedback From Job						43	41	57	37	-10	32	44	34	48	12	78	55	19
6. Feedback From Supervisor							31	37	24	02	25	25	52	44	-10	52	39	16
7. Association								26	42	-19	03	28	15	29	31	56	29	07
8. Job Satisfaction (JDS)									35	12	65	60	56	65	13	58	75	45
9. Motivation										-06	19	32	26	45	28	47	41	11
10. Pay Satisfaction											33	19	20	25	-21	-05	12	08
11. Security Satisfaction												52	48	51	-06	37	50	24
12. Social Satisfaction													54	65	04	49	54	41
13. Supervisor Satisfaction														72	01	45	50	15
14. Growth Satisfaction															04	60	58	22
15. Individual Growth Need																20	15	10
16. MPS																	51	26
17. Job Satisfaction (Hoppock)																		40
18. Intent																		

1. Decimals are omitted.
2. $r > |.25|$ $p < .01$
3. $|.25| \geq r > |.15|$ $.05 \geq p > .01$
4. $r \leq |.15|$ $p > .05$
5. Note. n = 107

The correlation matrices for job satisfaction showed fairly high intercorrelations for practically all variables measured by the JDS. This association between the variables suggests that the job satisfaction factors are all interacting with each other and seem to move together when determining job satisfaction.

Regression Analysis. This section will present the results of the stepwise multiple regression analyses of job satisfaction and career intent for the sample population, OMS, and FMS sub-populations. Regression analysis was performed not to predict job satisfaction or career intent, but merely to investigate the relationships between the explanatory variables (all dimensions tapped by the JDS) and the dependent variables (job satisfaction and career intent). In order for a variable to be considered a significant "explanatory" variable of either job satisfaction or career intent, the variable had to be significant at least at the 0.10 level (0.25 level for career intent), and it had to increase the amount of explained variance (R^2) by more than 1.5 percent of the total explainable variance. The author felt that this stopping rule would explain the majority of the variance in terms of the most important factors and that inclusion of variables which did not meet the stated criteria would not significantly help in understanding either job satisfaction or career intent. Some variables which were significant at 0.10 or less level (job satisfaction) or 0.25 or less level (career intent) are not very powerful "explanatory" variables; however they are shown for descriptive purposes.

Tables XV, XVI, and XVII show the results of the job satisfaction regression and Tables XIX, XX, and XXI show the results of the career intent regression for the total sample population, the FMS sub-population, and the OMS sub-population, respectively. Only the dimensions (as measured by the JDS) which appear to significantly influence job satisfaction or career intent are given in the tables of results for each sample group. The total amount of variance (R^2) in the criterion variable is given at each inclusion step along with the associated marginal increase in R^2. Associated statistical test data are also included. A condensed correlation matrix, extracted from the appropriate Pearson correlation matrix (Tables XII, XIII, and XIV) has been provided for continuity purposes. Finally, the explanatory model for job satisfaction or career intent is given, using the regression coefficients.

Job Satisfaction. The regression analyses for the independent groupings showed that the work environment factors were consistently more effective in explaining the variance in job satisfaction than the dimensions which describe the work itself. The sum of the proportions of variance (R^2) in job satisfaction explained by each type factor are shown in Table XVIII.

Overall, growth satisfaction was the most "explanatory" variable in each of the predictor models. For the FMS population, growth, security, and social satisfaction were the statistically significant "explanatory" variables. For the OMS population, growth, security, and social satisfaction; feedback from the job; motivation; and task identity were significant "explanatory"

TABLE XV

JOB SATISFACTION REGRESSION
(Maintenance Personnel)

Descriptor	Beta Weight	R^2	ΔR^2	Overall F-Value	Significance
1. Growth Satisfaction	.371	.467	.467	175.448	0.000
2. Security Satisfaction	.198	.511	.044	103.927	0.001
3. Skill Variety	.151	.537	.026	76.677	0.001
4. Feedback from the Job	.170	.551	.014	60.430	0.016
5. Task Identity	-.127	.564	.013	43.961	0.017
6. Social Satisfaction	.150	.575	.011	50.370	0.025
Constant					0.009

Correlation Matrix

Descriptor	1	2	3	4	5	6
Job Satisfaction	68	56	53	46	22	54
Growth Satisfaction		56	55	42	34	61
Security Satisfaction			38	35	25	44
Skill Variety				46	35	44
Feedback from the Job					40	30
Task Identity						30
Social Satisfaction						

Decimals are omitted

Job Satisfaction = 1.076 (Growth Satisfaction) + 0.513 (Security Satisfaction)
+0.449 (Skill Variety) + 0.586 (Feedback from the Job)
+0.653 (Social Satisfaction) - 0.427 (Task Identity)
+3.298

TABLE XVI

JOB SATISFACTION REGRESSION
(FMS Personnel)

Descriptor	Beta Weight	R^2	ΔR^2	Overall F-Value	Significance
1. Growth Satisfaction	.618	.666	.666	185.584	0.000
2. Security Satisfaction	.217	.696	.030	105.406	0.003
3. Social Satisfaction	.115	.705	.009	72.533	0.100
Constant					0.042

Correlation Matrix

Descriptor	1	2	3
Job Satisfaction	82	64	54
Growth Satisfaction		62	57
Security Satisfaction			37
Social Satisfaction	Decimals are omitted		

Job Satisfaction = 1.891 (Growth Satisfaction) + 0.604 (Security Satisfaction)
+0.467 (Social Satisfaction) + 2.648

TABLE XVII

JOB SATISFACTION REGRESSION
(OMS Personnel)

Descriptor	Beta Weight	R^2	ΔR^2	Overall F-Value	Significance
1. Growth Satisfaction	.188	.337	.337	53.415	0.000
2. Feedback From Job	.308	.433	.096	39.760	0.000
3. Security Satisfaction	.209	.473	.040	30.886	0.006
4. Motivation	.181	.489	.016	24.424	0.080
5. Task Identity	-.169	.505	.016	20.649	0.071
6. Social Satisfaction	.178	.521	.016	18.155	0.072
Constant					.396

Correlation Matrix

Descriptor	1	2	3	4	5	6
Job Satisfaction	58	55	50	41	18	54
Growth Satisfaction		48	51	45	34	65
Feedback From Job			32	37	38	44
Security Satisfaction				19	20	52
Motivation	Decimals				38	32
Task Identity	are					37
Social Satisfaction	omitted					

Job Satisfaction = 0.526 (Growth Satisfaction) + 1.112 (Feedback from Job)
+0.524 (Security Satisfaction) + 0.667 (Motivation)
-0.574 (Task Identity) + 0.825 (Social Satisfaction)
+1.754

variables with the second significant variable, feedback from the job providing only a 28.5 percent (R^2 = 0.337) increase in the total explained variation over the amount explained by the growth satisfaction variable. When the two independent sample responses were combined and analyzed, three statistically significant "explanatory" variables were identified. Growth satisfaction remained the most powerful predictor followed by security satisfaction and skill variety which increased the total explainable variance by 4.4 and 2.6 percent, respectively.

Table XVIII

Percentage Variance in Job Satisfaction Explained by Regression Models

Sample Population	Total R^2 (Explainable)	R^2 Explained by Work Environment Factors	R^2 Explained by Job Core Dimensions
OMS	.556	.427 (76.8)*	.129 (23.2)*
FMS	.725	.712 (98.2)*	.017 (1.8)*
Total	.588	.533 (90.6)*	.055 (9.4)*

*Percentage of total explainable variance explained by the given type of descriptive variable.

An examination of the beta weights revealed that, overall, the growth satisfaction variable was much more important in determining the degree of job satisfaction as any other variable.

Career Intent. The regressions for career intent were composed of only one variable with the variables being different

for each grouping. Overall, very little of the variance in career intent could be explained by the JDS and job satisfaction variables measured by this "Job Attitude Survey". The maximum percentage of variance in career intent explained by all JDS and job satisfaction (Hoppock measure) measurements was 0.294 which occurred for the OMS personnel. Of this total explainable variance, 58.1 percent was explained by the only significant variable which was social satisfaction. The minimum percentage of variance in career intent explained by all JDS and job satisfaction (Hoppock measure) measurements was 0.163 which occurred for the OMS and FMS personnel grouping. Of this total explainable variance, 71.4 percent was explained by the only significant variable which was overall job satisfaction. For the FMS population, the only significant factor associated with career intent was security satisfaction which accounted for 48.1 percent of the total explainable variance (o.241). Tables XIX, XX, and XXI show the results of the regression of career intent.

Although no specific factors could be identified which were powerful "explanatory" factors of career intent, examination of the Pearson correlation coefficients showed that, relative to the factors describing the work itself, the work environment factors were more closely associated with career intent than the work itself. Overall, the intercorrelations between the JDS, job satisfaction variables, and career intent were very low with several of the intercorrelations being not statistically different from zero. Therefore, one might surmise that the variables involved with career intent, using this instrument, are seemingly independent of each other.

