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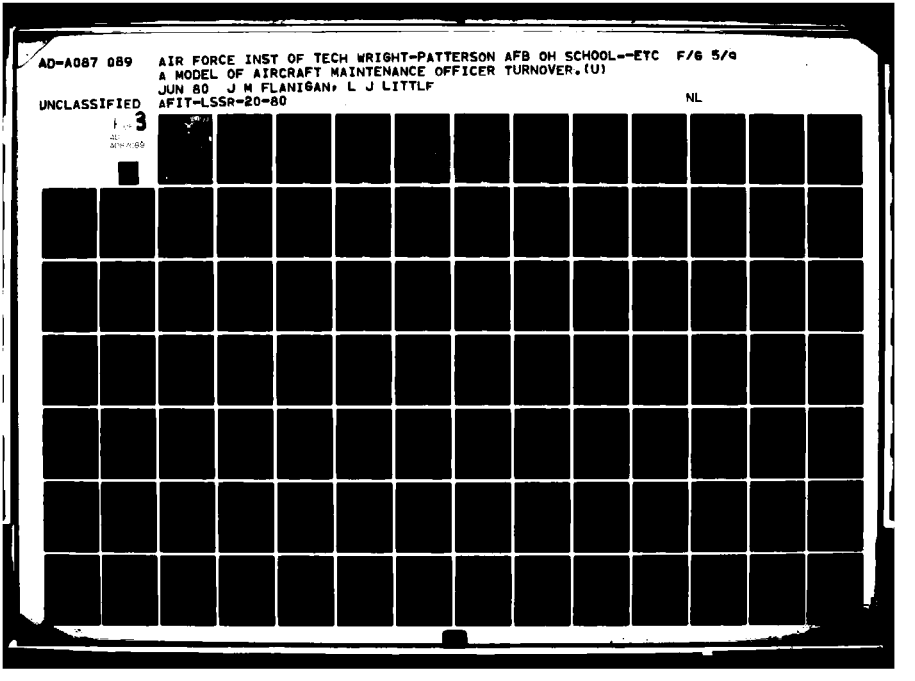

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Turnover is a major problem in the Air Force. Turnover costs the Air Force millions of dollars annually. A less tangible cost is the degraded readiness that results from the loss of trained personnel. These trained personnel are essential because of the growing technological complexity of our weapon systems. To maintain these systems we need an experienced and dedicated aircraft maintenance officer force. These aircraft maintenance officers are leaving career field and the Air Force. To reduce the number of officers who are leaving, we must first determine what factors are causing turnover and the relationship among these factors and turnover. The more the manager knows about the factors causing turnover, the better he can influence turnover. To determine these factors a survey was sent out by Captains Mills and Osadchey to 834 aircraft maintenance officers. This study used the data obtained from the 578 responses to develop a model of turnover. The authors concluded that job satisfaction was the most important contributor to crosstraining turnover and Air Force turnover.

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A MODEL OF AIRCRAFT MAINTENANCE OFFICER TURNOVER

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management

By

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Captain Laurence J. R. Little

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

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Captain Little wishes to express his personal thanks to his loving family for being so understanding of his ignoring them totally this year.

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CHAPTER 1

INTRODUCTION

Background

> We are . . . beginning to lose more good experienced people in critical skill areas, many of whom are impossible to replace in the short term . . . . The signs of a retention problem are clear and troubling [37:2-3].

This statement, made by the Chief of Staff of the Air Force, General Lew Allen, Jr., testifies to a problem of growing concern to the Department of Defense--turnover. In 1978 the Air Force alone spent over one billion dollars on turnover costs. Such costs include the cost of separation, hiring, training, lost productivity, equipment underutilization, and recruitment (18:36). A less tangible but no less troublesome cost is the degraded readiness that results from loss of trained personnel. For example, the Air Force is losing 40 percent of its pilots after the first six years. Estimates show that for each pilot who quits, the Air Force loses one-half million dollars worth of training (9:36).

The medical, scientific, and engineering career fields are also experiencing high turnover. The shortage of physicians in the Air Force is especially acute and "will

become even more serious unless improvements, particularly in pay are forthcoming [9:103]."

A less publicized turnover problem exists within the aircraft maintenance career field. The growing technological complexity of weapon systems and support equipment has placed a premium on highly trained, skilled and experienced maintenance technicians and managers. The loss of these people has a direct negative impact on Air Force readiness, manifesting itself in high aircraft downtime and cost of repair. In General Allen's opinion: "People are important--and more important than ever before . . . . It's possible people may become the weakest link in the readiness chain [38:2]."

The complex and critical nature of the aircraft maintenance field demands an experienced and dedicated officer force. And yet, turnover is as much a problem here as elsewhere. As of 30 April 1980 the captain and major 40XX authorizations were 76 percent and 85 percent manned, respectively (Table 1-1). Lieutenant colonel authorizations were just 77 percent manned. Two sources have been utilized to compensate for the disparity between authorized versus assigned personnel. The shortage in the captain through lieutenant colonel ranks was partially alleviated by the assignment of 688 rated supplement officers to the 40XX career field. In 1978, however, the mass pilot exodus was one factor which caused the number of rated supplement

officers to be reduced from 568 to 372 officers in the maintenance field, a drop of approximately 32 percent (as of 13 September 1979). The second manpower source is the accession of second lieutenants. At present, there are 532 lieutenants authorized versus 1,141 assigned, or a manning of 214 percent. Due to the lack of experienced captains, many of these lieutenants are assigned to captain positions.

Table 1-1

WORLDWIDE MANNING IN 40XX BY GRADE*
(students and those in transient status not included)

Grade	Authorized	Assigned	% Manned
Lieutenant Colonel	656	503	77%
Major	808	687	85%
Captain	1,296	981	76%
Lieutenant	532	1,141	214%

*Figures as of 30 April 1980

The problem of retention in the 40XX career field is being addressed through the Air Force Manpower and Personnel Center (AFMPC) PALACE LOG team. Although the team supports crosstraining as a career broadening tool, the manning situation has forced them to adhere to a severely limited crosstraining policy. This crosstraining policy, however, does not apply to the accession requests placed

upon their office by other career fields. In FY78, 159 40XX personnel were accessed into critical AFSC areas, primarily engineering. In FY79, a total of 30 40XX personnel were accessed to engineering while other career fields claimed 59 accessions from 40XX assets (35).

The sources of retention problems have elicited comments from many Air Force leaders. The Chief of Staff stated on 1 February 1979 that

> We have compounded the problem (of turnover) ourselves with sometimes poorly focused management efforts and pressure to compensate for force reductions and to support increased readiness by working long hours. We've pushed our people hard. To some extent, we may have lost the vital balance between concern about the task and for the individual . . . . The job of defense will continue to demand hard work, but I do not think hard work is at the root of the problem [37:2-3].

What is "at the root of the problem"? This is the question addressed by this research.

Problem

Turnover in the aircraft maintenance officer career field is of major concern to the Air Force. Air Force leaders are faced not only with reducing voluntary turnover costs but also with finding ways to fill the void left by the exiting rated supplement officers and by accessions into other career fields. In order to do this they must know what factors cause turnover and understand the relationship between these factors and turnover. To the extent

Air Force leaders can control the factors leading to turnover, they can control turnover itself.

Research Objective

The objective of this research is to identify the significant factors contributing to turnover of aircraft maintenance officers and to develop a model illustrating the relationship of these factors to turnover.

Research Questions

The following research questions must be answered in order to achieve the research objectives:

1) What are the significant factors contributing to turnover of aircraft maintenance officers?

2) What is the relationship between these factors and turnover?

CHAPTER 2

LITERATURE REVIEW

Overview

Turnover is a problem within the civilian as well as military sectors. Studies have been conducted internationally to gain an understanding of this turnover phenomenon (36:249). Conflicting conclusions have resulted from these studies due, in part, to the lack of agreement on the definition of turnover. Accession, separation, new hires, quits, discharges, labor migration, exodus, rotation and transfer are frequently equated with turnover.

Price defines turnover as "the degree of individual movement across the membership boundary of a social system [32:6]." The establishment of membership boundaries is difficult and therefore Price establishes three criteria. Boundaries may be determined by criterion of definition, criterion of frequency of interaction, and criterion of official sanctions (i.e. those which can be legitimately used to reward or punish behavior).

Turnover can be classified as voluntary and involuntary. Involuntary turnover, according to Price, is usually initiated by the organization, while voluntary turnover is a decision made by the individual (32:9). Bluedorn proposed

a refinement of Price's conceptualization of turnover by adding directionality to the concept (Figure 2-1). Bluedorn views turnover using two dimensions: direction of movement across the organization's membership boundary (in or out) and the initiation of the movement (voluntary or involuntary). The cross classification of the two dimensions results in four types of turnover: Type I, voluntary separations; Type II, voluntary accessions; Type III, involuntary accessions; and Type IV, involuntary separations. The term turnover as referenced in this thesis will refer to Type I turnover or voluntary separation (4:649-651).

Voluntary turnover, rather than involuntary, has been the subject of numerous studies. Price claims that voluntary turnover holds more interest for the manager because: (1) most turnover is voluntary; (2) the formation of the theory is easier when the phenomenon to be explained is homogenous; and (3) voluntary turnover is more subject to control by the manager (28:9).

The lack of agreement on the determinants of turnover has resulted in numerous theories and models. These models, however, have not led to a synthesis of the problem. A 1970 study concluded:

> There is a surprising lack of <u>comprehensive</u> research on turnover in view of the obvious costs to industry. . . . Research to tie down systematically more of the individual difference factors and environmental moderators explaining turnover variance could be quite useful both to organizations to reduce their manpower costs and to individuals to reduce the disruption often associated with job changes [34:1].

INITIATOR OF MOVEMENT	DIRECTION OF MOVEMENT	
	Into the Organization (Accessions)	Out of the Organization (Separations)
The Individual (Voluntary)	Type II Voluntary Accessions	Type I Voluntary Separations
Other than the Individual (Involuntary)	Type III Involuntary Accessions	Type IV Involuntary Separations

Fig. 2-1. Bluedorn's Taxonomy of Turnover (4:648)

This section will examine conceptual approaches to turnover and demonstrate the large number of theories extant. These theories will then be used to support model development in Chapter 4.

Major Studies on Turnover

Price

Price developed a conceptual model of turnover from a review of existing literature. He conceptualized a relationship among determinants, intervening variables, correlates and turnover (32:11).

One of the most widely used measures of turnover, according to Price, is average length of service. This measure may be computed by two methods--stayers and leavers. Average length of service (stayers) has three advantages: ease of computation, ease of understanding, and ease of obtaining a more reliable statistic due to use of total membership as the base. However, in organizations with a large number of high-service members the average (stayers) will be high and may consequently mask a large turnover among low-service members (32:13).

Average length of service (leavers) also possesses ease of computation and understanding. The third advantage of this average (leavers) is its ability to indicate where turnover is occurring within the organization as reflected by a low or high average. A disadvantage of this average

is the difficulty in obtaining an adequate size for the average because it is based solely on leavers. Additionally, the average does not indicate the volume of an organization's turnover (32:14). This latter criticism discourages Price from using such a measure.

Pay, integration, centralization, instrumental communication, and formal communication were presented as strongly supported determinants which are believed to cause variations in turnover (Figure 2-2). Price adopted Lawler's definition of pay which includes "the money, fringe benefits, and other commodities that have financial value which organizations give to employees in return for their service [32:68]." Here Price distinguishes between pay or the amount of money directly received from the organization and satisfaction with pay or the member's social psychological response to the amount received (32:68). Price mentions eight codifications, three reviews, and eleven empirical studies which support a negative causal relationship between pay and turnover.

Integration is defined as the extent of participation in primary and/or quasi-primary relationships. A relationship may be considered primary by its degree of emotional involvement or bias such as that found in a family. A secondary relationship is specific, emotionally neutral and impartial. The quasi-primary relationship thus refers to the "close friend" relationship (32:70-73).

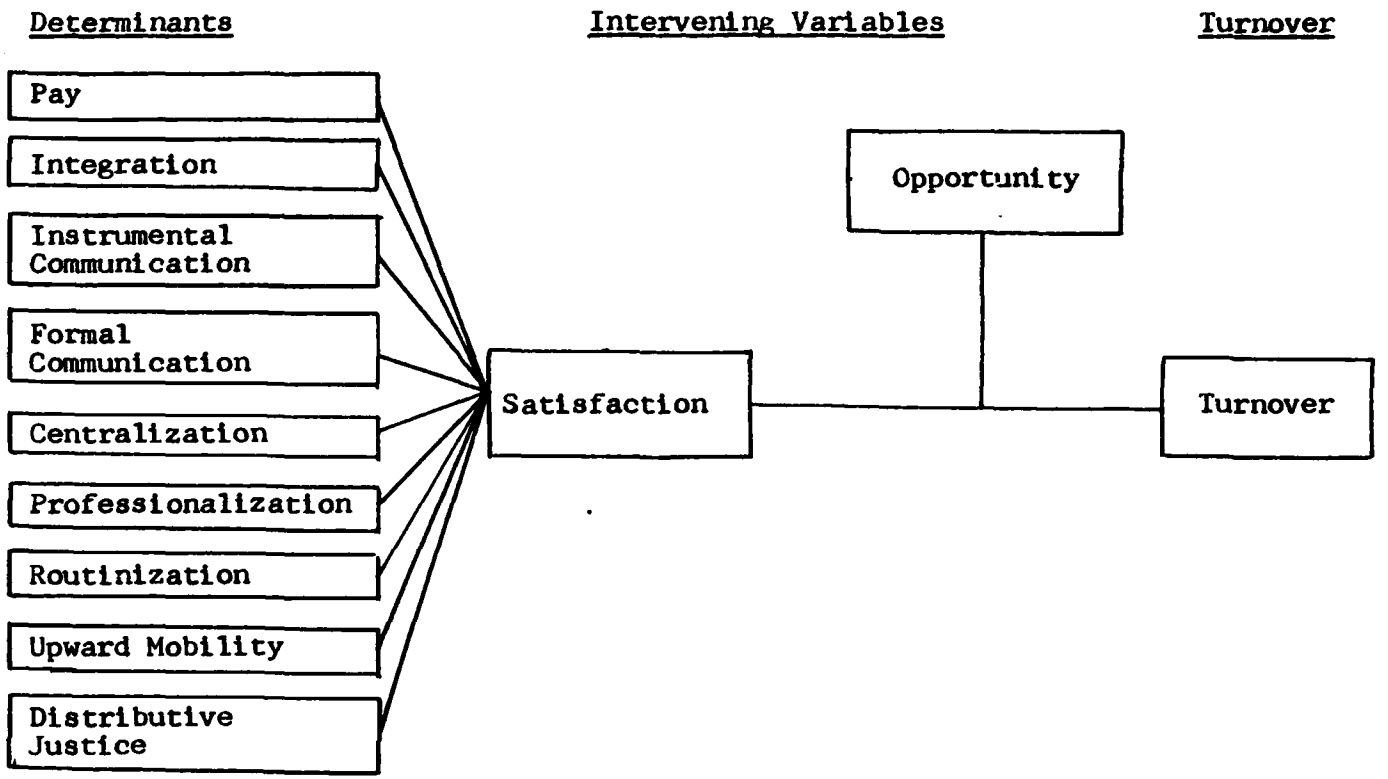


Fig. 2-2. Price Turnover Model (3:30)

Centralization is "the degree to which power is concentrated in a social system [32:76]." Price claims that participation, autonomy, independence and freedom are synonymous with centralization. The greater the extent to which power is concentrated in others, the greater the centralization. He further postulates that a response to high centralization is high turnover (32:76-79).

Instrumental communication is "the transmission of information directly related to role performance" with expressive communication being information not directly related to role performance (32:74). Conversely, formal communication represents "officially transmitted information [32:74]." Weakly supported determinants include professionalism, routinization, upward mobility, and distributive justice (32:73-76).

Intervening variables between the previously mentioned determinants and turnover include satisfaction (socio-psychological) and opportunity (structural). Satisfaction is defined as "the degree to which the members of a social system have a positive affective orientation toward membership in the system [32:79]." Price indicates that satisfaction is linked with work, supervision, pay, promotion and co-workers throughout the literature. He viewed satisfaction as the product of the five strongly supported determinants (i.e. pay, integration, centralization, instrumental communication and formal communication). An assumption of

satisfaction made by Price is that the individual's aim is to maximize the net balance of satisfaction versus dissatisfaction.

Opportunity is defined by Hickson et al as "the availability of alternative roles in the environment [32:81]." Bowey claimed a positive relationship between opportunity and turnover (32:81). Implicit in Price's assessment of opportunity are two assumptions. First, he assumes that individuals have knowledge of the available opportunities. Without such knowledge they are not likely to turnover. Secondly, it is assumed that members have the choice to leave or remain. Unlike satisfaction, fluctuations in opportunity are not produced by either the determinants or the level of satisfaction. Rather it is a characteristic of the organization's environment (32:68-88).

Price related correlates or indicators (length of service, age, level of employment, level of skill, blue-collar and white collar workers, country, education, non-managers and managers, and non-government and government) to turnover by classifying them as having strong, medium, or weak support. From his literature review he arrived at nine generalizations. Those applicable to this research are:

1. Members with low lengths of service usually have higher rates of turnover than members with high lengths of service (strong support).

2. Younger members usually have higher rates of turnover than older members (strong support).

3. Better-educated members usually have higher rates of turnover than less-educated members (weak support) (32:26-37).

Vroom

Expectancy is a decision theory of human motivation and choice in the work environment. This theory was first proposed by Vroom as an explanation of work behavior and choice of work occupation (11:481-482). Vroom's theory supported three models: a job satisfaction model, a work motivation model, and a job performance model (11:482). He purported that the selection of an individual's choice (e.g. turnover) from alternate courses of action depends on the relative strength of forces. Each force is hypothesized to be equal to the algebraic sum of the product of the valences and expectancies. He defines expectancy as "a momentary belief concerning the likelihood that a particular act will be followed by a particular outcome [41:17]." Valence refers to "affective orientations toward particular outcomes [41:15]."

Vroom's model accounts for individual differences. As he states, "there is no reason to believe that working serves the same purpose for different individuals [36:44]." Using his model Vroom hypothesized that the valence of the

work role to the worker is directly proportional to the strength of the force operating on him to stay in that job. Workers who are highly attracted to their jobs experience stronger forces to remain in them than those who are less attracted to their jobs. The stronger the force to remain, the less likely a person will turnover, either temporarily or permanently (41:187). Vroom further states that the force on a person to seek another job is a function of the valence of that job and of his expectancy that his attempt will be successful (41:282).

Porter and Steers

Porter and Steers attempted to analyze the components of job satisfaction as affected by the role of met expectations (31:151). They defined met expectations as the discrepancy between the positive or negative experiences of a job versus what the individual expected to encounter. They found that the literature had categorized job satisfaction according to organization-wide factors, immediate work environment factors, job content factors, and personal factors (Figure 2-3). Their assumption was that when an individual's expectations are not substantially met, his propensity to withdraw would increase (31:152).

Organization-wide factors were defined as those variables affecting the individuals which are determined by persons or events external to the immediate work group.

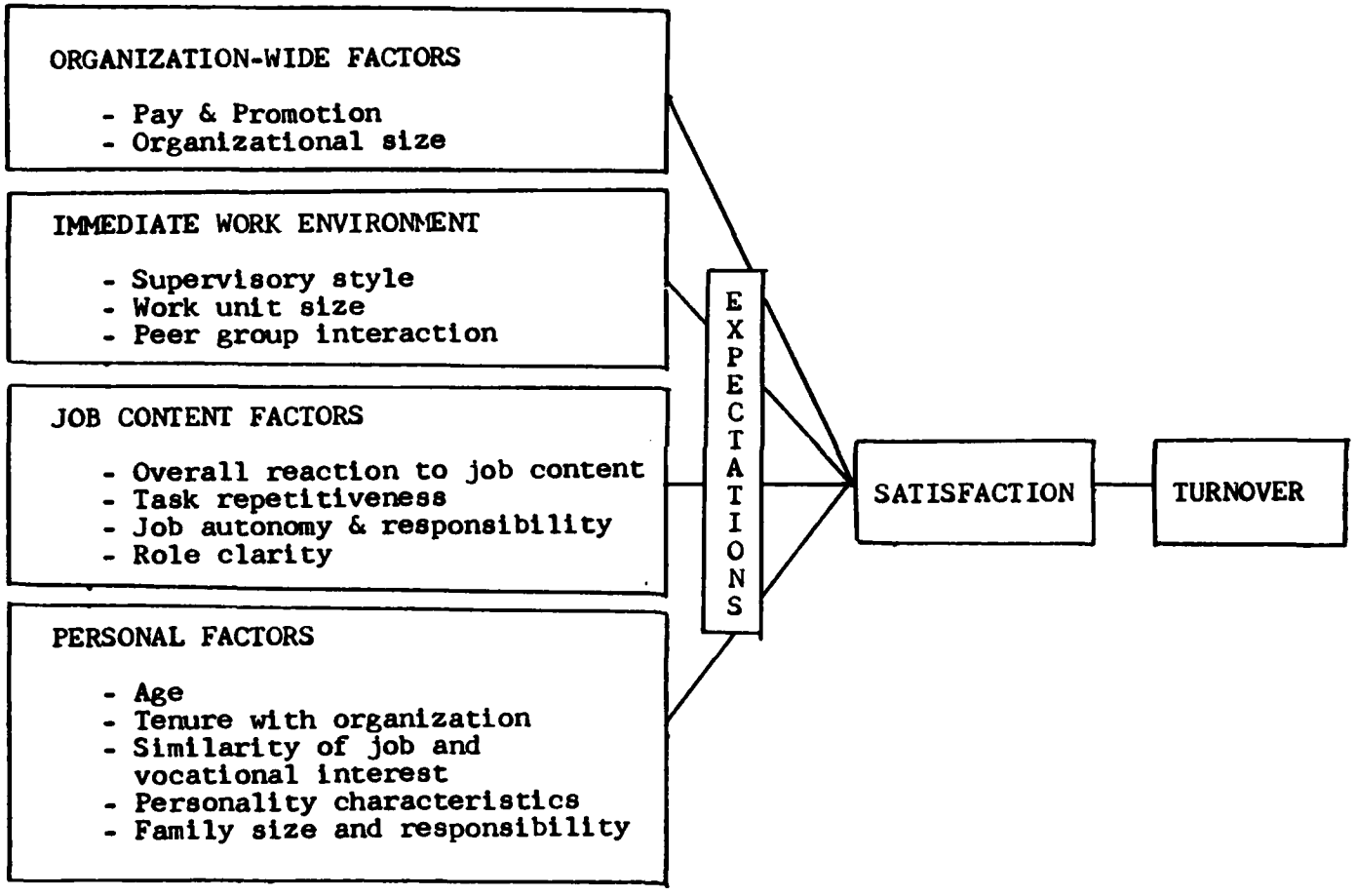


Fig. 2-3. Model of Porter and Steers' Conceptual Framework (3:19)

Included within this category are the factors of pay and promotion and organization size. They found that perceived equity and met expectations in pay and promotion determined the individual's satisfaction or dissatisfaction, which then resulted in a preference to remain or leave. Both factors are viewed by their relative increase and weighted by the individual's expectations versus his perceived contribution (31:152).

Immediate work environment factors included (1) supervisory style, (2) work unit size, and (3) the nature of peer group interaction. Supervisory style includes such aspects as initiating structure, equity of treatment, recognition and feedback, job requirements, performance improvement, job goals and managerial experience. Porter and Steers concluded that when one's expectations concerning the nature of the supervisor were not met, the individual's tendency to leave increased. The size of the working unit was related only to blue collar worker turnover, where turnover was higher in larger units than smaller units (31:162). Peer group interaction is the process of interactive dynamics between an individual and his peers (31:157). This interaction provides the support needed to adjust to the work environment. The lack of such support could lead to alienation. The diverse conclusions in this area, however, would not permit conclusive findings.

Job content factors include (1) overall reaction to job content, (2) task repetitiveness, (3) job autonomy and responsibility, and (4) role clarity. Overall reaction to job content was defined as the general level of satisfaction with assigned tasks. Task repetitiveness is the routinization of certain tasks. Conflicting conclusions exist on the relationship between task repetitiveness and turnover. Role clarity was defined through organizational change, organizational complexity, and managerial communication. Turnover was found to be positively related to dissatisfaction with job content and lack of job autonomy or responsibility. Congruence between expectations and actual experience in role clarity can increase satisfaction and job longevity (31:164).

Personal factors included age, length of service, similarity of job with vocational interest, personality characteristics, and family considerations. Age and tenure are strongly and negatively related to turnover. Limited studies pointed toward a positive relationship between the job satisfaction of vocational interests and job retention. A tentative finding was that extreme personality traits at either end of the personality trait continua may lead to turnover. For example, those exhibiting very high or very low degrees of achievement are more inclined to withdraw. Finally, family size and responsibility were generally

positively related to turnover in women but negatively related for males in some studies (31:167).

One of the conclusions of Porter and Steers was that overall job satisfaction (defined as the sum total of the individual's met expectations) represented an important force in the turnover decision (31:169).

