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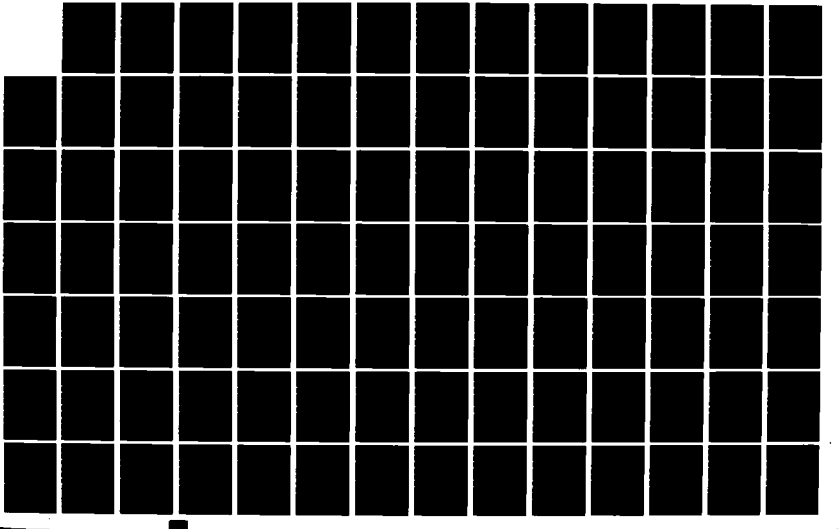

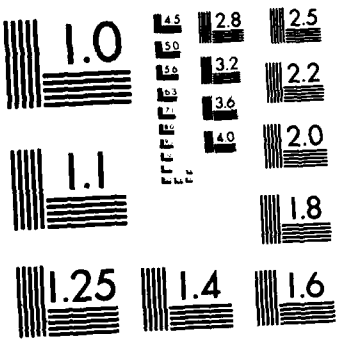

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A MODEL FOR DETERMINING THE COST OF GIVING OR WITHHOLDING A DESIRED ASSIGNMENT FROM A RATED OFFICER WITH SIX TO ELEVEN YEARS SERVICE

Captain Michael J. Snedeker, USAF

LSSR 6-83

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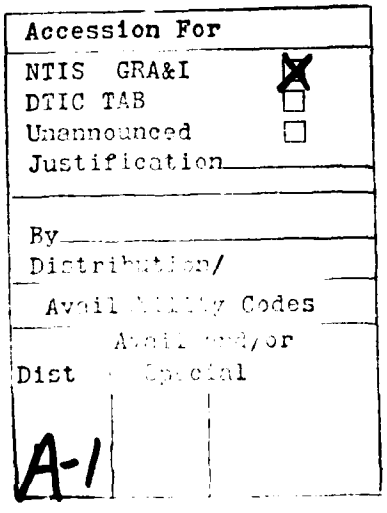

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LYNN E. WOLAVER
Dean for Research and Professional Development
Air Force Institute of Technology (ATC)
Wright-Patterson AFB OH 45433

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In the recent past, retention of rated officers in the six-to-eleven year group posed a serious problem for Air Force personnel managers. This study developed a model to determine the cost-effectiveness of giving a desired assignment to an officer who has indicated intent to leave the service unless the assignment is given. The model establishes a method of valuing flying experience, career potential, and training and education. It computes an amount representative of the loss or benefit to the Air Force with the loss or retention of a rated officer. Valuation is based on flying time and years experience in conjunction with multiplier values established in a survey answered by 250 Air Force flying unit commanders. The model made valid decisions in nine of 11 instances. Incorporation of the model in appropriate software in an integrated personnel data base would enable personnel managers to evaluate in seconds the cost of giving or withholding an assignment. Implementation would require no additional funds or approval from agencies outside the Air Force chain of command.

LSSR 6-83

A MODEL FOR DETERMINING THE COST OF GIVING OR WITHHOLDING A DESIRED ASSIGNMENT FROM A RATED OFFICER WITH SIX TO ELEVEN YEARS SERVICE

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 Systems Management

By

Michael J. Snedeker, BS
Captain, USAF

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This thesis, written by

Captain Michael J. Snedeker

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

MASTER OF SCIENCE IN SYSTEMS MANAGEMENT

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CHAPTER I

INTRODUCTION

In the late 1970s, the Department of Defense (DOD) faced a critical shortage of rated officers (pilots, navigators, and electonic warfare officers) in both the Air Force and Navy. The civilian sector, especially the airlines, provided some of the pilots leaving the service jobs that paid as much or more than their pay grade after as little as a year on the job. Years of pay caps, and a generally perceived lessening in the status of military personnel contributed to the decisions of many officers with six-to-eleven years of service to depart the service and seek employment in the civilian economy.

Public laws strictly limit the armed services in the amount and timing of incentive payments they may make to service members. While the leadership of the Air Force may lobby through official channels to a limited extent for pay increases for service members, or for special subgroups (such as in the case of the recent increase in military aviation career incentive pay), it is currently not possible to offer the individual rated officer in the Air Force a financial incentive to remain in service should he or she decide to resign after fulfilling current commitments.

During the last year of the Carter Administration, the Navy used authority granted it by Congress and DOD to pay "bonuses" to individual aviators who made specific commitments to remain in their career fields for a given period and thereby averted a more severe shortage. Precedent for this action lay in the payment of bonuses to nuclear submarine officers to remain in their jobs. The Air Force preferred not to pay continuation bonuses, declined the authority and partial funding received for bonus payments, and opted instead for an increase in Aviation Career Incentive Pay. (Aviators Bonus, 1981, p. 4)

Given that individual officers retain the right to resign from service at the expiration of their service obligation, and that those from critical specialties have done so in large numbers at several points in the past, one of the remaining tools the Air Force possesses to combat this loss of experienced personnel is its assignment system. The duty and location to which an officer is assigned will exert considerable influence. It will, to a large extent, determine what amounts of money will be spent, a significant portion of the lifestyle the officer will enjoy, advanced educational opportunities concurrent with the assignment, and possibly the potential for more desirable follow-on assignments and subsequent promotions as well.

In selecting officers to fill assignments,

Headquarters, Air Force Military Personnel Center (AFMPC) bears a weighty responsibility for trying to meet the "needs of the Air Force" for officers in all Air Force Specialty Codes (AFSCs) while attempting to satisfy the desires of as many individuals as practical. Tradeoffs between conflicting desires and assignment availabilities must be made daily. While difficult enough to accomplish using the Officer Career Objective Statement (Air Force Form 90), there are often cases when an officer decides that, unless given a particular assignment, he or she will resign at the end of the current service obligation. Faced with this mentality, AFMPC is often forced to offer an assignment which the officer has already decided to decline and thus separate from service.

As a result, the officer takes away unique experience and expertise, as well as the value of training and education conducted at Air Force expense, out of the available pool of Air Force human resources. The costs incurred by the Air Force to train and educate the departing officer up to that point may have been substantial, depending upon the type and the amount received. Training for rated officers in particular often amounts to hundreds of thousands of dollars invested by the Air Force.

Whether it is appropriate to consider past Air Force investments in individual training a "sunk cost" is a question crucial to determining the cost of giving an

officer the assignment he or she desires.

> Sunk costs result from past decisions over which management no longer has control and they are irrelevant for making decisions about the future. For example, the cost of mineral rights purchased in 1905 is not relevant in deciding whether to mine, sell the rights, or hold the rights. What is important is how much cash could be gained in the future from operations, from sale, or appreciation (Morse, 1981, p. 35).

Some method of reliably estimating the potential loss to the Air Force from an individual's departure would perhaps make assignment determination easier and more equitable.

Equally as important must be the effect of the AFMPC decision on the attitude of the officer. Depending on the age, maturity, years of service, and family situation of the officer, he or she may be more likely to stay having been given the assignment desired. If the officer elects to remain in service as a result of receiving the desired assignment, some method of estimating the potential value to the Air Force of the continued availability of a pilot, navigator, or other rated officer, might well add to the true definition of the value of giving out that assignment.

In making the initial assignment following completion of Undergraduate Flying Training, AFMPC does not have quite as difficult a time making individual assignments as with follow-on assignments. Individuals fortunate enough to be selected for and complete pilot or other rated training are knowingly committed to a predetermined length of service as a prerequisite to their being accepted for such training.

Although preferences are made known to AFMPC, the newly rated officers must go where they are sent.