TABLE XIX

CAREER INTENT REGRESSION
(Maintenance Personnel)

Descriptor	Beta Weight	R^2	ΔR^2	Overall F-Value	Significance
1. Job Satisfaction	.268	.127	.127	29.192	0.000
2. Skill Variety	.112	.133	.006	15.263	0.257
3. Task Identity	-.108	.141	.008	10.847	0.172
4. Security Satisfaction	.094	.147	.006	8.489	0.246
Constant					0.000

Correlation Matrix

Descriptor	1	2	3	4
Career Intent	36	25	01	26
Job Satisfaction		53	22	56
Skill Variety			35	38
Task Identity				25
Security Satisfaction	Decimals are omitted			

Career Intent = 0.069 (Job Satisfaction) + 0.086 (Skill Variety)
-0.093 (Task Identity) + 0.063 (Security Satisfaction)
+1.343

TABLE XX

CAREER INTENT REGRESSION
(FMS Personnel)

Descriptor	Beta Weight	R^2	ΔR^2	Overall F-Value	Significance
1. Security Satisfaction	.279	.116	.116	12.219	.001
2. Skill Variety	.301	.150	.034	8.111	.059
3. Task Significance	-.213	.188	.038	7.023	.042
4. Task Identity	-.128	.203	.015	5.736	.194
Constant					.001

Correlation Matrix

Descriptor	1	2	3	4
Career Intent	34	34	-02	-09
Security Satisfaction		54	32	26
Skill Variety			32	35
Task Significance				13
Task Identity	Decimals are omitted			

Career Intent = 0.211 (Security Satisfaction) + 0.239 (Skill Variety)
-0.208 (Task Significance) - 0.123 (Task Identity)
+2.330

TABLE XXI

CAREER INTENT REGRESSION
(OMS Personnel)

Descriptor	Beta Weight	R^2	ΔR^2	Overall F-Value	Significance
1. Social Satisfaction	.372	.171	.171	21.641	0.000
2. Job Satisfaction	.362	.213	.042	14.073	0.020
3. Supervisory Satisfaction	-.171	.238	.025	10.691	0.072
4. Association	-.130	.246	.008	8.312	0.290
5. Task Significance	.166	.260	.014	7.100	0.166
6. Motivation	-.125	.270	.010	6.178	0.236
Constant					0.670

Correlation Matrix

Descriptor	1	2	3	4	5	6
Career Intent	41	40	15	07	13	11
Social Satisfaction		54	54	28	09	32
Job Satisfaction			50	29	05	41
Supervisory Satisfaction				15	-07	26
Association					42	42
Task Significance						37
Motivation						

Decimals are omitted

Career Intent = 0.416 (Social Satisfaction) + 0.087 (Job Satisfaction)
-.114 (Supervisory Satisfaction) - 0.161 (Association)
+0.153 (Task Significance) - 0.111 (Motivation)
+0.329

DIAGNOSTIC EXAMINATION OF JOBS PERFORMED BY FMS AND OMS PERSONNEL

As discussed in Chapter IV, one of the major intended uses of the JDS is to diagnose existing jobs to determine if work redesign should be undertaken as a method of enhancing individual job satisfaction and increasing total productive output. The activities included in this diagnostic determination were as follows: (1) determination of whether or not motivation and job satisfaction were problematic, (2) determination of the motivating potential of the jobs, (3) identification of the aspects of the job that may be causing problems, (4) determination of whether or not the employees would support a redesign program, and (5) identification of special problem areas which may exist within the work environment.

The survey results upon which this diagnosis was performed are shown in Figure 9, 10, and 11. In order to provide more objective conclusions and recommendations, each work environment was independently diagnosed. All conclusions concerning maintenance personnel are based solely on the perceptions of this study population.

Step 1. Are Motivation and Satisfaction Really Problematic? Examination of the motivation and job satisfaction mean scores for the two maintenance organizations showed that personnel working in both environments displayed relatively high motivation to perform the tasks which they were assigned. Compared with job satisfaction indices for enlisted personnel Air Force wide, job satisfaction indices are lower for maintenance personnel. Although no baseline job satisfaction indices have

Figure 9

The JDS Diagnostic Profile
For Maintenance Jobs
(FMS and OMS)