Porter and Lawler

The aim of Porter and Lawler's investigation was to study the relationship of managerial attitudes to managerial performance. In their original theoretical model (Figure 2-4) they combined nine separate variables not previously combined in a meaningful manner. Those variables include: (1) value of reward--attractiveness of possible outcomes to individuals, (2) effort-reward probability--the expectation of the reward level depends upon the level of his efforts, (3) effort--amount of energy an individual expends to perform a task, (4) abilities and traits--stable, long-term individual characteristics such as intelligence, personality traits, manual skills indicative of the individual's capability to perform, (5) role perceptions--activities and behaviors an individual feels he should exhibit to contribute to successful job performance, (6) performance--amount of successful achievement or behavior that is accomplished or net effect of applied efforts and abilities and traits, (7) rewards--extrinsic or intrinsic outcomes or returns

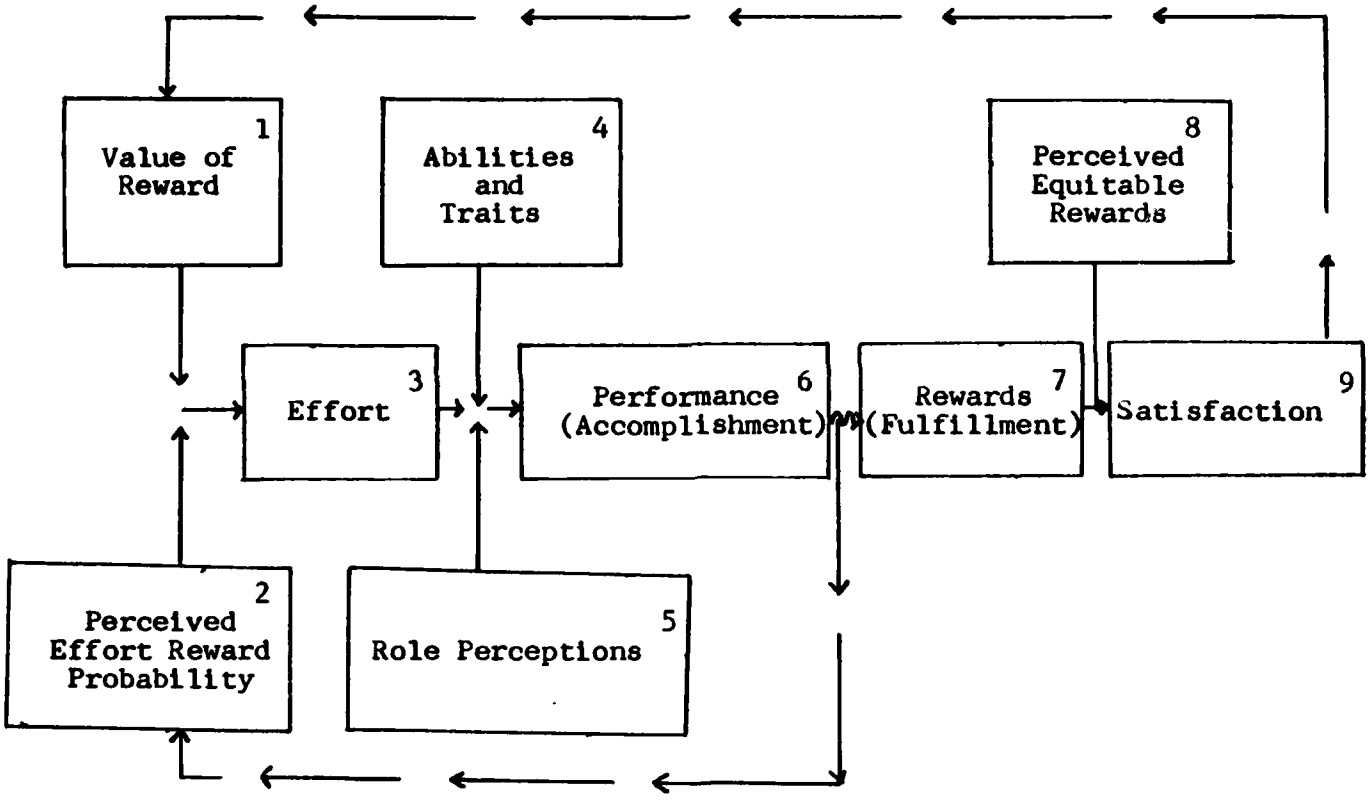


Fig. 2-4. Porter and Lawler's Theoretical Model (30:24)

that are positively valued by the individual, (8) perceived equitable rewards--level or amount of rewards that an individual feels he deserves as a result of a given level of performance, and (9) satisfaction--the derivative variable which identifies how rewards actually received compare with the perceived equitable level of rewards (30:16-31).

Porter and Lawler stated that satisfaction or the outcome of their model could be measured via two elements: the expected equitable level of rewards and the observed level of rewards received. The more that actual rewards did not at least meet the perceived equitable rewards, the more dissatisfaction a person experienced (30:31).

According to their theoretical model high job satisfaction will result from high performance only if the gap between perceived equitable rewards and the observed amount received decreases. Thus a high performer will be satisfied only if his efforts lead to commensurate rewards. Porter and Lawler thus view satisfaction as the dependent variable in the performance-satisfaction relationship. Consonant with Vroom's model, Porter and Lawler posit that if a person's previous efforts resulted in desired rewards, the individual will be more likely to increase future effort in anticipation of increased future rewards.

In the results of their random sample of a cross section of lower and upper managers in American industry, their hypothesized model was supported. In revising their

model (Figure 2-5) they made a correction in the reward variable. They found that the distinction between intrinsic and extrinsic rewards was viewed more definitively than they had originally anticipated. From this discovery they concluded that the needs satisfied by intrinsic rewards such as autonomy and self-actualization were more likely to result in attitudes of satisfaction related to performance (semi-wavy line) than are needs such as security and social needs which are often satisfied by extrinsic rewards (wavy line). Thus, these two types of rewards should be viewed as intervening variables between performance and job satisfaction (30:163).

A second change resulting from their survey involved a relationship between performance to the perceived equitable rewards which implied that self-ratings of performance acted directly upon the latter variable. In evaluating the pay-performance relationship, they hypothesized that if performance and pay are related to a high degree, then high performers should experience greater fulfillment. A causal inference drawn from their study was that the performance-satisfaction relationship applies only to managers who relate performance with actual pay. In concluding their study, Porter and Lawler insisted that organizations continue to evaluate job satisfaction with a close concentration on its relationship to performance (30:164).

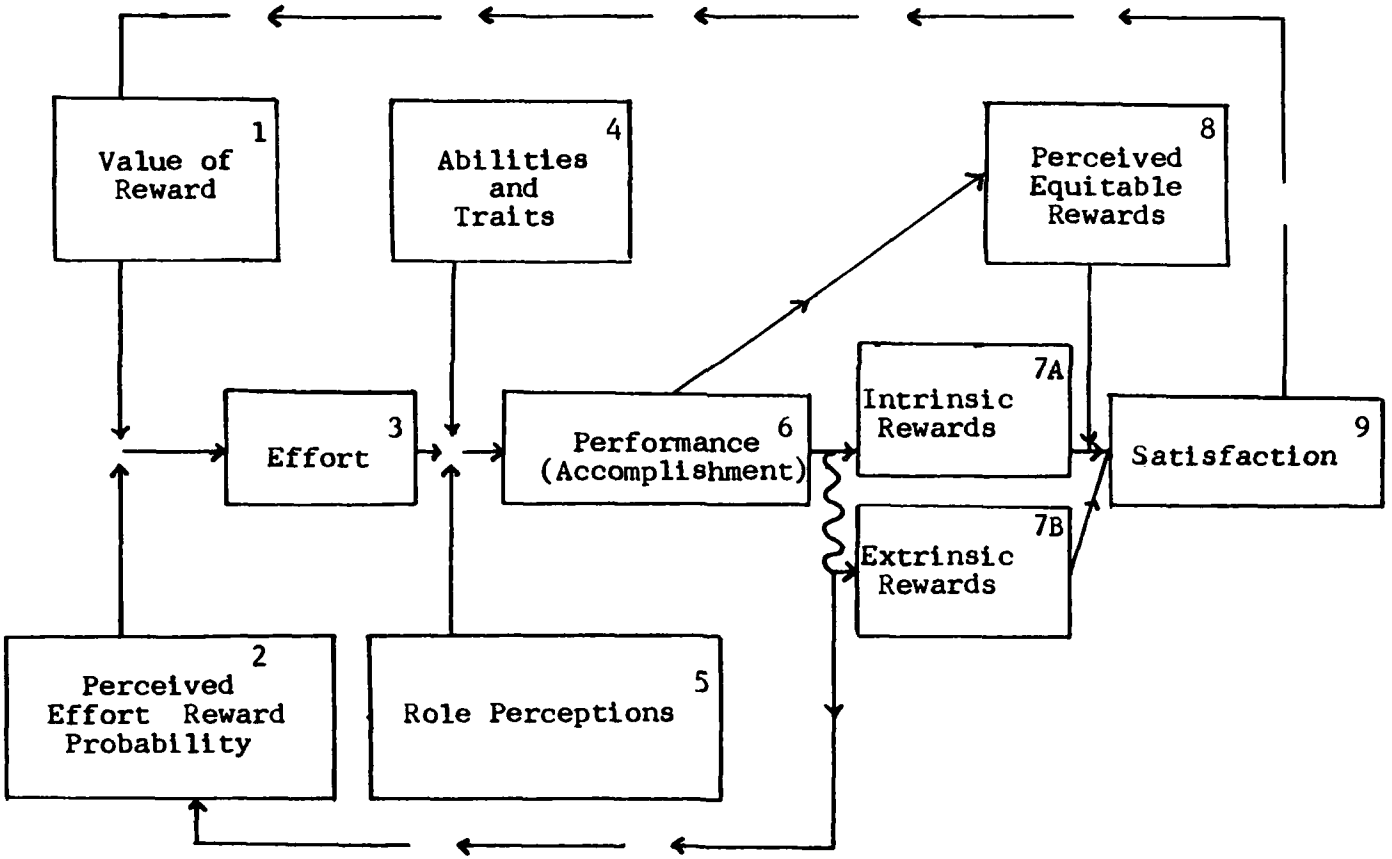


Fig. 2-5. Porter and Lawler's Revised Diagram of the Theoretical Model (30:164)

Mobley, Griffith, Hand and Meglino

In Review and Conceptual Analysis of the Employee Turnover Process, Mobley, Griffith, Hand and Meglino view turnover as "individual choice behavior [25:493]." According to this team the most frequently studied psychological variable presumed related to turnover is satisfaction. Yet, according to Locke (1976) as well as Porter and Steers (1973) studies, the satisfaction-turnover relationship accounts for less than 16 percent of the variance in turnover.

In the examination of turnover, Mobley et al attempt to "develop a conceptual model of the individual-level employee turnover process that is consistent with the research literature [25:496]." Following an evaluation of the literature Mobley et al developed a model (Figure 2-6) which examines five characteristics. First, it treats individual differences in perceptions, expectations, and values, as well as personal and occupation variables. Secondly, the perception and evaluation of alternative jobs are recognized. Thirdly, the roles of centrality of work values and interests as they relate to other values and interests are also recognized. Mobley et al consider not only the present effect of turnover to job satisfaction, but also the expected future effect through job attraction of attainable alternatives. Finally, the researchers relate intention to quit to turnover as the time between measurement of

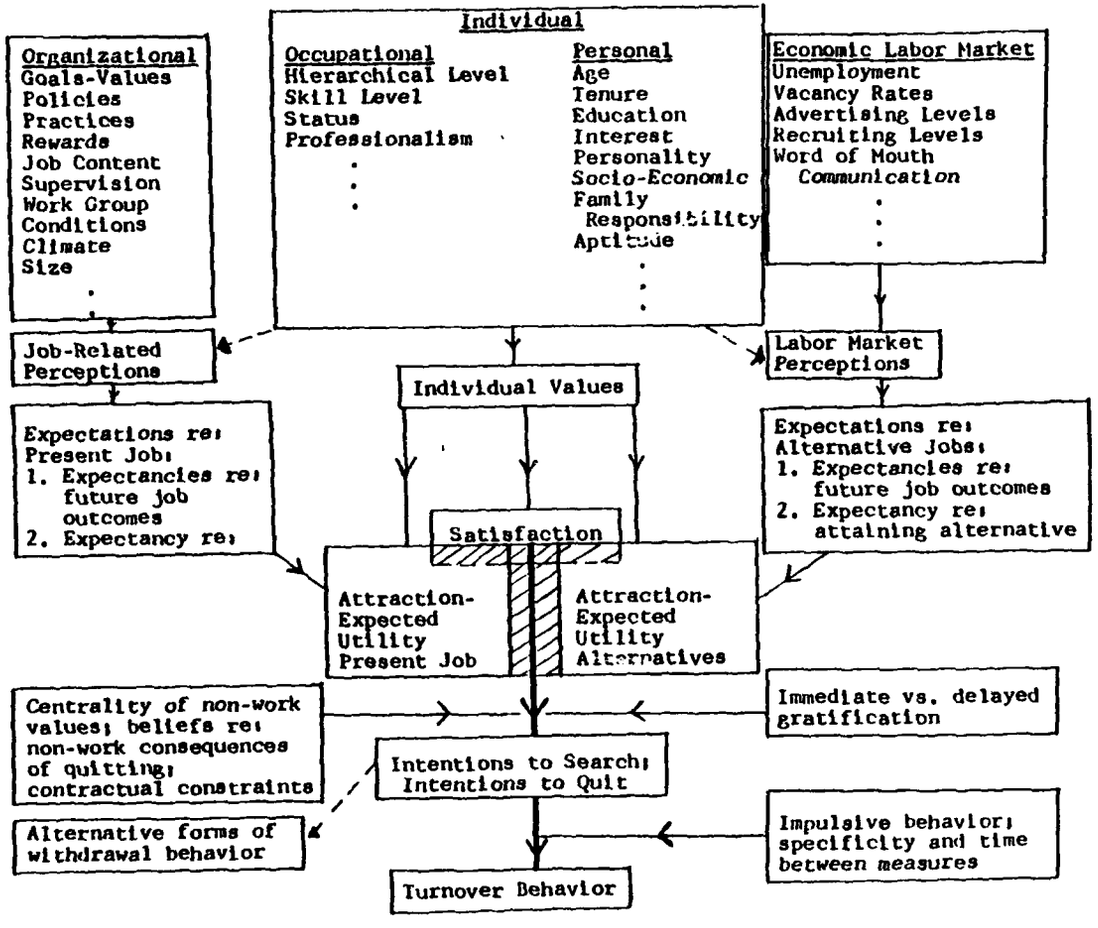


Fig. 2-6. A Schematic Representation of the Primary Variables and Process of Employee Turnover

intentions and behavior affecting the relationship. Behavior is stimulated by intentions. Thus, the most accurate predictor of turnover is intention to quit, which is normally preceded by intention to search. Mobley et al continue by stating that the primary determinants of intentions are: (a) satisfaction, (b) attraction-expected utility of present job, and (c) attraction-expected utility of alternative jobs or roles (25:458).

Satisfaction is seen by Mobley et al to be the affective response to job evaluation and to be present, rather than future oriented. They compare the satisfaction-dissatisfaction concept as an approach-avoidance tendency. The researchers relate this tendency in turnover to three variables: (1) attraction-expected utility of the present role; (2) attraction-expected utility of attainable alternative roles; and (3) centrality of work values, beliefs regarding nonwork consequences of quitting-staying and contractual constraints.

Contrasted with satisfaction is attraction, considered to be future oriented. Attraction is defined as the expectancies that the job will lead to a future attainment of various positive and negative outcomes. Mobley et al not only consider the visibility of alternatives but also the attraction of alternatives and expectancy of attaining those alternatives as being critical in their model. Here expectancy is the index.

Besides the primary variables of satisfaction, attraction-expected utility of the present job and attraction-expected utility of alternatives, there are several moderating variables that merit consideration. These include nonwork values and interests not central to the individual's life values and interests. The relationships between the primary variables and turnover will be modified according to the importance the individual places on nonwork consequences and quitting.

Mobley et al also specify the existence of antecedents of satisfaction and attraction. These include organizational variables as perceived by the individual, economic variables governing the availability of alternatives perceived by the individual and the individual's occupational and personal variables as they influence individual values, perceptions, and expectations (25:520).

Koch and Steers

In a 1976 technical report, Koch and Steers attempted to examine the predictive powers of job attachment and job satisfaction to turnover among a sample of public employees and to determine the components of attachment and satisfaction. Measures of job characteristics and individual characteristics were also included. Job attachment referred to an affective response to one's job that is indicated by congruence between one's real and ideal

jobs, an allegiance to one's chosen occupation and no desire to seek alternative employment. Thus, job attachment is related to organizational commitment with emphasis on occupational rather than organizational tendencies. Based on previous research they hypothesized that job attachment would be more indicative of turnover than satisfaction would be. Job characteristics measured were job autonomy, variety and responsibility. Individual characteristics compiled were age, education, sex, salary, and tenure with the organization (16:4).

Their hypothesis of job attachment being a better predictor of turnover than satisfaction was supported by their study. They propose that perhaps attachment is a component of satisfaction. They support this by stating that job satisfaction focuses on affective responses to job stimuli while attachment may be an intervening variable between satisfaction and turnover. They further discovered that individual characteristics are more dominant in forming attachment than job characteristics. Conversely, job satisfaction is simultaneously affected by both job and individual characteristics. Another interesting finding was the relationship between age and attachment and satisfaction. Once attachment was partialled out there did not appear to be a relationship between age and satisfaction. Thus, a senior employee's attachment may mask his dissatisfaction with his job (16:1-10).

Porter, Crampton, and Smith

Porter, Crampton and Smith investigated the relationship between organizational commitment and turnover, using a sample of managerial trainees in a 15 month longitudinal study (29:87). Organizational commitment refers to the

> . . . nature of the individual's relationship to the organization such that he demonstrates (a) a strong desire to remain a part of the organization, (b) a willingness to exert high levels of effort on behalf of the organization, and (c) a definite belief in the acceptance and value goals of the organization [29:91].

Specifically, they attempted to measure the changes in employee attitudes over a period of time and evaluate the attitude differences between those who left versus those who remained. Their results indicated that those who left during the first fifteen months of employment displayed a visible decline in commitment. Those leaving after six months of employment began to show a decline in commitment a few months prior to departure. They concluded that whenever a decline in commitment is evident, voluntary turnover is likely to occur.

Hunt and Saul

Hunt and Saul surveyed white collar workers to determine variable relationships with job satisfaction (12:690). Sixteen job factors were considered, with the average of these factors defined as job satisfaction. Six of the sixteen (interesting work, promotion, supervision,

working conditions, peer relations and pay) were defined as job facet satisfaction (12:692).

Strong positive linear relationships were found between overall job satisfaction and both the age and tenure of male and female workers. The correlation between age and overall job satisfaction was found to be greatest among workers with less than 12 months tenure. The correlation between tenure and overall job satisfaction was found to be greatest among workers under 25 years old. The former relationship was greater for females. Overall job satisfaction was found to be more strongly associated with age than with tenure for males, whereas the opposite held for females. For males, significant relationships were found between age and satisfaction with supervision, working conditions and co-workers; and between tenure and satisfaction with supervision and working conditions. For females, the only significant relationship was between tenure and working conditions (12:699-701).

Military Studies

Numerous studies have been conducted to evaluate the variables contributing toward the decision to remain in the military services around the world. Among such studies are those of Mallette (Canada), Shenk (United States), Mills and Osadchey (United States), and Branson and Peacock (United States).

Mallette

In 1974 Mallette conducted a pilot study of attrition among Royal Officer Training Program (ROTP) officers. He posited that an expected or implicit exchange of services exists between an individual and an organization. Individuals usually expect to receive work, training and pay in exchange for their efforts, while organizations expect a certain level of behavior and performance commensurate with pay and training. Equity exists if both parties' expectations are met. Separation may result if the individual does not perceive an equitable exchange (40:115).

In evaluating this equity exchange, Mallette interviewed Canadian officers having one year of their initial obligation remaining. His finding was that their career decision was strongly influenced by the comparative expectations of their potential future in the forces versus their potential future elsewhere. Mallette therefore concluded that the Canadian hierarchy needed to respond to the officers' expectations if they wished to keep attrition at an acceptable level (40:116).

Shenk

In a longitudinal study of Air Force commissioning sources, Shenk investigated two factors: (1) the stability of career intent through the initial obligated tour; and (2) the relationship between attitudes, performance,

service life experience, and job satisfaction and selection of an Air Force career. In his study Shenk found that career intent decreased through the third year, stabilizing during the fifth year. He also found that job satisfaction and opportunity to travel were the two factors exerting the greatest positive influence on remaining in the Air Force. Factors contributing most negatively were job dissatisfaction and separation from family. He concluded that the greater the number of factors perceived attainable in the Air Force, the greater the probability the individual would remain in the service (40:116).

In an effort to forecast actual career decisions and thereby minimize expected manning shortages, the Personnel Research Division and Occupational and Manpower Research Division at Lackland Air Force Base analyzed responses from 50,000 Air Force enlisted personnel. These responses were part of the Occupational Research Program (Christal, 1974). In the questionnaire respondents were asked about reenlistment intentions, present job interest, and perceived utilization of training associated with their job (1:5).

The results revealed an increasing tendency to reenlist as career intent responses became more positive. Additionally, a comparison across Total Active Federal Military Service (TAFMS) intervals indicated that the relationships between intent and actual decision became more pronounced as the time between the survey date and actual

reenlistment became shorter. Of the airmen surveyed in the fourth year, 76 percent of the "definitely yes" category reenlisted versus 4 percent of the airmen responding "definitely no" (1:6).

Job interest and utilization of talent and training also appeared related to career decisions but to a lesser degree than career intent. Again, the magnitude of the relationship between these two variables increased when time between the survey and reenlistment dates decreased. Among the fourth-year airmen, 6 percent reporting dull jobs reenlisted while 26 percent claiming interesting jobs reenlisted. When comparing the relationship between career intent and career decision it appeared to be curvilinear in nature, especially for third and fourth year respondees (1:9).

The report concluded that there was a basic feasibility in using career intent statements obtained during the first term as early indicators of career decisions at the individual or group level (1:24).

Mills and Osadchey

Mills and Osadchey examined the correlates of turnover within the non-rated company grade aircraft maintenance officer career field. Their initial conceptual model was developed from an extensive literature review. However, as a result of their findings this conceptual model changed

(Figures 2-7 and 2-8). They concluded that tenure, similarity of job with vocational interests, family size and responsibility, pay, promotion, peer group interaction, integration, supervisory style, role clarity, job autonomy and responsibility, task repetitiveness and overall reaction to job content were determinants of turnover. Their results did not support job satisfaction as an intervening variable between these determinants and expressed career intent to remain in the Air Force. However, opportunity to enter a civilian job was found to be an intervening variable. They stated that the intent to leave the 40XX Air Force Specialty Code (AFSC) itself was not important in the turnover decision, and did not equate to turnover from the Air Force. They concluded that their study found generally weak relationships, and speculated that non-rated company grade officers may view job satisfaction and expressed career intent as being synonymous.

Mills and Osadchey suggest that the traditional explanation of Air Force officer turnover may be based on inaccurate conceptual frameworks. Their recommendation for further study included the suggestion that further analysis be conducted on their data base (23:130).