In follow-on assignments, however, an officer may exercise the right to resign at the end of an obligation period. If the assignment he or she desires at that time is available, and if the officer has qualities and a service record AFMPC determines as advantageous to retain, the decision to grant or withhold an assignment may rest on their assessment of the officer's intent to remain in service. A certain amount of "investing" takes place in follow-on assignments. If an officer is given an assignment which requires additional training and a permanent change of station (PCS) move, he or she incurs a commitment which may be less than the term of the assignment. If the assignment is in a location where the officer can readily take his or her skills to a civilian firm which requires them and the officer then resigns at the end of the current obligation, the Air Force has lost twice. The officer's experience has been lost and another officer has to be found to fill that now-vacant position. The Air Force's (and consequently the taxpayers') "investment" in the individual has therefore been lost.

When deciding whether to go or stay, a decision which will affect at least the next three to four years and probably the rest of the individual's life, one assumes that most rational, mature adults weigh all relevant factors

carefully before making a final decision. The individual's subjective cost analysis of the rewards and liabilities of each alternative yields a final figure which either exceeds or falls short of that needed to keep the individual in the Air Force. A knowledge of the value an individual places on a particular assignment, combined with the value of Air Force resources invested in the individual, might then be of value in determining whether or not AFMPC should give an individual his or her assignment of choice, if it is available.

The Problem

Headquarters AFMPC lacks a means of determining the cost-effectiveness of giving or withholding a desired assignment for a rated officer in the six-to-eleven year group. For purposes of this study, "desired assignment" is defined as the first choice of assignment specified by the individual on the Air Force Form 90, Officer Career Objective Statement. The officer must have stated, either verbally or in writing, to HQAFMPC that he or she will leave the service if not given the desired assignment. The intent of this thesis was to develop a model to determine the cost-effectiveness of such a decision.

Justification

The Officer Retention Studies office of Headquarters

AFMPC has expressed interest in determining the value to a rated officer in the six-to-eleven year group of being given the assignment of his or her choice (Polk, Note 1). Such a model could be used to determine whether or not to give a particular individual an assignment, and in so doing, reduce the cost of training replacement personnel resulting from an otherwise higher turnover rate.

If such a model tended to help keep additional highly trained and experienced officers in service, it would certainly prove valuable in reducing training and education costs. Further, if the parameters of the model were well-known to the officer force, such knowledge might serve as motivation to complete those duty assignments, schools, and attain such proficiency levels as make them clearly more competitive for desired assignments. It might then also enhance the quality of the officer force, and make the assignment process somewhat more equitable in the eyes of the individual rated officer.

Hypotheses

The research focused on the development of two equations which, when summed, should give a figure to justify giving or withholding an assignment. If the final figure indicated an unacceptably high cost to the Air Force of withholding the assignment, the officer would be offered it, if available. The two equations are used to determine

(1) the cost of withholding the assignment, and (2) the cost of granting the assignment.

Hypothesis 1. The cost of withholding the assignment (Cw) is represented by the equation

$$Cw = TC + ExpV + CPV$$

where

TC = Training and Education Costs of the individual to the Air Force to date, in current dollars.
ExpV = Experience Value in replacement cost dollars.
CPV = Career Potential Value as a function of the probability of that individual becoming a unit commander, operations officer, or key staff officer given that someone of his or her experience and training remained in service.

It is important to point out that, unlike mineral rights, the investment made by the Air Force in educating and training an individual to fill his or her present or past jobs cannot easily be dismissed as "sunk costs". For example, if a navigator were to demand a particular assignment, would it be correct to consider Reserve Officer Training Corps (ROTC) costs paid by the Air Force to educate and commission the navigator as "sunk costs"? His or her replacement will have to have had similar pre-commissioning training, yet, if the individual stays in service there will be one less requirement to educate, train, and commission an officer.

While not always the case, it often happens that the individual asks for a job that can be done without extensive retraining, as in a change of location while remaining in

the same aircraft. If that is the case, previous training costs can hardly be dismissed as "sunk". The model therefore assumes that training and education costs are not "sunk", and that they must be included.

The model assumes that the Air Force must spend additional funds to maintain the same level of effectiveness should a productive officer leave the service. Training and education costs are largely a initial investment, whereas experience value constitutes improvements to the original product. Career potential value amounts to an expected return on the investments made.

The equation considers, in effect, the costs of securing an equivalent replacement for the officer. If these costs incurred are not "sunk costs" but rather investments to be protected, potentially significant savings may result from training fewer replacements because more rated officers decide to stay in service. By giving officers whose computed replacement dollar value warrants such consideration their choice of assignment, Air Force personnel managers may ultimately be saving additional training and education dollars. Dollar figures already exist for many of the Air Force's training and education programs (Rindy, Note 2). This study has developed methods to determine values for the other variables.

Hypothesis 2. The costs of granting an assignment (Cg) are represented by the equation

$$Cg = TCa1 + TCa2 - IA2$$

where

TC = Training and Education Costs associated with assignments a1 and a2.
a1 = Current assignment or "undesirable alternative" currently rejected by the officer.
a2 = Assignment desired.
IA2 = Value of desired assignment to the individual.

The above equation assumes that there is a cost to be paid by the Air Force to train a replacement for the officer in his or her previous job, unless that job is being phased out.

The value an individual places on the assignment desired is a function of what the Air Force would have to give the individual to take a less desirable job assignment rather than the assignment he or she wants. That amount would include those additional moving costs uncompensated by the Air Force (new drapes, carpets, losses on sales of residence, etc.) plus financial incentives for retention.

Research Methods

First, each variable was developed based on information found in a review of the relevant literature. Second, some probabilities had to be established for use with career potential value. For example, which professional military education courses, assignments, and qualifications in given aircraft give what probabilities of assignments as unit commanders, operations officers, or key staff officers?

Scope

The research focused on rated officers in the six-to-eleven year group since retention past that point is less of a problem; a probable result of individual vested interests in the military officer retirement system (Schuman, Note 3). While it touched on behavioral aspects of the decision to remain or separate, the sheer volume of behavioral research relevant to retention made it a practical necessity to limit this research primarily to actual determination of costs involved.

Limitations

Human behavior has not been studied to the point that actions can be precisely predicted and quantified in all cases. Therefore, probabilities assigned to individuals on the basis of courses and assignments completed only represent estimates of predicted behavior. Given the differences of opinion among individuals in attaching importance and value to indicators of experience (flying hours, crew position, etc.), there was disagreement over the indicators selected here. Yet, a measure which demonstrates some predictive value is preferable to guesswork.

It should be possible to establish some measure of an individual's replacement value to the Air Force, and compare that value to the cost of that which the individual is

asking in return. A similar study by Hiller found that "location of choice appears to be equally effective as [sic.] a bonus amounting to roughly one-third of annual pay", (1982, p. 37).

If the model tended to help keep additional highly trained and experienced officers in service, it would certainly prove valuable in reducing education and training costs. Further, if the parameters of the model were well-known to the officer force, such knowledge might serve as motivation to complete those duty assignments, schools, and attain such proficiency levels as make them clearly more competitive for desired assignments.

> Work with insurance agents (Weitz, 1956) and entering cadets at the United States Military Academy (Macedonia, 1969) has demonstrated that applicants, who received realistic information about the organization they were considering, more frequently decided to join the organzation and less frequently resigned voluntarily. Katzell (1968) also found realistic expectations about the situation reduced turnover among nursing students (Ilgen & Seely, 1974, p. 452).

It might then also enhance the quality of the officer force, and make the assignment process somewhat more equitable in the eyes of the individual rated officer.

Literature Review

This review synthesizes a portion of the research conducted to date which is both relevant to the proposed cost-analysis model and suggestive of variables for inclusion in it. While studies of rated officer retention

are not uncommon, little research directly addresses determination of costs and values involved. This review examines both the logical basis for the composition of the model, and support for the variables it incorporates.

Gulick and Laakman (1980) addressed the issue of the cost of replacing a pilot. They defined that cost as a combination of four subcosts. "A represents the cost to send an officer through UPT (Undergraduate Pilot Training)" (p. 56). The letter "A" was chosen to represent acquisition costs. "D represents the summation of all permanent change of station (PCS) costs and training costs associated with qualifying a pilot resource in one of the various weapons systems" (pp. 58-9), so "D" represents distribution costs. "C" refers to conservation costs which include both proficiency training and pay, benefits, policies, and other factors needed to keep a pilot in service (pp. 60-61). "'E' represents the resources lost if a pilot elects to leave the Air Force" (p. 59). Gulick and Laakman's sum cost of replacing a pilot was then A+D+C+E. In particular, they felt that the lost resource variable "E"

> could be simply a cumulative total of training costs spent on an individual, multiplied by a factor for combat tours, professional military education, education, or other considerations important to the Air Force (p. 59).