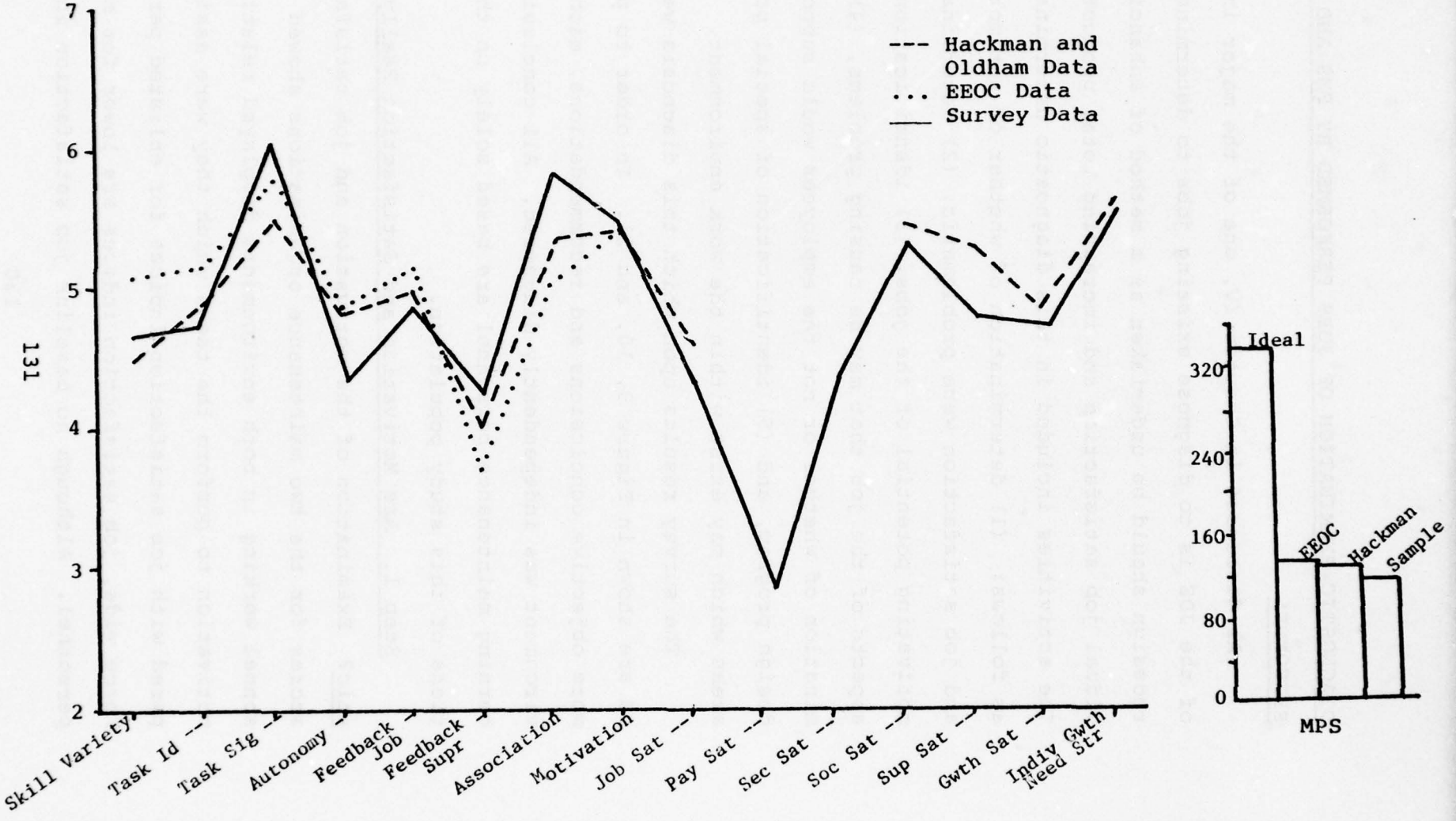


Figure 10

The JDS Diagnostic Profile
For FMS Jobs

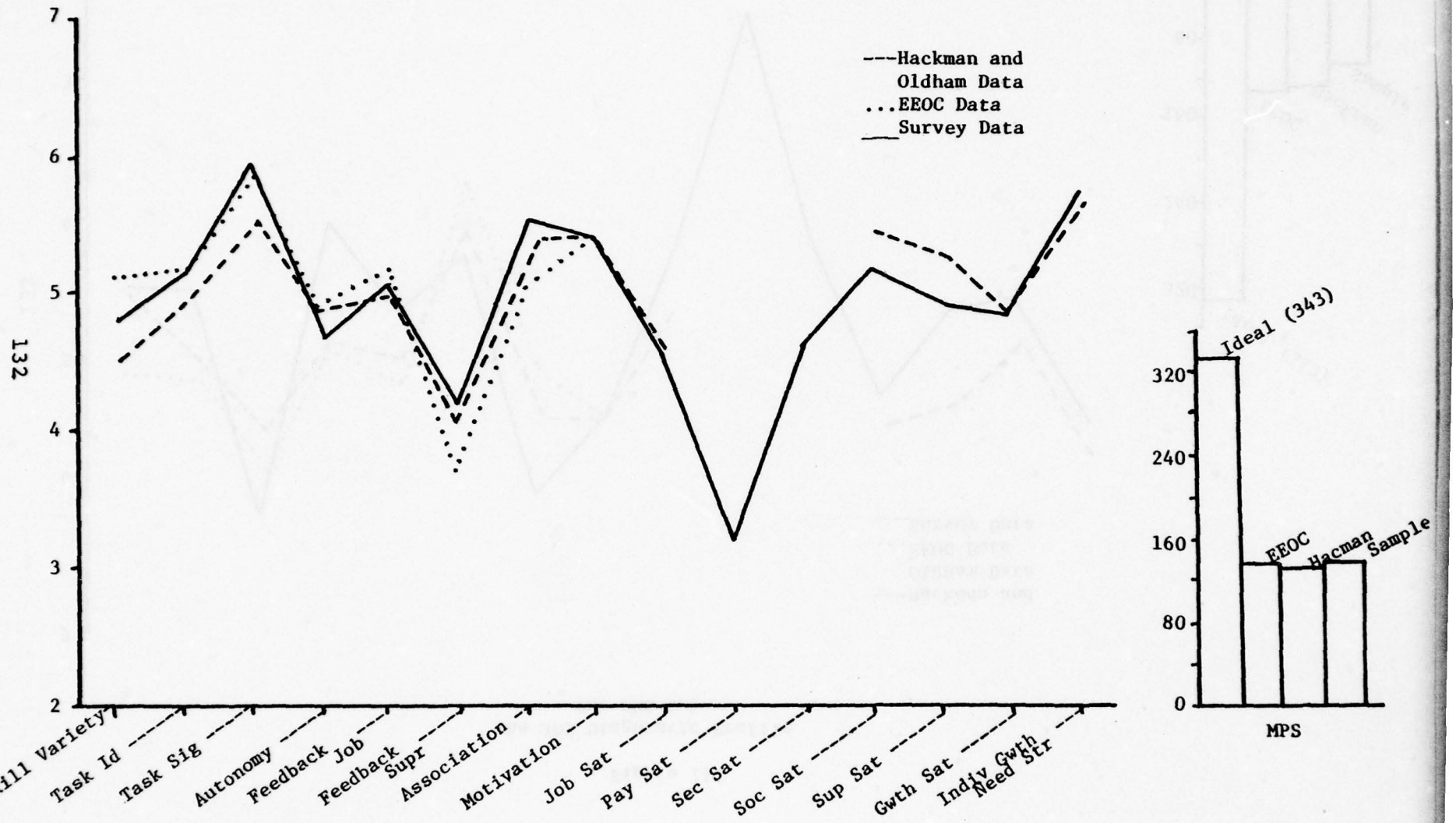
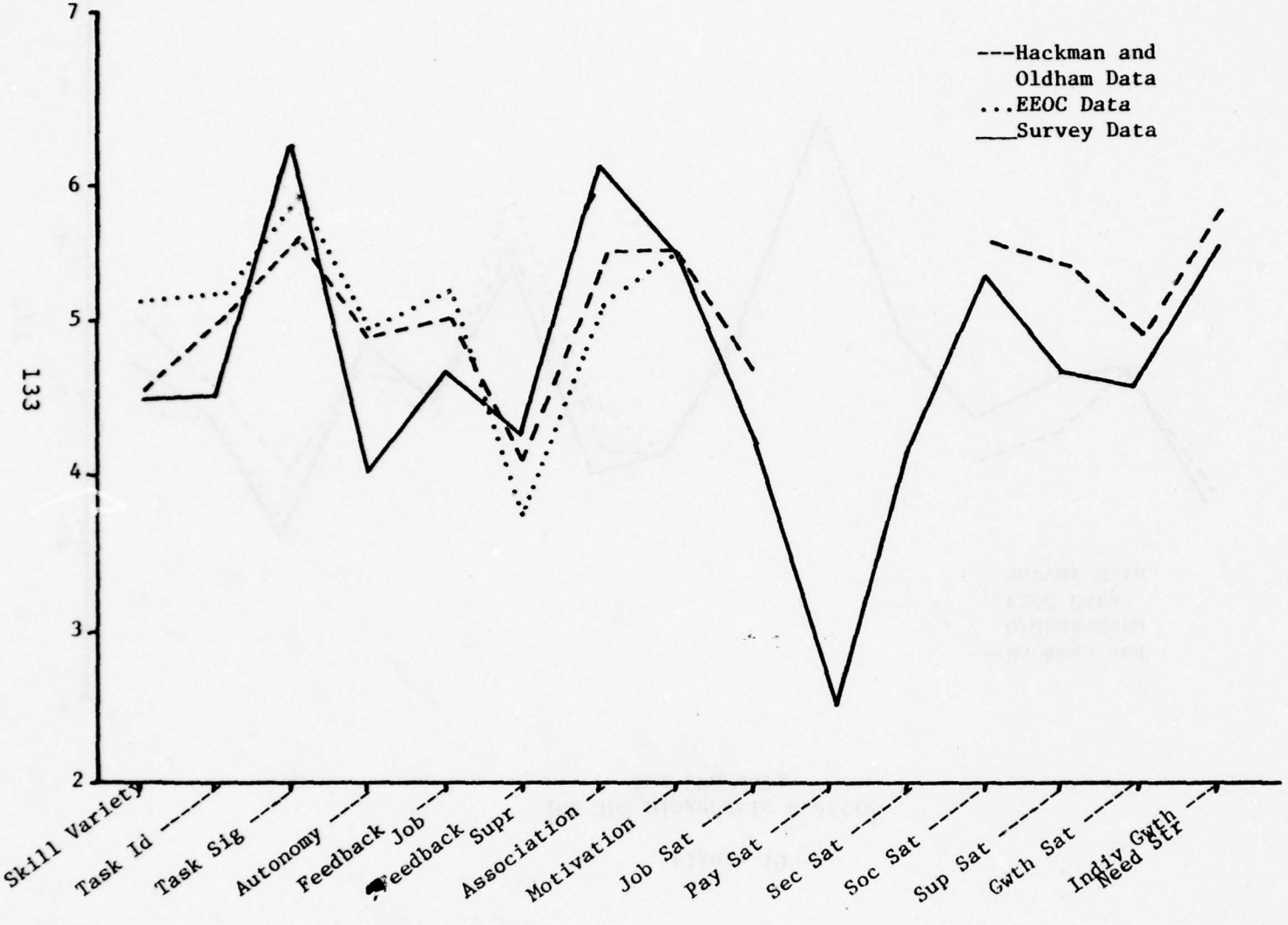
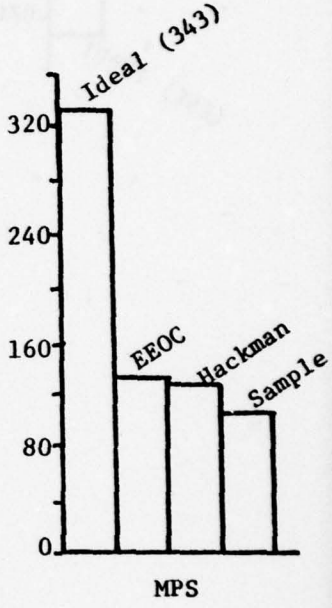


Figure 11

The JDS Diagnostic Profile
For OMS Jobs





been previously documented for maintenance personnel, previous analyses indicate that job satisfaction may be problematic. This fact accompanied by low retention rates for maintenance personnel, Air Force wide; and the small number of personnel who expressed a desire to make the military a career led the author to hypothesize that job satisfaction scores are low. Therefore, diagnosis of the jobs performed by FMS and OMS personnel was based on the conclusion that job satisfaction was problematic.

Step 2. Is the Job Low in Motivating Potential? Motivating potential scores (MPS) were 131 (FMS) and 100 (OMS). Although no MPS norms have been established for Air Force maintenance personnel, Hackman, et al, has established that the average MPS value for all jobs surveyed is 125 (Hackman and Suttle, 1977:134). Possible scores range from one (1) to 343. Although the degree to which the employee is self-motivated to perform effectively on the job (internal work motivation) is moderately high, the MPS for the OMS subpopulation may indicate that the internal work motivation may be characteristic of the individual rather than the work. A moderately high mean score for internal work motivation and motivating potential scores of FMS jobs supports the conclusion that the work does not appear to greatly affect job satisfaction. The problem appears to stem from the work environment factors (e.g. the pay plan, the nature of supervision, growth satisfaction, and so on). Since the MPS for OMS jobs was "low", the various aspects of the work were examined.

Step 3. What (If Any) Aspects of the Job Are Causing The Difficulty? This step involved examination of the job on each of the five core dimensions to pinpoint specific strengths and weaknesses of the job as it currently exists. An OMS job "profile" is shown in Figure 11. Examination of the profile indicates that the "low" MPS results because of a perceived deficency on the autonomy dimension. The mean score on this dimension does not indicate an apparent major deficiency; however, the author suggests that the work procedures be examined and modified (where possible) in an attempt to provide more autonomy for OMS personnel. Mean scores for all other dimensions are moderately high.

Step 4. How "Ready" Are The Employees For Change? An important factor in planning specific action steps is determination of growth need strength of the personnel since workers which are high on growth needs usually respond more readily to job change than do workers with little need for growth. The individual growth need strength mean score was 5.42 with a possible range of scores of one (1) to seven (7); therefore, any change program should be favorably accepted.

Step 5. What Special Problems and Opportunities Are Present In The Existing Work System? Based on this diagnosis of FMS and OMS jobs and analysis of the satisfaction of personnel with the various aspects of their organizational life, the author believes that primary emphasis should be placed on changing the administrative policies and operational procedures rather than pursuing an all-inclusive job redesign program. The "low" degree of job satisfaction appears to stem from

dissatisfaction with the organizational environment; not the work itself.

VI. OVERVIEW, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY OF THEORY SYNTHESIS

Examination of organizational environments tends to show that opportunities abound for enhancing the quality of work life of people in organizations. Some of the benefits that can be expected from such improvements include more motivated, more satisfied, and more productive employees and more efficient and adaptive organizations. Oftentimes, these opportunities go unrecognized because management personnel are unaware of the potential gains that might be reaped from the improved quality of work life, or management personnel do not have the knowledge and abilities needed to bring about the required changes. This study has been an attempt to provide both a greater awareness of the problems and opportunities associated with the quality of work life in an aircraft maintenance complex and to provide a better understanding of the approaches which management may take in an attempt to capitalize on these opportunities.

In recent years, a number of strategies for enhancing motivation, job satisfaction, and career intent have been proposed, evangelized, and assessed by behavioral scientists, psychologists, and managers. However, reports of these efforts are not collectively published nor readily available to those who might learn from the application of this knowledge. In conducting this research, an attempt was made to adopt a more integrative prospective. The preliminary chapters seek: (1) to assimilate several major theoretical approaches dealing with worker attitudes

and intentions; and (2) to outline some generally accepted and effective methods for change activities and attempt to determine their appropriateness for improving the quality of work life within an aircraft maintenance complex. This synthesis of knowledge is intended to both stimulate and guide future change activities.

Due to the multiplicity of approaches that describe jobs and job structures, particular change problems become very complex. All these various approaches have some common characteristics, foremost of which is that they are all based on individual perceptions. Job satisfaction, for example, is a subjective rather than an objective expression, and therefore no general job satisfaction, job enrichment program can be formulated. Since there is little commonality among the approaches, each approach makes certain implicit assumptions about the nature of man which are based on divergent models of man.

The quality of work life and organizational productivity are affected by the nature of man--his needs and desires, intrinsic and extrinsic reward systems, managerial style and principles, the design of work, and several other attributes of organizations and their environments. The author has tried to provide some perspectives and tools that may facilitate the development of usable and useful strategies for change within each of these general areas. Maslow's theoretical "hierarchy of prepotency" provides an insight into the needs and need strengths of the individual; McGregor's and Argyris' theories of man, when extrapolated to

the management arena, provide the concept of a "proper" organizational environment. This "proper" environment affords the individual the opportunity to simultaneously contribute to the fulfillment of both his own higher level needs and the organization's goals. However, if the individual is to accomplish this, he must be motivated. The motivation and job design theories of Herzberg, Vroom, and Hackman and Oldham provide theoretical solutions to this problem. The intent was not to provide either final solutions nor specific prescriptions for change, but to provide an insight into what may be required if the behavioral sciences are to effectively guide maintenance personnel or maintenance organizational development.

Using this synthesis of job satisfaction and job enrichment theories as a framework, an analysis of job attitudes was performed on a group of fighter aircraft maintenance personnel. This analysis involved a measure of the degree of job satisfaction, career intent, and identification of those work/work environment factors which tend to have the greatest influence on motivation, job satisfaction, and enrichment potential. Additionally, each work environment was analyzed in an attempt to determine if (and what) inherent enrichment potentials did exist.

DISCUSSION OF ANALYSIS RESULTS

Since no job satisfaction indices have been established for aircraft maintenance personnel, the author can not objectively state that the personnel comprising this study group are satisfied or dissatisfied with their jobs. Job satisfaction indices of

16.77 and 16.99, OMS and FMS subpopulations respectively, may constitute normative satisfaction indices for these types of work and work environments. However, when the indices for this study group are compared with job satisfaction indices for similar populations performing a variety of jobs within the Air Force, maintenance personnel appear to be less satisfied with their jobs than their counterparts Air Force wide and Air Force personnel in general.