Branson and Peacock

Branson and Peacock attempted to identify the variables that significantly impacted job satisfaction of Air

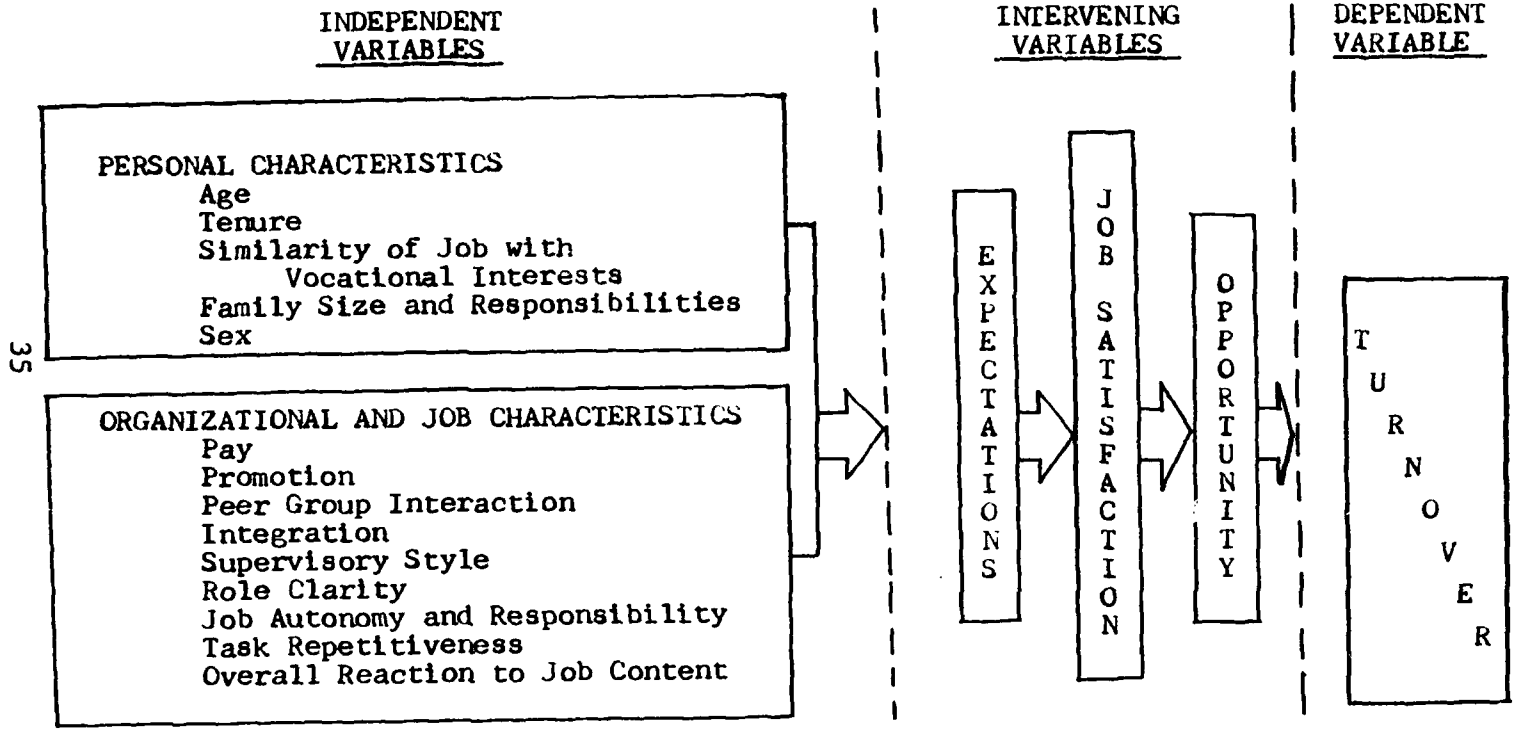


Fig. 2-7. Modification to Blackburn and Johnson Synthesized Turnover Model by Mills and Osadchey (23:26)

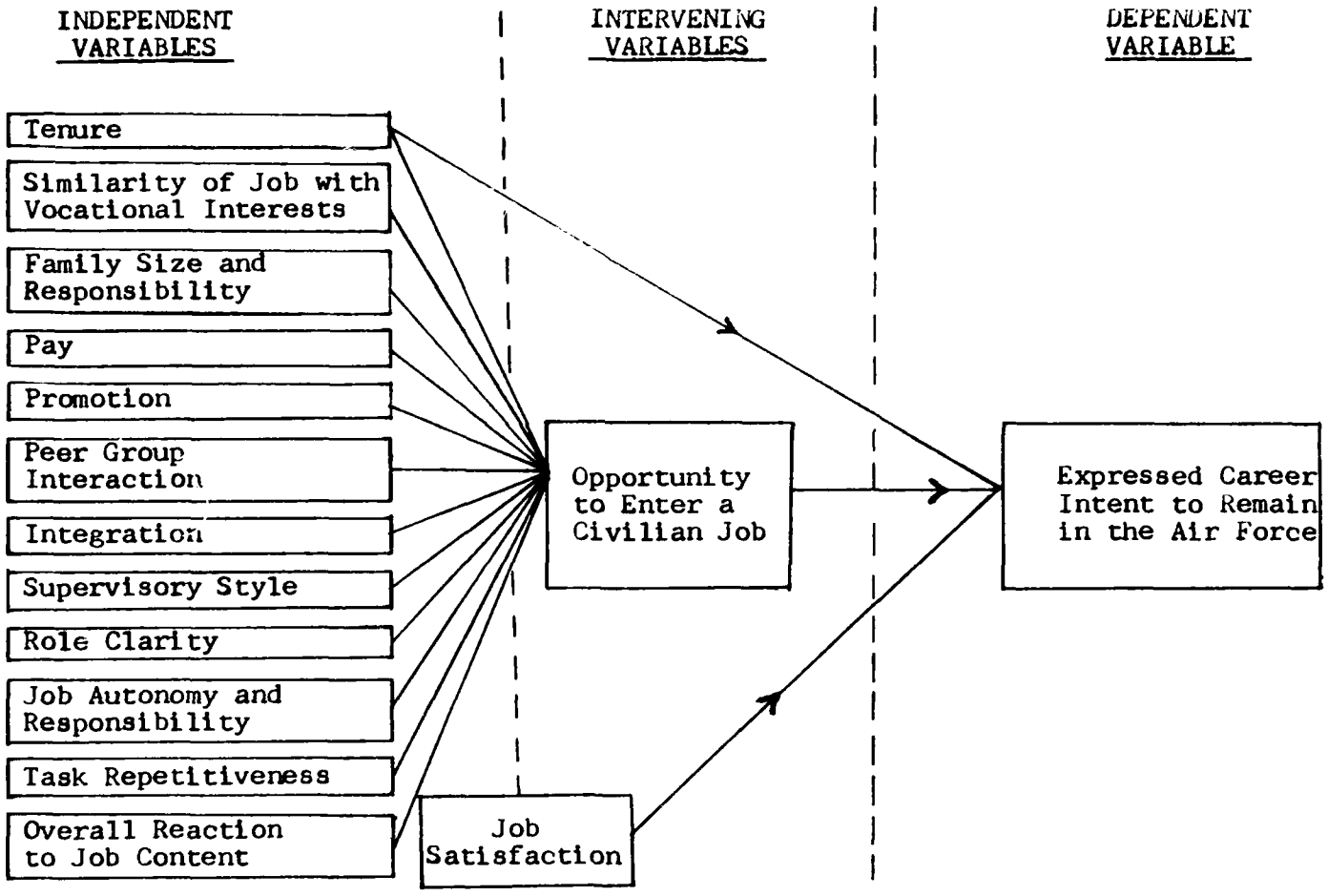


Fig. 2-8. Mills and Osadchey Revised Model of Turnover (23:128)

Force civilian employees. Additionally, they attempted to compare their findings with the variables found by Thompson (1975) in his study of Air Force military personnel (3:20).

In their study Branson and Peacock selected three categories of independent variables which they felt would function as predictors of job satisfaction. The categories (1:26-28) were: demographic characteristics, Air Force Quality of Life indicators, and job related variables (3:21).

Results accrued from the analysis on the first category of independent variables revealed that demographic characteristics were relatively insignificant predictors of job satisfaction for Air Force civilians. The only variable displaying any variance was age with 2.6 percent. Similar results were also found in Thompson's report (3:25).

The second category used to explain job satisfaction was the Air Force Quality of Life indicators. Of the nine indicators contributing to this category, work explained 35.27 percent of the variation of job satisfaction for screening sample civilian employees. Again, similar findings were detected by Thompson who also saw work as explaining significant variation in military personnel job satisfaction. He reported that work satisfaction and job satisfaction were very similar, with job satisfaction proving to be more encompassing. This finding by Thompson led Branson and Peacock to exclude work from further analysis. When work was excluded from the analysis, leadership/supervision

and growth proved to be the most significant predictors. Leadership/supervision claimed 14.29 percent while personal growth explained 7.25 percent of the variance (3:40).

The final category of variables measured in their survey dealt with job related variables. Job challenge took the lead claiming 41.04 percent of the variation followed by job preparation for greater responsibility capturing 2.80 percent and job freedom running third with 1.17 percent. Job challenge also rated highly in Thompson's study and had the greatest influence on job satisfaction of military personnel. Job preparation for greater responsibility and job freedom coupled with job challenge accounted for 61.49 percent of the total variation in job satisfaction for military (3:42).

The overriding dominance of job challenge in explaining variance led Branson and Peacock to perform a second analysis on the job related variables but excluding job challenge. As expected, job preparation for greater responsibility and job freedom claimed 20.03 percent and 7.68 percent, respectively (3:47). Following analysis on the three categories of indicators--demographic, Quality of Life, and job related variables--the researchers combined the most significant predictors from each category. They were: age, job challenge, job preparation, job freedom, and leadership/supervision. The researchers expected job challenge to take top billing because of the 41.04 percent

variance it claimed previously. Their prediction on job challenge was correct. In addition, job freedom (2.39 percent), personal growth (1.67 percent) and job preparation for greater responsibility (1.17 percent) surfaced. In toto, they combined to explain 46.27 percent of the job satisfaction variance. Cross-validation verified their findings (3:48).

Minor Studies on Turnover

The works of researchers such as Price, Vroom, and Porter and Steers represent the main thrust of attempts to resolve the turnover construct. Other researchers, however, have sought to support and/or deny and expand upon their models. This section will address new approaches to turnover, considering, in particular, job satisfaction as a construct relating to turnover.

Mobley, Horner, and Hollingsworth investigated how bivariate relationships between age, tenure, satisfaction, thinking of quitting, intention to search, probability of finding an acceptable alternative, intention to quit and actual attrition combined to influence turnover (Figure 2-9). As a result of their survey of 203 full-time hospital employees, they asserted the immediate cause of turnover to be intention to quit, as verified through significant regression coefficients. Age and tenure were indirect causes of turnover via job satisfaction and probability of finding an

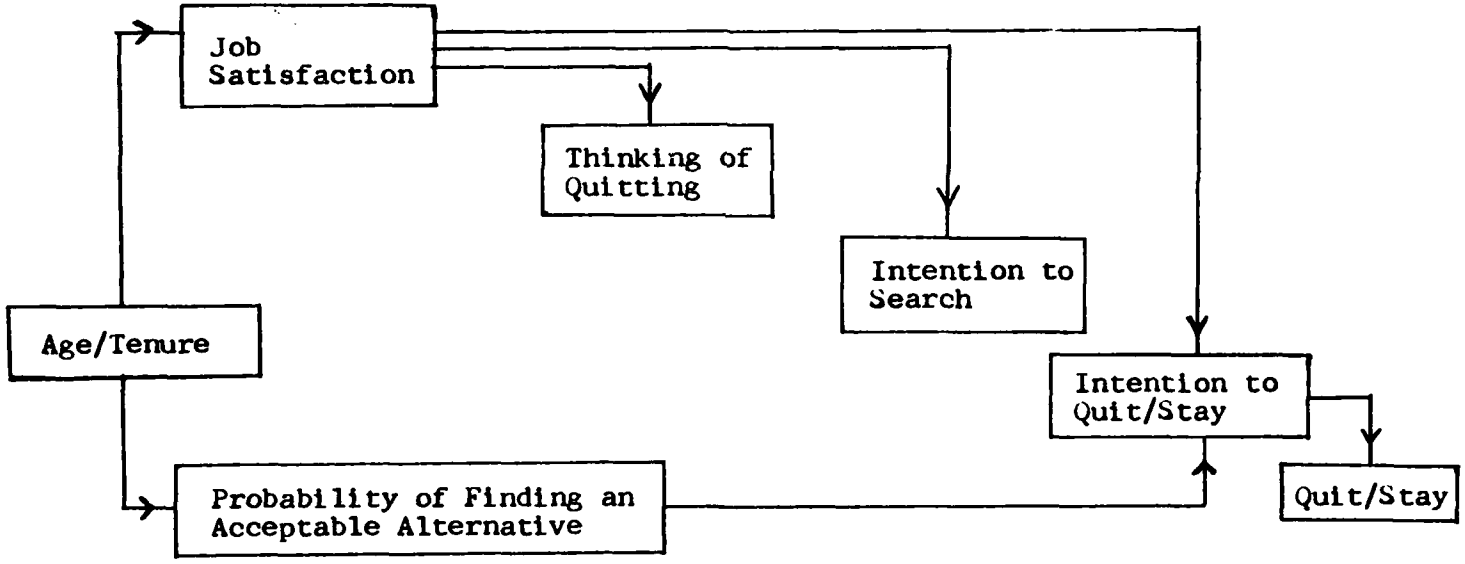


Fig. 2-9. A Simplified Representation of Intermediate Linkages in the Employee Withdrawal Decision Process (22:514)

alternative. This latter variable meanwhile contributes to intention to quit and intention to search (26:409).

Research by Miller, Katerberg, and Hulin tested the validity of Mobley et al's model. Miller et al reclassified Mobley et al's seven variables into four: withdrawal behavior (turnover), withdrawal cognition (intention to quit, intention to search, thinking of quitting), job satisfactions, and career mobility (age/tenure, probability of finding an acceptable alternative). The study performed by Miller et al supported the empirical validity of the Mobley et al turnover model. When the model was simplified to three predictors, namely, withdrawal cognition, job satisfaction, and career mobility, withdrawal cognition showed considerable variance to turnover. Further, job satisfaction and career mobility influenced turnover but only through their influence on withdrawal cognition. Miller et al again found intention to quit as the strongest and most consistent predictor of turnover. However, Miller et al propose that intention to quit may not operate as the immediate precursor of turnover. This was supported by their conversations with Guard members who indicated that they formed their intentions to quit when they originally enlisted and prior to experience in the organization. Thus, Miller et al suggest that path correlations other than those portrayed in the Mobley et al model may be plausible (22:515).

Summary

The review of the literature has revealed a wide range of theoretical models, conceptual designs, and proposed correlates of turnover. Several key variables relating to turnover have been commonly found within the literature. These variables are age, tenure, job attachment, job interest, job opportunity, job commitment, career mobility and job satisfaction. The most frequently identified is job satisfaction. Some elements composing job satisfaction include job content, personal factors, organizatic ·ide factors, job evaluation, equity, age, tenure, sex, j interest, utilization of talents/training, job challenge, job preparation, and supervision. Like turnover, the key elements leading to job satisfaction have not been agreed upon.

There are many models which propose the relationships leading to turnover. These models do share commonality. In many cases, models are constructed through a sequential linking of factors to turnover. For example, Porter and Steers link organization-wide factors with expectations which lead to job satisfaction and result in turnover. One linkage which is continually supported is job satisfaction leading to turnover.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

Introduction

This chapter addresses the specific research design and methodology used to achieve the research objectives. Specifically, the data collection plan, test design and statistical tests, and assumptions and limitations used to test the research questions will be discussed.

Data Collection Plan

The particular data collection method used in this study was a 95 data point questionnaire based on the seven-point Likert scale (Figure 3-1). The questions were closed questions with an option for open-ended comments at the end. The questionnaire or survey instrument adopted a majority of questions directly from the Organizational Climate Survey User's Guide (39). These questions were complemented by 32 additional questions modeled after questions derived from the same source. The Organizational Climate Survey User's Guide was compiled by HQUSAF/MPC and is managed by the Research and Management Division of Air Force MPC(AFMPC/MPCYP), Randolph AFB TX 78148 (19:ii). This source has been used extensively by the Air Force as a

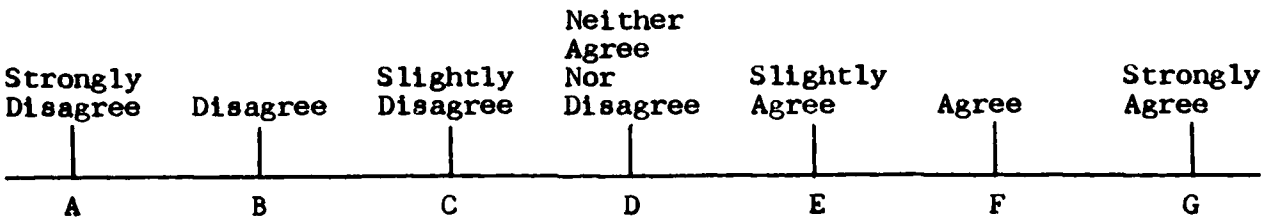


Fig. 3-1. Seven-Point Likert Scale

reference for numerous other questionnaires. Thus, its validity and reliability can be deduced from its widespread use.

The survey instrument was divided into five areas. The first twelve questions provided a demographic profile of the respondents. Questions 13 through 71 addressed job content, job dimensions and job characteristics. The next eleven questions (72-82) attempted to assess the personal value system of the respondent by requesting opinions on eleven experienced social competence variables. Questions 83 through 86 measured job satisfaction, while the remaining nine questions queried the individual's expected rewards for high job performance. A copy of the survey instrument is found in Appendix A.

Test Design and Statistical Tests

Overview

Many statisticians classify the seven-point Likert scale as ordinal in nature (7:250) and consequently do not support the use of parametric statistical tests with the Likert scale (6:45). It has been traditionally believed that data must be at least interval level for the use of parametric statistics, but recent trends have led to a reassessment of this position (7:55). Gardner summarizes one position on the use of ordinal versus interval level scaling:

1) The distinction between ordinal and interval scales is not sharp. Many summated scales yield scores that, although not strictly of interval strength, are only mildly distorted versions of an interval scale.
2) Some of the arguments supporting the assertion that parametric procedures require interval strength statistics, have doubtful reliability.
3) Parametric procedures, are, in any case, robust and yield valid conclusions even when mildly distorted data are fed into them. Furthermore, if the distortions are severe, various transformation techniques can be applied to the data [7:551].

Based on this discussion, this research adopted the Likert scale as "minimal distortion" interval level data. These interval data were tested using four statistical techniques: (1) factor analysis, (2) multiple regression, (3) path analysis, and (4) cross tabulations. Factor analysis attempts to determine underlying patterns of relationship so that the data may be condensed into a concise set of factors. The particular program was extracted from the Statistical Package for the Social Sciences (SPSS). The factor analysis technique resulted in identifiable factors which were used in developing a model consistent with current theories and research addressed in the literature review. The interaction between factors as presented in the model was tested using multiple regression. The total interaction among all factors of the model was then examined through path analysis. Cross tabulation was utilized to compare the joint frequency of specific questionnaire responses. This technique was used only to assist in explaining patterns of variable interaction of selected

significant and non-significant relationships identified by path analysis.

As mentioned previously the questionnaire permitted the option of open-ended responses. These responses were evaluated through content analysis. A brief explanation of the above techniques and the part they played in answering the research questions follows.

Factor Analysis

Factor analysis is a procedure for locating and defining dimensional space among a relatively large group of variables (28:10). Factor analysis examines gathered data and derives the variable set of which the data are composed. This variable set describes interdependencies, regularities, patterns of relationship and variations within the data (29:446-452).

This analysis concentrated on two of the many objectives of factor analysis--dimensionality and interpretation. First, the dimensionality of the variable set was identified through the principal component technique. This technique indicated that the responses obtained could be represented by fewer factors (17:6-3). The second objective was to interpret the variables and assign a name reflecting their nature. This was accomplished by examining those specific questions having the highest factor loadings within each factor and determining their common attribute.

To achieve the two objectives of factor analysis, three steps were necessary: (1) measuring associations between sets of variables, (2) exploring data-reduction possibilities by constructing a new set of variables, and (3) selecting the rotational method leading to the solution. The first step focused on the correlations between 51 of the 83 variables measured through the questionnaire, rather than on the 578 individuals who completed the instrument. Using factors rather than individuals as the point of rotation is called R-factor analysis. Factors in this study were exactly defined through continual iterations of rotations so that each factor was examined in all possible combinations and independently from all others. This orthogonal approach complements and emphasizes the second step or detection of data reduction possibilities. In the second step new variables were defined as exact mathematical transformations of the original data. This method of extracting initial factors is known as principal-component analysis. Principal-component analysis transforms a set of variables into a new set of composite variables or principal components that are uncorrelated (orthogonal) to each other. This analysis resulted in the best linear combination of variables which accounted for the most variance in the data. The first principal component is the single best summary of linear relationships in the data. The second component is orthogonal

to the first and is the second best linear combination of variables. The principal component model may be expressed as

$$z_1 = a_{j1}F_1 + a_{j2}F_2 + \ldots a_{jn}F_n$$

where the sum is a linear combination of n observed variables and n uncorrelated components F_1, F_2, ... F_n.

The final step in factor analysis involved the selection of the rotational method to arrive at the terminal solution. The final definition of the underlying dimensions of the data set can be accomplished by use of orthogonal or oblique rotational methods. The same general principle applies to both the oblique and orthogonal rotations. The orthogonal rotational method, however, results in simpler and theoretically more meaningful factor patterns. Yet, the oblique rotation method is more realistic because the underlying dimensions are not assumed to be unrelated to each other. Figure 3-2 represents the difference between the two rotation methods. As indicated, the oblique axes represent the clustering of variables more accurately as each axis is closer to the respective group of variables. It also provides information about the amount of actual correlation between the factors. However, orthogonal factors are mathematically simpler to work with. Orthogonal factoring was used in this research because of its relative ease of comprehension and application (21:482-483).

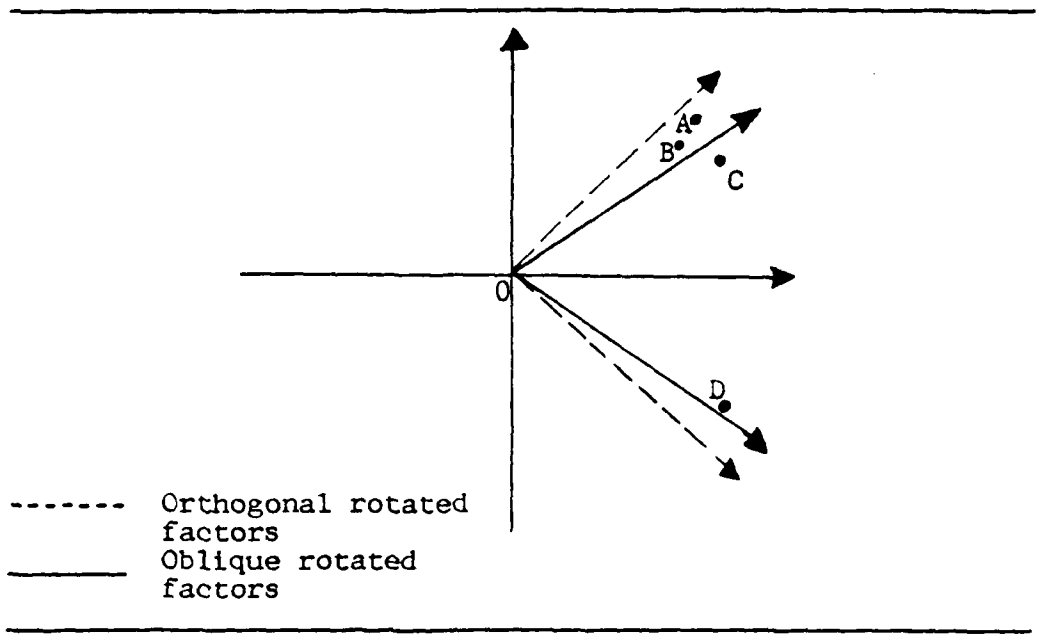


Fig. 3-2. Comparison of Orthogonal and Oblique Rotated Factors

Principal-component analysis with orthogonal rotation offers five different methods of factoring. The following statements are true for all five methods: (1) all factors are imposed to be orthogonal, (2) factors are arranged in order of their importance, and (3) the first factor tends to be a general factor. Subsequent factors tend to be bi-polar-positive or negative. The factoring method used in this thesis was PA2 (principal factoring with iteration) which assumes linear independence. The particular SPSS package used retains components with eigenvalues greater than or equal to 1.0, thus insuring that components selected as

significant will at least account for the variance of a single variable. Eigenvalues represent the amount of total variance explained by each successive factor (21:672).

Missing values were handled by use of pairwise deletion of missing data. Under pairwise deletion, a case is omitted from the computation of a given correlation coefficient only if the particular variable value being examined is missing. Pairwise deletion has the advantage of utilizing as much data as possible in the computation of each of the simple coefficients. Due to the scattered lack of questionnaire responses, pairwise deletion was utilized in this project.

In summary this study used an R-type matrix, extracted by principal-component solution, then rotated to orthogonal factors. These factors were then applied to a conceptual model where variables will be defined and relationships hypothesized. These relationships were tested through the use of multiple regression and path analysis techniques and subsequently examined by cross tabulation analysis.

Multiple Regression

In an attempt to determine the strength and nature of the relationships among the independent factors and job satisfaction, multiple regression was used. Multiple regression analyzes the relationship between a dependent

variable and a set of independent variables. The analysis enabled the researchers to determine the best prediction equation, evaluate the relative contribution of specific variables and sets of variables and determine the structure of the complex multivariate relationship (24:8). First, multiple regression estimated the ability of the independent factors to predict the level of job satisfaction and determine the functional form of the relationship. The analysis also yielded a measure of the relative importance of each of the predictor variables. As anticipated, the number of significant predictor variables was reduced, thereby simplifying the final model (21:4-1).

The mathematical representation of linear regression models is:

$$Y_i = B_0 + B_1X_{i1} + \ldots + B_{p-1}X_{ip-1} + i,\ i = 1,2,\ldots,n$$

where Y_i is the ith observation response, X_{i1}'s are independent variable values, B_i's are parameters and are independent $N(0,\sigma)$. From the data, an estimated regression function $Y' = b_0 + b_1X_1 + b_2X_2$ is obtained by the method of least squares.

The least squares method allows the total variability of the dependent variable Y (SS_y) to be partitioned into parts which are either explained by the regression line (SS_{reg}) or unexplained ($SS_{res} + (Y - Y')^2$). Thus, the total variability of the dependent variable Y (SS_y) is merely the

sum of the variance explained by the regression line and the unexplained. Within this decomposition, the ratio of explained variation to the total variation of the total variable Y is an excellent measure of the predictive power and strength of the relationship. The ratio is referred to as the coefficient of determination. This is represented as $R^2_{xy} = SS_{reg}/SS_y$. The square root of this ratio is referred to as the Pearson product-moment correlation, R_{xy}. Both R^2_{xy} and R_{xy} were used to measure the strength of the relationship between the variables (21:323-324).

The F test was then utilized to determine whether there is a significant relation between the dependent and the independent variables. The null hypothesis stated that a linear relationship did not exist. The significance of the relationship of the individual variables to the dependent variable and the total of the independent variable to the dependent variable are shown in the F ratio where

$$F = \frac{SS_{reg}}{SS_{res}/(N-2)}$$

with degrees of freedom 1 and N-2. If the statistical table critical value for the chosen significance level of .05 is less than the computed F value, the null hypothesis was rejected (21:326). Tests for individual regression coefficients B_k were conducted in the same manner. These test results were then used to test if any of the factors were

insignificant and could be eliminated from the model (27:492-516).

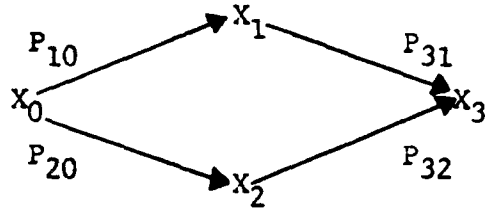
Path Analysis

As a result of the literature review and factor analysis, a theoretically based a priori model of causal relationships among the variables was developed. Path analysis decomposed the correlations between variables into direct and indirect effect components and identified the spurious bivariate relationships (13:327). The assumptions for path analysis were initially considered. We were interested in linear, additive, assymmetric relationships in a set of variables of interval level data. Our independent variables included those developed from factor analysis. The dependent variable of turnover was assumed to be completely determined by the independent variables (6:2-3).

Path analysis assumes that a causal order exists among the variables and that there is a weak causal closure among these variables (28:383). The idea of causation is that X_0 is a cause of X_1 if and only if X_1 changes as a result of changes in X_0. This is not to imply that in the empirical setting X_1 will change only as a result of changes in X_0 or that only X_0 influences X_1. However, the direction of causal control is from X_0 to X_1. A representation of this relationship could be $X_1 = C_{01}X_0$ where C_{01} is a constant representing the magnitude of change in X_1 for each unit

change in X_0. C_{01} is referred to as the effect coefficient. Causal closure assumes that if X_0 causes X_1, then the observed covariation between X_0 and X_1 may be due to (1) the causal dependence of X_1 on X_0, (2) their mutual dependence on a different variable, or (3) a combination of the above two causal relationships. X_1 must be completely caused, within this model, by X_0 and the latent residuals (28:385). Path analysis is simply an extension of regression analysis if the coefficients of Y on X (for example, $Y' = a + bx$) are interpreted as effect coefficients by assuming weak causal order and causal closure (28:384).