In addition, they felt that the cost of educating a potential pilot prior to commissioning might also be included in "A" (p. 55). In their research, they concluded

that the most statistically significant factor in explaining pilot turnover was assignment policy, and

> that between 23 and 47 percent of the sample of the 94 pilots who left the service would have stayed in had they been able to receive the assignment of their choice (p. 71).

It should be noted here that the survey used by Gulick and Laakman permitted responses of "yes, definitely" and "yes, probably" in answer to the question of whether being given their choice of assignment would have kept them in service (p. 83).

In a related effort, Bonnell and Hendrick (1981, pp. 50-51) found that, in their sample of 410 pilots and 130 navigators, the one factor found to be either a moderate or major contributor to the decision to leave the Air Force was assignment policy. They felt that Gulick and Laakman's (1980, p. 66) recommendation of a one-time career choice at about the six-year point of either a particular weapons system group or geographical area had some merit as a possible method to reduce voluntary separations. The same study called for "a serious study to include an analysis of the costs associated with such a program" (p. 65).

An earlier study by Millard (1979) on U.S. Navy and Marine Corps rated officers found that "Active duty company grade respondents and all separated respondents are most concerned and least satisfied with personnel management, especially policies regarding duty assignment" (p. iii). A

survey by Gregory (1982) showed personnel policies to be the leading complaint among current active duty pilots in the Air Force as well.

Given then the dissatisfaction with rated officer assignment policy and the evidence to indicate that assignment of choice might have caused a substantial number of officers who left to remain in service, it seems reasonable to conclude that the services should consider the value of choice in assigning rated officers. If Gulick and Laakman's finding were typical of all rated officers leaving the Air Force, it might well be less costly to agree to some desired assignments for that group and save the cost of training brand new replacements to their level of skill.

This poses a question central to the point of the research. If the decision to grant or withhold an assignment is to be based even partially on a cost analysis, which assignment factors and which individual factors of the ones hypothesized must be considered relevant?

Assignment Cost Factors

Training

When an individual becomes a rated officer, he or she does so only after having completed an extensive and intensive training program. The cost of training an individual is recognized as a major part of the investment the Air Force makes in every member, rated or otherwise

(Atchinson & Lefferts, 1972, p. 55; Gulick & Laakman, 1981, p. 55). Getting to the initially qualified level as a rated officer requires roughly one year, depending upon the rating. The fiscal year 1982 cost of putting one individual through pilot training was $321,778. Initial navigator training cost $79,004 and electronic warfare officer (EWO) training $31,150 (Anonymous, HQATC/ACMC, Note 4). To become an EWO, one must first complete navigator training.

Once individuals qualify for one of the above ratings, they begin a follow-on process of additional training in one of the major air commands. Either they hone skills for instructor duty in the trainer aircraft just mastered, or they qualify in different aircraft required by each command's unique mission. As an individual increases in experience and skill, various levels of proficiency lead to instructor and evaluator duties in their respective specialties.

While training may be a part of the investment the Air Force has in an individual, does AFMPC consider it a relevant variable for assignment decisions? Currently the Air Force manages its rated officers by "weapons system identity" (Gulick & Laakman, 1981, p. 59). A fighter pilot can expect to spend the major portion of his flying career flying different types of fighter aircraft. Were training not a relevant cost, there might be less emphasis on minimizing training costs through identification of officers

with given types of aircraft. Training then seems an obvious factor for inclusion in the cost/value of an individual to the Air Force.

Education

Education is generally not addressed by itself, but rather as a subset of and adjunct to training. Gulick & Laakman (1981, p. 55) allow for the possibility of precommissioning education costs of officers taught at Air Force expense being included as part of acquisition costs for a pilot. Officer assignment regulations specify the required educational level and degree desired or required for each AFSC as well.

Can education be considered a relevant cost factor by AFMPC in deciding on whether or not an individual is given a particular assignment? Since certain specific assignments open to rated officers require advanced degrees, some cost consideration must be given to educational level. If the degree(s) an individual holds was(were) secured at Air Force/DOD expense, either prior to or in commissioned service, then the failure to retain an officer with the appropriate degree eligible for that assignment would constitute a dollar loss equal at least to the cost of securing the degree.

Individual Experience Value

While more difficult to quantify, the value of

individual experience has been recognized by the highest levels of Air Force leadership. General B. L. Davis, commander of the Air Training Command, expressed his feelings on experience this way:

> What concerns me most, is not the loss of a pilot capable of flying a mission, but the far greater loss of an irreplaceable cadre of experienced and potential leadership in middle-management ranks. That loss will eventually affect our senior leadership ranks. We can put someone into a trainer cockpit and have that person flying a mission in a year or two, but we can't replace 11 years of operational experience and skills in any time short of 11 years (Gulick & Laakman, 1981, p. 3).

Gulick & Laakman (1981, p. 59) believe some measure of experience is central to determining the replacement cost of a pilot. Officer assignment regulations spell out experience requirements in terms of required flying hours and levels of qualification (aircraft commander or copilot, for example). Such an experience level, or more correctly, the impending lack of it, drives the concern voiced by senior Air Force leadership about rated officer retention. Individual experience value, however defined and quantified, must be included as a factor.

Career Potential Value

Although addressed previously by General Davis, little else appears to have been written about the career potential value of rated officers who leave the service. Yet, the Air Force devotes considerable effort to the management of careers. The inch-thick AFR 36-23, Officer

Career Development regulation identifies "individual officer career development (as) essential to support the Air Force mission" (1979, p. 1-1). It further tasks the Air Force to encourage promising officers to stay for a career by

> a. Developing their qualification to meet Air Force needs.
> b. Providing the training and rotation of assignments needed to develop their capabilities.
> c. Ensuring that all officers have an opportunity to compete for those positions which satisfy their career goals.
> d. Ensuring that adequate information is available to allow each individual to plan his or her career realistically (1979, p. 1-1).

It appears that the emphasis lies not in attempting to retain the "fence-sitter" who may leave, but rather to develop and groom the more "committed careerist" who elects to remain in service, regardless of outside economic opportunity. Since it is technically not possible for the Air Force to purchase middle and higher level managers "off the shelf" to command squadrons or fill staff positions in uniform, the likelihood of fewer qualified managers being available in later years as a result of fewer experienced rated officers staying in service should therefore be addressed as a potential cost factor.

While the factors examined thus far define the system's cost and value considerations, perhaps the most essential consideration of all is that of the individual. What value does the individual place on the assignment, and is it enough to keep the individual in service?

Individual Cost Factors

The equation in chapter one refers to "Individual Assignment Value" as one variable in the cost of giving an assignment to a rated officer. The determination of that value is probably much more complex than any other cost value associated with the equations hypothesized because it must account for differing individual attitudes and circumstances. In their study for Rand Corporation on military retention rates, Gotz and McCall (1980, p. 6) determined that the "individual remains in the Air Force until the cost of leaving becomes negative." Assuming that a "cost" to the individual represents a "savings" to the Air Force in this regard, what goes into determining an assignment's value to an individual?

The literature does not address the subject very directly. Hiller (1982, p. V) found that "researchers have...given only slight attention to non-pay considerations of rotation, job assignment, family separation, and location." Mobley (1977) addressed the costs involved when an employee looks for another job by citing the person's evaluation of potential lost seniority and vested benefits, as well as the probability of being hired in a desired position (pp. 237-8). Hall and Schneider (1972) tend to agree with this approach, speculating that individuals might base their decision to stay or leave an organization more on what they will lose than gain (p. 319).

Arriving at the decision to leave or stay in service is at least a two-step process. Mobley determined (1977) that considering quitting logically follows dissatisfaction experienced on the job and that "intention to leave" may be the last step in the process prior to actually leaving a firm (p. 237). Atchinson and Lefferts (1972) found support for this line of reasoning from their examination of a survey of former Air Force officers:

> They were asked how positive and negative events affected their performance and career intentions. It was found that positive events were related to positive feelings of performance, and that negative events related to career intentions of leaving the Air Force. This was further verified by examining the actual career decisions of the individuals (p. 63).

Is satisfaction with the job the key determinate of the individual's decision to stay or leave? The literature suggests otherwise.

Satisfaction

Mobley (1977) found that several previous studies showed a 'consistent negative relationship' between turnover and job satisfaction with correlations of less than .40 (p. 237). Mobley further pointed out that

> it is recognized that other forms of withdrawal behavior less extreme than quitting (e.g. absenteeism, passive job behavior) are possible consequences of dissatisfaction (see e.g., Brayfield & Crockett, 1955, Kraut, 1975)(p. 237).