Documented job satisfaction indices for various subgroupings of Air Force personnel are consistently higher than those for subgroupings involved in this study. Independent research and consulting efforts by Air Force Institute of Technology Systems Management Department personnel have resulted in an accumulated mean job satisfaction score (N = 1331) of 17.85 (Manley, et al, 1975:8), and Quality of Air Force Life (QOAFL) Surveys (May 1975 and May 1977) have established mean job satisfaction scores of 17.69 and 17.77 respectively for the total Air Force population (Manley, et al, 1975:8 and McNichols, 1977). Although enlisted personnel, Air Force wide, do in fact have a lower mean job satisfaction score than officers (17.48 vs. 18.71, QOAFL-1 and 17.57 vs. 18.72, QOAFL-2) the total subpopulation still appears to be more satisfied with their jobs than maintenance personnel.

A comparative analysis of mean job satisfaction scores for the two subpopulations indicates that there is no significant difference in job satisfaction levels for OMS and FMS personnel. Further, although the more "seasoned", supervisory personnel exhibit a higher mean job satisfaction score than do the less

experienced, non-supervisory personnel, the difference in the degree of job satisfaction is not statistically significant. According to motivation and job satisfaction theories, one would expect a higher degree of job satisfaction to be experienced by FMS and supervisory personnel than by OMS and non-supervisory personnel. Using the five core job dimensions (skill variety, task identity, task significance, autonomy, and feedback from the job) as a basis for evaluation, the work performed by OMS and FMS personnel was analyzed in order to gain an insight into the lack of difference in job satisfaction levels.

Analysis of the types of work performed by each group showed that, in fact, FMS jobs are significantly different in terms of challenge, complexity, achievement, and associated responsibility with these factors being more explicit in FMS jobs than in OMS jobs. Further, analysis of the mean scores for each of the core job dimensions indicate that the personnel in both OMS and FMS organizations are moderately satisfied with the jobs as they are presently structured. The only possible exception is for OMS personnel who perceive a lack of autonomy in performance of their tasks. Due to the nature of their work, the author concludes that the only way that OMS personnel can be given more autonomy is to retain the job procedures as they are currently stated but allow the personnel flexibility in scheduling work and applying personal techniques which work best for them.

Although normative data collected for work groups performing similar tasks in different work environments can not be used as baseline data for evaluating the influence of work factors on

overall job satisfaction, the core job dimension scores for this study group parallels those norms which have been established for similar work groupings. The only notable exception is autonomy.

The moderately high mean scores for the core job dimension measurements, the lack of difference in job satisfaction level existing in jobs which are significantly different in terms of motivators, and the responses to an open-ended question in the survey led the author to conclude that maintenance personnel do not perceive the work itself (actual performance of the job) as the most potent source of overall job satisfaction. That is, the degree of overall job satisfaction is more dependent on the work environment factors than on the work itself. It may be that the adverse working conditions are perceived by the maintenance personnel as the major block to any meaningful job satisfaction from the work itself. However, the author hypothesizes that the workers are receiving satisfaction from the work, and that work environment factors are creating a significant amount of job dissatisfaction.

Factors Effecting Job Satisfaction. Preliminary analysis of the factors associated with job satisfaction revealed that the demographic variables were not very powerful "explanatory" factors for job satisfaction determinations. These results are consistent with those obtained by Madia (1974:131) and Thompson (1975:122). Madia (1974:131) concludes that "The demographic variables.... simply do not provide an adequate model for job satisfaction in the Air Force". The maximum amount of variance in job satisfaction that could be accounted for using any subgrouping of this survey population was 19.0 percent.

The work environment factors, growth satisfaction and security satisfaction, are the most meaningful factors when speaking of job satisfaction. These factors appeared in correlation, regression analysis, and supplementary analyses (AID and canonical correlation) for each analysis grouping. The most influential factor was growth satisfaction accounting for 79.4 percent of the total explainable variance in job satisfaction for the total sample population. Percentages for the individual organizations were 60.6 for OMS and 92.0 for FMS.

Security satisfaction was a lesser but still important factor in job satisfaction for each analysis grouping. Feedback from the job was found to be significantly lower for OMS than FMS personnel. This came as a surprise since the nature of OMS tasks is such that direct and immediate feedback normally occurs. Apparently, feedback from the job is perceived as an indication of job completion, but, for the FMS personnel, it is a function of how well the work was done.

Analysis on the total population showed that the core job dimensions (skill variety, feedback from the job, and task identity) are significant factors ($p < 0.05$ level of significance) in influencing job satisfaction. Considering the small amount of variance (23.2%-OMS, 1.8%-FMS, and 9.4%-total population) explained by the five core dimensions it would seem that the work itself does not enhance job satisfaction to a high degree for the participants in this study. However, work environment factors were found to produce more dissatisfaction and thereby tend to overshadow the satisfaction inherent within the work itself.

Factors Effecting Career Intent. For the sample population as a whole, overall job satisfaction is the most important factor in explaining career intent. When the sample population is split into the individual organizations, the work environment factors become the most important factors in explaining career intent; in which case the most important variable in depicting career intent for FMS personnel is security satisfaction, and for OMS personnel it is social satisfaction. Secondary factors which account for very little variation in career intent range from task identity, security satisfaction, and supervisory satisfaction for the total sample; to task significance, skill variety, and task identity for the FMS grouping; to supervisory satisfaction, task significance, and feedback from the job for the OMS grouping (significant at $p \leq 0.25$ level of significance). Overall, job satisfaction stemming from satisfaction with the work environment is the best indicator of career intent, as measured by the Job Diagnostic Survey.

Enrichment Potential by Work Environment. Diagnostic analysis of the different work environments indicate that an all-inclusive work redesign program is unwarranted for either maintenance organization. Worker motivation appears to be moderately high; however personal job satisfaction indices appear to be low. Previous discussion has established that this appears to be caused by work environment factors rather than the work design factors. An analysis of the work situation in terms of current policies and procedures should prove beneficial in identifying problems associated with job satisfaction. Evaluation of the responses received to the open-ended question contained in the survey showed that 58.8 percent of the 148 who plan to separate or who

are undecided about separating listed administrative policies and operating procedures as the basis for their decision. More specifically, 25.7 percent of these individuals, (n = 148), identified the twelve hour work days, shift work, and work overload as the "causitive" factors. The most common observation was that personnel are disgruntled with work days extending beyond eight hours with no additional compensation. Support personnel work an eight hour day within more pleasant environments, yet the compensation is commensurate with grade; not effort expended. Results and responses were equivalent and consistent throughout each work environment.

The most degraded aspect of the work itself exists within the OMS organization, and it is within the autonomy dimension. As previously discussed, the nature of the work gives very little flexibility in redesigning jobs to enhance this dimension. Flexibility in scheduling work and applying personal techniques to task performance rather than requiring strict adherence to rigid procedures may enhance this dimension.

CONCLUSIONS

Job satisfaction is primarily dependent on growth satisfaction which is a measure of how much challenge a job provides, opportunity for accomplishment, potential to exercise responsibility, and potential for personal growth and development. Growth satisfaction coupled with the second significant factor, security satisfaction, is considered to indicate that maintenance personnel are future oriented. That is, the opportunity to achieve and to develop

greatly affects perceived job satisfaction and career intent. The more sought after responsible jobs are seen as means-to-an ultimate goal of job satisfaction and an Air Force career with the current job providing a baseline.

Job satisfaction and career intent can be explained by the same category of factors (work environment); however, personnel within each individual organization perceive work satisfaction/dissatisfaction as being functions of different work environment factors. Comparative analysis of job satisfaction indices for this study group with those for other Air Force populations indicate that maintenance personnel are not as highly satisfied with their jobs as their counterparts. Examination of the mean scores for the core job dimensions characterizing the jobs indicates that satisfaction with the work itself did not provide significant differences. The lack of significant findings appears to stem from dissatisfaction with the work environment. The result is that dissatisfaction with the work environment factors appears to overshadow satisfaction with the work content, thereby reducing overall satisfaction.

Based on the findings of this research, the author hypothesizes that, for the Air Force maintenance personnel studied, career intent is a function of job satisfaction but job satisfaction is not a function of career intent. As job satisfaction increases, the attractiveness of an Air Force career also increases.

Results of this study lead the author to conclude that no major job redesign program should be undertaken in either maintenance organization. The findings do suggest that administrative and personnel policies and operational procedures could be reviewed

and modified in order to eliminate the dissatisfactions identified in this study.

RECOMMENDATIONS FOR FURTHER RESEARCH

Currently, plans exist whereby tactical aircraft maintenance complexes will be reorganized into a "semi-squadron maintenance" concept (POMO). The job structures will remain basically the same; however, significant changes in administrative and operational policies and procedures should accompany the reorganization. The author recommends that a study of this nature be performed on the same organization after the reorganization of maintenance resources has occurred in order to determine the effectiveness of the change.

This study was conducted at one point in time on a limited sample size which is continually subject to changing operational requirements. A replication of this study on the same sample population or on a larger sample population at a future point in time may show what factors remain constant in affecting job satisfaction and career intent determinants for maintenance personnel, as well as trends within the sample population. The relative changes in significance levels of the "explanatory" factors which remain significant determinants may be of interest and use to Air Force planners. Baseline data for this sample population is contained in Appendix F.

Finally, investigation of the same type of maintenance jobs in other commands may reveal the effects of intra-command policies and procedures on job satisfaction and career intent.

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APPENDIX A

JOB ATTITUDE SURVEY
(Job Diagnostic Survey Short Form
and
Hoppock Job Satisfaction Blank)

USAF SCN 77-115
Expires 30 Sep 77

JOB ATTITUDE SURVEY[1]

This questionnaire is designed to assist in the study of your job and to show how it affects you. The survey data will help to determine how jobs can be better designed by obtaining information about how people react to different kinds of jobs.

On the following pages, you will find several different kinds of questions about your job. Specific instructions are given at the start of each section. Please read them carefully. It should take about fifteen minutes to complete the entire questionnaire.

The questions are designed to measure your perceptions of your job and your reaction to it. Please answer each item as honestly and frankly as possible. Your individual answers will be held in the strictest confidence.

Thank you for your cooperation and participation.