The starting point in path analysis required the development of a path diagram of proposed relationships. Structural equations were then developed using the path diagram model. For example if the path diagram is:



then the system can be rewritten as

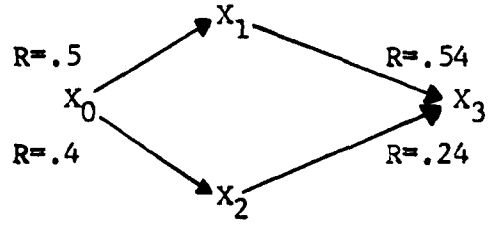
$$X_1 = P_{10}X_0 + P_1E_u, \quad X_2 = P_{20}X_0 + P_2E_u,$$

$$X_3 = (P_{31}X_1)(P_{10}X_0) + (P_{32}X_2)(P_{20}X_0)$$

In this example X represents the variables, P is the path coefficient (Beta coefficient), and E is the residual (6:3-5).

The path coefficient can be interpreted as the amount of variance in the dependent variables directly attributable to a specific independent variable. The indirect causal effect can be determined by "tracking the effects from independent to dependent variables along the path, using correlation coefficients to derive standardized beta and residual coefficients [28:329-331]."

As a simple example of interpretation of results, consider the previous model. In this model the correlation coefficients (R values) for $P_{10} = .5$, $P_{20} = .4$, $P_{31} = .54$, and $P_{32} = .24$.



The R values are then squared to obtain the coefficient of simple determination (R^2). Subtracting each of the R^2 values from 1 results in the residual coefficients (E).

$$E_1 = \sqrt{1 - .25} = .86;\ E_2 = \sqrt{1 - .16} = .91;\ E_3 = \sqrt{1 - .36} = .80$$

These residual coefficients denote the amount of unexplained variation found in the model. P_{31} and P_{32} are combined in

the calculations to form E_3 since both of the paths converge at the same point.

The completeness of each subsystem can then be determined by looking at the path coefficients from the latent variables. In this example 86 percent of the variation in X_1, 91 percent of the variation in X_2, and 80 percent of the variation in X_3 remain unexplained by the model. The effects of X_0 on X_1, X_2, and X_1 and X_2 on X_3 can be identified. Lastly, the total covariation between pairs of variables were decomposed into direct, indirect, and spurious factors (28:386-389).

Crosstabs

Crosstabs is an SPSS crosstabulation program which develops two-way to n-way contingency tables. These tables are joint frequency distributions of the cases composing the data base. The statistical significance of these relative frequencies and the strength of the relationship were provided in the SPSS output. These measures of association show how strongly two or more variables are related to each other. This measure also indicates the extent to which prior knowledge of a variable will predict the value of another variable. If the entire population of 2,036 aircraft maintenance officers were included in the results, these results would be precise. However, the use of a sample size of 578 requires development of a confidence level through tests of

statistical significance. These tests will identify the probability of the results occurring through chance. We used our previous convention of accepting an alpha of .05 as significant; that is to say, the results had a probability of chance occurrence 5 or less percent of the time. The statistical test used was the chi-square test of statistical significance. This test assumes that both variables in the table are at least nominal level. The chi-square test will indicate only the statistical significance of the relationship and not its strength. To compensate for this lack of strength identification, Cramer's V statistic was utilized. Phi is the correction factor used in the statistic and adjusts the χ^2 value to compensate for the fact that the chi-square is directly related to the number of cases. V ranges from 0 to 1 with a value of 1 indicating a perfect degree of association (28:218-247).

Content Analysis

Examination of the open-ended responses was accomplished through content analysis. Content analysis is a technique for studying communications in an attempt to measure variables. This method of analysis may use several units of analysis. The thematic approach was used in this thesis (15:525-529). This approach involves the classification of comments into various categories and annotation of their frequencies found in the communications (20:288).

Assumptions and Limitations

Inherent in any research method are certain assumptions and limitations that must be recognized as possible sources of error. The assumptions will be discussed first followed by an examination of the limitations.

The assumption must be made that the respondees answered the questions accurately by annotating the correct answer on the answer sheet. Additionally, we must assume that the respondents were honest in their evaluations. This is a necessary assumption so that valid conclusions may be drawn from the collected data and therefore reflect an accurate assessment of both the sample and population. The output from the data points will only be as accurate as the input made by the respondees.

The assumptions for the use of multiple regression were addressed through testing. The random variables were: (1) statistically independent, (2) identically distributed, (3) from a population with a zero mean, and (4) normally distributed. Examination of the aptness of the model was accomplished through study of the residuals. Due to the independence of factors found through use of the factor analytic method, the potential problem of multicollinearity has been mitigated.

Limitations include the use of incomplete surveys. A handful of questionnaires contained unanswered questions. Thus, it must be assumed that because of the small number

involved (less than 1 percent) it will not alter the results significantly.

CHAPTER 4

RESULTS AND ANALYSES

This chapter presents the results of the application of the techniques discussed in Chapter 3. These results are analyzed to determine the significant factors effecting turnover, and further, the relationships among these factors. On the strength of this analysis, two models of turnover are developed and discussed. The chapter is divided into seven sections: (1) population description, (2) factor determination, (3) model structure, (4) determination of significant relationships, (5) determination of the strength of the relationships, (6) further analysis of specific questions, and (7) analysis of the comments attached to the questionnaire.

Description of the Population/Sample

The target population used in this thesis is non-rated company grade (second lieutenant, first lieutenant and captain), 40XX aircraft maintenance officers on extended active duty with the Air Force. The size of the 40XX target population was estimated to be 2,036 in May 1979 (23:32). No individuals or groups within the 40XX field were intentionally excluded from the target population. The source of the elements of the population was the 18 May 1979 DESIRE

listing from the Air Force Automated Personnel Data System (APDS).

The frame of reference above served as the vehicle through which a simple random sample was drawn. The number of individuals sampled totaled 834, representing 41 percent of the target population. The number of individuals sampled was based on a 95 percent confidence level in anticipation of a 40 percent response rate (23:ii-5).

Of the 334 randomly selected company grade officers, 578 participated in the data collection process, representing a 69 percent response rate. All of these responses were used in the demographic description of the population. Several individuals failed to mark various questions, thereby leading to a different number of total responses in the demographic questions. All tables reflect adjusted frequencies resulting from this loss of data.

Of the 576 who responded concerning grade, 160 were second lieutenants, 115 first lieutenants, and the remaining 301 were captains (Table 4-1). Further, 87 percent were males, while 13 percent were females (Table 4-2). The overall percentage of male versus female officers on active duty in the Air Force is 93.1 percent versus 6.9 percent. Thus, in terms of sex, the sample population is fairly representative of the Air Force as a whole.

The modal age of the 577 respondents to this question fell between 30 and 34 years of age (Table 4-3). Almost

Table 4-1

RESPONDENTS' GRADE

	Frequencies		
Category	Absolute	Adjusted	Cumulative
2nd Lieutenants	160	27.7	27.7
1st Lieutenants	115	19.9	47.6
Captains	301	52.3	100.0

Table 4-2

RESPONDENTS' SEX

	Frequencies		
Category	Absolute	Adjusted	Cumulative
Male	503	87.0	87.0
Female	74	13.0	100.0

Table 4-3

RESPONDENTS' AGE

	Frequencies		
Category	Absolute	Adjusted	Cumulative
20-24	72	12.5	12.5
25-29	181	31.3	43.8
30-34	225	38.9	82.7
35-39	78	13.6	96.3
40 or more	21	3.7	100.0

42 percent had prior enlisted experience (Table 4-4). The breadth of the sample across the Air Force is demonstrated in Table 4-5. Here the individuals are grouped by major command of assignment. Table 4-6 specifies job assignment further by breaking the sample down by organizational level of assignment. Over 64.1 percent of the sample members were assigned to squadron level jobs, while 13.4 percent of their counterparts worked at wing level.

Table 4-4

RESPONDENTS' PRIOR ENLISTED SERVICE

	Frequencies		
Category	Absolute	Adjusted	Cumulative
No	337	58.4	58.4
1 year or less	27	4.7	63.1
1 but less than 2	13	2.3	65.3
2 but less than 3	9	1.6	66.9
3 but less than 4	16	2.8	69.7
4 but less than 5	20	3.5	73.1
5 but less than 6	8	1.4	74.5
6 but less than 7	9	1.6	76.1
7 but less than 8	21	3.6	79.7
8 but less than 9	15	2.6	82.3
9 but less than 10	14	2.4	84.7
over 10	88	15.3	100.0

Table 4-5

RESPONDENTS' MAJOR COMMAND OF ASSIGNMENT

	Frequencies		
Category	Absolute	Adjusted	Cumulative
SAC	106	18.4	18.4
TAC	145	25.2	43.6
MAC	94	16.3	59.9
ATC	39	6.8	66.7
USAF RED	1	0.2	66.8
HQ USAF	3	0.5	67.4
PACAF	26	4.5	71.9
USAFA	0	0.0	71.9
USAFE	76	13.2	85.1
USAFSO	1	0.2	85.2
USAFSS	0	0.0	85.2
AAC	9	1.6	86.8
ADCOM	29	5.0	91.8
AFAFC	0	0.0	91.8
AFCS	2	0.3	92.2
AFLC	25	4.3	96.5
AFSC	17	3.0	99.5

Table 4-6

RESPONDENTS' ORGANIZATIONAL LEVEL OF ASSIGNMENT

	Frequencies		
Category	Absolute	Adjusted	Cumulative
Squadron or below	369	64.1	64.1
Group	24	4.2	68.2
Wing	77	13.4	81.6
Air Division	1	0.2	81.8
Numbered Air Force	38	6.6	88.4
Major Command	56	9.7	98.1
HQ USAF	2	0.3	98.4
DOD	3	0.5	99.0
Separate Operating Agency	1	0.2	99.1
Other	5	0.9	100.0

Marital status as seen in Table 4-7 shows 75.2 percent married, while Table 4-8 illustrates that about 75 percent had at least one child or other dependent. Over 49.7 percent had been at their present assignment for one year or less and 30.7 percent had been at their present base between one to two years (Table 4-9). The final demographic descriptor concerns educational level and shows 65.6 percent of the sample members had at least baccalaureate degrees and 33.6 percent had completed master degrees or better (Table 4-10). Each of these demographic variables were tested through crosstabulations or regression analysis using dummy variables to determine if they were significantly related to predictors of turnover.

Table 4-7

RESPONDENTS' MARITAL STATUS

	Frequencies		
Category	Absolute	Adjusted	Cumulative
Married	433	75.2	75.2
Single, never married	104	18.1	93.2
Single, previously married	39	6.8	100.0

Table 4-8

RESPONDENTS' NUMBER OF SUPPORTED DEPENDENTS

	Frequencies		
Category	Absolute	Adjusted	Cumulative
0	147	25.5	25.5
1	105	18.2	43.7
2	117	20.3	64.1
3	135	23.4	87.5
4	52	9.0	96.5
5	16	2.8	99.3
6	2	0.3	99.7
7	2	0.3	100.0
8	0	0.0	100.0
9	0	0.0	100.0
10 or more	0	0.0	100.0

Table 4-9

RESPONDENTS' TENURE AT PRESENT ASSIGNMENT

	Frequencies		
Category	Absolute	Adjusted	Cumulative
One year or less	287	49.7	49.7
Over one year but less than two years	177	30.7	80.4
Two years but less than three years	77	13.3	93.8
Three years or over	36	6.2	100.0

Table 4-10

RESPONDENTS' HIGHEST LEVEL OF EDUCATION

	Frequencies		
Category	Absolute	Adjusted	Cumulative
Some college	4	0.7	0.7
Undergraduate degree (BA, BS or equivalent)	197	34.1	34.8
College beyond undergraduate degree	182	31.5	66.3
Masters degree	174	30.1	96.4
College beyond masters degree	19	3.6	100.0

We can characterize this sample as being young, line, junior officers, with families, highly educated, working at base level, with a high percentage having prior enlisted service.

Factor Determination

This section relates the results of the factor analysis to the two research questions. Results will be used to determine the nature of the relationship, strength, and direction between these factors and turnover. Specifically, factor analysis will assist in identification of the independent and intervening variables which exist within the data base. Two factor analysis programs were utilized. Initially, the entire questionnaire, with the exception of the demographic questions (questions 1-12) and turnover (questions 21 and 50), were factor analyzed (Factor Analysis 81). The results of this analysis assisted in delimiting the number of questions used in determining the factors (Factor Analysis 51).

Factor Analysis 81

The most interesting results of the initial factor analysis were the factor groupings of questions and identification of questions not strongly correlated to any usable factor. The specific factors were named through a synthesis of the questions having the highest factor loadings. Questions comprising each factor are shown in Appendix B.

Factor one contains all four components of the Hoppock Job Satisfaction Measure, and other questions related to job satisfaction, job interest, and job content. The Hoppock Job Satisfaction Measure consists of four questions querying an individual's perceived satisfaction with different aspects of his job. The job satisfaction score represents the sum of the responses of the four questions.

Factor two was identified as an evaluation of the respondents' current supervisor. Factor three included questions 72-82 and was identified as organizational well-being. A frequency distribution of these questions indicated they were significantly skewed to the right. Due to the lack of normally distributed data, regression correlations would be weak. This assumption was verified by subsequent regression results. Factor four was easily identified as promotion opportunity. Factor five was identified as peer group relations. Factor six was job autonomy. Factor seven measured pay satisfaction. Factors eight and nine were closely related concepts, but were made distinct through factor analysis. Factor eight is the perceived opportunity of the individual to enter another Air Force specialty. Factor nine is the opportunity to find a satisfactory, comparable civilian job. Factor ten is closely related to factor one, as those questions significant to factor ten were more important to factor one. This factor was tentatively identified as job responsibility. Factor eleven comprised a

combination of job clarity (questions 42 and 69) and two questions relating to expectations (questions 91 and 92). This combination factor was tentatively labeled as utilization of skills and abilities. Factor 13 represented organizational communication. Factor 14 was strongly identified with the set of questions measuring expectations, with the exception of questions 91 and 92. However, a key variable necessary for conceptually developing Vroom's expectancy model was missing. The valence of outcomes was not measured and therefore these questions could not be used in an expectancy model. Questions 91 and 92 were evidently not interpreted by the respondents in the same manner as the other expectancy questions contained in the questionnaire. This lent further doubt as to the validity of using this block of questions as a measure of expectancy. Those questions related to factors 15 and 16 were more significantly related to factor 3, organizational well-being. As previously mentioned, these skewed variables did not contribute to model development. Question 52 was the only question that was not significantly related to any unique factor.

The next two factor analysis programs were designed to determine if job satisfaction within the aircraft maintenance officer career field was accurately measured with the Hoppock Job Satisfaction Measure. The first run deleted the organizational well-being and expectations questions. These results indicate that "I do not look forward to coming

to work each day (question 24)" and "I enjoy my job (question 49)" were measuring the same underlying job satisfaction factor as the Hoppock scale. To verify this, another factor analysis run was accomplished without the four Hoppock job satisfaction questions. This demonstrated that these two questions were more strongly correlated to a unique factor, job satisfaction, than to the more general job content factor. Therefore, the measure of job satisfaction used throughout subsequent analysis was composed of questions 24 and 49, and the four Hoppock job satisfaction questions.

Factor Analysis 51

To determine what factors are present in the data, 51 questions were used in the final factor analysis run. Questions 21 and 50 (turnover), 24, 49, and 83-86 (job satisfaction), 31 and 58 (civilian job opportunity), 40 and 70 (crosstraining opportunity), 72-82 (organizational well-being) and 87-95 (expectations) were deleted for the final factor analysis program. Organizational well-being and expectations were eliminated because they did not contribute to model development. The development of factors corresponding to job satisfaction, opportunity, and turnover would tend to create artificial, independent variables. The results of this run produced the factors and factor scores used in later path analysis.

The first output of statistical interest was the listing of communalities by variable. Communality is the fraction of variance in a specific question that is captured by the factor retained. This is equivalent to the multiple R^2 value that would be obtained if all the retained factors were incorporated as predictor variables in a multiple regression analysis. If the communality is extremely low for a specific question, the retention of these factors has caused the loss of most of the information about it. The high range of communalities indicated that all questions were related to the factors. The percent of variation explained by each factor is shown in Appendix C. This indicated that the eighth factor explained the least variance. Appendix D shows the questions most significant to each factor. These questions were used to name each factor. Each of the questions significant to factor eight exhibited more importance to factor one. Additionally, inclusion of varied questions from several topics made this factor difficult to conceptually identify. The inability to identify this factor as a variable that the manager can control, and its relatively low contribution to total explained variation, supported its deletion from subsequent path analysis interpretation.

A comparison of the initial factor analysis run and this final product showed that several factors were changed. Job clarity and utilization of skills and abilities were

lost as unique factors. Job content was decomposed into job satisfaction and a new factor, identified as overall job interest. In summary, the factors that were identified within this factor analysis were: (1) job interest, (2) supervisory style, (3) peer group relations, (4) promotion opportunity, (5) job autonomy, (6) pay satisfaction, and (7) organizational communication. Each of these factors is defined below.

Job interest--the degree to which the individual perceives that his job is challenging, stimulating, requires a variety of skills and knowledge, and offers responsibility.

Supervisory style--the degree to which the individual perceives that his supervisor shows concern for people problems as well as production; demonstrates leadership, personal and technical competence; works hard, and keeps his subordinates informed.

Peer group relations--the degree to which an individual perceives group members are friendly, trusting, competent in their jobs, and work well together.

Promotion opportunity--the degree to which the individual perceives that career promotions in his career field are fair and equitable and that he is competitive for promotions.

Job autonomy--the degree to which the individual perceives himself to be responsible for the total project, able to set his own work goals and make his own decisions.

Pay satisfaction--the degree to which an individual is satisfied with the economic security and standard of living an Air Force career provides.

Organizational communication--the degree to which an individual perceives that information is shared throughout the organization, and that his work unit is aware of important facts and contributes to decisions affecting it.

Job satisfaction, civilian job opportunity, crosstraining opportunity, crosstraining turnover, and Air Force turnover were previously mentioned and are now defined below.

Job satisfaction--the degree to which an individual expresses positive affective orientation toward his job (41:99).

Civilian job opportunity--the individual's perceived probability that he can get a civilian job with equal pay, benefits, duties, and responsibilities.

Crosstraining opportunity--the individual's perceived probability that he can crosstrain into another career field that he would find desirable.

Crosstraining turnover--the percentage of individuals who state that they do not intend to remain in the aircraft maintenance officer career field.

Air Force turnover--the percentage of individuals who state that they do not intend to make the Air Force a career.

These factors were then combined into two separate models--a model of crosstraining turnover and a model of Air Force turnover.

Model Structure

Crosstraining turnover can be viewed as a subset of turnover itself. It is important to make this distinction. Although the structural models may be similar, the relative contribution of the factors towards turnover may be substantially different. Therefore, two path analysis models were established to measure these relative effects. The factors which were identified and used to develop a causal path analysis structural model were: (1) job interest, (2) supervisory style, (3) peer group relations, (4) promotion opportunity, (5) job autonomy, (6) pay satisfaction, (7) organizational communication, (8) job satisfaction, (9) crosstraining opportunity, and (10) civilian job opportunity.

To use path analysis, a common initial starting point had to be established. Demographic variables of sex, age, total years of military service (tenure), prior/non-prior service, and years on station were all candidates tested as initial starting conditions. The relationship of each of these to the seven factors was tested through regression analysis. The results (Appendix E) indicate that the relationship of tenure to the factors was stronger than the

other possible starting conditions. Tenure was also the most highly supported variable affecting turnover within the literature (32:28). These results supported the use of tenure as a starting condition. As a further explanatory aid in the development of turnover models, the factors and job satisfaction were regressed against civilian job opportunity and crosstraining opportunity. The results (Appendix E) indicate that the factors were more significantly correlated with both crosstraining opportunity and civilian job opportunity than tenure was. Conceptual models were then developed.

Increased tenure was hypothesized to influence the level of job interest, supervisory style, peer group relations, promotion opportunity, job autonomy, pay satisfaction and organizational communication. These, in turn, directly influence the individual's job satisfaction and opportunity. Both civilian job opportunity and crosstraining opportunity were conceptually viewed as being influenced through a search for either another Air Force job or civilian employment. For example, if an aircraft maintenance officer is generally dissatisfied with his job, supervisor, pay or promotion potential, he will initiate a search for either another Air Force job or a civilian job. The search will lead to an increased awareness of the existence of other jobs. The decision to make the aircraft maintenance officer career field or the Air Force a career then, is seen as the

joint effect of job satisfaction, and the opportunity to get another job. The structural models developed are shown in Figures 4-1 and 4-2.

Each of the variables within these models exhibited central tendency, with the sample size of 573 being large enough to satisfy the central limit theorem. The sample size was reduced from 578 to 573 because five individuals had an excessive number of unanswered questions which created difficulties in statistical testing. They were therefore deleted from subsequent statistical testing. The frequency distribution of each question did not indicate any reason to suspect that regression analysis was inappropriate. Therefore, it was decided to use regression analysis as the basic statistical tool in path analysis.

The development of models of Air Force turnover and crosstraining turnover satisfied the first requirement of path analysis, the development of a structural model. These models are shown in Figures 4-3 and 4-4. Each factor is assumed to be determined by the sum of the path coefficients times the factor value of all causally prior factors. Appendix F lists the regression equations developed for the structural models. Path coefficients used in the calculated regression equations (Appendix G) were computed by first calculating the residual latent (noncausal) variable coefficient of $\sqrt{1-R^2}$ using the multiple R of all causally prior variables as predictors. The path coefficient was then

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A MODEL OF AIRCRAFT MAINTENANCE OFFICER TURNOVER.(U)
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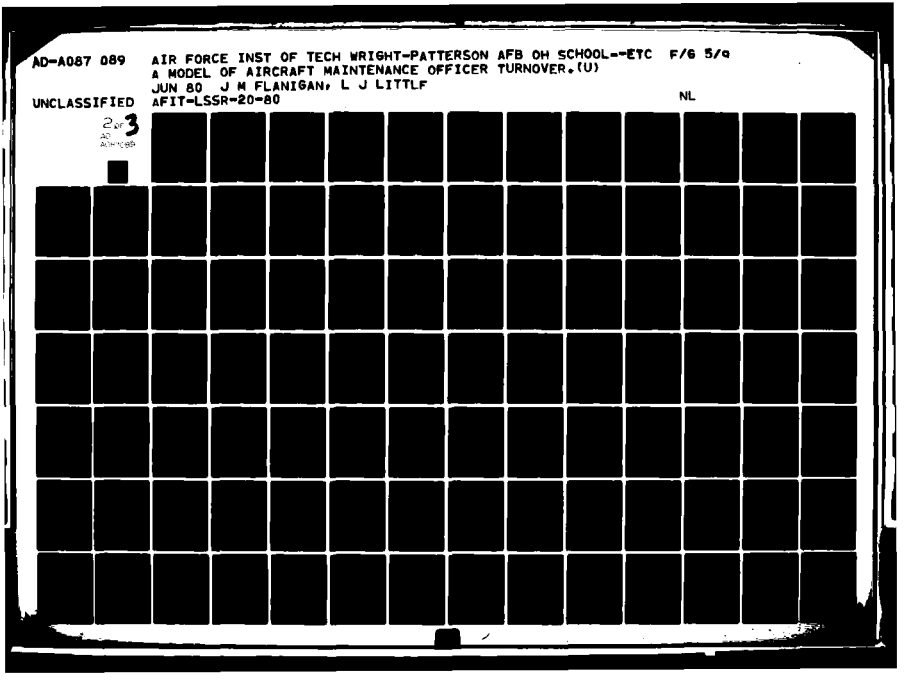

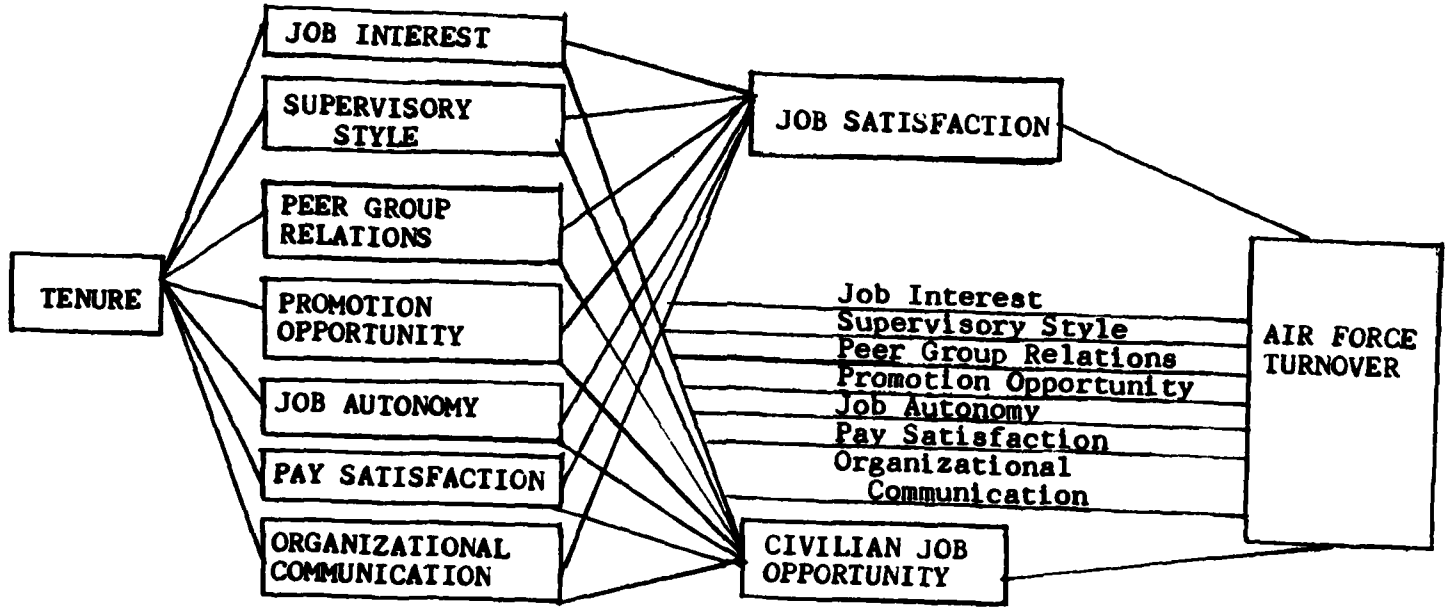

Fig. 4-1. Initial Air Force Turnover Model (Model 2)