Hom, Katerberg, and Hulin (1979) found that "relationships between job satisfaction and turnover are

seldom strong" (p. 280). Farrell and Rusbult (1981) further questioned the primacy of job satisfaction in explaining turnover in that

> employee turnover has consistently been shown to be only moderately related to a variety of job satisfaction-measures (Koch & Steers, 1978; Porter, Crampon & Smith, 1976; Porter & Steers, 1973; Porter, Steers, Mowday &-Boulian, 1974). As noted in a recent review of this literature, "the satisfaction-turnover relationship, although consistent, usually acounts for less than 16 percent of the variance in turnover" (Mobley, Griffeth, Hand & Meglino, 1979)(p. 78).

It appears that satisfaction is, at best a weak predictor of turnover. With correlations of less than .40 in the cases studied, it appears that other factors may exist which may better predict the individual's decision to leave an organization. One possible predictor is intention to stay or to leave.

Intentions

Hom and Hulin's (1981) search for better predictors found that "intention to remain is more strongly related to retention than is job satisfaction (Mobley, et al., 1979)" (p. 26). Hiller's (1982) Analysis of Second-Term Reenlistment Behavior of Air Force enlisted personnel concluded that "...intentions data appear to be closely and systematically related to the actual reenlistment behavior and may be used in analyzing reenlistment factors" (p. 8).

While officers do not "enlist," they do serve commitments of time associated with a given assignment,

somewhat similar to an "enlistment." The period of time is specified and the officer is bound by a written agreement to remain in service for at least the length of the obligation, similar in some respects to reenlistment paperwork of enlisted Air Force members.

It appears that stated intention to leave is an accurate indicator of future behaviors. It therefore seems logical that AFMPC should carefully consider an officer's stated intention to leave if not given assignment of choice, before determining which assignment will be offered. But intention only signals a probable behavior. An additional factor is needed that ties the individual's attitude toward the organization with the decision to stay or leave. A person's commitment to that organization may be the key variable here.

Commitment

Kiesler and Sakumura (1966) define commitment as "the binding of the individual to behavioral acts" (p. 349). Farrell and Rusbult (1981, p. 79) built their test of commitment in turnover studies on the same definition. Welsh and LaVan state that

> Organizational commitment concentrates on the extent to which employees identify with organizational goals, value organizational membership, and intend to work hard to attain the overall organizational mission (Mowday, Steers, & Porter, 1979). It is analagous to March and Simon's (1958) decision to participate in the organization after the decision is made to stay or leave. However, it goes one step further by focusing on the strength or level of this participation... It is an

> exchange relationship which goes beyond mere passive loyalty to an organization (Mowday, et al., 1979)(pp. 1079-1080).

There is considerable support in the literature for commitment as a predictor of turnover. Farrell and Rusbult (1981) noted that organizational commitment was a better predictor than job satisfaction, and that job attachment also predicted turnover better than job satisfaction (p. 79). They further noted that

> satisfaction with a job and commitment to that association need not necessarily be strongly correlated. Since high commitment may be caused by poor alternatives or large investments as well as by high satisfaction, it is possible that a worker may be dissatisfied with his/her job but still remain highly committed to it (p. 82).

They found that overall, "Job commitment was more closely related to turnover than was job satisfaction" (p. 93).

O'Reilly and Caldwell (1981) found in a study of new employees in one firm that "...commitment was significantly related to turnover 18 months later" (p. 612). Hom, Katerberg, and Hulin (1979) found that "Organizational commitment also significantly predicted reenlistment intention and behavior with correlations of .68 ($p<.05$) with intention and .58 ($p<.05$) with the act" (p. 284). Porter, Crampon, and Smith (1976), in a study of 212 management trainees found that

> those trainees who voluntarily left the company during the initial 15-month employment period had begun to show a definite decline in commitment prior to termination. Early leavers tended to show an early decline and later leavers a later decline (p. 87).

Hom and Hulin (1981) felt that commitment's power to predict was "...not in assessing a more relevant employee attitude but in its assessing intention to withdraw from the organization" (p. 34). In the same light, Hom, Katerberg, and Hulin (1979) found that "...organizational commitment predicted reenlistment behavior more accurately than did job satisfaction" (p. 287).

Commitment does not appear to be totally independent of satisfaction, however.

> It has been speculated (Porter et al., 1974) that commitment may be a more global and stable evaluative linkage between the employee and the organization that includes job satisfaction as a component" (Porter, Crampon, & Smith, 1976, p. 88).

Farrell and Rusbult (1981) also found that "Measures of job commitment were significantly correlated with job satisfaction, reward and cost values, alternative values, and investment size" (p. 92).

In reaching a point where commitment is low enough to consider quitting, Mobley (1977) asserted that

> If the costs of quitting are high and/or expected utility of search is low, the individual may reevaluate the existing job (resulting in a change in job satisfaction), reduce thinking of quitting, and/or engage in other forms of withdrawal behavior (p. 238).

If commitment is accepted as a key factor in determination of turnover, and if expressed intentions to leave, (e.g., "If I don't get this assignment I want, I'll get out of the Air Force.") are valid predictors of

commitment, then raising commitment would appear to improve chances for retention. Would giving an individual his or her choice of assignment tend to raise their commitment to the Air Force?

Enhancing Commitment

According to Grusky (1966),

> If the person discovers that he cannot obtain the rewards he originally desired, he either leaves the organization and joins another; or if this is not feasible he accepts those rewards which he can obtain and, we suspect, at the same time feels less committed to that organization (p. 489).

Grusky (p. 489) further asserts that "obtaining the rewards sought operates to further his (the individual's) felt obligation to the organization, and his commitment is strengthened." Hrebiniak and Alutto (1972) found that "...the more abundant the perceived rewards in relation to cost, the greater the organizational commitment" (p. 556). Farrell and Rusbult (1981) also found job commitment "...to be a function of rewards, costs, investments, and alternatives" (p. 80). O'Reilly and Caldwell's (1980) study of MBA candidates determined that

> MBA students who indicated a job choice predicated on extrinsic job features (salary and location) also expressed greater satisfaction and organizational commitment than those who were not as excited about these aspects of the job" (p. 563).

Given some measure of agreement that organizational rewards increase commitment, it seems logical to conclude

that an individual might consider being given the assignment he or she asked for as a type of reward, thus raising commitment level and lowering the likelihood of quitting. But rewards are not the only factor found to contribute to commitment.

Buchanan's (1974) work on organizational commitment quotes Sheldon (1971) in that "...commitment was related to social involvement with colleagues and to such personal investments as length of organizational service, age, and hierarchical position" (p. 534). Sheldon (1971) determined that "...professional commitment did increase with experience" (p. 148) in the 102 Ph.D. scientists he studied. Hrebiniak and Alutto (1972) wrote that

> Becker (1960) suggests that the more one has at stake in an organization, or, similarly, the more one has accrued and thus could lose by leaving the employing system, the greater the personal commitment to the organization (p. 556).

Grusky (1966), too, found that "Strength of commitment was strongest in the highest seniority category and weakest in the lowest seniority category" (p. 497). And, as Farrell and Rusbult (1981) point out,

> Evidence abounds in support of the hypothesized positive relationship between commitment and investments such as time in organization, tenure, and age (Alutto, Hrebiniak & Alonso, 1973; Aranya & Jacobson, 1975; Buchanan, 1974; Hrebiniak & Alutto, 1972; Koch & Steers, 1978; Pfeffer & Lawler, 1980; Sheldon, 1971)(p. 82).

The strength of the relationship between time invested in and benefits accrued from service to the

retention of officers who are past the eleven year point may then logically be accounted for by that being the point at which most officers are promoted to major and have less than half their career left before the first opportunity for a paid retirement. Acceptance of promotion to major carries with it an additional two-year service commitment which, after being served, would leave the average officer with only six years remaining to a 50 percent of base pay retirement under current rules.

Given that the twelve year point (Schuman, 1982) is the point beyond which retention ceases to be a significant problem, it appears that whatever positive measures the Air Force can take to raise the commitment of an officer who voices intentions to leave the service before that point might well help to keep that officer in the service.

Relevant Cost Factors

From the literature reviewed, it appears that the variables identified in the earlier hypothesized equations are valid and relevant. Training appears to be a well-recognized cost associated with loss or retention of rated Air Force officers. Education seems also to be recognized as having value, but, because of its nature, it is difficult to define and therefore quantify. Career potential value appears all but ignored in the literature related to costs, but it is a subject of considerable

interest to senior Air Force leadership and should be so to all the services as a matter of both survival and common sense.