WALTER J. GUTHRIE, Capt, USAF
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Wright-Patterson AFB, OH 45433

[1]Based on the JDS Short Form as proposed by Hackman and Oldham (Hackman, et al, 1974a:62-69).

PRIVACY STATEMENT

In accordance with paragraph 30, AFR 12-35, the following information is provided as required by the Privacy Act of 1974:

a. Authority:

(1) DOD Instruction 1100.13, 17 April 1968, Surveys of Department of Defense Personnel; and/or

(2) AFR 178-9, 9 October 1973, Air Force Military Survey Program; and/or

(3) 5 U.S.C. 301 and 10 U.S.C. 8012, Secretary of the Air Force, Powers, Duties, Delegation by Compensation.

b. Principle Purposes. The survey is being conducted to collect information to be used in research aimed at illuminating and providing inputs to the solution of problems of interest to the Air Force and/or DOD.

c. Routine Uses. The survey data will be converted to information for use in research of management related problems. Results of the research, based on the data provided, will be included in written master's theses and may also be included in published articles, reports, or texts. Distribution of the results of the research, based on the survey data, whether in written form or presented orally, will be unlimited.

d. Participation in this survey is entirely voluntary.

e. No adverse action of any kind may be taken against any individual who elects not to participate in any or all of this survey.

BIOGRAPHICAL DATA

All information in this section will be held in the strictest confidence; no one in your organization will have access to individual responses.

1. What is your present active duty grade? (Check one)

_____	A. E-1	_____	F. E-6
_____	B. E-2	_____	G. E-7
_____	C. E-3	_____	H. E-8
_____	D. E-4	_____	I. E-9
_____	E. E-5		

2. How much total active federal military service have you completed? (Check one)

_____ A. Less than one year
_____ B. 1 - 4 years
_____ C. 5 - 8 years
_____ D. 9 - 12 years
_____ E. 13 - 16 years
_____ F. Over 16 years

3. What is your age? (Check one)

_____ A. Under 20 years
_____ B. 21 - 25 years
_____ C. 26 - 30 years
_____ D. 31 - 35 years
_____ E. 36 - 40 years
_____ F. 41 - 45 years
_____ G. Over 45 years

4. What is your highest education level? (Check one)

_____ A. Grade School
_____ B. Some High School
_____ C. High School Graduate
_____ D. Some College
_____ E. College Graduate
_____ F. Some Graduate Work
_____ G. Graduate Degree

5. What is your sex?

_____ Male _____ Female

6. What is your marital status?

_____ Married _____ Not Married

7. What is your organizational identifier? (Check one)

_____A. AMS
_____B. FMS
_____C. MMS
_____D. OMS
_____E. Other (please specify _____)

8. What is your current specialty code (AFSC)?

_____

9. What skill level do you hold in your current job specialty?

_____A. 3 Level
_____B. 5 Level
_____C. 7 Level
_____D. 9 Level

10. Have you worked in your present career field throughout your Air Force career?

_____ Yes _____ No

If no, how long have you worked in your present career field?

_____A. Less than one year
_____B. 1 - 4 years
_____C. 5 - 8 years
_____D. 9 - 12 years
_____E. Over 12 years

11. Do you supervise others?

_____ Yes _____ No

If yes, how many personnel do you supervise? (Check one)

_____A. Less than 5 personnel
_____B. 6 - 10 personnel
_____C. 11 - 15 personnel
_____D. 16 - 20 personnel
_____E. 21 - 30 personnel
_____F. Over 30 personnel

12. Do you intend to stay in the Air Force beyond your present commitment? (Check one)

_____A. No, I am separating.
_____B. No, I am retiring.
_____C. Undecided
_____D. Yes

If the answer to this question is NO or UNDECIDED, please answer the following question.

13. Is your present job a major factor in your decision?

_____ No _____ Yes

If YES, in what way? Your comments will be most helpful in making any recommendations for change deemed necessary by this study.

_____

_____

_____

_____

SECTION ONE

This part of the questionnaire asks you to describe your job, as objectively as you can.

Please do not use this part of the questionnaire to show how much you like or dislike your job. Questions about that will come later. Instead, try to make your descriptions as accurate and objective as you possibly can.

A sample question is given below.

A. TO WHAT EXTENT DOES YOUR JOB REQUIRE YOU TO WORK WITH MECHANICAL EQUIPMENT?

1.....2.....3.....4.....5.....(6).....7

Very little; the job requires almost no contact with mechanical equipment of any kind.	Moderately	Very much; the job requires almost constant work with mechanical equipment.

NOTE: You are to circle the number which is the most accurate description of your job.

If, for example, your job requires you to work with mechanical equipment a good deal of the time--but also requires some paperwork--you might circle the number six, as was done in the example above.

1. TO WHAT EXTENT DOES YOUR JOB REQUIRE YOU TO WORK CLOSELY WITH OTHER PEOPLE (EITHER "CLIENTS", OR PEOPLE IN RELATED JOBS IN YOUR OWN ORGANIZATION)?

1.....2.....3.....4.....5.....6.....7

Very little; dealing with other people is not at all necessary in doing the job.	Moderately; some dealing with others is necessary.	Very much; dealing with people is an absolutely essential part of doing the job.

2. HOW MUCH AUTONOMY IS THERE IN YOUR JOB? THAT IS, TO WHAT EXTENT DOES YOUR JOB PERMIT YOU TO DECIDE ON YOUR OWN HOW TO GO ABOUT DOING THE WORK?

1.....2.....3.....4.....5.....6.....7

Very little; the job gives me almost no personal "say" about how and when the work is done.	Moderate autonomy; many things are standardized and not under my control, but I can make some decisions about the work.	Very much; the job gives me almost complete responsibility for deciding how and when the work is done.

3. TO WHAT EXTENT DOES YOUR JOB INVOLVE DOING A "WHOLE" AND IDENTIFIABLE PIECE OF WORK? THAT IS, IS THE JOB A COMPLETE PIECE OF WORK THAT HAS AN OBVIOUS BEGINNING AND END? OR IS IT ONLY A SMALL PART OF THE OVERALL PIECE OF WORK, WHICH IS FINISHED BY OTHER PEOPLE OR BY AUTOMATIC MACHINES?

1.....2.....3.....4.....5.....6.....7

My job is only a tiny part of the overall piece of work; the results of my activities cannot be seen in the final product or service.	My job is a moderate-sized "chunk" of the overall piece of work; my own contribution can be seen in the final outcome.	My job involves doing the whole piece of work, from start to finish; the results of my activities are easily seen in the final product or service.

4. HOW MUCH VARIETY IS THERE IN YOUR JOB? THAT IS, TO WHAT EXTENT DOES THE JOB REQUIRE YOU TO DO MANY DIFFERENT THINGS AT WORK, USING A VARIETY OF YOUR SKILLS AND TALENTS?

1.....2.....3.....4.....5.....6.....7

Very little; the job requires me to do the same routine things over and over again.	Moderate variety.	Very much; the job requires me to do many different things, using a number of different skills and talents.

5. IN GENERAL, HOW SIGNIFICANT OR IMPORTANT IS YOUR JOB? THAT IS, ARE THE RESULTS OF YOUR WORK LIKELY TO SIGNIFICANTLY AFFECT THE LIVES OR WELL-BEING OF OTHER PEOPLE?

1.....2.....3.....4.....5.....6.....7

Not very significant; the outcomes of my work are not likely to have important effects on other people.	Moderate significant.	Highly significant; the outcomes of my work can affect other people in very important ways.

6. TO WHAT EXTENT DO MANAGERS OR CO-WORKERS LET YOU KNOW HOW WELL YOU ARE DOING IN YOUR JOB?

1.....2.....3.....4.....5.....6.....7

Very little; people almost never let me know how well I am doing.	Moderately; Sometimes people may give me "feedback"; other times they may not.	Very much; managers or co-workers provide me with almost constant "feedback" about how well I am doing.

7. TO WHAT EXTENT DOES DOING THE JOB ITSELF PROVIDE YOU WITH INFORMATION ABOUT YOUR WORK PERFORMANCE? THAT IS, DOES THE ACTUAL WORK ITSELF PROVIDE CLUES ABOUT HOW WELL YOU ARE DOING --ASIDE FROM ANY "FEEDBACK" CO-WORKERS OR SUPERVISORS MAY PROVIDE?

1.....2.....3.....4.....5.....6.....7

Very little; the job itself is set up so I could work forever without finding out how well I am doing.

Moderately; sometimes doing the job provides "feedback" to me; sometimes it does not.

Very much; the job is set up so that I get almost constant "feedback" as I work about how well I am doing.

SECTION TWO

Listed below are a number of statements which could be used to describe a job.

You are to indicate whether each statement is an accurate or inaccurate description of your job.

Once again, please try to be as objective as you can in deciding how accurately each statement describes your job--regardless of whether you like or dislike your job.

Write a number in the blank beside each statement, based on the following scale:

HOW ACCURATE IS THE STATEMENT IN DESCRIBING YOUR JOB?

1.....2.....3.....4.....5.....6.....7

Very Inaccurate	Mostly Inaccurate	Slightly Inaccurate	Uncertain	Slightly Accurate	Mostly Accurate	Very Accurate

_____1. The job requires me to use a number of complex of high-level skills.

_____2. The job requires a lot of cooperative work with other people.

_____3. The job is arranged so that I do not have the chance to do an entire piece of work from beginning to end.

_____4. Just doing the work required by the job provides many chances for me to figure out how well I am doing.

_____5. The job is quite simple and repetitive.

_____6. The job can be done adequately by a person working alone--without talking or checking with other people.

_____7. The supervisors and co-workers on this job almost never give me any "feedback" about how well I am doing in my work.

_____8. This job is one where a lot of other people can be affected by how well the work gets done.

_____9. The job denies me any chance to use my personal initiative or judgment in carrying out the work.

____10. Supervisors often let me know how well they think I am performing the job.

HOW ACCURATE IS THE STATEMENT IN DESCRIBING YOUR JOB?