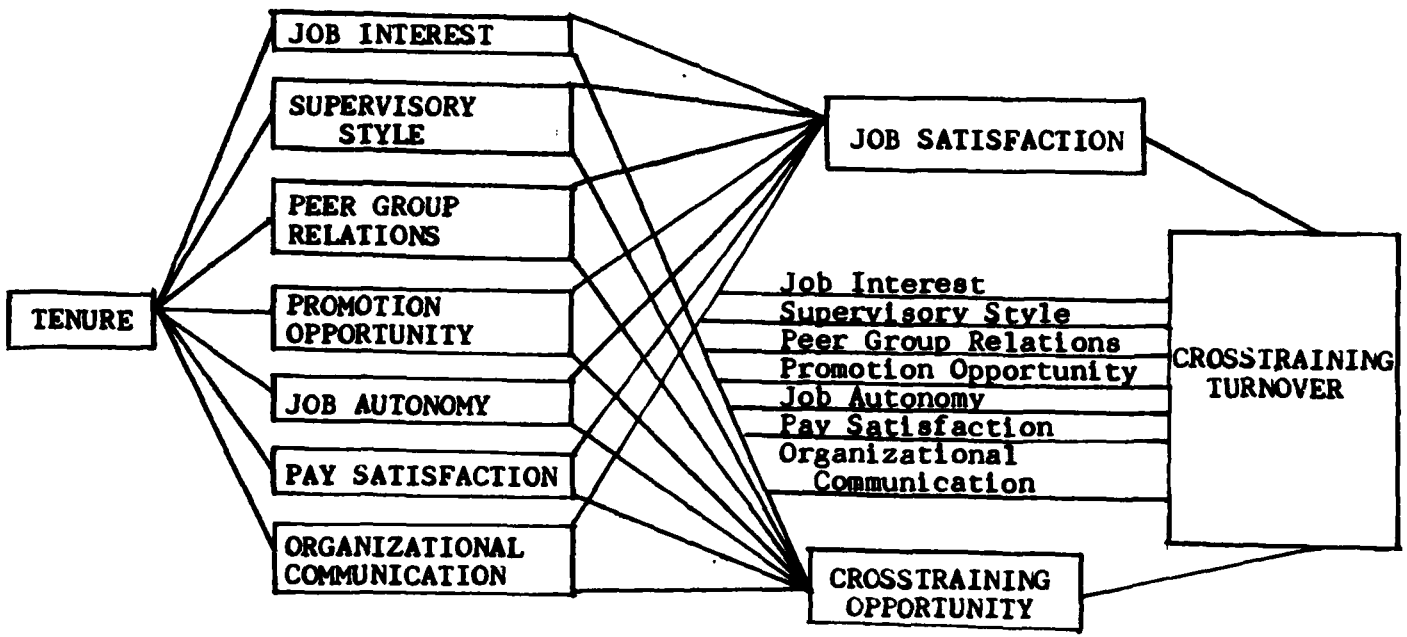

Fig. 4-2. Initial Crosstraining Turnover Model (Model 1)

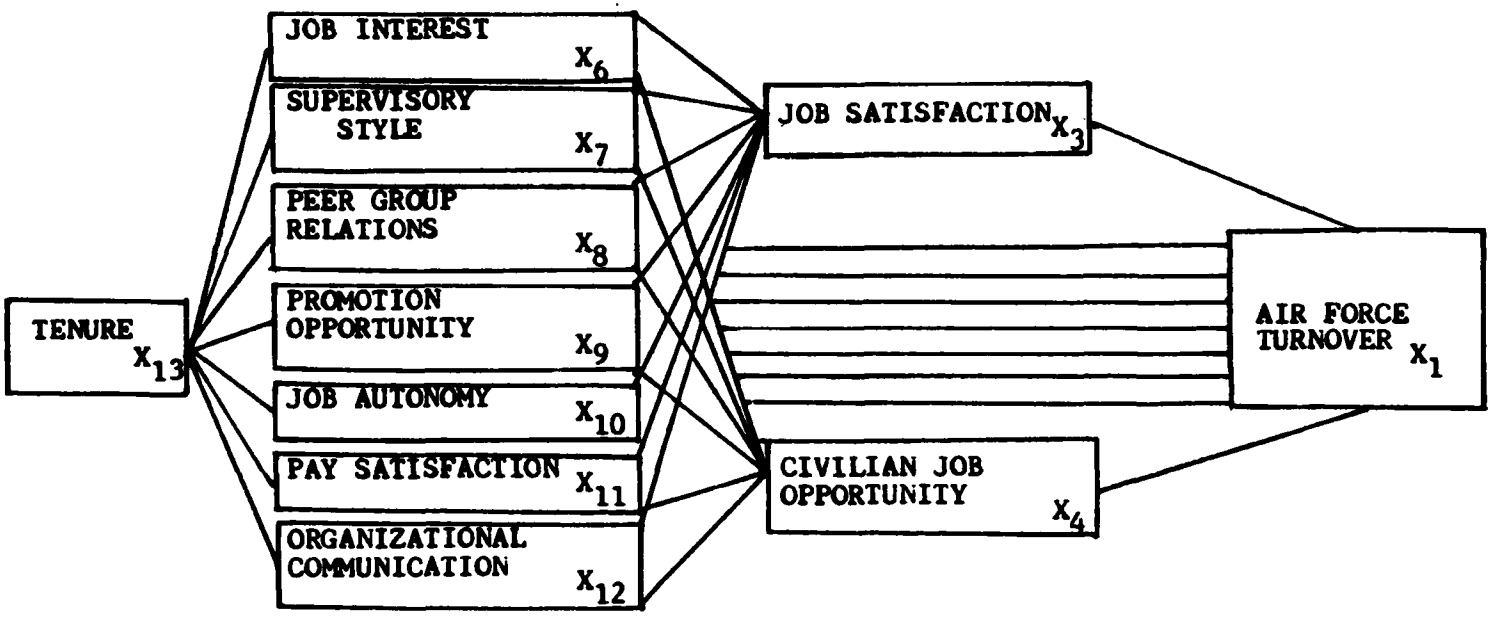

Fig. 4-3. Path Diagram for Air Force Turnover (Model 2)

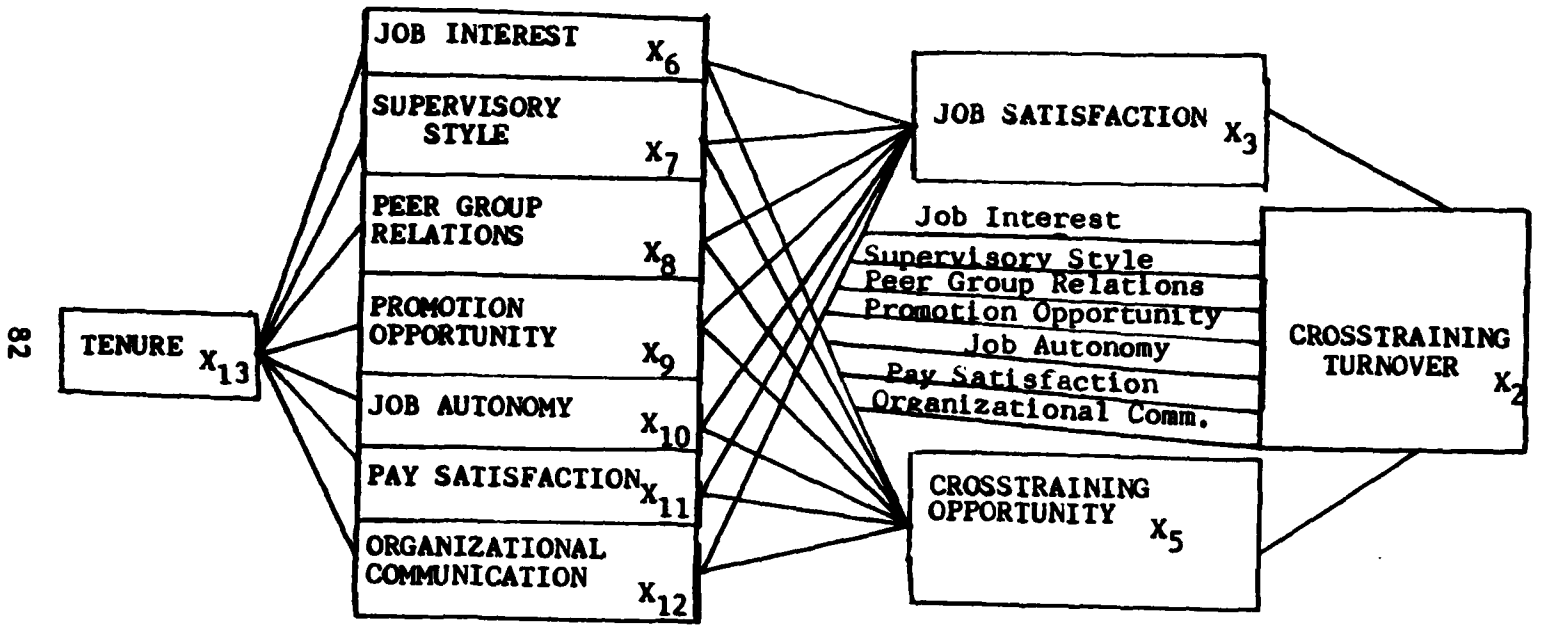

Fig. 4-4. Path Diagram for Crosstraining Turnover (Model 1)

determined by subtracting the latent coefficient from one (28:387). The next task was to determine which relationships were significant.

Determination of Significant Relationships

The research questions initially posed in this thesis dealt with the nature, strength and direction of the relationship between the correlates of turnover and turnover. This section used regression analysis to determine which relationships were significant throughout both models. To test the relationships, the F test was used. The level of significance for managerial acceptance was set at the .05 level. Regression analysis assisted in determining whether factors could be eliminated from the models. Subsequent sections will address only those relationships which were found to be significant. The following sections will then use path analytic techniques to determine the relative strength of these relationships. The similarities and differences between the models will then be assessed.

Model 1 (Crosstraining Turnover)

Model 1 tests the hypothesized relationship among factors affecting crosstraining turnover. Dummy or indicator variables are used when the variable of interest is qualitative in nature, such as tenure. Dummy variables are created by dividing each category of the nominal variable, in this case, the individual's tenure, into separate variables

(e.g. D1, D2, D3, etc.). These dummy variables are then assigned scores which indicate the presence or absence of the particular category in question. The nominal variable tenure, derived from question 4, "What is your total years of service for pay (active and reserve, officer and enlisted)?", was subsequently divided into eight categories. All dummy variables have values of 0 and 1, and may be treated as interval level variables. Consequently, they may be substituted into the regression equation.

Table 4-11 shows the results when the F test was applied to the factors versus tenure. Three of the seven possible relationships were significant: job interest, promotion opportunity, and job autonomy. The other factors did not exhibit significant relationships with tenure.

The factor relationships with job satisfaction were then tested. The F test results (Table 4-12) indicated that the individual relationship between job interest, supervision, peer group relations, promotion opportunity, job autonomy and job satisfaction were significant at the .05 level. The relationships between pay and communication, and job satisfaction were not significant.

Table 4-12 also shows the results of the regression F test between the factors and crosstraining opportunity. Promotion opportunity, pay satisfaction, and supervisory style were significant contributors in explaining variation in crosstraining opportunity. When job satisfaction was

Table 4-11

F STATISTIC VALUES (FACTORS VERSUS TENURE)

Factors	F_{table}	$F_{calculated}$	Conclusion
Job Interest	2.09	3.6623	H_1
Supervisory Style	2.09	1.5219	H_o
Peer Group Relations	2.09	.5230	H_o
Promotion Opportunity	2.09	3.6643	H_1
Job Autonomy	2.09	2.7770	H_1
Pay Satisfaction	2.09	2.0109	H_o
Organizational Communication	2.09	.5024	H_o

Table 4-12

t^* STATISTICS VALUES (FACTORS VERSUS JOB SATISFACTION AND CROSSTRAINING OPPORTUNITY)

	Job Satisfaction			Crosstraining Opportunity		
Factors	F_{table}	$F_{calculated}$	Conclusion	F_{table}	$F_{calculated}$	Conclusion
Job Interest	1.96	24.8058	H_1	1.96	1.6112	H_o
Supervisory Style	1.96	5.1879	H_1	1.96	1.9730	H_1
Peer Group Relations	1.96	11.3977	H_1	1.96	.4404	H_o
Promotion Opportunity	1.96	6.9879	H_1	1.96	5.4046	H_1
Job Autonomy	1.96	7.7381	H_1	1.96	.4669	H_o
Pay Satisfaction	1.96	1.6926	H_o	1.96	3.5940	H_1
Organizational Communication	1.96	1.9416	H_o	1.96	.5596	H_o
Job Satisfaction				1.96	2.72	H_1
Overall	2.09	139.8864	H_1	2.02	13.4776	H_1

regressed against crosstraining opportunity, it was classified as highly significant.

The next area to be considered was the relationship between the factors, job satisfaction and crosstraining opportunity to crosstraining turnover. Results are presented in Table 4-13. Of these, only two relationships--job satisfaction and peer group relations--proved to be significant at the .05 level.

Figure 4-5 illustrates the significant relationships shown throughout this model. As illustrated, the only complete paths in this model are from tenure to job interest, promotion opportunity, and job autonomy, through job satisfaction, to crosstraining turnover. Thus, this model demonstrates the importance of job satisfaction in influencing crosstraining turnover.

Model 2 (Air Force Turnover)

The second model examines the relationships exhibited in the Air Force turnover model. Models 1 and 2 are identical in their relationships from tenure through the factors to job satisfaction. Thus, the explanation of these relationships will not be addressed again.

The first new relationship was between civilian job opportunity and the factors, and job satisfaction. The only relationship determined to be significant was between pay satisfaction and civilian job opportunity (Table 4-14).

Table 4-13

JOB SATISFACTION, CROSSTRAINING OPPORTUNITY AND FACTORS VERSUS CROSSTRAINING TURNOVER

Factors	F_{table}	$F_{calculated}$	Conclusion
Job Interest	1.96	1.5849	H_o
Supervisory Style	1.96	1.7632	H_o
Peer Group Relations	1.96	2.1000	H_1
Promotion Opportunity	1.96	.6920	H_o
Job Autonomy	1.96	.7640	H_o
Pay Satisfaction	1.96	1.5023	H_o
Organizational Communication	1.96	1.8371	H_o
Job Satisfaction	1.96	5.8632	H_1
Crosstraining Opportunity	1.96	1.0406	H_o
Overall	2.02	20.2269	H_1

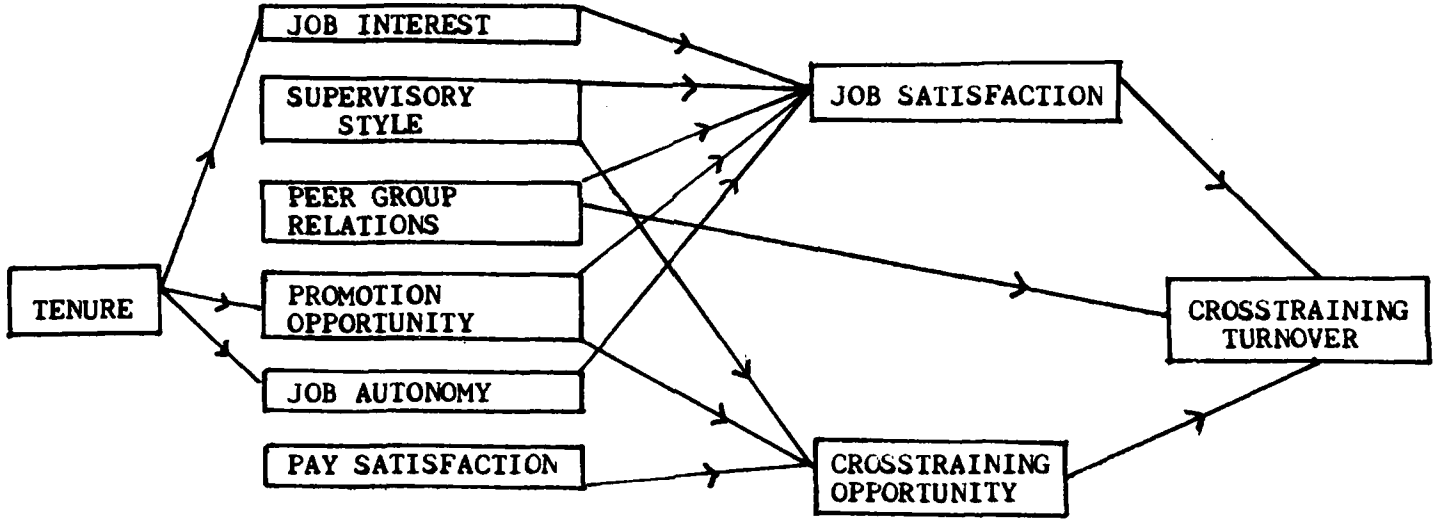

Fig. 4-5. Significant Paths for Crosstraining Turnover Model (Model 1)

Table 4-14

JOB SATISFACTION AND FACTORS VERSUS CIVILIAN JOB OPPORTUNITY

Factors	F_{table}	$F_{calculated}$	Conclusion
Job Interest	1.96	1.3608	H_o
Supervisory Style	1.96	1.0034	H_o
Peer Group Relations	1.96	1.6908	H_o
Promotion Opportunity	1.96	.6212	H_o
Job Autonomy	1.96	1.3794	H_o
Pay Satisfaction	1.96	3.6222	H_1
Organizational Communication	1.96	1.8058	H_o
Job Satisfaction	1.96	Nonsignificant	H_o
Overall	2.09	3.4796	H_1

In the relationships of all factors to Air Force turnover, several factor relationships were significant. As shown in Table 4-15, significant relationships existed between job satisfaction, civilian job opportunity, peer group relations, promotion opportunity, and job interest and Air Force turnover.

Figure 4-6 illustrates the significant relationships shown throughout the model. Several complete paths are traced in this model. Complete paths are traced from tenure to job interest, promotion opportunity, and job autonomy through job satisfaction to Air Force turnover. Other complete paths are traced from tenure through job interest, peer group relations and promotion opportunity to Air Force turnover. This model of turnover illustrates that while job interest, peer group relations and promotion opportunity have a direct relationship with Air Force turnover from tenure, they also influence Air Force turnover through their stronger effect on job satisfaction.

Determination of the Strength of Significant Relationships

The use of path analysis adds interpretive power to the simple multivariate regression relationships. This section will use path analysis to determine the strength of the relationships found to be significant. Determination of the relative contributions of the factors to job satisfaction and turnover will assist the manager in placing priorities

Table 4-15

JOB SATISFACTION, FACTORS AND CIVILIAN JOB OPPORTUNITY VERSUS AIR FORCE TURNOVER

Factors	F_{table}	$F_{calculated}$	Conclusion
Job Interest	1.96	2.4256	H_1
Supervisory Style	1.96	1.5501	H_o
Peer Group Relations	1.96	4.3250	H_1
Promotion Opportunity	1.96	3.1606	H_1
Job Autonomy	1.96	1.1193	H_o
Pay Satisfaction	1.96	.0316	H_o
Organizational Communication	1.96	.8111	H_o
Job Satisfaction	1.96	2.9837	H_1
Civilian Job Opportunity	1.96	3.4882	H_1
Overall	2.02	17.4803	H_1

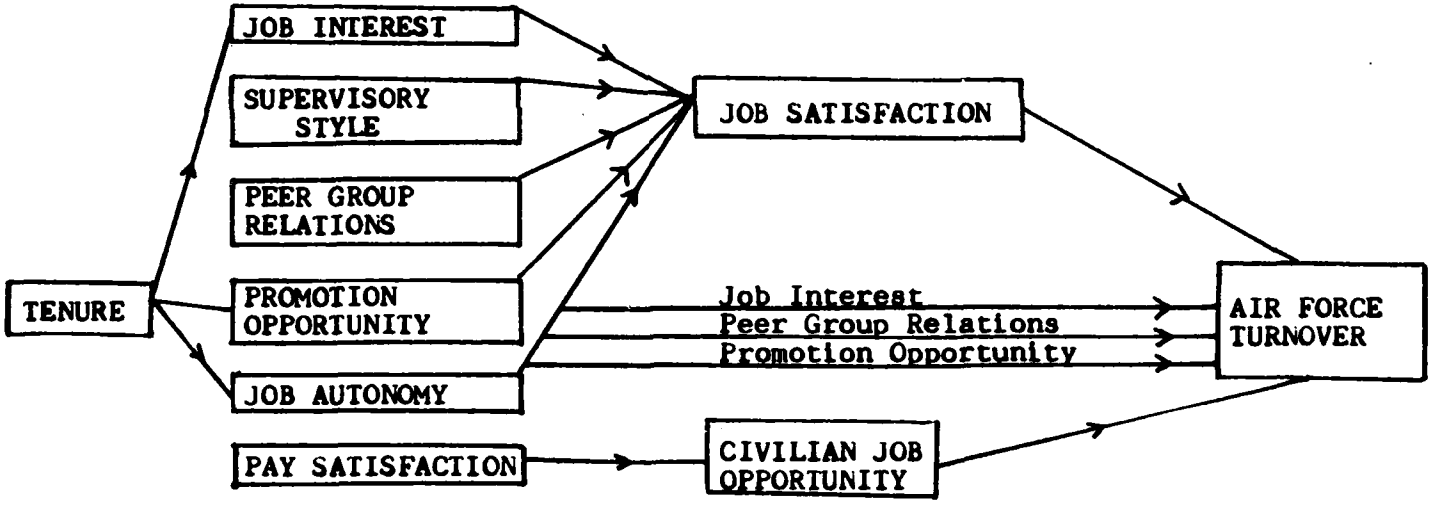

Fig. 4-6. Significant Paths for Air Force Turnover Model (Model 2)

in order to lower the turnover rate. This section will analyze the strength of the relationships in both crosstraining turnover and Air Force turnover in two different ways. Each model will first examine the non-causal latent residuals. This signifies the amount of variation unexplained by the model. The second step will involve examination of the effect coefficients. Effect coefficients are the sum of the direct and indirect contributions of the factors to turnover. For example, job interest has been shown to significantly influence Air Force turnover directly, as well as indirectly by influencing job satisfaction. Specific values of all variables are shown in the decomposition table (Appendix H), and hence will not be referenced in the text.

Model 1 (Crosstraining Turnover)

The latent variables (Appendix I) identified greater than 95 percent of the variation as unexplained by their respective causal factors for job interest, supervisory style, peer group relations, promotion opportunity, job autonomy, pay satisfaction, and organizational communication. The residuals identified only 60.5 percent of the variation as unexplained for job satisfaction. The residual for crosstraining opportunity identified 91.6 percent of the variation, while the residual for crosstraining turnover explained 86.9 percent of the variation. This means that

this model explains less than 5 percent of the variation in job interest, supervisory style, peer group relations, promotion opportunity, job autonomy, pay satisfaction, and organizational communication; 8.4 percent of crosstraining opportunity; 13.1 percent of crosstraining turnover and almost 40 percent of the variation in job satisfaction. The residual for tenure is assumed to account for all of its variation.

The second step involved the development of effect coefficients, which measured the effect of all prior causal factors. The effect coefficients can be interpreted as the incremental increase in the factors being influenced by a one unit increase in the causal factor. That is to say, it is equivalent to the total causal value. Only paths previously found to be significant were evaluated.

In this model, job autonomy showed the greatest increase as a result of an increase in tenure, followed by job interest. Promotion opportunity, conversely, showed a decrease in response to increased tenure.

For the significant paths to crosstraining opportunity, the greatest relative effect on crosstraining opportunity is caused by promotion opportunity, followed by job satisfaction, pay satisfaction and then supervisory style.

The determination of those factors having the greatest relative effect on job satisfaction is of crucial

importance to this study. Because job satisfaction is part of every path from tenure to crosstraining turnover, its determination is important to managers. In order of relative importance to job satisfaction, the factors are: (1) job interest, (2) peer group relations, (3) job autonomy, (4) promotion opportunity, and (5) supervisory style. Job interest had over twice the relative effect of any other factor on job satisfaction.

The final relationship was to crosstraining turnover from job satisfaction and peer group relations. Job satisfaction showed a greater effect on crosstraining turnover than did peer group relations. It was approximately twice as strong a relationship.

It can be seen from this analysis that job satisfaction has the greatest effect on crosstraining turnover. The two strongest paths in the model are from tenure to job interest through job satisfaction to crosstraining turnover, and from tenure to job autonomy through job satisfaction to crosstraining turnover. However, peer group relations, as the second most significant contribution to job satisfaction, must also be considered by managers seeking to control crosstraining turnover. These relationships will be considered in greater depth in the next chapter.

Model 2 (Air Force Turnover)

The structural model for Air Force turnover is identical to that of crosstraining up to job satisfaction.

Therefore, the residual and effect coefficients are identical to that point and will not be restated.

Within the Air Force turnover model, latent noncausal effects accounted for 97.9 percent of the variation in civilian job opportunity, and 89.5 percent of the variation in Air Force turnover. These values are greater than their counterparts in the crosstraining model. This means that this model explains only 2.1 percent of civilian job opportunity and 10.5 percent of the variation in Air Force turnover.

Pay satisfaction has the only significant relationship with civilian job opportunity. As anticipated, it has a negative effect coefficient value. This indicates that as pay satisfaction declines, search for a new job increases, resulting in an increased awareness of civilian job opportunities.

The factor with the largest effect coefficient leading to Air Force turnover is job interest. In order of relative effect on Air Force turnover, the factors are: (1) job interest, (2) peer group relations, (3) job satisfaction, (4) promotion opportunity, and (5) civilian job opportunity. These relationships indicate that an increase in job interest will lead to the largest corresponding increase in career intent, followed by peer group relations and then job satisfaction. Conversely, civilian job opportunity demonstrated an inverse relationship with turnover. This means that as

civilian job opportunity increases, expressed career intent decreases.