The value an individual places on an assignment is probably least well defined of all the factors hypothesized as relevant to this research. But given the literature reviewed, it seems logical that, if an individual sees the assignment that he or she desires being given as a positive reward, that might well raise the individual's commitment to the Air Force enough for them to decide to remain.

Considerable Air Force personnel-related literature identifies people as the Air Force's most important resource. Valued resources retained would therefore constitute a savings of some magnitude to the Air Force. From the literature examined, there appears to be a valid need and use for determining what value an individual places on the choice of assignment. Given the already known Air Force investments in individual rated officers, it might well prove beneficial to use a model that considered such costs when assigning a rated officer who has made known his or her intentions to Headquarters AFMPC.

CHAPTER II

MODEL DEVELOPMENT

The model proposed in chapter one used a combination of cost variables which were not yet quantified in all cases. In order to test the model, it was necessary to determine reliable values for the individual variables first. The best test of the model would then have been to track its effectiveness in reducing costs over several years by giving preferred assignments to a test group and comparing their retention percentages with a control group.

Since time did not permit such a study, the next logical alternative was to develop the model and apply it to recent cases of rated officers considering separation to see if, given the known facts of each case, an assignment would have been given under the model. If the assignment was given, did the individual then stay in service or resign? If the individual stayed in service, that would tend to support the model.

The procedure followed in this study was to first specifically define the variables, then establish reliable values, or reliable methods to determine values, and then measure the model's performance against current actual cases.

Variable Values Defined

Training and Education Costs

These costs cover all formal training and education programs paid for by the Air Force for an individual from the time he or she first comes under Air Force jurisdiction in precommissioning programs until the present. For the individual programs, the institutions conducting the training, or their major commands, were contacted to determine the most current cost figures available.

Precommissioning sources include the Air Force Reserve Officer Training Corps, Air Force Officer Training School, and the United States Air Force Academy. Undergraduate Pilot and Navigator Training are Air Training Command functions. The individual major commands were contacted for information on appropriate aircrew training and upgrade course costs for their command's respective weapons systems. Finally, Air University was contacted for costs associated with correspondence and resident professional military education courses (Squadron Officers School, Air Command and Staff College, and Air War College), as well as advanced degree programs under the Air Force Institute of Technology (AFIT).

One additional and previously unmentioned cost directly related to training and education is the permanent change of station (PCS) move costs associated with formal

courses and new assignments. The cost of previous moves at government expense fits the description of "sunk costs" in that there is nothing that can be done about them once paid. While the move positions the officer for training and/or duty, it does not by itself increase the officer's capability to perform a given task. However, the cost of a particular assignment should include the PCS costs for both the desired assignment and the alternative, if there is one, which must be filled with another officer. Since the cost of a PCS move varies with distance and shipment weight, an Air Force average cost figure of $2,789.30 per move was used. This figure was based on a total calendar year 1982 PCS cost to the Air Force of $721,000,000 on 258,488 personal property shipments (Beach, 1983, p. 1).

Experience Value

Experience value is the cost to replace a rated officer's experience as defined by measurable indicators. Since major air commands use minimum flying hour requirements for upgrading to advanced crewmember positions (e.g. instructor), total flying hours was one of two indicators tested. The other was years of rated experience. The determination of exact dollar values for experience is difficult at best. However, a system of multipliers (their development suggested in large part by Hunter & Schmidt(1983, p. 475)) used with these experience indicators, makes possible determination of such values.

The multiples represent averaged weighting factors chosen by flying unit commanders for experience of rated officers in different qualification levels (See Appendix B, page 109).

Large aircraft, such as the C-141B, C-5A, B-52, etc., require considerable amounts of fuel and maintenance to carry out their missions. Since the two are major portions of the operating costs of the Air Force, the cost of fuel consumed by an aircraft during pilot proficiency and other training flights, and the cost of maintenance for such flights must be considered part of the "investment" the Air Force has in each rated officer on the crew. Yet, can one hour of C-141B time be considered more valuable than one hour of F-16 time only because the C-141B burns considerably more fuel and requires generally more maintenance per flying hour? It would require little imagination to create valid arguments on both sides of the question.

Further complicating the issue is the navigator who becomes a pilot. The individual may have nearly 1,000 hours of flying time in a position other than the one he or she is currently filling. Although these individuals generally have service commitments which extend nearly to the end of the eleven year point due to Undergraduate Pilot Training (UPT), they may still reach that decision point before being promoted to major and confront AFMPC with a problem. Would it be logical to discount hours in one crew position because the crew member no longer performs that type of duty? It

does not seem so. Navigators and pilots are ultimately concerned with much the same information and decisions.

To balance both the actual costs of flying hours with the (more difficult to quantify) values of experience and maturity gained, a compromise measure was used. The appropriate dollar-per-flying-hour figure was established by contacting the major air commands using the aircraft manned by the pilots and navigators who were the subject of this study. These figures were then used in an equation that determines flying hour experience value based on inputs from the survey of flying unit commanders. The survey also had the commanders place a value on years of rated experience. The resultant figure sets a value for experience in the case of each rated officer considered for assignment.

The figure for the value of a flying hour's worth of experience might easily be set at the cost to fly the aircraft for one hour. That might work well for single-seat fighter aircraft such as the F-16, but what about multi-place aircraft such as the B-52? Commanders were asked to decide this question. Additionally, if the Industrial Airlift fund pays for cargo missions flown by MAC aircraft (often meaning that the Army or some agency other than the Air Force pays the cost), is it appropriate for all of the flying hours of a cargo pilot to be counted in the total? The fact that Department of Defense funds are used to pay for airlift, and that the Air Force is part of the

Department of Defense, suggest that it would be appropriate to count all cargo flying hours in the experience totals.

Years of experience may not be a valid indicator by itself. It is possible that figures based on experience may have to be further refined by constant multipliers which differ for advanced levels of qualification in different crew positions. For example, an instructor navigator's experience might be considered worth 1.5 times that of a line navigator. A commander might justify this based on the instructor's requirement to both teach procedure and perform basic navigation duties simultaneously. As a result, while flying hours multiplied by cost per hour would still be a part of the equation, the years spent as an instructor would carry 1.5 times the dollar value of the previous years.

It is possible that, while cumulative, experience value may not accrue at a constant value per year. The Aviation Career Incentive Pay scale supports this in that flight pay starts at $125.00 a month for officers with less than two years experience and goes to $400.00 a month for those with over six years flying. As such, a sliding scale of increasing experience value per additional year of flying may provide a more accurate assessment of the variable's value. The validity of this approach was judged by the unit commander survey. The commanders were asked if they felt that such a sliding scale is valid, and, if so, what it should look like. (See Appendix A, page 102).

Career Potential Value

This is the estimated value to the Air Force of an individual based on his or her flying and service record up to the point of considering separation over an assignment. Specifically, for the model proposed, it is an estimate based on the probability of achieving the rank of lieutenant colonel or higher given the completion of certain assignments, qualification levels, professional military education courses, and academic degree(s). Those probabilities were to have been developed based on AFMPC historical data on rated officers who achieved the grade of lieutenant colonel or higher. Lieutenant colonel was selected as the determining grade since the majority of incumbent Air Force flying squadron commanders, operations officers, and many key higher headquarters staff officers hold this rank. Further, making lieutenant colonel technically places the officer in consideration for even greater responsibility.

The desired joint probabilities could not be developed in time for the completion of the thesis. Instead, promotion percentages for rated officers were substituted where available. There was an understandable reluctance on the part of the promotions section at HQAFMPC to release extensive information on promotion percentages based on PME and other indicators mentioned above. The fear was that people would assume that completion of such items

would "guarantee" promotion when in fact such an approach overlooks the overriding importance of job performance in determination of selection for promotion.

The available probabilities of promotion were multiplied by the estimated cost to the Air Force of an officer in a commander, operations officer, or key staff position. As a minimum, this involves taking the salary paid a rated officer receiving flight pay from the point at which they consider separation, through a 20-year career. Promotions are assumed to be made at first primary zone opportunities, but the values of the salaries computed are adjusted downward by the less than 100% probability of promotion to the next higher grade. The expected value calculated gives an approximation of career potential value.

Individual Assignment Value

This is the sum of all considerations an individual believes important in selecting a particular assignment, expressed in dollar form. It is in effect that amount of money the Air Force would have to pay the officer (assuming that Air Force leadership philosophy and Congressional funding permitted such actions) as compensation to remain in service and take an unwanted, instead of a preferred, assignment.