1.....2.....3.....4.....5.....6.....7

Very Inaccurate	Mostly Inaccurate	Slightly Inaccurate	Uncertain	Slightly Accurate	Mostly Accurate	Very Accurate

____11. The job provides me the chance to completely finish the piece of work I begin.

____12. The job itself provides very few clues about whether or not I am performing well.

____13. The job gives me considerable opportunity for independence and freedom in how I do the work.

____14. The job itself is not very significant or important in the broader scheme of things.

____15.* There is good rapport between superiors and the subordinates in this organization.

____16.* When there is personal conflict in the organization, those involved openly discuss the problem.

____17.* My immediate supervisor communicates often with me.

____18.* For every situation there is an appropriate regulation.

____19.* I am encouraged to be innovative in the performance of my tasks.

____20.* My supervisor provides me with adequate information to perform my job in the best manner.

____21.* Rewards and encouragement outweigh threats and criticism.

____22.* The working environment is relaxed.

____23.* The chain of command is strictly enforced.

____24.* It is hard to get people higher up in this organization to listen to people at my level.

____25.* I am encouraged to say what I really think.

____26.* Strict obedience of orders is important here.

____27.* Relations between different levels of organization are informal.

*These questions are not part of the JDS as proposed by Hackman and Oldham. These questions consider organizational climate measurements.

SECTION THREE

Now please indicate how you personally feel about your job.

Each of the statements below is something that a person might say about his or her job. You are to indicate your own, personal feelings about your job by marking how much you agree with each of the statements.

Write a number in the blank for each statement, based on this scale:

HOW MUCH DO YOU AGREE WITH THE STATEMENT?

1	2	3	4	5	6	7
Disagree Strongly	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Agree Strongly

_____1. My opinion of myself goes up when I do this job well.

_____2. Generally speaking, I am very satisfied with this job.

_____3. I feel a great sense of personal satisfaction when I do this job well.

_____4. I frequently think of quitting this job.

_____5. I feel bad and unhappy when I discover that I have performed poorly on this job.

_____6. I am generally satisfied with the kind of work I do in this job.

_____7. My own feelings generally are not affected much one way or the other by how well I do on this job.

_____8.* In this organization people are rewarded in proportion to the excellence of their performance.

_____9.* There is a great deal of criticism in this organization.

____10.* There are not enough rewards or recognition given in this organization for doing good work.

*These questions are not part of the JDS as proposed by Hackman and Oldham. These questions consider organizational climate measurements.

SECTION FOUR*

Now please indicate how satisfied you are with each aspect of your job listed below. Once again, write the appropriate number in the blank beside each statement.

HOW SATISFIED ARE YOU WITH THIS ASPECT OF YOUR JOB?

1.....2.....3.....4.....5.....6.....7

Extremely Dissatisfied	Dissatisfied	Slightly Dissatisfied	Neutral	Slightly Satisfied	Satisfied	Extremely Satisfied

_____1. The amount of personal growth and development I get in doing my job.

_____2. The people I talk to and work with on my job.

_____3. The degree of respect and fair treatment I receive from my boss.

_____4. The feeling of worthwhile accomplishment I get from doing my job.

_____5. The chance to get to know other people while on the job.

_____6. The amount of support and guidance I receive from my supervisor.

_____7. The amount of independent thought and action I can exercise in my job.

_____8. The chance to help other people while at work.

_____9. The amount of challenge in my job.

____10. The overall quality of the supervision I receive in my work.

____11. The amount of job security I have.

____12. The amount of pay and fringe benefits I receive.

____13. The degree to which I am fairly paid for what I contribute to this organization.

____14. How secure things look for me in the future in this organization.

*The order in which the questions are asked does not conform to the order in the JDS.

SECTION FIVE

Listed below are a number of characteristics which could be present on any job. People differ about how much they would like to have each one present in their own jobs. We are interested in learning how much you personally would like to have each one present in your job.

Using the scale below, please indicate the degree to which you would like to have each characteristic present in your job.

NOTE: The numbers on this scale are different from those used in previous scales.

4.....5.....6.....7.....8.....9.....10

Would like having this only a moderate amount (or less) — Would like having this very much — Would like having this extremely

_____1. High respect and fair treatment from my supervisor.

_____2. Stimulating and challenging work.

_____3. Chances to exercise independent thought and action in my job.

_____4. Great job security.

_____5. Very friendly co-workers.

_____6. Opportunities to learn new things from my work.

_____7. High salary and good fringe benefits.

_____8. Opportunities to be creative and imaginative in my work.

_____9. Quick promotions.

____10. Opportunities for personal growth and development in my job.

____11. A sense of worthwhile accomplishment in my work.

SECTION SIX

For the following questions choose the response that best reflects your feeling about your job. Circle the number that most accurately reflects your feelings.

1. WHICH ONE OF THE FOLLOWING SHOWS HOW MUCH OF THE TIME YOU FEEL SATISFIED WITH YOUR JOB?

   1. All the time.
   2. Most of the time.
   3. A good deal of the time.
   4. About half of the time.
   5. Occasionally.
   6. Seldom.
   7. Never.

2. CHOOSE THE ONE OF THE FOLLOWING STATEMENTS WHICH BEST TELLS HOW WELL YOU LIKE YOUR JOB.

   1. I hate it.
   2. I dislike it.
   3. I don't like it.
   4. I am indifferent to it.
   5. I like it.
   6. I am enthusiastic about it.
   7. I love it.

3. WHICH ONE OF THE FOLLOWING BEST TELLS HOW YOU FEEL ABOUT CHANGING YOUR JOB?

   1. I would quit this job at once if I could.
   2. I would take almost any other job in which I could earn as much as I am earning now.
   3. I would like to change both my job and my occupation.
   4. I would like to exchange my present job for another one.
   5. I am not eager to change my job, but I would do so if I could get a better job.
   6. I cannot think of any jobs for which I would exchange.
   7. I would not exchange my job for any other.

4. WHICH ONE OF THE FOLLOWING SHOWS HOW YOU THINK YOU COMPARE WITH OTHER PEOPLE?

   1. No one likes his job better than I like mine.
   2. I like my job much better than most people like theirs.
   3. I like my job better than most people like theirs.
   4. I like my job about as well as most people like theirs.
   5. I dislike my job more than most people dislike theirs.
   6. I dislike my job much more than most people dislike theirs.
   7. No one dislikes his job more than I dislike mine.

[1]APPENDIX B

SCORING KEY FOR THE SHORT FORM
OF THE JOB DIAGNOSTIC
SURVEY

[1](Hackman and Oldham, 1974a:70-73)

SCORING KEY FOR THE SHORT FORM OF THE JOB DIAGNOSTIC SURVEY

The Short Form of the Job Diagnostic Survey (JDS) measures several characteristics of jobs, the reactions of the respondents to their jobs, and the growth need strength of the respondents. Some of the scales tapped by the JDS are not included in the Short Form; others are measured with fewer items. The scales measuring the objective job dimensions are; however, identical with those in the JDS.

Each variable measured by the JDS Short Form is listed below, along with (a) a one or two sentence description of the variable, and (b) a list of the questionnaire items which are averaged to yield a summary score for the variable.

* * * *

I. JOB DIMENSIONS: Objective characteristics of the job itself.

A. Skill Variety: The degree to which a job requires a variety of different activities in carrying out the work, which involves the use of a number of different skills and talents of the employee.

Average the following items:

Section One #4
Section Two #1
#5 (reversed scoring--i.e., subtract the number entered by the resondent from 8)

B. Task Identity: The degree to which the job requires the completion of a "whole" and identifiable piece of work--i.e., doing a job from beginning to end with a visible outcome.

Average the following items:

Section One #3
Section Two #11
#3 (reversed scoring)

C. Task Significance: The degree to which the job has a substantial impact on the lives or work of other people--whether in the immediate organization or in the external environment.

Average the following items:

Section One #5
Section Two #8
#14 (reversed scoring)

D. Autonomy: The degree to which the job provides substantial freedom, independence, and discretion to the employee in scheduling his work and in determining the procedures to be used in carrying it out.

Average the following items:

Section One #2
Section Two #13
#9 (reversed scoring)

E. Feedback from the Job Itself: The degree to which carrying out the work activities required by the job results in the employee obtaining information about the effectiveness of his or her performance.

Average the following items:

Section One #7
Section Two #4
#12 (reversed scoring)

F. Feedback from Agents: The degree to which the employee receives information about his or her performance effectiveness from supervisors or from co-workers. (This construct is not a job characteristic per se, and is included only to provide information supplementary to construct (E) above.)

Average the following items:

Section One #6
Section Two #10
#7 (reversed scoring)

G. Dealing with Others: The degree to which the job requires the employee to work closely with other people (whether other organization members or organizational "clients").

Average the following items:

Section One #1
Section Two #2
#6 (reversed scoring)

II. EFFECTIVE RESPONSES TO THE JOB: The private, effective reactions or feelings an employee gets from working on his job.

A. General Satisfaction: An overall measure of the degree to which the employee is satisfied and happy in his or her work.

Average the following items:

Section Three #2
#6
#4 (reversed scoring)

B. Internal Work Motivation: The degree to which the employee is self-motivated to perform effectively on the job.

Average the following items:

Section Three #1
#3
#5
#7 (reversed scoring)

C. Specific Satisfaction:* These short scales tap several specific aspects of the employee's job satisfaction.

C1. "Pay" satisfaction. Average items #2 (12) and #9 (13) of Section Four.
C2. "Security" satisfaction. Average items #1 (11) and #11 (14) of Section Four.
C3. "Social" satisfaction. Average items #4 (2), #7 (5), and #12 (8) of Section Four.
C4. "Supervisory" satisfaction. Average items #5 (3), #8 (6), and #14 (10) of Section Four.
C5. "Growth" satisfaction. Average items #3 (1), #6 (4), #10 (7), and #13 (9) of Section Four.

*Numbers in parentheses show the order in which the questions were asked in Section Four (4).

III. INDIVIDUAL GROWTH NEED STRENGTH: This scale taps the degree to which an employee has strong vs. weak desire to obtain "growth" satisfactions from his or her work.

Average the six items from Section Five listed below. Before averaging, subtract 3 from each item score; this will result in a summary scale ranging from one to seven. The items are: #2, #3, #6, #8, #10, and #11.

IV. MOTIVATING POTENTIAL SCORE: A score reflecting the potential of a job for eliciting positive internal work motivation on the part of employees (especially those with high desire for growth need satisfaction) is given below.

$$MPS = \frac{\text{Skill Variety} + \text{Task Identity} + \text{Task Significance}}{3} \times \text{Autonomy} \times \text{Feedback from the Job}$$

APPENDIX C

JOB DIAGNOSTIC SURVEY

INSTRUMENT VALIDITY

Instrument Validity

Various forms of the JDS have been administered by Hackman and Oldham to over 1500 individuals holding more than 100 different types of jobs within 15 different organizations throughout the United States (Hackman and Oldham, 1974a:8). The sample population characteristics were highly heterogeneous and ran the spectrum from blue collar worker to the professional worker. Results obtained from each study group have validated the reliabilities of the JDS scales which were originally based on data obtained from 658 workers engaged in 62 different jobs in seven organizations. Although the JDS has undergone three major revisions, the reliabilities of component scales remain highly satisfactory (Hackman and Oldham, 1974a:7).