The results from the Air Force turnover model differ from the results of the crosstraining turnover model. Job satisfaction had the most significant relationship with crosstraining turnover. It also had a greater effect on crosstraining turnover than it had on Air Force turnover. However, in the Air Force model, job interest and peer group relations had a greater effect on Air Force turnover than job satisfaction did. This is because of the indirect effect they have on Air Force turnover through job satisfaction. That is to say, their effect on turnover is the sum of the direct influence they have on turnover and their direct influence on job satisfaction. Job satisfaction therefore becomes a key variable for consideration by managers in an attempt to control turnover. These results will be developed further in the concluding chapter.

Further Analysis of Specific Questions

Three specific relationships were felt to be of interest to this team, and were evaluated through the use of crosstabulation. These results cannot be interpreted as providing "proof" of any hypothesis. However, they can point out relationships and correlations existing within the data. The three questions addressed were:

1. Is there a difference between Air Force commands in relation to turnover rates?

2. Is sex related to job satisfaction and turnover?

3. Is the relationship between pay satisfaction and Air Force turnover affected by tenure?

Each of these questions will be addressed in separate subsections.

Command Versus Turnover

The crosstabs run on command versus both crosstraining turnover and Air Force turnover provided evidence of differences within the commands (Table 4-16). All commands with at least ten persons responding on the survey were included for analysis. Because of the reassignment of aircraft maintenance officers in the Air Defense Command to different commands, their turnover intent was not considered.

Table 4-16

TURNOVER DIFFERENCES BY COMMAND

Command	Intent to Crosstrain	Command	Intent to Leave the Air Force
AFSC	58.3	AFSC	35.3
MAC	39.4	MAC	21.3
PACAF	38.5	TAC	17.9
TAC	37.9	USAFE	14.5
USAFE	34.2	SAC	10.4
SAC	32.1	ATC	10.3
AFLC	24.0	AFLC	8.0
ATC	17.9	PACAF	3.8

Within both models a wide disparity exists in rates of turnover intent among the commands. AFSC and MAC have the highest turnover rates in both categories. Conversely, AFLC demonstrates the second lowest turnover rate in both categories while ATC has the lowest crosstraining turnover rate and third lowest Air Force turnover rate. PACAF presents a unique profile of high intent to crosstrain with a correspondingly high intent to remain in the Air Force. These results must be considered within the context of the different sample sizes for each command.

Sex Versus Job Satisfaction and Turnover

To determine if there was evidence that sex was related to job satisfaction and turnover, crosstabulations were run with sex versus the following questions:

1. "I enjoy my job" (question 49).

2. "I do not look forward to coming to work each day" (question 24).

3. "How much of the time (do) you feel satisfied with your job?" (question 83).

4. "How well (do) you like your job?" (question 84).

5. "How (do) you feel about changing your job?" (question 85).

6. "How (do) you think you compare with other people (in liking your job)?" (question 86).

These were the questions factor analysis grouped in measuring job satisfaction. Results showed that none of the relationships were significant at the .05 level. This indicated that sex was not a significant factor in job satisfaction.

The comparison of sex versus turnover proved to be significant for both crosstraining turnover and Air Force turnover. For the comparison of sex versus intent to remain in the career field, sex was run against the measure of crosstraining turnover. Table 4-17 shows the results. This relationship was significant at the .02 level. There were 52.8 percent of the females versus 47 percent of the males who answered positively (Likert scale "E" or higher) as to intent to remain in the aircraft maintenance officer career field.

The results of the crosstabulation run between sex and career intent was significant at greater than the .001 level, (Table 4-18). There were 70.6 percent of males versus 47.3 percent of females who responded positively to career intent. On this question, a higher percentage of females than males (20.3 to 16.9) were undecided as to career intent.

Pay Versus Turnover

The last question to be evaluated was the relationship between pay and Air Force turnover. This problem was

Table 4-17

CROSSTRAINING TURNOVER VERSUS SEX

	SEX		
CROSSTRAINING TURNOVER	Male	Female	
Question Response	Total Number/Percent	Total Number/Percent	
A	87/17.5%	17/23.0%	LEAVE
B	63/12.7%	8/10.8%	
C	26/5.2%	2/2.7%	
D	88/17.7%	8/10.8%	UNDECIDED
E	27/5.4%	5/6.8%	
F	130/26.1%	25/33.8%	
G	77/15.5%	9/12.2%	STAY
TOTAL	478	74	

Significance = .016
Cramer's V = .147

Table 4-18

AIR FORCE TURNOVER VERSUS SEX

	SEX		
AIR FORCE TURNOVER	Male	Female	
Question Response	Total Number/Percent	Total Number/Percent	
A	30/6.0%	14/18.9%	LEAVE
B	20/4.0%	6/8.1%	
C	12/2.4%	4/514%	
D	84/16.9%	15/20/3%	UNDECIDED
E	40/8.0%	11/14.9%	
F	152/30.5%	16/21.6%	
G	160/32.1%	8/10.8%	STAY
TOTAL	498	74	

Significance = 0.0
Cramer's V = .196

explored through the use of several crosstabulation programs. Each of the individual questions measuring pay were initially compared to Air Force turnover. All questions presented a similar profile. As an example, the results of question 18, "I feel my career provides sufficient economic security," versus Air Force turnover, are shown in Table 4-19. These results are significant at greater than the .001 level. The summary of this crosstabulation shows that the majority of Air Force maintenance officers, 52.7 percent, are satisfied with Air Force pay, while only 38.7 percent are dissatisfied. It also indicates that of those satisfied with pay (response "E" or greater) 74.8 percent expressed career intent (response "E" or higher). Conversely, of those dissatisfied with pay, 60 percent expressed definite career intent. At the extremes, 77.3 percent of those having the highest level of pay satisfaction expressed career intent, versus only 47.4 percent of those with the lowest level of pay satisfaction. Thus, it can be seen that pay may have a relationship with turnover, although not of a linear nature. To further explore this relationship, three-way crosstabs between turnover and tenure, with pay being controlled, was accomplished (Tables 4-20 and 4-21). It was hypothesized that increased tenure would lead to career intent, regardless of level of pay satisfaction. If this was true, the lack of a linear relationship between pay and turnover would be explained. For ease of

Table 4-19

PAY SATISFACTION VERSUS AIR FORCE TURNOVER

		PAY SATISFACTION							
		Question Responses (Total Number)							
					LESS	MORE			
		A	B	C	D	E	F	G	
AIR FORCE TURNOVER		18.5% of those dissatisfied with pay				16.3% of those satisfied with pay			
LEAVE	A	10	10	5	8	3	5	3	
LEAVE	B	4	4	3	1	3	8	3	15%
LEAVE	C	2	3	0	2	4	5	0	
	D	14	15	18	0	15	23	4	17.3%
STAY		60.4% of those dissatisfied with pay				74.8% of those satisfied with pay			
STAY	E	5	12	6	3	12	14	0	
STAY	F	12	23	29	18	40	43	3	67.7%
STAY	G	10	17	20	7	30	53	31	
		Dissatisfied 38.7%			8.6%	52.7% Satisfied			

Table 4-20

AIR FORCE TURNOVER VERSUS TENURE WITH PAY DISSATISFACTION

AIR FORCE TURNOVER	Grouped Responses	Years of Service (Tenure) 0-2	2-3	3-4	4-6	6-8	8-10	10-12	12-14	Over 14	
		Total Number/Percent									
	A - C	7/43.8%	6/26.1%	7/46.7%	6/28.6%	3/23.1%	3/12.0%	5/10.0%	3/16.7%	1/2.4%	LEAVE
	D	3/18.8%	8/34.8%	3/20.0%	7/33.3%	4/30.8%	3/12.0%	9/18.0%	3/16.7%	7/17.1%	UNDECIDED
	E - G	6/37.5%	9/39.1%	5/33.3%	8/38.1%	6/46.2%	19/76.0%	36/72.0%	12/66.7%	33/80.5%	STAY
	Significance = .0007 Cramer's V = .301										

Table 4-21

AIR FORCE TURNOVER VERSUS TENURE WITH PAY SATISFACTION

AIR FORCE TURNOVER	Grouped Responses	Years of Service (Tenure) 0-2	2-3	3-4	4-6	6-8	8-10	10-12	12-14	Over 14	
		Total Number/Percent									
	A - C	5.16.7%	6/18.8%	4/19.0%	10/23.3%	7/19.4%	1/5.9%	1/2.2%	0/0.0%	0/0.0%	LEAVE
	D	9/30.0%	11/34.4%	7/33.3%	7/16.3%	6/16.7%	0/0.0%	0/0.0%	1/3.2%	1/2.1%	UNDECIDED
	E - G	16/53.3%	15/46.9%	10/47.6%	26/60.5%	23/63.9%	16/94.1%	44/97.8%	30/96.8%	46/97.9%	STAY
	Significance = .0007 Cramer's V = .301										

interpretation, responses "A" through "C" have been grouped (dissatisfied/negative career intent) and "E" through "H" (satisfied/positive career intent), for both pay and turnover. These results were all significant at the .02 level. In relation to the hypothesis, results were mixed. However, it was shown that the relationship between turnover and pay was highly influenced by tenure. It can be seen that within each year group those expressing pay satisfaction had a higher career intent than those dissatisfied with pay. The 8-year point presents an interesting breakpoint. After eight years of service, over two-thirds expressed career intent regardless of pay satisfaction. However, for those satisfied with pay, at least 94.1 percent expressed career intent after the 8-year point versus only 63.9 percent of those in the 6-8 year group. Of those dissatisfied with pay, 75 percent expressed career intent after the 8-year point versus only 46 percent in the 6-8 year group. This seems to indicate that if those dissatisfied with pay become satisfied at the 8-year point and beyond, over 90 percent will remain in the Air Force. While this crosstabulation result can point out a relationship that may exist, it cannot be used to provide "proof" for that relationship.

Content Analysis

As mentioned in Chapter 3 the questionnaire allowed for open-ended comments. The purpose of this option was to

permit further comment on particular questions or on areas not addressed within the survey instrument.

Of the 578 completed questionnaires, 54 of them or 9.34 percent contained open-ended comments. The area attracting most criticism and concern was pay. Comments centered around two main themes--inflation and equity. The first and most predominant theme, inflation, was mentioned by 13 of the 19 respondents addressing pay as a problem. Their main concern was the continued presidential paycaps which were further compounding the fight against inflation. The second theme was concerned with the perceived equity of pay both within the Air Force, and between the Air Force and the civilian sector. Within the Air Force, comparisons were made between the hours worked by aircraft maintenance officers and the hours put in by their counterparts in other career fields. Perceived inequity existed because the aircraft maintenance officers felt that their longer hours should be compensated for with higher pay. Because the Air Force pay system is structured by rank and years in service this is not currently feasible.

Dissatisfaction with assignments was also broached. Here comments ranged from too many PCS moves in a short period of time to too many changes of jobs within a maintenance complex in too short a period of time. Respondents felt that these moves decreased an individual's ability to become proficient and experienced in one area.

Other areas receiving comment included the lack of positive feedback, assignment into the 40XX career field versus previous education and training, the feeling of being second class citizens, quality of facilities and amount of responsibility. Laudatory comments for a job well done appeared to be few and far between for 11 percent of the respondents. The same percentage felt that their technical training and often unrelated college degrees were not sufficient to prepare them for maintenance environments. In most cases, aircraft maintenance was an OJT situation--what was learned was learned on their own. Finally, 10 percent claimed they were treated as second class citizens not only within the confines of the Air Force, but also in the civilian communities.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

The objective of this research was to identify the significant factors contributing to the turnover of aircraft maintenance officers. To accomplish this objective two research questions were posed in Chapter 1:

1. What are the significant factors contributing to turnover?

2. What is the relationship between these factors and turnover?

To identify these factors and relationships a 95 data point questionnaire was sent out to 834 company grade aircraft maintenance officers (40XX) on active duty in the Air Force. The 578 questionnaires which were completed and returned served as the data base for this research. The techniques used to analyze these data included factor analysis, multiple regression, path analysis, and content analysis. The results obtained from using these techniques were discussed in Chapter 4. This chapter will discuss the results as they relate to the research questions, draw conclusions about those variables which are controllable by the manager, and recommend areas of further research. Specifically, the chapter will be divided into six sections:

(1) factors leading to crosstraining turnover, (2) factors leading to Air Force turnover, (3) a synthesized model of the two types of turnover, (4) the effect of demographic variables on turnover, (5) implications for the manager resulting from this study, and (6) recommended research areas.

Factors Leading to Crosstraining Turnover

The most significant factor affecting crosstraining is job satisfaction, or the degree to which an individual perceives that his job is challenging, stimulating, requires a variety of skills and knowledge and offers responsibility and autonomy. This finding is coincident with Price's literature review where he noted job satisfaction as the variable most frequently linked to turnover. The strong positive relationship between job satisfaction and turnover is logical. A satisfied individual is more likely to remain in a job than one who is not satisfied.

The results of this analysis show that five factors comprise job satisfaction. They include job interest, peer group relations, job autonomy, promotion opportunity, and supervisory style. These five factors are rather logical indicators of job satisfaction within the aircraft maintenance officer career field. The most important of these is job interest. This high correlation is an expected result. The satisfaction that an individual derives from his job

will be directly influenced by the degree to which his particular interest needs are met. A person who is not interested in aircraft maintenance will probably not be as satisfied as they could be if they held a job in an area which fulfilled their interests. To a certain degree the interest an individual has in a particular area is also indicative of their familiarity and confidence with it. Thus, a person who is more familiar and interested in a certain career field will be more likely to be satisfied with it because of the compatibility between the needs of the job and his personal interests. As mentioned in Chapter 4, changes in the level of job interest have the greatest effect on job satisfaction.

Peer group relations had the next largest effect on job satisfaction. Thus, trust, friendliness, and teamwork are viewed as being important contributors to job satisfaction among maintenance officers. When viewing the work environment of aircraft maintenance officers, the criticality of this factor is readily apparent. The goal of maintenance is to maintain aircraft in an operational status. However, this goal cannot be achieved without the teamwork and often the accomplishment of sequential activities by all maintenance units within a specified period of time. The breakdown of one link in this sequence can delay or prevent the accomplishment of the job. Maintenance revolves around the flying schedule. Therefore, the importance of

teamwork is compounded by the time constraint within which the jobs must be completed. This element of time is probably more prevalent in aircraft maintenance than in any other career field. Thus, the impact of peer group relations may be more critical in maintenance than in other career fields. The failure of teamwork and the resulting unaccomplished jobs can lead to personal frustration and consequently affect the job satisfaction of the individual.

Job autonomy also contributed to job satisfaction. The aircraft maintenance officer views the ability to assume responsibility, make his own decisions, and formulate his own work goals and methods as fulfilling to his feeling of job satisfaction. Specifically, they desire to be creative and independent in carrying out their duties. This creativity is the means through which they can express their individuality and add a personal touch to an otherwise regimented career field of technical order checklists. Such a structured environment finds avenues of self-expression in job autonomy.

Promotion opportunity is also important to the aircraft maintenance officer. Within the Air Force, promotion is normally linked to change of rank. As indicated by one of the questions in the questionnaire, however, the maintenance officer considers not only the equity and opportunity for promotion to the next rank but also the chance for future advancement. Thus, the chance to change jobs within

their own career field (i.e. work a staff job versus flightline) is also linked to promotion and seen as a reward for past performance.

The final component of job satisfaction is supervisory style. The aircraft maintenance officer sees the ideal supervisor as hardworking, technically qualified, supportive of subordinates' decisions, and possessing leadership qualities and the ability to deal with people. This supervisory profile is closely aligned to the requirements of the job where the officers must put in long hours, deal with technical problems, support the sometimes unpopular decisions made by his subordinates and handle the numerous people problems which haunt the maintenance squadrons. Concern for subordinates supports General Allen's call for increased attention to "people needs" within the context of mission accomplishment.

As shown in Chapter 4, job satisfaction is related to the individual's perception of crosstraining opportunity. The reason for this relationship appears to be two-fold. First, as the individual becomes more satisfied with his job, he initiates a more serious search into crosstraining opportunities. This should enhance the individual's awareness of crosstraining opportunity. Second, supervisory style and promotion opportunity are directly related to crosstraining opportunity, but they are also directly related to job satisfaction. Combining with the other

factors affecting job satisfaction, they cause overall job satisfaction to be related to crosstraining opportunity.

An interesting result of this research was that crosstraining opportunity was not significantly related to crosstraining turnover. To explain this, it should be remembered that crosstraining turnover represents the individual's expressed intent to crosstrain. An individual who is well informed about the 40XX career field realizes that because of critical manning, the true opportunity to crosstrain is virtually nonexistent. Thus, although the individual becomes aware that crosstraining, in general, is an option for someone dissatisfied in his present career field, he does not express intent to crosstrain because on further investigation, he determines that his chances to succeed are slim at best. Therefore, the results of statistical tests indicate no significant relationship between crosstraining opportunity and crosstraining turnover.

In addition to job satisfaction, other factors influencing opportunity to crosstrain are supervisory style, promotion opportunity, and pay satisfaction. The interpretation of these relationships is not quite as clear cut as those leading to job satisfaction. Within supervisory style, the aircraft maintenance officer desires to have a supportive supervisor. The supportive supervisor would be more likely to approve a crosstraining request, for example, than a nonsupportive supervisor. This perception exists

because a supportive supervisor would place more emphasis on the individual's needs than the nonsupportive supervisor. In terms of promotion opportunity, the individual who perceives he has a good promotion opportunity could view crosstraining opportunity as a viable option because other career fields would value their promotion competitiveness. Pay satisfaction and crosstraining opportunity appear to be nebulously related at first. When analyzed within the aircraft maintenance officer environment, the relationship becomes somewhat clearer. Here, the individual feels that by changing career fields pay equity will increase even though the real pay remains constant. This anomaly is due to the long working hours put in by maintenance officers (an area of concern which surfaced from content analysis). By changing career fields the maintenance officer may experience an increase in pay equity because he could work less hours for the same pay.

Thus, to encourage aircraft maintenance officers to remain in the 40XX career field the key ingredient is to maintain high job satisfaction. Job satisfaction is, in turn, directly affected in varying degrees by job interest, peer group relations, job autonomy, promotion opportunity, and supervisory style.

Factors Leading to Air Force Turnover

Job satisfaction was the factor driving Air Force turnover. The composite of job satisfaction represents the same factors discussed in crosstraining turnover--job interest, peer group relations, job autonomy, promotion opportunity, and supervisory style. One additional factor contributing to turnover is civilian job opportunity. The significant factor affecting civilian job opportunity in a negative sense is pay satisfaction. This relationship indicates that if a person feels that he is not being paid enough, he will search the civilian environment for a better paying job. The greater the discrepancy between pay equity and received pay, the more attractive civilian job opportunity will appear.

Thus, two major contributors to Air Force turnover are job satisfaction and civilian job opportunity. The more satisfied the individual is, the less likely he is to seek civilian job opportunities. However, the less satisfied the person becomes both with his job and with his pay, the more viable the civilian job opportunity option becomes.

Synthesis of the Models

Thus far, we have explained turnover through two separate models, crosstraining turnover, and Air Force turnover. Although both models have unique relationships, areas of commonality can be identified.

These aspects of commonality can be used to develop a conceptual framework which identifies an underlying turnover process. This section will review the major findings of the study and then synthesize these findings into a single conceptual model. The following section will summarize the major findings.

Job satisfaction was found to be a major determinant of turnover in the aircraft maintenance officer career field. Thus, the intrinsic satisfaction the aircraft maintenance officer receives from his job will play the largest part in his decision to remain in the career field and the Air Force. Job satisfaction had a stronger relationship with cross-training turnover than with Air Force turnover. This result is significant. If the individual does not receive intrinsic job satisfaction, he will initially seek to find a satisfactory job within the Air Force. This dissatisfaction will lead directly to a search through crosstraining opportunity and an intent to crosstrain. If an acceptable job within the Air Force cannot be secured, the individual must then evaluate whether separation from the Air Force will result in the satisfaction of his needs.

Job satisfaction itself is significantly affected by five factors: job interest, peer group relations, job autonomy, promotion opportunity, and supervisory style. Job satisfaction was not found to be related to satisfaction with pay. This is consistent with the interpretation of job

satisfaction being primarily composed of intrinsic satisfaction with the job itself, rather than extrinsic satisfiers, such as pay.

Pay was, however, related to turnover. Pay was found to be related to turnover, but not in a direct, linear relationship. Pay was a significant contributor to Air Force turnover, through civilian job opportunity. This supports the contention that the nation's economic climate will impact USAF attrition. As increased opportunity for civilian employment is found, aircraft maintenance officers dissatisfied with their jobs are more likely to turnover. Pay was correlated with both civilian job opportunity and crosstraining opportunity. Pay becomes significant to crosstraining opportunity through the mechanism of pay equity. Content analysis identified the perception of long work hours and greater responsibility without commensurate increased pay as being an inherent irritant within the career field. Consequently, the maintenance officer does not feel that he is being fairly paid, in relation to individuals in other career fields, in which he perceives less work required for equal pay. This perception of a lack of equity between his pay and another individual's pay leads him to investigate the possibility of crosstraining. However, he quickly discovers that crosstraining is restricted. Only 16.3 percent of the sample felt that they had any opportunity to crosstrain. This finding also helps explain

the lack of relationship with crosstraining turnover. The search for crosstraining opportunity results in the realization that he cannot crosstrain. Hence, his perception of crosstraining opportunity decreases, while his intent to leave the career field (through separation from the Air Force if necessary) remains constant. The avenue left to achieve pay equity is through civilian employment. He will then search the civilian job sector for civilian job opportunities.

A second and separate attitude toward pay relates to the absolute level of pay--pay satisfaction. This was measured in this study. As shown, pay satisfaction leads directly to an awareness of civilian job opportunity.

This discussion of the turnover process leads to a synthesized conceptual model of turnover. Job interest, peer group relations, job autonomy, promotion opportunity and supervisory style collectively lead to job satisfaction. This is the major determinant of turnover. If job satisfaction is not present, the individual first seeks to crosstrain. If this does not appear to be a viable option, he considers separation from the Air Force. Dissatisfaction with pay equity also leads to a search for crosstraining opportunities. Again, if this path is not a viable option, the individual then searches the civilian community for a job which would provide him with pay equity. The combined effects of the results of this search and the level of job

satisfaction will determine the individual turnover decision. This conceptual turnover process model is shown in Figure 5-1.

Several factors which may affect the turnover process in the aircraft maintenance officer career field are not shown in this model. Several factors which quite possibly are related to turnover but were not fully evaluated in this analysis include: (1) rated supplement utilization within the career field, (2) reassignment policy, (3) lack of proper preparation to assume the aircraft maintenance officer's duties, and (4) differences in turnover by sex. Thus, even this conceptual model of turnover is not entirely inclusive of all factors leading to turnover in the aircraft maintenance officer career field. However, this model does satisfy the constraints of being both theoretically feasible and practically useful. It is recommended that this model be further developed and tested for inclusion of those unique factors not addressed in this study.

Effects of Demographic Variables

The comparison of sex versus turnover proved to be significant in both crosstraining turnover and Air Force turnover. As indicated earlier a large discrepancy exists between males and females in their intent to make the Air Force a career. One possible factor causing low career intent among females is the rareness of seeing female

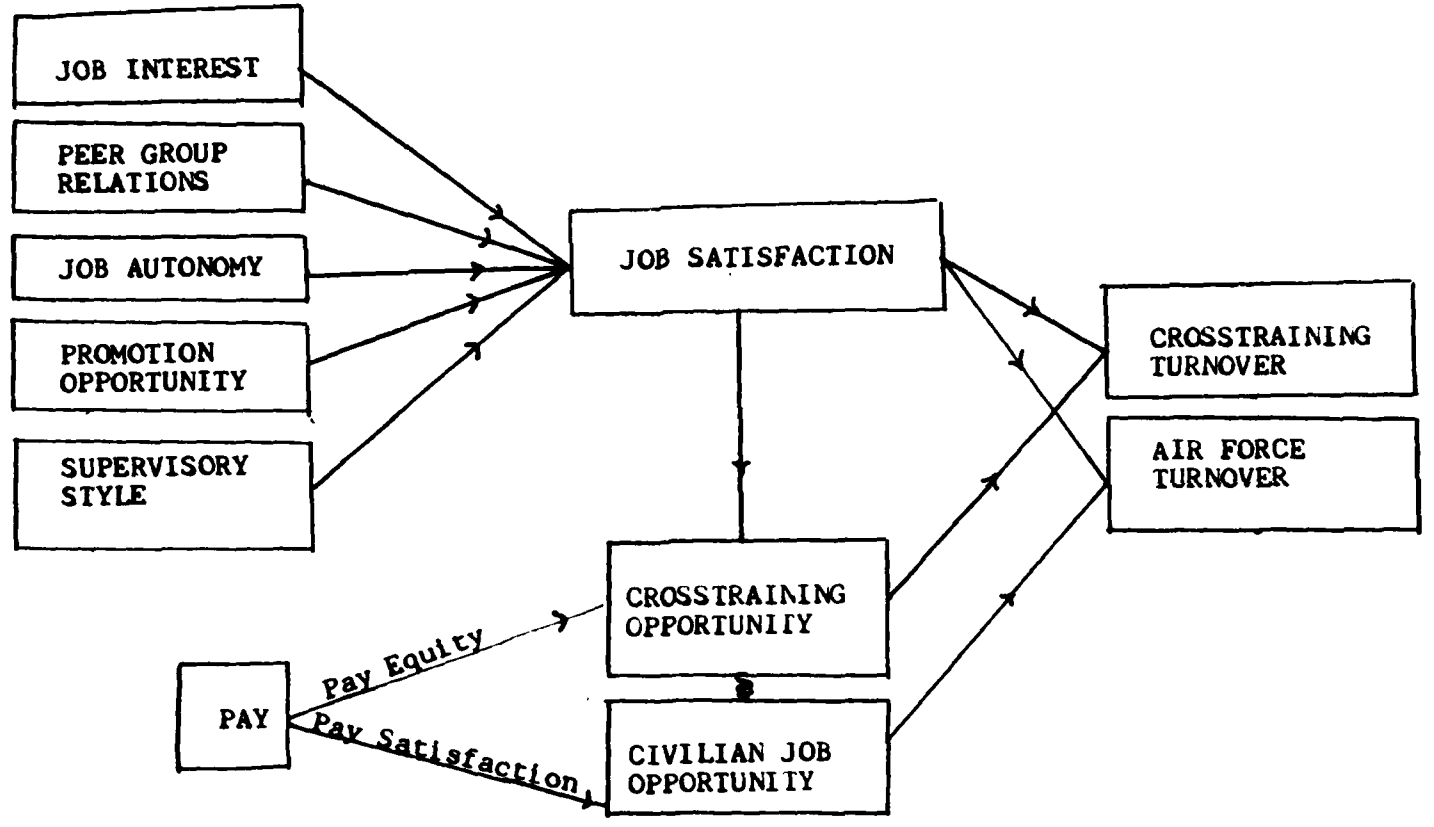

Fig. 5-1. Conceptual Model of Turnover

officers above the rank of 0-4, exclusive of the nursing field. There are such few examples of higher ranking women throughout the Air Force that females are less likely to consider the option of a career.