Such a figure combines many or all of at least the following: losses suffered on sale of real estate, personal

property, and other goods; losses suffered in buying new and more expensive mortgages; added relocation expenses such as new carpeting/drapes/painting/furniture, etc.; expense of required second vehicle or inconvenience of having to give up one or all due to duty location; relocation of dependent relatives other than immediate family; mental anguish and family/marital strain caused by PCS moves; and potential career opportunity losses. While a complete list could probably fill several volumes, it should be possible to address some specific considerations and to attach an estimated dollar cost to them. The effort to establish that value was discontinued and individual assignment value deleted from consideration in the model. In any event, this value would probably be so small in relation to training and other costs as to not effect the model's decision. For a more detailed explanation, see Appendix C, page 120.

Methods For Determining Variable Values

Training and Education Costs

As previously discussed, training and education costs were collected from the agencies which administer the programs involved.

Experience Value

To determine a method for computing experience value, a survey of flying unit commanders was developed and distributed (see Appendix A.). The survey asked flying unit

commanders to assess the dollar value of experience gained with each year of rated service, as well as what numbers (if any) these should be multiplied by as an individual upgrades his or her qualification from basic crew position to instructor or evaluator. The proposed relationship for their evaluation is that experience value (ExpV) is represented by the sum of each year's value where

ExpV(year x) = (FH * C/Hr * QM * TM) and

FH = Flying hours that year
C/Hr = Current cost per hour to fly the aircraft
QM = Qualification level multiplier
TM = Multiplier for enhanced value of service in a given position for more than a year (improvement with experience in job)

These data were analyzed by measures of central tendency to determine estimated values for crew members by position.

The survey further asked the commanders to assess the validity of the suggested approach in this chapter to determine experience value.

Sample

The survey was originally to have been sent to 10 commanders of B-52, KC-135, C-141, C-130, F-4, and F-16 squadrons with units to be chosen at random worldwide. There were 339 squadron commanders available in the data base at the time of the survey's mailing. With the deletion of the individual assignment value survey from the study, there was time to sample all the commanders available in the

data base to make the findings somewhat more generalizable.

The rationale for this procedure was based in part on work by Schmidt, Hunter, McKenzie, & Muldrow (1979). The method proposed by these researchers for determining dollar value of job performance by computer programmers in the federal government asked supervisors for estimated values of their 15th, 50th, and 85th percentile workers, thus establishing the standard distribution (p. 619). The survey specifically asked if instructors could be considered the uppermost performers in a unit, and what percentage of the crew force they comprised. Subsequent questions tried to establish the increase in value of an instructor's contribution compared to another crew member in a lower qualification level.

Career Potential Value

The Career Potential Value (CpV) of an individual was represented by the sum of expected earnings an individual who remained in service for the balance of a twenty-year career would earn. Once the year group of the individual was established, Table 3 values (page 69) for promotion opportunity were used as promotion probabilities. Also, Table 3 values for average promotion point in a twenty-year career were used to determine average times spent in grades of captain, major, and lieutenant colonel until the expiration of the first twenty years of service. The expression for CpV thus becomes the sum of

(avg yrs left as O-3)*(annual O-3 pay)
(avg yrs O-4)*(p(promoted to O-4))*(annual O-4 pay)
+(avg yrs O-5)*(p(O-5))*(p(O-4))*(annual O-5 pay)
Career Potential Value

Survey Construction and Validity

The survey was pretested to correct or remove shortcomings. It was constructed to gradually move from non-threatening general detail and opinion questions toward more difficult subjects, such as determining specific experience values.

The survey was largely an attempt to establish the validity of the hypothesized relationships. The survey's validity rests on the following assumptions:

1. Based on their experience, flying unit commanders are best qualified to render value estimates on rated officer flying experience.
2. The steps taken to keep respondents anonymous will assure open and honest responses.

Data Analysis

Data gathered from the commander's survey were analyzed to determine estimates of experience values. The AFMPC promotion board data were used for the probability portion of the equations hypothesized. These figures were combined in the hypothesized equations and used to establish giving and withholding costs as previously defined.

Model Testing

Once cost figures had been established according to the procedures described above, the model was initially tested against recent cases of officers considering separation over an assignment. In the chapter which follows, AFMPC rated officer assignment personnel provided the applicable time, service length, and service record inputs on some of the individuals who most recently asked AFMPC for a given assignment and threatened to leave the Air Force if not given it. The results are listed there as well. (See Table 7, page 81).

Summary

Time constraints limited this study to testing the model against cases already decided. TAC, MAC, and SAC were selected since they are large enough to include the majority of Air Force rated officers while representing neither the best or worst rated officer retention rates of all the commands (Rindy, Note 2, 1983). Should reliable values prove determinable with this model, the most effective test of the model will be in use with actual assignment determination in the future. With the prospects of an economic recovery and resurgence of civilian sector aviation and management concerns hiring talented former rated officers a distinct possibility, such a model might prove its worth in reducing the cost of training replacements by keeping more trained

people in the Air Force.

Experience Value Survey

The survey of flying unit commanders (see appendix A, page 102) went to 339 officers (majors and lieutenant colonels) in the United States and overseas. Over 40 aircraft types were represented by their Air Force Specialty Codes (AFSCs). Of 339 mailed out, 250 were returned for a 73.75% response. Six of the responses were blank or incompletely identified by aircraft type, reducing the effective response rate to 71.98%.

Basic Research Questions

The first question asked what kind of aircraft the commander's unit flew. By aircraft type, the responses are listed in Table 1 (page 45). No responses were received from commanders of units flying the EF-111, E-4A, A-7, T-43, AC-130, or KC-10 aircraft. The percentages represent values based only upon names available in the data base. Some highly specialized aircraft types may have been missed. Additionally, some commanders were leaving or assuming command at the time the surveys were mailed, and some aircraft types were reassigned to another command near this time, possibly eliminating a command position.

Aircraft were grouped according to the detail with which the commanders completed this question. Several C-130 commanders put simply "C-130", even though there are both

C-130E and C-130H aircraft flying the tactical airlift mission. The F-4 was also collectively grouped, even though there D, E, and G model units flying.

Table 1: Survey Responses by Aircraft Type

Aircraft Type	Surveys Returned	Percent
UH-1F	4	100
UH-1N	10	77
CH-3E	34	100
HH-1H	4	80
HH-3E	2	50
CH/HH-53	3	100
A-10A	18	82
AT-38	2	50
F-4	14	50
F-5E	3	60
F-15	13	54
F-16	18	66
F-100 & T-33*	2	40
F-106	4	80
F-111	10	71
E-3A	2	66
Fighter, MC**	4	***
RF-4C	10	91
O-2 & OA-37****	2	100
OV-10	3	100
B-52	15	79
FB-111	2	40
KC-135	24	77
RC-135	2	50
EC-135	2	50
U-2/TR-1	3	75
SR-71	1	100
C-5A	5	100
C-9	4	100
CT-39	14	82
C-130	11	79
C-141B	12	86
HC-130	2	100
MC-130	2	66
WC-130	2	100
WC-135	1	100
T-37	4	57
T-38	4	57
NKC-135 & UV-18	2	***
Total	244	
Unusable Responses	6	
Total Returned	250	

* Grouped together for data collection only (1 of a kind)
** Multiple fighter aircraft types commanded by same individual
*** Percentages unknown
****Both aircraft types commanded by same individual

The second question represented the central focus of the survey in general terms. Specifically, did the commanders feel that the value of an individual's flying experience was some combination of both the number of hours they had in given aircraft types and the number of years rated experience they had? Of 239 who answered the question, their responses were:

Strongly agree	94	(39.33%)
Agree	131	(54.81%)
Neither agree nor disagree	4	(01.67%)
Disagree	7	(02.39%)
Strongly disagree	3	(01.26%)

With better than 94% agreement among those who answered this question (70% of the population), it is clear that this supports the use of both flying time and years of rated service in some formula for valuing flying experience. It was of interest to note that often comments were made on the value of "experience" being more than just a combination of these two variables. "Leadership", "officership", "contributions", additional non-flying duties, and other considerations were often mentioned as important subjective measures of experience value which many commanders felt could only be determined by them; ususally in ordinal scales of some kind. The fact that the question specified "flying experience" was often overlooked, or perhaps interpreted to mean the officer experience value of rated officers. However, these considerations are addressed

separately in each individual's Officer Effectiveness Reports.