Internal consistency reliabilities for each of the scales measured by the JDS are shown in Table XXII. These reliability estimates were computed by "...obtaining the median inter-item correlations for all items which are scored on each scale, and then adjusting the median by Spearman-Brown procedures to obtain an estimate of the reliability of the summary scale scores" (Hackman and OLdham, 1974a:39).

Discriminant validity of the various items are reflected in Table XXII as the median "off-diagonal" correlations. The median "off-diagonal" correlation is the correlation between items on a given scale and all other items scored on the same type but different scales. These correlations provide a measure of the instrument's "ability" to discriminate between the various items being measured (Hackman and Oldham, 1974a:17,19).

Tables XXIII and XXIV which show the intercorrelations among the JDS scales are based on Hackman and Oldham's study group responses. Table XXIII correlations were computed across total group responses, whereas Table XXIV correlations were computed across group responses by job type.

In general, the intercorrelations for the two methods are quite similar. Hackman and Oldham's research found that the job dimensions themselves are moderately intercorrelated, thus validating Hackman and Lawler's findings (1971). A moderate level of intercorrelation among the dimensions does not detract from their usefulness as separate measures as long as one will accept that they are non-independent and account for this fact in interpreting the scores of various jobs given specific job dimensions (Hackman and Oldham, 1974a:26). This independency will be examined and accounted for by performing several different types of statistical analyses, all designed to achieve the same objective.

Examination of the intercorrelations, Tables XXIII and XXIV, shows that the variables measured by the JDS are interrelated as predicted by the theory. Furthermore, these variables relate positively to each other and to each of the supplementary dimensions tapped by the JDS. Due to this positive correlation and to the magnitude of the correlation coefficients, this instrument is considered a valid measure of the theory concepts (Hackman and Oldham, 1974a:26). For a further discussion of the JDS validity, see Motivation Through the Design of Work: Test of a Theory, Department of Administrative Services, Yale University, by J. Richard Hackman and Greg R. Oldham.

TABLE XXII

RELIABILITIES OF THE JDS SCALES[1]

	Internal Consistency Reliability	Median Off-diagonal Correlation[a]
JOB DIMENSIONS		
Skill Variety	.71	.19
Task Identity	.59	.12
Task Significance	.66	.14
Autonomy	.66	.19
Feedback from the Job Itself	.71	.19
Feedback from Agents	.78	.15
Dealing with Others	.59	.15
PSYCHOLOGICAL STATES		
Experienced Meaningfulness of the Work	.74	.26
Experienced Responsibility for the Work	.72	.23
Knowledge of Results	.76	.17
AFFECTIVE RESPONSES TO THE JOB		
General Satisfaction	.76	.25
Internal Work Motivation	.76	.25
Specific Satisfactions:		
Job Security	b	b
Pay	b	b
Social	.56	.23
Supervisory	.79	.25
Growth	.84	.28
GROWTH NEED STRENGTH		
"Would Like" Format	.88	c
Job Choice Format	.71	c

Notes:

a. The median off-diagonal correlation is the median correlation of the items scored on a given scale with all of the items scored on different scales of the same type. Thus, the median off-diagonal correlation for skill variety (.19) is the median correlation of all items measuring skill variety with all the items measuring the other six job dimensions.

b. These scales were added to the JDS after the present data were collected, and no reliability data are yet available.

c. Off-diagonal correlations are not reported for these two scales, since all items were designed to tap the same construct. The scale scores obtained using the "would like" format correlate .50 with the scale scores obtained using the job choice format.

[1](Hackman and Oldham, 1974a:18)

TABLE XXIII

INTERCORRELATIONS AMONG JDS SCALE SCORES (ACROSS 658 RESPONDENTS)[1]

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Skill Variety	--																	
2	Task Identity	.16	--																
3	Task Signicance	.21	.20	--															
4	Autonomy	.51	.38	.22	--														
5	Feedback from the Job Itself	.32	.26	.26	.34	--													
6	Feedback from Agents	.25	.16	.22	.23	.37	--												
7	Dealing with Others	.46	.02	.24	.29	.24	.26	--											
8	Motivating Potential Score (MPS)	.62	.51	.41	.80	.72	.36	.34	--										
9	Experienced Meaningfulness of the Work	.51	.26	.43	.46	.41	.31	.33	.57	--									
10	Experienced Responsibility for the Work	.40	.34	.34	.41	.37	.23	.24	.53	.64	--								
11	Knowledge of Results	.12	.21	.21	.26	.54	.39	.06	.43	.33	.32	--							
12	General Satisfaction	.42	.22	.24	.43	.37	.33	.24	.49	.66	.48	.34	--						
13	Internal Work Motivation	.42	.22	.32	.33	.36	.25	.30	.46	.63	.66	.25	.51	--					
14	Social Satisfaction	.31	.17	.24	.38	.27	.31	.36	.40	.41	.38	.32	.40	.40	--				
15	Supervisory Satisfaction	.15	.16	.16	.32	.31	.41	.13	.35	.39	.32	.37	.46	.31	.37	--			
16	Growth Satisfaction	.52	.31	.33	.58	.44	.39	.28	.63	.68	.54	.36	.67	.56	.52	.47	--		
17	Growth Need Strength (would like format)	.22	.08	.03	.10	.11	.13	.16	.19	.10	.21	.07	.04	.19	.08	.07	.02	--	
18	Growth Need Strength (job choice format)	.31	.06	-.01	.19	.13	.15	.20	.25	.15	.21	.05	.13	.17	.10	.10	.08	.50	--

Note. N = 658. Correlations .10 are significant at the .01 level (two tailed)

[1]Hackman and Oldham, 1974a:24)

TABLE XXIV

INTERCORRELATIONS AMONG JDS SCALE SCORES (ACROSS 62 JOBS)[1]

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Skill Variety	--																	
2	Task Identity	.20	--																
3	Task Significance	.23	.33	--															
4	Autonomy	.64	.40	.06	--														
5	Feedback from the Job Itself	.43	.37	.36	.46	--													
6	Feedback from Agents	.12	.32	-.01	.25	.24	--												
7	Dealing with Others	.61	-.04	.11	.44	.37	.21	--											
8	Motivating Potential Score (MPS)	.76	.55	.37	.86	.76	.30	.49	--										
9	Experienced Meaningfulness of the Work	.64	.31	.46	.49	.47	.10	.31	.66	--									
10	Experienced Responsibility for the Work	.58	.58	.47	.58	.53	.26	.35	.74	.64	--								
11	Knowledge of Results	.06	.16	.34	.30	.57	.27	.10	.40	.29	.30	--							
12	General Satisfaction	.54	.38	.21	.57	.52	.27	.32	.67	.54	.68	.35	--						
13	Internal Motivation	.52	.36	.39	.41	.65	.11	.29	.66	.65	.77	.32	.71	--					
14	Social Satisfaction	.35	.10	.26	.37	.42	.16	.63	.45	.35	.45	.44	.35	.35	--				
15	Supervisory Satisfaction	.15	.20	.29	.31	.43	.42	.16	.40	.33	.42	.61	.57	.43	.38	--			
16	Growth Satisfaction	.65	.43	.39	.76	.63	.36	.48	.85	.63	.77	.46	.74	.66	.60	.55	--		
17	Growth Need Strength (would like format)	.43	.37	.10	.43	.40	.47	.26	.53	.40	.55	.23	.57	.51	.23	.39	.39	--	
18	Growth Need Strength (job choice format)	.54	.34	.14	.47	.37	.40	.43	.58	.32	.57	.06	.51	.49	.26	.29	.39	.80	--

Note:--N = 62. Correlations .32 are significant at the .01 level (two tailed)

[1](Hackman and Oldham, 1974a:25)

APPENDIX D

MEANS AND VARIANCES OF JDS SCORES

MEANS AND VARIANCES OF JDS SCORES[1]

	TOTAL SAMPLE		ANALYSIS OF VARIANCE ACROSS JOBS			
	$\bar{X}$	S.D.	$\bar{X}$	S^2 within jobs	S^2 between jobs	F-ratio
JOB DIMENSIONS						
Skill Variety	4.49	1.67	4.47	1.54	17.70	11.49
Task Identity	4.87	1.43	4.87	1.71	5.90	3.45
Task Significance	5.49	1.29	5.54	1.55	3.22	2.08
Autonomy	4.80	1.43	4.75	1.55	7.92	5.11
Feedback from the Job Itself	4.98	1.41	4.96	1.76	4.41	2.51
Feedback from Agents	3.98	1.65	3.87	2.28	6.82	2.99
Dealing with Others	5.29	1.34	5.27	1.35	6.70	4.96
Motivating Potential Score (MPS)	128.31	72.73	120.68	4,112.	19,959.	4.85
PSYCHOLOGICAL STATES						
Experienced Meaningfulness of the Work	5.12	1.10	5.06	1.05	3.19	3.04
Experienced Responsibility for the Work	5.48	0.91	5.44	0.70	2.37	2.24
Knowledge of Results	5.18	1.09	5.19	1.06	2.57	2.42
AFFECTIVE RESPONSES TO THE JOB						
General Satisfaction	4.62	1.18	4.57	1.13	4.19	3.71
Internal Work Motivation	5.39	0.96	5.34	0.82	2.19	2.67
Specific Satisfactions:						
Job Security	a	a	a	a	a	
Pay	a	a	a	a	a	
Social	5.42	0.92	5.42	0.77	1.72	2.23
Supervisory	5.28	1.27	5.32	1.42	3.81	2.68
Growth	4.82	1.32	4.77	1.48	4.64	3.14
GROWTH NEED STRENGTH						
"Would Like" Format	5.62	1.28	5.51	1.30	5.11	3.93
Job Choice Format	b	b	b	b	b	b
N	658		62	c	c	c

Notes:

a. These scales were added to the JDS after the present data were collected, and normative data are not yet available.

b. The response scale for the job choice format was revised from seven to five points after these data were collected. Preliminary indications are that the mean of the five-point scale will be close to the midpoint (3.0).

c. The analysis of variance was conducted on 50 jobs which had five or more respondents. df=49, 563. All F-ratios are significant beyond the .01 level.