Many females will enter the Air Force with the intent of trying it out. The problems of entering a previously all-male career field, such as maintenance, tests the female's ability to handle the job. This testing ranges from acceptance by males as their peers to competition with male maintenance officers many of whom had been exposed to technical areas while growing up. The mental conversion which the female must make from the domestic background to a field of mechanics is frustrating and puts many females one step behind their male peers. These areas make the career field more difficult for females to cope with. This fact coupled with limited crosstraining policy for maintenance officers, leaves females with one option--turnover from the Air Force. Leaving the Air Force is an attractive option because of the demand for female managers in the civilian sector as a result of Affirmative Action Programs. In the civilian world the female will have her choice of the environment in which she works (i.e. industrial firms in private sector versus public service). Here she is not necessarily restricted to one job or speciality as she was in the Air Force.

The distinct possibility of marriage and becoming a housewife makes the personal commitment to a career less probable. However, the growing number of women balancing careers with family duties may result in an increasing number of women pursuing Air Force careers over the next few years. The acceptance of women into the Air Force Academy has lent professionalism to the Air Force position that women do have a place in the Air Force. This professional training may encourage more females to remain for careers.

Another program which may increase the career intent of women is joint spouse. The number of military marriages is growing. Here, the Air Force is dealing with the career intent of two individuals rather than one. Thus, increased emphasis may be needed on programming joint assignments for military spouses. Failure to station spouses together may lead to the turnover of not only the female but also the male.

Implications for the Manager

The single most important challenge of the Air Force manager in reducing crosstraining and/or Air Force turnover is to maintain job satisfaction at a high level. Such a goal, however, is rather nebulous because of individual differences which exist. Thus, there is no one answer on how to improve job satisfaction.

The five factors comprising job satisfaction may give some indication of those areas where improvements may be made to directly influence job satisfaction in a positive way. In the area of job interest, a conscious effort should be made by the Air Force manager to match an individual's career field with his interests. This could be accomplished by selecting aircraft maintenance officers who exhibit an inherent interest in the career field. Tests such as the Kuder Preference Test may indicate the level of interest in aircraft maintenance. Another way to increase job interest and, consequently, job satisfaction is through job enrichment programs, where an individual could not only establish his own goals but simultaneously increase his job autonomy.

Peer group relations had the second highest effect on turnover. An area of managerial control for this factor includes encouraging the cohesiveness and compatibility of work groups. Peer group relations within the maintenance career field presents unique problems due to the limited number of officers assigned to each squadron and the competitive environment that exists within each maintenance squadron as well as between maintenance and operations and other support squadrons. Fostering a more "global" view of the maintenance officers' peer group, rather than a narrow squadron parochialism, could enhance peer group relations and consequently reduce turnover.

Job autonomy improvements could result from job enrichment programs. Additionally, the delegation of more responsibility and decentralization of decision-making could enhance job autonomy. The degree of delegation is inherent in the supervisory style and consequently affects peer group relations.

The fourth area of managerial concern is promotion opportunity. An individual's perception of promotion opportunity might be enhanced through the dissemination of promotion information to subordinates. This dissemination of information could be done through a viable career progression program which is more than just an additional duty. The officer filling that position should be someone within the career field who has up-to-date knowledge of the career field promotions, an understanding of how the promotion system works, and what comprises promotion competitiveness in that and other career fields. This program should allow for biannual consultations where an individual could discuss his career desires and match them against Air Force needs. Information on resident schools, special programs for fast track officers, special duty assignments, and suggested positions that the individual could fill at the current base should be discussed. Additionally, the AF Form 90 should be reviewed to match future assignments with promotion needs. This would not only encourage the continual update of the form but would also be more reflective of the

available options versus the individual's needs. The control of this program within the maintenance complex could serve two purposes: (1) the individual's desires and needs could be made known, and (2) these desires could be matched against the maintenance complex needs to see if compatibility exists. This links job interest with promotion opportunity.

Supervisory style is another potential indicator of job satisfaction. The presence of rated supplement officers in the aircraft maintenance officer career field surfaced in the content analysis as an irritant. The biggest concern was the lack of expertise which the rated officers had in maintenance. One solution to this deficient technical knowledge is to send the rated officers, regardless of rank, through the entry level Aircraft Maintenance Officer Course (AMOC) at Chanute AFB IL. This education would permit them to become familiar with maintenance jargon and procedures. Supplementing this, the officers should then attend the Staff Officer Course to broaden their managerial and leadership background. These courses would eliminate some of the communication gaps between the career aircraft maintenance officers and the rated supplements. Emphasis also needs to be placed on understanding people problems and being able to balance the productivity needs and people needs with the appropriate leadership style.

The initiation of the above programs will enhance job interest, peer group relations, job autonomy, promotion opportunity, and supervisory style. These improvements will positively affect job satisfaction and lead to a decreased desire to crosstrain out of the 40XX career field.

Within the context of the Air Force turnover model, managerial attention should be focused on job satisfaction and the factor influencing civilian opportunity--pay satisfaction. Influencing this factor lies mainly with top management. Closely related to pay satisfaction is pay equity. Pay equity is one area of pay which is partially controllable by the manager. The manager may isolate one facet of the individual's job which is creating perceived pay inequity. One means of diminishing the inequity is by monitoring the work schedule to insure that weekend duties are shared equally by all individuals. Compensation time for extra hours worked may also be possible. Another cause of pay equity derived from content analysis is responsibility. Here attention should be directed to the amount of responsibility an individual holds for his respective rank as compared to the assigned responsibility held by his peers. Finally, the fact that pay satisfaction at about the 8-year point in an individual's career has a dramatic effect on expressed intent to remain in the Air Force should be the impetus for an investigation into the overall USAF officer pay structure.

Recommendations for Further Research

This section will address further research suggested by the current study. Recommendations are taken from two sources: (1) the statistical analysis results discussed in Chapter 4, and (2) the content analysis obtained from the open-ended comments.

This study has been directed to a global view of aircraft maintenance officer turnover. Because of this broad scope, peculiarities which are attributable to demographic variables may have been glossed over. For instance, differing turnover rates exist within the various commands. An analysis should be made which concentrates on peculiar career irritants, personnel policies, and job satisfaction factors. Areas such as these may directly effect turnover and thus result in different turnover indicators among the commands. A crosstabulation study could be initially accomplished using the existing data base. However, it is recognized that the present data base does not measure all factors significantly driving turnover. The data base should ideally include the factors identified in the content analysis as contributors to turnover. The results of this study could then be sent to the respective commands for further study and dissemination to the operational managers.

The relatively low power of both models to explain turnover can be explained in two ways. First, a linear

relationship does not exist between job satisfaction and turnover. The relative effect of these variables is modified by demographic variables such as tenure, age and command. We therefore recommend that future studies use statistical tests of relationship which do not assume linearity. Secondly, all factors which drive turnover were not measured within this questionnaire. We recommend that future research include factors identified in the content analysis results--work hours, rated supplement, assignment problems, positive feedback and personal qualifications for the 40XX career field.

APPENDICES

APPENDIX A

AIRCRAFT MAINTENANCE OFFICER (4[illegible]XX) QUESTIONNAIRE

GENERAL INSTRUCTIONS

1. Do not in any manner indicate your name or Social Security Number on the answer sheet.

2. All statements may be answered by filling in appropriate spaces on the answer sheet. If you do not find the exact answer that reflects your opinion, use the one that is closest to it. Do not answer in the survey booklet; use the separate answer sheet.

3. The answer sheet is designed for machine scanning of your responses. Please use a Number 2 pencil and observe the following requirements:

- Make heavy black marks that fill the spaces.
- Erase cleanly any answer you wish to change.
- Make no stray markings of any kind on the answer sheet.
- Do not staple, tear or fold the answer sheet.

4. Below is a list of key words and their definitions as they are used in this survey:

UNIT/ORGANIZATION: your Squadron/Division

SUPERVISOR/BOSS: the person to whom you report directly (the reporting official on your performance report)

WORK GROUP: all those persons who report to the same supervisor as you do

5. Do not staple or otherwise damage the answer sheet.

THANK YOU FOR YOUR COOPERATION IN COMPLETING THIS QUESTIONNAIRE. PLEASE FEEL FREE TO ENCLOSE ANY ADDITIONAL COMMENTS ON A SEPARATE SHEET.

PLEASE ENCLOSE THE ANSWER SHEET IN THE ATTACHED PRE-ADDRESSED RETURN ENVELOPE AND PLACE THE ENVELOPE IN OUTGOING OFFICIAL DISTRIBUTION.

SECTION I

For the following questions choose the response which best reflects your current status.

1. What is your current grade?
   a. 0-1
   b. 0-2
   c. 0-3

2. What is your sex?
   a. Male
   b. Female

3. What was your age on your last birthday?
   a. 20-24
   b. 25-29
   c. 30-34
   d. 35-39
   e. 40 or more

4. What is your total years of service for pay (active and reserve, officer and enlisted)?
   a. under 2 years
   b. 2 years, but less than 3 years
   c. 3 years, but less than 4 years
   d. 4 years, but less than 6 years
   e. 6 years, but less than 8 years
   f. 8 years, but less than 10 years
   g. 10 years, but less than 12 years
   h. 12 years, but less than 14 years
   i. 14 years or more

5. Do you have prior active enlisted service?
   a. No
   b. Yes, 1 year or less
   c. Yes, over 1 year to 2 years
   d. Yes, over 2 years to 3 years
   e. Yes, over 3 years to 4 years
   f. Yes, over 4 years to 5 years
   g. Yes, over 5 years to 6 years
   h. Yes, over 6 years to 7 years
   i. Yes, over 7 years to 8 years
   j. Yes, over 8 years to 9 years
   k. Yes, over 9 years to 10 years
   l. Yes, over 10 years

6. What is your present Major Command of assignment?

a. SAC	g. PACAF	m. ADCOM
b. TAC	h. USAFA	n. AFAFC
c. MAC	i. USAFE	o. AFCS
d. ATC	j. USAFSO	p. AFLC
e. USAF RED	k. USAFSS	q. AFSC
f. HQ USAF	l. AAC	r. Other

7. What is the organizational level of your current assignment?

a. Squadron or below	f. Major Command
b. Group	g. HQ Air Force
c. Wing	h. Department of Defense
d. Air Division	i. Separate Operating Agency
e. Numbered Air Force	j. Other

8. What is your marital status?
   a. Married
   b. Single, never married
   c. Single, previously married

9. How many dependents do you support?

a. 0	e. 4	i. 8
b. 1	f. 5	j. 9
c. 2	g. 6	k. 10 or more
d. 3	h. 7	

10. How long have you held your present assignment?
    a. 1 year or less
    b. Over 1 year but less than 2 years
    c. 2 years but less than 3 years
    d. 3 years or over

11. What is your aeronautical rating?
    a. Pilot
    b. Navigator
    c. Nonrated

12. What is the highest level of formal education you have completed?
    a. Some college
    b. Undergraduate degree (BA, BS, or equivalent)
    c. College beyond undergraduate degree
    d. Master's degree
    e. College beyond master's degree

SECTION II

The following are a series of statements about your job. Using the scale below, indicate how much you agree or disagree with each statement.

Mark A in the answer sheet if you STRONGLY DISAGREE
Mark B in the answer sheet if you DISAGREE
Mark C in the answer sheet if you SLIGHTLY DISAGREE
Mark D in the answer sheet if you NEITHER AGREE NOR DISAGREE
Mark E in the answer sheet if you SLIGHTLY AGREE
Mark F in the answer sheet if you AGREE
Mark G in the answer sheet if you STRONGLY AGREE

Please respond to every statement. While some of the statements may appear similar to each other, no two statements are identical. Please do not go back to previous statements. Try to give as accurate a picture as possible of your feelings and opinions about all aspects of your unit.

13. My supervisor sets an example by working hard.

14. Information is usually widely shared in my unit so that those who make the decisions will base their decisions on the best available know-how.

15. I feel I am doing something important by serving as a member of the Air Force team.

16. I have confidence and trust in the persons in my work group.

17. The opportunity to take on new responsibilities is available if I want it.

18. I feel my career provides sufficient economic security.

19. I have a good chance for promotion.

20. My supervisor tries to strike a balance between people needs and production needs.

21. I intend to remain in my present Air Force career field.

22. Persons in my work group are friendly and easy to approach.

23. In general, I decide for myself how to accomplish a job.

24. I do not look forward to coming to work each day.

25. In my job I utilize my civilian/military education and training.

26. Most of the time my supervisor will not back me up.

27. Most of the time my military service pay is adequate to cover the basic expenses with a little left over.

28. My job requires me to use a number of different skills.

29. I am often given responsibility for a total project.

30. My immediate supervisor usually tells me what's going on at higher levels of management.

31. The probability of my getting the job of my choice outside of the Air Force is high.

32. Opportunity for promotions in my career field is fair and equitable.

33. The people in my unit work together effectively as a team.

34. My job is boring.

35. I have a say in setting my work goals.

36. My supervisor handles the technical side of his/her job well--for example, general expertness, knowledge of job, technical skills needed in his/her profession or trade.

37. There is not much similarity between my abilities and the requirements of my job.

38. The people in my work unit believe that they are doing something important for the country by working in the Air Force.

39. Our work unit receives little information about what is going on in other sections or branches.

40. The chances for me to voluntarily enter a job specialty (AFSC) I desire are high.

41. Persons in my work group know what their jobs are and know how to do them well.

42. I know how my job fits into my organization's mission.

43. I usually don't get the chance to handle the tough and highly visible projects.

44. My job is quite simple and repetitive.

45. My military service income provides me with an acceptable standard of living.

46. My present job assignment offers the opportunity for future advancement.

47. My supervisor has poor leadership qualities.

48. Very little responsibility goes with my job.

49. I enjoy my job.

50. I intend to make the Air Force a career.

51. Rarely am I given the opportunity to make decisions for myself.

52. I am proud to be a member of the Air Force team.

53. My supervisor is not effective in handling personnel problems.

54. Promotions are usually based on performance and ability.

55. My job gives me the chance to "dig deeper" into work activities which interest me.

56. My supervisor is well qualified for his/her job.

57. My present assignment does not give me the chance to do the kind of work I do best.

58. If I left the Air Force, it would be very difficult to get a job with pay, benefits, duties, and responsibilities comparable with those of my present job.

59. I generally decide the work methods and procedures for my job.

60. Our work unit is usually aware of important events and situations.

61. My supervisor is not a capable individual.

62. The Air Force usually tries to take care of its own.

63. When decisions are being made in my unit, the persons who will be affected most are asked for their ideas.

64. I feel secure that I will be able to make ends meet on my military service pay.

65. I get to do a lot of interesting work in my present job.

66. I have confidence and trust in my supervisor.

67. Promotion policy is unfair.

68. In general, most of my skills and abilities are being used in my present job.

69. I know what is expected of me in my job.

70. The probability that I could enter another Air Force specialty that I truly desire is high.

71. My job contains a lot of variety. That is, the job requires me to do many different things at work using a variety of my skills and talents.

SECTION III

Listed below in items 72-82 are a number of factors and their descriptions which are often used to describe organizational well being.

Using the scale below, please indicate the amount of importance you personally place on each of these factors. Mark the appropriate letter of the scale next to the appropriate number on the answer sheet. For example, if you feel that ACHIEVEMENT is between not important and moderately important, then darken either the B or C oval next to number 72 on the answer sheet. If, however, you feel ACHIEVEMENT is extremely important, then you would mark G on the answer sheet. Indicate only how important each factor is to you, not how satisfied you currently are with each fac or in your organization.

72. ACHIEVEMENT--Feelings of accomplishment derived from job performance. The pride and pleasure associated with a job well done.

73. COMMUNICATION--Adequacy of communication structure. Free flow of dialogue up, down and across organizational structure. Well defined feedback loops.

74. GROUP COHESION/WORKER RELATIONS--The compatibility of coworkers. Includes characteristics of coworkers such as how friendly, cooperative, competent, and sociable they are.

75. INDEPENDENCE--The chance for the individual to plan and carry out work activities rather than be directed by others. The chance to work with minimal supervision, and to have some independence in planning and implementing work.

76. INTEREST--The chance to perform work activities which are consistent with personal preferences or interests. The chance to do work which is pleasurable.

77. PAY AND BENEFITS/ECONOMIC SECURITY--The level of pay and the desirability of military service benefits. Included (as applicable) are incentive pay, retirement, medical care or insurance, BX, commissary, etc. Feeling that the job is secure even if economic situation changes. The feeling that basic needs will be met.

78. PERSONAL GROWTH AND DEVELOPMENT--The opportunity for self-fulfillment in the job. The chance to "grow" in the job, by developing new interests and skills.

79. PROMOTION OPPORTUNITY--The operation of the military service promotion system. Includes opportunity for promotion, the criteria for promotion, etc.

80. RESPONSIBILITY--The amount of responsibility for your actions, decisions, and their consequences. Includes responsibility for the welfare of people, for accomplishment of a mission, for tools or equipment and other property, or for financial assets.

81. SUPERVISION--The ability of the boss or supervisor to handle human or social situations on the job. The amount of concern displayed by supervisor for the welfare of his/her people. The competence displayed by supervisor dealing with technical problems encountered in the job. Supervisor's ability to develop technical skills in his/her people.

82. UTILIZATION--The extent to which the job makes use of individual abilities, training, and expertise.

SECTION IV

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

83. WHICH ONE OF THE FOLLOWING SHOWS HOW MUCH OF THE TIME YOU FEEL SATISFIED WITH YOUR JOB?
   A. All the time
   B. Most of the time
   C. A good deal of the time
   D. About half of the time
   E. Occasionally
   F. Seldom
   G. Never

84. CHOOSE THE ONE OF THE FOLLOWING STATEMENTS WHICH BEST TELLS HOW WELL YOU LIKE YOUR JOB.
   A. I hate it
   B. I dislike it
   C. I don't like it
   D. I am indifferent to it
   E. I like it
   F. I am enthusiastic about it
   G. I love it

85. WHICH ONE OF THE FOLLOWING BEST TELLS HOW YOU FEEL ABOUT CHANGING YOUR JOB?
   A. I would quit this job at once if I could
   B. I would take almost any other job in which I could earn as much as I am earning now
   C. I would like to change both my job and my occupation
   D. I would like to exchange my present job for another one
   E. I am not eager to change my job, but I would do so if I could get a better job
   F. I cannot think of any jobs for which I would exchange
   G. I would not exchange my job for any other

86. WHICH ONE OF THE FOLLOWING SHOWS HOW YOU THINK YOU COMPARE WITH OTHER PEOPLE?
   A. No one likes his job better than I like mine
   B. I like my job much better than most people like theirs
   C. I like my job better than most people like theirs
   D. I like my job about as well as most people like theirs
   E. I dislike my job more than most people dislike theirs
   F. I dislike my job much more than most people dislike theirs
   G. No one dislikes his job more than I dislike mine

SECTION V

The following are a series of statements about your job performance. Using the same scale as that used in Section II, indicate how much you agree or disagree with each statement.

87. If my job performance level was high, I would receive increased opportunities for personal growth and development.

88. If my job performance level was low, I would have less opportunity for promotion.

89. If my job performance level was high, I would be given more authority and responsibility.

90. If my job performance level was high, I would receive recognition from my supervisor.

91. If my job performance level was low, I would be criticized by my fellow workers.

92. If my job performance level was low, I would have less freedom from supervision.

93. If my job performance level was high, I would have feelings of accomplishment.

94. If my job performance level was high, I would have more opportunities to work on tasks that really interest me.

95. If my job performance level was high, I would expect that my abilities and skills would be better utilized.

APPENDIX B

FACTOR ANALYSIS (FACT 81)

JOB CONTENT (FACTOR 1)

QUESTION		FACTOR LOADING
15.	I feel I am going something important by serving as a member of the Air Force team.	.5531
24.	I do not look forward to coming to work each day.	.6398
34.	My job is boring.	.7060
49.	I enjoy my job.	.8244
55.	My job gives me the chance to "dig deeper" into work activities which interest me.	.4630
57.	My present assignment does not give me the chance to do the kind of work I do best.	.6627
65.	I get to do a lot of interesting work in my present job.	.8106
68.	In general, most of my skills and abilities are being used in my present job.	.7090
71.	My job contains a lot of variety. That is, the job requires me to do many different things at work using a variety of my skills and talents.	.6937
83.	Which one of the following shows <u>how much of the time</u> you feel satisfied with your job? a. All the time b. Most of the time c. A good deal of the time d. About half of the time e. Occasionally f. Seldom g. Never	.7607

84. Choose the <u>one</u> of the following statements which best tells how well you like your job. .8429
a. I hate it
b. I dislike it
c. I don't like it
d. I am indifferent to it
e. I like it
f. I am enthusiastic about it
g. I love it

85. Which <u>one</u> of the following best tells how you feel about changing your job? .6438
a. I would quit this job at once if I could
b. I would take almost any other job in which I could earn as much as I am earning now
c. I would like to change my present job for another one
d. I would like to exchange my present job for another one
e. I am not eager to change my job, but I would do so if I could get a better job
f. I cannot think of any jobs for which I would exchange
g. I would not exchange my job for any other

86. Which <u>one</u> of the following shows how you think you compare with other people? .7650
a. No one likes his job better than I like mine
b. I like my job much better than most people like theirs
c. I like my job better than most people like theirs
d. I like my job about as well as most people like theirs
e. I dislike my job more than most people dislike theirs
f. I dislike my job much more than most people dislike theirs
g. No one dislikes his job more than I dislike mine.