The third question asked commanders if higher levels of qualification meant greater contributions to their units and the Air Force. The 241 who answered generally thought that higher qualification levels did make such contributions more valuable, as reflected by the following results:

Strongly agree	98	(40.66%)
Agree	111	(46.06%)
Neither agree nor disagree	20	(08.30%)
Disagree	12	(04.98%)
Strongly disagree	0	

Since 86.72% of those answering agree with this concept, there is strong support for experience value multipliers for lead, instructor, and evaluator qualifications when determining experience value. The multipliers are addressed later.

Question four asked the commanders to decide if the cost per hour to operate a multi-place aircraft should be divided among the number of officers on the crew to determine a value for each hour of rated experience. A B-52, for example, can have five rated officers on a normal crew. Opinions on this idea were divided. Of 235 answering, they responded as shown:

Strongly agree	6	(02.55%)
Agree	34	(14.47%)
Neither agree nor disagree	73	(31.06%)
Disagree	83	(35.32%)
Strongly disagree	39	(16.60%)

As the number of those disagreeing constituted a slight majority of those answering, and roughly one-third were undecided, they appeared to favor (slightly) not dividing flying time costs for officers in multi-place aircraft. This question generated written comments which pointed out that some missions contribute little or nothing to one crew member while they may develop and hone skills of another. The example of a local pilot proficiency training flight was used to show that a navigator might have to ride along and accomplish few duties while the pilots repeatedly practiced critical hand-flying skills. Such a division of flying time costs would unfairly favor the navigator's value and shortchange the pilots'. The reverse would be true of a long over-water mission with a single takeoff and landing.

In anticipation of a split in thinking on this question, the survey was constructed to reword and ask the question again later. Question six received 228 responses which were more evenly divided. The responses favored slightly the use of the same figure, rather than dividing it among the crew members.

Strongly agree	12	(05.26%)
Agree	75	(32.89%)
Neither agree nor disagree	60	(26.32%)
Disagree	68	(29.82%)
Strongly disagree	13	(05.70%)

If anything, the data appear to indicate a split opinion over using the same figure for each crew member with

dividing the cost among multi-place crews as one alternative.

Question five addressed the problem of aircraft which cost more to operate than others. Should some factor be included for the number of years of rated service to offset the number of flying hours. There were 228 responses.

Stongly agree	27	(11.84%)
Agree	101	(44.30%)
Neither agree nor disagree	49	(21.49%)
Disagree	36	(15.79%)
Strongly disagree	15	(06.58%)

Since such a factor would tend to favor single-seat or two-man crew aircraft over large crew aircraft, it would be appropriate to compare the responses of groups who predominantly flew one or the other type aircraft. Ninety commanders of Tactical Air Command units (primarily fighter aircraft) were compared with 53 from Military Airlift Command and 44 from Strategic Air Command (primarily multi-place aircraft). The results shown below indicate between 10 and 14 percent lesser totals of disagreements with this idea among the multi-place aircraft unit commanders than with the fighter commanders, but an overall majority in agreement with it in each case.

Responses by Percent of Command Grouping

	TAC	MAC	SAC
Strongly agree	12.22	5.66	11.36
Agree	40.00	45.28	54.55
Neither agree nor disagree	20.00	32.08	20.45

Disagree	20.00	7.55	13.64
Strongly disagree	07.78	9.43	0

When the total number of those disagreeing with adding a factor for years of rated service specifically to offset flying hours is added to the number of those undecided, it appears that such a factor would receive mixed support if used.

Question seven asked what seemed to most a somewhat obvious question. Were instructors selected for skills and abilities beyond those of their contemporaries? There were 240 responses.

Strongly agree	145	(60.42%)
Agree	85	(35.42%)
Neither agree nor disagree	1	(00.42%)
Disagree	9	(03.75%)
Strongly disagree	0	

Question ten represented a reversed wording of question seven to check the validity of the results. The question asked if basic line crew member contributions were generally not as valuable as those of the instructors. Opinion among the 242 commanders responding was expectedly divided.

Strongly agree	14	(05.79%)
Agree	108	(44.63%)
Neither agree nor disagree	39	(16.12%)
Disagree	70	(28.93%)
Strongly disagree	11	(04.55%)

The wording of the question provoked several

reminders that while instructors might be more highly qualified, it was often the basic line crew member who got th. job done. Because of this interpretation of the question by some of the commanders, I feel the results offer, at best, qualified support for experience value multipliers for instructors, and indirectly therefore, evaluators.

In side comments on the survey, it was occasionally pointed out that instructors are sometimes selected by additional criteria, including seniority. Also, some "instructor quality" crew members are blocked from upgrading by quotas and manning tables. Finally, those crew members who demonstrate superior ability often find themselves moved to higher staff positions which do not permit them the time and opportunity to maintain instructor status. Instructor selection based on superior abilities would lend support for experience value multipliers for instructors.

Question eight asked if evaluators generally possessed experience and skills superior to their instructor counterparts. The intent of this question was to build support for the idea that a hierarchy of multipliers should logically place higher values on higher qualification levels. Since an evaluator is in almost every case an instructor to begin with, it would seem that to be selected as an evaluator implied greater skill and ability. Two hundred forty-one commanders answered this question.

Strongly agree	31	(12.86%)
Agree	133	(55.19%)
Neither agree nor disagree	34	(14.11%)
Disagree	43	(17.84%)
Strongly disagree	0	

While similar in nature to the preceding question on instructors, it is interesting to observe the downward shift in opinion on evaluators. Side margin comments on several surveys conveyed the idea that evaluators were not as useful as instructors in that their functions were often limited strictly to evaluation; thus making unavailable the benefit of their experience for much of the time. Despite the downward shift, there appears to be strong support for a higher value multiplier for evaluators than instructors.

Question nine was designed to directly address the question of multipliers. Using a basic qualified crew member's experience in a given position (pilot, navigator, etc.) as worth the cost to operate the aircraft per hour, would an instructor or an evaluator in that position be worth some multiplier greater than 1.0 times that figure? There were 240 responses.

Strongly agree	31	(12.92%)
Agree	149	(62.08%)
Neither agree nor disagree	29	(12.08%)
Disagree	25	(10.42%)
Strongly disagree	6	(02.50%)

Question eleven was a straight-forward inquiry as to the percentage of each unit comprised of instructors. It

was asked primarily to assure that there was adequate opportunity in all cases for commanders to differentiate between the values of instructor and line crew member contributions. The percentages below were received from the 242 commanders answering.

Five percent instructors	9	(03.72%)
Ten percent instructors	35	(14.46%)
Fifteen percent instructors	40	(16.53%)
Twenty percent instructors	63	(26.03%)
Twentyfive percent or greater	95	(39.26%)

Since the vast majority of commanders had 10% or more of their crew force comprised of instructors, it appears that the commanders have had ample opportunity to observe and differientiate between the experience value of instuctors and line crew members.

Multiplier Values Established

Question twelve was an attempt to establish what values should be assigned to experience multipliers for several levels of qualification in different crew positions. A detailed breakdown by aircraft of the mean and modal multiplier values, plus their standard deviations, is listed in Appendix B (page 110). For brevity, presented below are the mean and modal values established for these various crew positions by command or functional grouping. Sample sizes and standard deviations for the samples are also listed. Note that commanders often would fill in some of the values while leaving others blank. In those

instances where they did not employ or train a particular crew position in their aircraft (F-5E navigator, for example), inputs on that crew position were ignored.

Table 2: Multipliers by Command or Functional Grouping

Helicopters

	Mean	Mode	Stan. Dev.	Sample Size
Basic qualified aircraft commander	1.0861	1.0	0.1326	18
Element/flight lead aircraft commander	1.2425	1.1	0.1928	20
Instructor pilot	1.4500	1 2	0.3205	23
Evaluator pilot	1.7065	1.5	0.5609	23

Fighter/Forward Air Controller/Airborne Warning & Control

	Mean	Mode	Stan. Dev.	Sample Size
Basic qualified aircraft commander	1.0086	1.0	0.0596	81
Element/flight lead aircraft commander	1.3824	1.5	0.2579	85
Instructor pilot	1.7733	2.0	0.4651	86
Evaluator pilot	1.8738	2.0	0.5657	86
Lead navigator (bi-modal)	1.2704	1.2 1.5	0.2317	27
Instructor navigator	1.6014	1.5	0.4450	36
Evaluator navigator (bi-modal)	1.7265	1.3 1.5	0.5810	34
Instructor electronic warfare officer	1.4793	1.5	0.3121	29
Evaluator electronic warfare officer	1.6185	1.5	0.4479	27

Strategic Air Command (Other than U-2/TR-1/SR-71)