[1] (Hackman, et al, 1974a:22)

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APPENDIX E

MEANS OF JOB DIMENSIONS BY EQUAL EMPLOYMENT OPPORTUNITY COMMISSION (EEOC) CATEGORIES

MEANS OF JOB DIMENSIONS BY EQUAL EMPLOYMENT OPPORTUNITY COMMISSION (EEOC) CATEGORIES[1]

JOB DIMENSION	Overall Sample	EEOC JOB CATEGORIES: Administrators	Professionals	Technicians	Protective Services	Paraprofessionals	Office, Clerical	Skilled Craft	Maintenance, Service
Skill Variety	5.18	5.98	5.84	5.33	5.83	5.05	4.47	5.06	4.23
Task Identity	5.09	5.42	5.30	5.18	4.58	5.11	4.89	5.15	5.12
Task Significance	6.06	6.26	6.22	5.94	6.43	6.20	5.90	5.78	5.87
Autonomy	5.04	5.60	5.50	5.20	4.97	4.89	4.75	4.85	4.59
Feedback from Job	5.12	5.39	5.25	5.22	4.92	4.83	5.13	5.14	4.92
Feedback from Agents	4.01	4.58	4.31	3.80	4.07	4.02	3.90	3.68	3.70
Dealing with Others	5.68	6.29	6.05	5.70	6.13	5.95	5.36	5.09	5.14
Experienced Meaningfulness of Work	5.68	6.08	5.86	5.69	5.95	5.46	5.47	5.50	5.36
Experienced Responsibility for Work	5.67	6.10	5.89	5.63	5.52	5.52	5.73	5.42	5.34
Knowledge of Results	5.40	5.52	5.32	5.46	5.21	5.06	5.53	5.48	5.40
Internal Work Motivation	5.64	5.96	5.86	5.66	5.68	5.48	5.62	5.42	5.33
Motivating Potential Score (MPS)	140	178	167	149	137	129	124	133	115
N	3059	368	477	380	352	159	582	287	427

NOTE: From (VanMaanen & Katz, 1974.)

[1](Hackman and Oldham, 1974a:84)

APPENDIX F

SURVEY POPULATION CHARACTERISTICS AND BASELINE DATA FOR JOB SATISFAC[illegible] AND JOB CHARACTERISTIC MEASURES FO[illegible] FMS AND OMS JOBS

1. The following compilations show the composition of the study group as described by the demographic variables tapped by the study survey.

a) Present Active Duty Grade

Grade	FMS (Percentage)	OMS (Percentage)	Total (Percentage)
E-1	2(2.1)	6(5.6)	8(4.0)
E-2	11(11.6)	13(12.1)	24(11.9)
E-3	35(36.8)	42(39.3)	77(38.1)
E-4	22(23.2)	24(22.4)	46(22.8)
E-5	15(15.8)	14(13.1)	29(14.4)
E-6	5(5.3)	3(2.8)	8(4.0)
E-7	4(4.2)	5(4.7)	9(4.5)
E-8	1(1.1)		1(.5)

b) Total Active Federal Military Service

Years Service	FMS (Percentage)	OMS (Percentage)	Total (Percentage)
Less than 1 Year	11(11.6)	14(13.1)	25(12.4)
1-4 Years	55(57.9)	57(53.3)	112(55.4)
5-8 Years	12(12.6)	26(24.3)	38(18.8)
9-12 Years	8(8.4)	4(3.7)	12(5.9)
13-16 Years	3(3.2)	3(2.8)	6(3.0)
Over 16 Years	6(6.3)	3(2.8)	9(4.5)

c) Age

Age	FMS (Percentage)	OMS (Percentage)	Total (Percentage)
Under 20 Years	23(24.2)	32(29.9)	55(27.2)
21-25 Years	43(45.3)	49(45.8)	92(45.5)
26-30 Years	20(21.1)	19(17.8)	39(19.3)
31-35 Years	6(6.3)	4(3.7)	10(5.0)
36-40 Years	2(2.1)	1(.9)	3(1.5)
41-45 Years	1(1.1)	2(1.9)	3(1.5)

d) Highest Educational Level

Level	FMS (Percentage)	OMS (Percentage)	Total (Percentage)
Grade School			
Some High School	2(2.1)	4(3.7)	6(3.0)
High School Graduate	69(72.6)	75(70.1)	144(71.3)
Some College	24(25.3)	28(26.2)	52(25.7)
College Graduate			
Some Graduate Work			
Graduate Degree			

e) Sex

Sex	FMS (Percentage)	OMS (Percentage)	Total (Percentage)
Male	89(93.7)	106(99.1)	195(96.5)
Female	6(6.3)	1(.9)	7(3.5)

f) Marital Status

Status	FMS (Percentage)	OMS (Percentage)	Total (Percentage)
Married	58(61.1)	48(45.3)	106(52.7)
Single	37(38.9)	58(54.7)	95(47.3)

g) Skill Level

Level	FMS (Percentage)	OMS (Percentage)	Total (Percentage)
3 Level	17(18.1)	12(11.2)	29(14.4)
5 Level	57(60.6)	80(74.8)	137(68.2)
7 Level	18(19.1)	13(12.1)	31(15.4)
9 Level	2(2.1)	2(1.9)	4(2.0)

h) Supervisor/Non-Supervisor Status

Status	FMS (Percentage)	OMS (Percentage)	Total (Percentage)
Supervisor	46(48.4)	53(49.5)	99(49.0)
Non-Supervisor	49(51.6)	54(50.5)	103(51.0)

i) Career Intent

Intent	FMS (Percentage)	OMS (Percentage)	Total (Percentage)
No, Separating	28(29.5)	20(18.7)	48(23.8)
No,Retiring	3(3.2)	3(2.8)	6(3.0)
Undecided	44(46.3)	56(52.3)	100(49.5)
Yes	20(21.1)	28(26.2)	48(23.8)

j) Present Job a Factor in Career Intent Decision (No and Undecided Responses to item i).

Factor	FMS (Percentage)	OMS (Percentage)	Total (Percentage)
No	40(54.1)	26(32.9)	66(43.1)
Yes	34(45.9)	53(67.1)	87(56.9)

2. Mean Scores / Standard Deviations for Dimensions Tapped by the JDS.

Variable	FMS	OMS	Total
Skill Variety	4.77 / 1.42	4.47 / 1.38	4.61 / 1.40
Task Identity	5.10 / 1.17	4.51 / 1.23	4.79 / 1.24
Task Significance	5.89 / 1.16	6.15 / 1.10	6.03 / 1.13
Autonomy	4.65 / 1.34	3.99 / 1.17	4.30 / 1.29
Feedback From Job	5.04 / 1.23	4.65 / 1.16	4.83 / 1.21
Feedback From Supervisors	4.12 / 1.49	4.20 / 1.59	4.16 / 1.54
Association	5.52 / 1.00	5.98 / .81	5.76 / .93
Motivation	5.39 / 1.10	5.29 / 1.14	5.34 / 1.12
Pay Satisfaction	3.14 / 1.71	2.48 / 1.77	2.79 / 1.77
Security Satisfaction	4.59 / 1.49	4.10 / 1.67	4.33 / 1.61
Social Satisfaction	5.30 / 1.02	5.28 / .91	5.29 / .96
Supervisory Satisfaction	4.91 / 1.39	4.60 / 1.52	4.75 / 1.47
Growth Need Strength	4.81 / 1.36	4.57 / 1.51	4.68 / 1.44
Individual Growth Need Strength	5.64 / 1.28	5.42 / 1.06	5.53 / 1.17
Job Satisfaction (Hoppock)	16.99 / 4.16	16.77 / 4.20	16.87 / 4.17

VITA

Walter J. Guthrie was born on 18 April 1945 in Hahira, Georgia. His childhood years were spent in Adel, a rural community in the heart of the agricultural region of Georgia. In 1963, he entered Auburn University where he earned a Bachelor of Science Degree in Chemical Engineering.

Upon graduation from Auburn, he was commissioned in the United States Air Force and was assigned to Mather Air Force Base, California, where he completed navigator training in 1970. After attending a short combat crew training program for the F-4, he was off to help fight the "war" in Southeast Asia. While at Ubon Royal Thai Air Force Base, he served as Paveway (Laser Munitions) Project Officer with the 433rd Tactical Fighter Squadron and as a forward air controller with the renowned Wolf FACs. Surviving that, he served a consecutive overseas tour in "merry ole" England, flying the F-4 out of RAF Lakenheath. The "hardship" European tour was followed by an assignment to Seymour Johnson Air Force Base, North Carolina, where he continued performing duties as an F-4 weapon systems operator and where he also served as a wing standardization and evaluation officer. In June 1976, Captain Guthrie entered the Air Force Institute of Technology as a graduate student in the Systems Management curriculum.

Captain Guthrie is married to the former Micheline H. Kreh of Goldsboro, North Carolina. They have four children, Patricia, Barbara, Ronald, and Derek.

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Job Enrichment
Career Intent
Motivation

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This study investigates the job attitudes of enlisted maintenance personnel (FMS and OMS) serving in a Tactical Air Command fighter aircraft maintenance complex. The overall objective of the study was to determine if a job enrichment program might hold potential for improving individual motivation and organizational effectiveness. This analysis consisted of measuring job satisfaction levels, using the Hoppock job satisfaction measure, and measuring satisfaction with the various dimensions of the work and

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work environment, using the "Job Diagnostic Survey" developed by Hackman and Oldham.

Compared with sample populations (all ranks and enlisted only) drawn from the total Air Force population, the study group exhibited a "lower" degree of job satisfaction. Data analysis indicates that work environment factors are most highly associated with the dissatisfaction displayed. Overall, growth satisfaction (a measure of how much challenge a job provides, opportunity for accomplishment, potential to exercise responsibility, and potential for personal growth and development) was found to be the primary determinant of job satisfaction for this study group. Demographic variables were found to be of little importance in determining job satisfaction.

Career intent disclosures of the maintenance personnel surveyed show that only 25 percent of the individuals definitely plan to remain in the Air Force. Forty-three (43) percent of the individuals who did not express definite positive career intent listed their job as the major factor effecting their decision. Expressed career intent was found to be influenced by job satisfaction and the perceived satisfaction with the work environment factors. Low job satisfaction mean scores and the lack of personnel commitment to a military career coupled with analysis of these dimensions appear to indicate that the work environment is problematic.

Diagnostic analysis of the work itself indicates that an all-inclusive job enrichment program is unwarranted in either maintenance organizations. Autonomy within the OMS activities is the only dimension which appears to be a deficient area.