SUPERVISORY STYLE (FACTOR 2)

QUESTION		FACTOR LOADING
13.	My supervisor sets an example by working hard.	.6853
20.	My supervisor tries to strike a balance between people needs and production needs.	.6900
26.	Most of the time my supervisor will not back me up.	.5461
36.	My supervisor handles the technical side of his/her job well--for example, general expertness, knowledge of job, technical skills needed in his/her profession or trade.	.7279
47.	My supervisor has poor leadership qualities.	.8364
53.	My supervisor is not effective in handling personnel problems.	.7751
56.	My supervisor is well qualified in his/her job.	.7815
61.	My supervisor is not a capable individual.	.8074
66.	I have confidence and trust in my supervisor.	.8563

ORGANIZATIONAL WELL-BEING (FACTOR 3)

QUESTION		FACTOR LOADING
72.	ACHIEVEMENT--Feelings of accomplishment derived from job performance. The pride and pleasure associated with a job well done.	.5006
73.	COMMUNICATION--Adequacy of communication structure. Free flow on dialogue up, down and across organizational structure. Well defined feedback loops.	.5214

74. GROUP COHESION/WORKER RELATIONS--The compatibility of coworkers. Includes characteristics of co-workers such as how friendly, cooperative, competent, and sociable they are. .5078

75. INDEPENDENCE--The chance for the individual to plan and carry out work activities rather than be directed by others. The chance to work with minimal supervision, and to have some independence in planning and implementing work. .4414

76. INTEREST--The chance to perform work activities which are consistent with personal preferences or interests. The chance to do work which is pleasurable. .4107

77. PAY AND BENEFITS/ECONOMIC SECURITY--The level of pay and the desirability of military service benefits. Included (as applicable) are incentive pay, retirement, medical care or insurance, BX, commissary, etc. Feeling that the job is secure even if economic situation changes. The feeling that basic needs will be met. .3595

78. PERSONAL GROWTH AND DEVELOPMENT--The opportunity for self-fulfillment in the job. The chance to "grow" in the job, by developing new interests and skills. .5642

79. PROMOTION OPPORTUNITY--The operation of the military service promotion system. Includes the opportunity for promotion, the criteria for promotion, etc. .4886

80. RESPONSIBILITY--The amount of responsibility for your actions, decisions and their consequences. Includes responsibility for the welfare of people, for accomplishment of a mission, for tools or equipment and other property, or for financial assets. .6192

81.	SUPERVISION--The ability of the boss or supervisor to handle human or social situations on the job. The amount of concern displayed by supervisor for the welfare of his/her people. The competence displayed by supervisor dealing with technical problems encountered in the job. Supervisor's ability to develop technical skills in his/her people.	.6313
82.	UTILIZATION--The extent to which the job makes use of individual abilities, training, and expertise.	.6296

PROMOTION OPPORTUNITY (FACTOR 4)

QUESTION		FACTOR LOADING
19.	I have a good chance for promotion.	.7052
32.	Opportunity for promotions in my career field is fair and equitable.	.7181
46.	My present job assignment offers the opportunity for future advancement.	.5148
54.	Promotions are usually based on performance and ability.	.6448
62.	The Air Force usually tries to take care of its own.	.3643
67.	Promotion policy is unfair.	.5918

PEER GROUP RELATIONS (FACTOR 5)

QUESTION		FACTOR LOADING
16.	I have confidence and trust in the persons in my work group.	.6280
22.	Persons in my work group are friendly and easy to approach.	.5927
33.	The people in my work unit work together effectively as a team.	.6322

38.	The people in my work unit believe that they are doing something important for the country by working in the Air Force.	.4161
41.	Persons in my work group know what their jobs are and know how to do them well.	.6384

JOB AUTONOMY (FACTOR 6)

QUESTION		FACTOR LOADING
23.	In general, I decide for myself how to accomplish a job.	.6841
29.	I am often given responsibility for a total project.	.4586
35.	I have a say in setting my work goals.	.4970
51.	Rarely am I given the opportunity to make decisions for myself.	.5776
59.	I generally decide the work methods and procedures for my job.	.5903

PAY SATISFACTION (FACTOR 7)

QUESTION		FACTOR LOADING
18.	I feel my career provides sufficient economic security.	.5052
27.	Most of the time my military service pay is adequate to cover the basic expenses with a little left over.	.6703
45.	My military service income provides me with an acceptable standard of living.	.8076
64.	I feel secure that I will be able to make ends meet on my military service pay.	.8028

CROSSTRAINING OPPORTUNITY (FACTOR 8)

QUESTION		FACTOR LOADING
40.	The chances for me to voluntarily enter a job speciality (AFSC) I desire are high.	.7571
70.	The probability that I could enter another Air Force speciality that I truly desire is high.	.7958

CIVILIAN JOB OPPORTUNITY (FACTOR 9)

QUESTION		FACTOR LOADING
31.	The probability of my getting the job of my choice outside of the Air Force is high.	.7170
58.	If I left the Air Force, it would be very difficult to get a job with pay, benefits, duties and responsibilities comparable with those of my present job.	.6564

JOB RESPONSIBILITY (FACTOR 10)

QUESTION		FACTOR LOADING
43.	I usually don't get the chance to handle the tough and highly visible projects.	.3594
44.	My job is quite simple and repetitive.	.5037
48.	Very little responsibility goes with my job.	.4366

JOB CLARITY (FACTOR 11)

QUESTION		FACTOR LOADING
42.	I know how my job fits into my organization's mission.	.2321
69.	I know what is expected of me in my job.	.2268
91.	If my job performance level was low, I would be criticized by my fellow workers.	.3688
92.	If my job performance level was low, I would have less freedom from supervision.	.5013

UTILIZATION OF SKILLS AND ABILITIES (FACTOR 12)

QUESTION		FACTOR LOADING
25.	In my job I utilize my civilian/ military education and training.	.4309
37.	There is not much similarity between my abilities and the requirements of my job.	.3327

ORGANIZATIONAL COMMUNICATION (FACTOR 13)

QUESTION		FACTOR LOADING
14.	Information is usually widely shared in my unit so that those who make the decisions will base their decisions on the best available know-how.	.4957
30.	My immediate supervisor usually tells me what's going on at higher levels of management.	.4446
39.	Our work unit receives little information about what is going on in other sections or branches.	.4862

60.	Our work unit is usually aware of important events and situations.	.4763
63.	When decisions are being made in my unit, the persons who will be affected most are asked for their ideas.	.3405

EXPECTATIONS (FACTOR 14)

QUESTION		FACTOR LOADING
17.	The opportunity to take on new responsibilities is available if I want it.	.2399
87.	If my job performance level was high, I would receive increased opportunities for personal growth and development.	.6056
88.	If my job performance level was low, I would have less opportunity for promotion.	.3435
89.	If my job performance level was high, I would be given more authority and responsibility.	.6197
90.	If my job performance level was high, I would receive recognition from my supervisor.	.3909
93.	If my job performance level was high, I would have feelings of accomplishment.	.2428
94.	If my job performance level was high, I would have more opportunities to work on tasks that really interest me.	.5337
95.	If my job performance level was high, I would expect that my abilities and skills would be better utilized.	.4639

APPENDIX C

FACTOR ANALYSIS

Factor	Eigenvalue	Percent of Variation Explained
1	13.86	51.5
2	4.47	16.6
3	2.86	10.6
4	1.86	6.9
5	1.37	5.1
6	1.12	4.2
7	.74	2.8
8	.63	2.3

APPENDIX D

FACTOR ANALYSIS (FACT 51)

JOB INTEREST (FACTOR 1)

QUESTION		FACTOR LOADING
15.	I feel I am doing something important by serving as a member of the Air Force team.	.5311
17.	The opportunity to take on new responsibilities is available if I want it.	.4256
28.	My job requires me to use a number of different skills.	.5515
34.	My job is boring.	.7733
37.	There is not much similarity between my abilities and the requirements of my job.	.5915
43.	I usually don't get the chance to handle the tough and highly visible projects.	.4723
44.	My job is quite simple and repetitive.	.7270
48.	Very little responsibility goes with my job.	.6033
55.	My job gives me the chance to "dig deeper" into work activities which interest me.	.3874
57.	My present assignment does not give me the chance to do the kind of work I do best.	.6228
65.	I get to do a lot of interesting work in my present job.	.7759
68.	In general, most of my skills and abilities are being used in my present job.	.7133
71.	My job contains a lot of variety. That is, the job requires me to do many different things at work using a variety of my skills and talents.	.7681

SUPERVISORY STYLE (FACTOR 2)

QUESTION		FACTOR LOADING
13.	My supervisor sets an example by working hard.	.6773
20.	My supervisor tries to strike a balance between people needs and production needs.	.6728
27.	Most of the time my supervisor will not back me up.	.5318
30.	My immediate supervisor usually tells me what's going on at higher levels of management.	.5440
36.	My supervisor handles the technical side of his/her job well-for example, general expertness, knowledge of job, technical skills needed in his/her profession or trade.	.7270
47.	My supervisor has poor leadership qualities.	.8372
53.	My supervisor is not effective in handling personnel problems.	.7713
56.	My supervisor is well qualified for his/her job.	.7788
61.	My supervisor is not a capable individual.	.8056

PEER GROUP RELATIONS (FACTOR 3)

QUESTION		FACTOR LOADING
16.	I have confidence and trust in the persons in my work group.	.6235
22.	Persons in my work group are friendly and easy to approach.	.5857
33.	The people in my unit work together effectively as a team.	.6529

38.	The people in my work unit believe that they are doing something important for the country by working in the Air Force.	.4505
41.	Persons in my work group know what their jobs are and know how to do them well.	.6449

PROMOTION OPPORTUNITY (FACTOR 4)

QUESTION		FACTOR LOADING
19.	I have a good chance for promotion.	.7089
32.	Opportunity for promotions in my career field is fair and equitable.	.7225
46.	My present job assignment offers the opportunity for future advancement.	.5439
54.	Promotions are usually based on performance and ability.	.6676
67.	Promotion policy is fair.	.6162

JOB AUTONOMY (FACTOR 5)

QUESTION		FACTOR LOADING
23.	In general, I decide for myself how to accomplish a job.	.7082
29.	I am often given responsibility for a total project.	.4576
35.	I have a say in setting my work goals.	.5264
51.	Rarely am I given the opportunity to make decisions for myself.	.5771
59.	I generally decide the work methods and procedures for my job.	.5986

PAY SATISFACTION (FACTOR 6)

QUESTION		FACTOR LOADING
18.	I feel my career provides sufficient economic security.	.4860
27.	Most of the time my military service pay is adequate to cover the basic expenses with a little left over.	.6786
45.	My military service income provides me with an acceptable standard of living.	.8120
64.	I feel secure that I will be able to make ends meet on my military service pay.	.8150

ORGANIZATIONAL COMMUNICATION (FACTOR 7)

QUESTION		FACTOR LOADING
14.	Information is usually widely shared in my unit so that those who make the decisions will base their decisions on the best available know-how.	.4732
39.	Our work unit receives little information about what is going on in other sections or branches.	.5414
60.	Our work unit is usually aware of important events and situations.	.4846
63.	When decisions are being made in my unit, the persons who will be affected most are asked for their ideas.	.3757

APPENDIX E

RELATIVE STRENGTH OF ALTERNATE STARTING POINTS

RELATIVE STRENGTH OF ALTERNATE STARTING POINTS

Factors	Age	Tenure	Prior Enlisted	Years on Station
	R Value/Significance Level			
Job Interest	.1224/NS	.1927/.005	.1225/NS	.1054/NS
Supervisory Style	.1395/NS	.1348/NS	.1076/NS	.0562/NS
Peer Group Relations	.0640/NS	.0812/NS	.0620/NS	.0211/NS
Promotion Opportunity	.2545/.005	.2187/.001	.1828/.025	.1877/.001
Job Autonomy	.1815/.100	.1920/.01	.1134/NS	.0682/NS
Pay Satisfaction	.1070/NS	.1630/.05	.1027/NS	.0274/NS
Organizational Communication	.0839/NS	.1032/NS	.1359/NS	.0434/NS
Crosstraining Opportunity	.0978/NS	.0797/NS	.1577/NS	
Civilian Job Opportunity	.0863/NS	.0729/NS	.1282/NS	

APPENDIX F

GENERALIZED REGRESSION EQUATIONS

$$X_{13} = E_{13}$$

$$X_{12} = P_{1213(2)}X_{13_{D_2}} + P_{1213(3)}X_{13_{D_3}} + P_{1213(4)}X_{13_{D_4}} + P_{1213(5)}X_{13_{D_5}} + P_{1213(6)}X_{13_{D_6}} + P_{1213(7)}X_{13_{D_7}} + P_{1213(8)}X_{13_{D_8}} + E_{12}$$

$$X_{11} = P_{1113(2)}X_{13_{D_2}} + P_{1113(3)}X_{13_{D_3}} + P_{1113(4)}X_{13_{D_4}} + P_{1113(5)}X_{13_{D_5}} + P_{1113(6)}X_{13_{D_6}} + P_{1113(7)}X_{13_{D_7}} + P_{1113(8)}X_{13_{D_8}} + E_{11}$$

$$X_{10} = P_{1013(2)}X_{13_{D_2}} + P_{1013(3)}X_{13_{D_3}} + P_{1013(4)}X_{13_{D_4}} + P_{1013(5)}X_{13_{D_5}} + P_{1013(6)}X_{13_{D_6}} + P_{1013(7)}X_{13_{D_7}} + P_{1013(8)}X_{13_{D_8}} + E_{10}$$

$$X_{9} = P_{913(2)}X_{13_{D_2}} + P_{913(3)}X_{13_{D_3}} + P_{913(4)}X_{13_{D_4}} + P_{913(5)}X_{13_{D_5}} + P_{913(6)}X_{13_{D_6}} + P_{913(7)}X_{13_{D_7}} + P_{913(8)}X_{13_{D_8}} + E_{9}$$

$$X_8 = P_{813(2)}X_{13_{D_2}} + P_{813(3)}X_{13_{D_3}} + P_{813(4)}X_{13_{D_4}} + P_{813(5)}X_{13_{D_5}} +$$
$$P_{813(6)}X_{13_{D_6}} + P_{813(7)}X_{13_{D_7}} + P_{813(8)}X_{13_{D_8}} + E_8$$

$$X_7 = P_{713(2)}X_{13_{D_2}} + P_{713(3)}X_{13_{D_3}} + P_{713(4)}X_{13_{D_4}} + P_{713(5)}X_{13_{D_5}} +$$
$$P_{713(6)}X_{13_{D_6}} + P_{713(7)}X_{13_{D_7}} + P_{713(8)}X_{13_{D_8}} + E_7$$

$$X_6 = P_{613(2)}X_{13_{D_2}} + P_{613(3)}X_{13_{D_3}} + P_{613(4)}X_{13_{D_4}} + P_{613(5)}X_{13_{D_5}} +$$
$$P_{613(6)}X_{13_{D_6}} + P_{613(7)}X_{13_{D_7}} + P_{613(8)}X_{13_{D_8}} + E_6$$

$$X_5 = P_{56}X_6 + P_{57}X_7 + P_{58}X_8 + P_{59}X_9 +$$
$$P_{510}X_{10} + P_{511}X_{11} + P_{512}X_{12} + P_{53}X_3 + E_5$$

$$X_4 = P_{46}X_6 + P_{47}X_7 + P_{48}X_8 + P_{49}X_9 +$$
$$P_{410}X_{10} + P_{411}X_{11} + P_{412}X_{12} + E_4$$

$$X_3 = P_{36}X_6 + P_{37}X_7 + P_{38}X_8 + P_{39}X_9 + P_{310}X_{10} + P_{311}X_{11} + P_{312}X_{12} + E_3$$

$$X_2 = P_{26}X_6 + P_{27}X_7 + P_{28}X_8 + P_{29}X_9 + P_{210}X_{10} + P_{211}X_{11} + P_{212}X_{12} + P_{23}X_3 + P_{25}X_5 + E_2$$

$$X_1 = P_{16}X_6 + P_{17}X_7 + P_{18}X_8 + P_{19}X_9 + P_{110}X_{10} + P_{111}X_{11} + P_{112}X_{12} + P_{13}X_3 + P_{14}X_4 + E_1$$

APPENDIX G

CALCULATED REGRESSION EQUATIONS

$$X_{12} = .08878X_{13_{D_2}} + .05045X_{13_{D_3}} + .04525X_{13_{D_4}} + .08796X_{13_{D_5}} + .08552X_{13_{D_6}} + .04133X_{13_{D_7}} + .04179X_{13_{D_8}}$$

$$X_{11} = .01818X_{13_{D_2}} + .12294X_{13_{D_3}} + .09073X_{13_{D_4}} - .04594X_{13_{D_5}} + .01985X_{13_{D_6}} + .03334X_{13_{D_7}} - .01594X_{13_{D_8}}$$

$$X_{10} = .08876X_{13_{D_2}} + .13966X_{13_{D_3}} + .14215X_{13_{D_4}} + .14693X_{13_{D_5}} + .24086X_{13_{D_6}} + .16783X_{13_{D_7}} + .13037X_{13_{D_8}}$$

$$X_9 = -.08194X_{13_{D_2}} - .12323X_{13_{D_3}} - .06715X_{13_{D_4}} - .10724X_{13_{D_5}} - .19393X_{13_{D_6}} - .17646X_{13_{D_7}} - .25941X_{13_{D_8}}$$

$$X_8 = -.01037X_{13_{D_2}} + .05621X_{13_{D_3}} + .04863X_{13_{D_4}} + .03868X_{13_{D_5}} + .07245X_{13_{D_6}} + .04365X_{13_{D_7}} + .04226X_{13_{D_8}}$$

$$X_7 = -.04918X_{13_{D_2}} - .12013X_{13_{D_3}} - .05295X_{13_{D_4}} - 02963X_{13_{D_5}} + .02898X_{13_{D_6}} + .00126X_{13_{D_7}} - .07209X_{13_{D_8}}$$

$$X_6 = .11922X_{13_{D_2}} - .04477X_{13_{D_3}} + .07400X_{13_{D_4}} + .13270X_{13_{D_5}} + .15362X_{13_{D_6}} + .17602X_{13_{D_7}} + .10004X_{13_{D_8}}$$

$$X_5 = .09005X_6 + .07806X_7 + .01897X_8 + .21828X_9 - .01918X_{10} + .13928X_{11} - .02188X_{12} + .17361X_3$$

$$X_2 = .08430X_6 + .06648X_7 + .08589X_8 + .02723X_9 + .02984X_{10} + .05592X_{11} - .06830X_{12} + .35745X_3 + .04162X_5$$

$$X_3 = .63267X_6 + .13227X_7 + .29194X_8 + .17860X_9 + .19935X_{10} + .04315X_{11} + .04996X_{12}$$

$$X_4 = .05618X_6 - .04140X_7 + .07010X_8 - .02569X_9 + .05752X_{10} - .14950X_{11} - .07521X_{12}$$

$$X_1 = .13301X_6 + .05991X_7 + .18288X_8 + .12463X_9 + .04506X_{10} - .00147X_{11} - .03101X_{12} + .18625X_3 - .13332X_4$$

APPENDIX H

DECOMPOSITION TABLE

Bivariate Relationship	Total Covariation (A)	Causal			Latent Noncausal (E) A-D	Effect Coefficients (E-B)
		Direct (B)	Indirect (C)	Total (D) (B&C)		
$X_6X_{13}{}_{D_2}$	.11922	.11922	None	.11922	None	
$X_6X_{13}{}_{D_3}$	.04477	-.04477	None	-.04477	None	
$X_6X_{13}{}_{D_4}$	.07400	.07400	None	.07400	None	
$X_6X_{13}{}_{D_5}$	.13270	.13270	None	.13270	None	
$X_6X_{13}{}_{D_6}$	.15362	.15362	None	.15362	None	
$X_6X_{13}{}_{D_7}$	.17602	.17602	None	.17602	None	
$X_6X_{13}{}_{D_8}$	.10004	.10004	None	.10004	None	Total .70497
$X_7X_{13}{}_{D_2}$	.04918	-.04918	None	-.04918	None	
$X_7X_{13}{}_{D_3}$	.12013	.12013	None	.12013	None	

Bivariate Relationship	Total Covariation (A)	Causal			Latent Noncausal (E) A-D	Effect Coefficients (E-B)
		Direct (B)	Indirect (C)	Total (D) (B&C)		
$X_7X_{13}{}_{D_4}$	.05295	-.05295	None	-.05295	None	
$X_7X_{13}{}_{D_5}$	.02963	-.02963	None	-.02963	None	
$X_7X_{13}{}_{D_6}$	.02898	.02898	None	.02898	None	
$X_7X_{13}{}_{D_7}$	.00126	.00126	None	.00126	None	
$X_7X_{13}{}_{D_8}$	.07209	-.07209	None	-.07209	None	Total -.05348
$X_8X_{13}{}_{D_2}$	.01037	-.01037	None	-.01037	None	
$X_8X_{13}{}_{D_3}$	.05621	.05621	None	.05621	None	
$X_8X_{13}{}_{D_4}$	.04863	.04863	None	.04863	None	
$X_8X_{13}{}_{D_5}$	.03868	.03868	None	.03868	None	
$X_8X_{13}{}_{D_6}$	.07245	.07245	None	.07245	None	

Bivariate Relationship	Total Covariation (A)	Causal			Latent Noncausal (E) A-D	Effect Coefficients (E-B)
		Direct (B)	Indirect (C)	Total (D) (B&C)		
$X_8X_{13}{}_{D_7}$	.04365	.04365	None	.04365	None	
$X_8X_{13}{}_{D_8}$	.04226	.04226	None	.04226	None	Total .29151
$X_9X_{13}{}_{D_2}$	.08194	-.08194	None	-.08194	None	
$X_9X_{13}{}_{D_3}$	.12323	-.12323	None	-.12323	None	
$X_9X_{13}{}_{D_4}$	.06715	-.06715	None	-.06715	None	
$X_9X_{13}{}_{D_5}$	.10724	-.10724	None	-.10724	None	
$X_9X_{13}{}_{D_6}$	.19393	-.19393	None	-.19393	None	
$X_9X_{13}{}_{D_7}$	.17646	.17646	None	-.17646	None	
$X_9X_{13}{}_{D_8}$	.25941	-.25941	None	-.25941	None	Total -1.00936
$X_{10}X_{13}{}_{D_2}$	.08876	.08876	None	.08876	None	

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A MODEL OF AIRCRAFT MAINTENANCE OFFICER TURNOVER.(U)
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Bivariate Relationship	Total Covariation (A)	Causal			Latent Noncausal (E) A-D	Effect Coefficients (E-B)
		Direct (B)	Indirect (C)	Total (D) (B&C)		
$X_{10}X_{13_{D_3}}$	.13966	.13966	None	.13966	None	
$X_{10}X_{13_{D_4}}$	.14215	.14215	None	.14215	None	
$X_{10}X_{13_{D_5}}$	.14693	.14693	None	.14392	None	
$X_{10}X_{13_{D_6}}$	.24086	.24086	None	.24086	None	
$X_{10}X_{13_{D_7}}$	.16783	.16783	None	.16783	None	
$X_{10}X_{13_{D_8}}$	.13037	.13037	None	.13037	None	Total 1.05656
$X_{11}X_{13_{D_2}}$	.01818	.01818	None	.01818	None	
$X_{11}X_{13_{D_3}}$	.12294	.12294	None	.12294	None	
$X_{11}X_{13_{D_4}}$	.09073	.09073	None	.09073	None	
$X_{11}X_{13_{D_5}}$	.04594	-.04594	None	-.04594	None	

Bivariate Relationship	Total Covariation (A)	Causal			Latent Noncausal (E) A-D	Effect Coefficients (E-B)
		Direct (B)	Indirect (C)	Total (D) (B&C)		
$X_{11}X_{13_{D_6}}$	.01985	.01985	None	.01985	None	
$X_{11}X_{13_{D_7}}$	.03334	.03334	None	.03334	None	
$X_{11}X_{13_{D_8}}$	.01594	-.01594	None	-.01594	None	Total .22316
$X_{12}X_{13_{D_2}}$	.08878	.08878	None	.08878	None	
$X_{12}X_{13_{D_3}}$	.05045	.05045	None	.05045	None	
$X_{12}X_{13_{D_4}}$	.04525	.04525	None	.04525	None	
$X_{12}X_{13_{D_5}}$	.08796	.08796	None	.08796	None	
$X_{12}X_{13_{D_6}}$	.08552	.08552	None	.08552	None	
$X_{12}X_{13_{D_7}}$	.04133	.04133	None	.04133	None	
$X_{12}X_{13_{D_8}}$	.04179	.04179	None	.04179	None	Total .44108

Bivariate Relationship	Total Covariation (A)	Causal			Latent Noncausal (E) A-D	Effect Coefficients (E-B)
		Direct (B)	Indirect (C)	Total (D) (B&C)		
X_3X_6	1.38741	.63276	None	.63276	.75465	.63276
X_3X_7	1.12317	.13227	None	.13227	.99090	.13227
X_3X_8	1.23763	.29194	None	.29194	.94569	.29194
X_3X_9	1.16145	.17860	None	.17860	.98285	.17860
X_3X_{10}	1.17832	.19935	None	.19935	.97897	.19935
X_3X_{11}	1.04221	.04315	None	.04315	.99906	.04315
X_3X_{12}	1.04875	.04996	None	.04996	.99879	.04996
X_5X_3	1.128309	.17361	None	.17361	.954699	.17361
X_5X_6	1.1977154	.09005	.1098378	.1998878	.9978276	.1998878
X_5X_7	1.0987308	.07806	.0229634	.1010234	.9977074	.1010234
X_5X_8	1.0695087	.01897	.0506837	.0696537	.999855	.0696537
X_5X_9	1.227346	.21828	.0310067	.2492867	.9780593	.2492867
X_5X_{10}	1.0536042	-.01918	.0346092	.0154292	.999815	.0154292
X_5X_{11}	1.1375185	.13928	.00074913	.1467713	.9907472	.1467713
X_5X_{12}	1.0302836	-.02188	.0086736	-.0132064	.99973	-.0132064

Bivariate Relationship	Total Covariation (A)	Causal			Latent Noncausal (E) A-D	Effect Coefficients (E-B)
		Direct (B)	Indirect (C)	Total (D) (B&C)		
X_4X_6	1.0356237	.05618	None	.05618	.9794437	.05618
X_4X_7	1.0361412	-.04140	None	-.04140	.9947412	-.04140
X_4X_8	1.067647	.07010	None	.07010	.997547	.07010
X_4X_9	.9892252	-.02569	None	-.02569	.9635352	-.02569
X_4X_{10}	1.057425	.05752	None	.05752	.999905	.05752
X_4X_{11}	1.149405	-.14950	None	-.14950	.989227	-.14950
X_4X_{12}	1.075125	-.07521	None	-.07521	.999915	-.07521
X_2X_3	1.2458566	.35745	.0072256	.3646756	.881181	.35745
X_2X_5	1.0406545	.04162	None	.04162	.9990345	.04162
X_2X_6	1.3174264	.08430	.2344673	.3187673	.9986591	.3141958
X_2X_7	1.1162681	.06648	.0514845	.1179645	.9983036	.1170088
X_2X_8	1.1913664	.08589	.107253	.193143	.9982234	.1910335
X_2X_9	1.1011258	.02723	.0742159	.1014459	.9996799	.1014459
X_2X_{10}	1.1029853	.02984	.0704594	.1002994	.999649	.1002994
X_2X_{11}	1.0757311	.05592	.0215326	.0774526	.9982785	.0774526

Bivariate Relationship	Total Covariation (A)	Causal			Latent Noncausal (E) A-D	Effect Coefficients (E-B)
		Direct (B)	Indirect (C)	Total (D) (B&C)		
X_2X_{12}	1.0853405	-.06830	.0169476	-.0513524	.9977425	-.0513524
X_1X_3	1.1112851	.18625	None	.18625	.9250351	.18625
X_1X_4	1.1255246	-.13332	None	-.13332	.9922046	-.13332
X_1X_6	1.2551697	.13301	.1103449	.2583347	.996835	.2433549
X_1X_7	1.0885486	.05991	.0301547	.0900647	-.9984839	.0900647
X_1X_8	1.2381791	.18288	.0450281	.2279081	.9915795	.2279081
X_1X_9	1.156186	.12463	.0366892	.1613192	.9948668	.1613192
X_1X_{10}	1.0890772	.14506	.0447975	.0294604	.9992197	.0898575
X_1X_{11}	1.027027	-.00133	.026638	.025388	.9992647	.025308
X_1X_{12}	1.0499369	-.03107	.0193321	-.0117379	.9995349	-.0117379

APPENDIX I

NONCAUSAL RESIDUALS

Latent Variable		Percent Variation Unexplained $1 - R^2$
E_1	Air Force Turnover	.8952
E_2	Crosstraining Turnover	.8693
E_3	Job Satisfaction	.6049
E_4	Civilian Job Opportunity	.9791
E_5	Crosstraining Opportunity	.9162
E_6	Job Interest	.9781
E_7	Supervisory Style	.9907
E_8	Peer Group Relations	.9968
E_9	Promotion Opportunity	.9782
E_{10}	Job Autonomy	.9832
E_{11}	Pay Satisfaction	.9878
E_{12}	Organizational Communication	.9969
E_{13}	Tenure	1.0000

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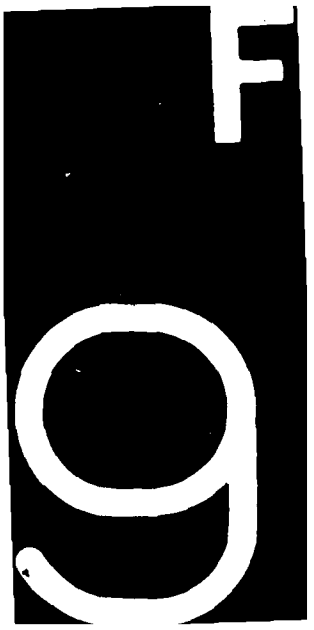
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