	Mean	Mode	Stan. Dev.	Sample Size
Basic qualified aircraft commander	1.2000	1.0	0.3622	31
Lead qualified aircraft commander	1.3424	1.1	0.5195	33
Instructor pilot	1.5722	1.5	0.6386	36
Evaluator pilot	1.6556	1.5	0.7276	36
Lead navigator	1.2530	1.1	0.3666	33
Instructor navigator (bi-modal)	1.4271	1.2 1.5	0.4955	35
Evaluator navigator	1.5319	1.2	0.6966	36
Instructor electronic warfare officer (bi-modal)	1.4143	1.5 1.1	0.4849	14
Evaluator electronic warfare officer	1.4643	1.2	0.5032	14

U-2/TR-1/SR-71

	Mean	Mode	Stan. Dev.	Sample Size
Basic qualified aircraft commander	1.0000	1.0	0.0000	3
Instructor pilot	1.3667	-	0.1528	3
Evaluator pilot	1.4667	-	0.1528	3
Instructor electronic warfare officer	1.4	-	-	1
Evaluator electronic warfare officer	1.5	-	-	1

Military Airlift Command (Other than helicopters)

	Mean	Mode	Stan. Dev.	Sample Size
Basic qualified aircraft commander	1.2628	1.0	0.2810	47
Lead qualified aircraft commander	1.5143	1.3	0.4113	30

Instructor pilot	1.6970	1.5	0.5959	50
Evaluator pilot	1.9346	1.5	0.9064	50
Lead navigator	1.3472	1.5	0.2307	29
Instructor navigator	1.5364	1.5	0.3282	33
Evaluator navigator	1.7885	1.5	0.5607	33
Instructor electronic warfare officer	1.4000	-	0.1414	2
Evaluator electronic warfare officer	1.7500	-	0.3536	2

Air Training Command

	Mean	Mode	Stan. Dev.	Sample Size
Basic qualified aircraft commander (bi-modal)	1.0500	1.0 1.1	0.0577	4
Lead qualified aircraft commander (bi-modal)	1.4286	2.0 1.2	0.4192	7
Instructor pilot	1.5714	-	0.5024	7
Evaluator pilot	1.6571	1.5	0.6754	7

All Other Aircraft Types

	Mean	Mode	Stan. Dev.	Sample Size
Basic qualified aircraft commander	1.0000	1.0	0.0000	3
Instructor pilot	1.0670	1.1	0.0577	3
Evaluator pilot	1.1333	1.2	0.1155	3

An examination of the data revealed some interesting trends. In only four cases did commanders rate a higher level of qualification lower in its multiple value than the level below it. In all four cases the qualification level downgraded was evaluator. In one instance the commander

stated his belief that he probably rated evaluators lower than other commanders and based that rating on their underutilization for instructor duties.

In every other case, although the amount of differentiation varied from aircraft to aircraft, the higher the level of qualification, the higher the mean multiple value assigned to that level. Multiples for groupings with similar crew sizes (SAC & MAC) were less than 0.3 apart for similar crew positions and qualification levels. The majority (72.09%) of SAC and MAC commanders (other than helicopters) assigned the basic aircraft commander multiples greater than 1.0. Several wrote in their agreement with the establishment of a copilot's multiple as the basic 1.0 against which to compare the other pilots.

The rate of non-response to this question (14.75% for evaluator pilots represented the lowest figure) reflects the feelings of fair number of commanders that such ratings are subjective and not easily quantified. The numbers of responses do suggest, however, that the results might still be generalizable within their groupings. Those commanders who felt strongly that such a system could not work generally refused to fill in any values and often wrote in side comments to that effect. Given that so many of those who commanded individuals serving in those crew positions provided multiplier values, I believe it is logical to assume that such multipliers would receive some measure of

acceptance as part of the experience value equation.

Rates of Change in Experience Value

Question thirteen asked commanders to indicate if they felt the multiples ought to change as time passed and, if so, how. A total of 209 commanders answered. Forty-seven (22.49%) selected a constant annual rate of increase. Another 46 (22.01%) said that the multiples should remain constant. Three (1.44%) thought they should decrease at a constant rate. There were 77 (36.84%) who believed that the multiple should increase for a given number of years, then remain constant. Thirty-five (16.75%) believed that the multiple should increase for a given number of years, remain constant for a time, then begin to decrease. One (0.48%) selected a multiple that remained constant for a time, then began to increase. With 59.33% in agreement with an increasing multiple of one kind or another, I believe this provides at least qualified support for experience value increasing with time spent in the same position.

The period most often chosen for increasing multiples was three years (24 times) with five years a close second (21 times). The periods of constancy following increases varied from two to ten years with five years most often being selected (6 times). There was little agreement on the time for multiples to decrease. It is worth noting, however, that the survey was designed to assess the value of

rated officer flying experience in the six to eleven year group. As such, were the modal values for the above periods chosen, and if an officer held the same position in the same type aircraft for a period of eleven years (a virtual impossibility under the present system), there would be little need to compute a period of diminishing multiplier value. Were the attempt made to assess rated officer value beyond the eleven year point using this formula, such a consideration might then be relevant. However, the hypothesized equations from Chapter I would then have to be revised to allow for greater emphasis on managerial performance since greater responsbilities would tend to accompany the increased rank gained with the passage of time.

Question fourteen asked the commanders to specify the rates at which their multiples would change each year. Responses to this question are as shown.

Aircraft type	Annual Increase	Annual Decrease	Sample Size
Helicopters	12.700%	-	10 inc.
Fighter/FAC/AWACS	18.416%	18.400%	62 inc./5 dec.
SAC (Not U-2/TR-1/ SR-71)	16.160%	11.000%	31 inc./4 dec.
SAC Strat Recce	5.000%	-	1 inc.
MAC (Non-helicopter)	12.576%	14.200%	33 inc./5 dec.
ATC	9.000%	10.000%	5 inc./1 dec.
Other	10.000%	-	2 inc.

From the data presented above, it seems that few concrete statements can be made about multiplier rates of

change other than that those who supported an increasing multiplier far outnumbered those who supported a decreasing one. The values suggest an assumed higher rate of learning associated with fighter aircraft than with multi-place, multi-engine aircraft. This would be consistent with a copilot's learning the tasks of aircraft commander from observing and assisting another more experienced pilot in the cockpit while the largely single-pilot fighters require the pilot to learn the tasks of aircraft commander first hand from the first flight on.

Establishing a Formula for Experience Value

Question fifteen asked the commanders to select a formula they thought would properly reflect the value of a basic qualification level crew member in each position applicable for a year. They were offered a choice of the following:

a. His or her training cost divided by average number of years rated officers in that crew position stays in service.
b. His or her flying time in a year times the cost per hour to operate the aircraft.
c. His or her training costs, plus pay and allowances, divided by number of years served to date.
d. His or her training costs to date, plus a year's pay and allowances plus cost per flying hour multiplied by the number of hours flown this year.
e. Some other measure.

A total of 203 commanders responded.

Method	Number	Percentage
a	26	12.81
b	25	12.32
c	22	10.84

d	55	27.09
e	75	36.95

When the survey was written, it was anticipated that no one method of those suggested above would receive endorsement by even a simple majority of the commanders surveyed. Question sixteen proposed a method which employed the multipliers and the cost to operate the aircraft per hour. Implicit in the formula, but not clearly stated, was the idea that experience value multipliers would go down to basic levels again when an individual switched aircraft. Total experience value would be a cumulative figure based on operational hours after initial pilot/navigator training.

The formula proposed in question sixteen was marked or commented upon by 234 commanders. Those commanders who commented but did not select an option were assigned an "e" category selection and added to the number disagreeing with the formula. Answer "a" was also disagreement with the formula. Answer "b" identified the formula as complex but probably a good approximation. Answers "c" and "d" represented qualified support for the formula with "c" asking for a factor to reduce the final total by, and "d" for a factor to increase it by. The results were as follows:

Too complicated.	43	(18.38%)
Complex but good approximation	135	(57.69%)
Would overvalue. Reduce	20	(8.55%)
Would undervalue. Increase	4	(1.71%)
Comments disagree with formula	35	(14.89%)

With 67.95% of the commanders sampled indicating qualified or stronger agreement with the formula proposed, and considering the support received for both the concept of experience value multipliers and the use of flying hours and years rated service in determining experience value, this formula seems at least a reasonable approximation for the experience value of a given crew member. It requires, however, the incorporation of current costs for the operation of each aircraft type involved for complete computation of dollar figures.

A compilation of flying hour costs all Air Force aircraft was beyond the scope of the thesis. However, costs per flying hour for the aircraft in the case studies are listed for use later in the thesis. (See Table 4, page 71).

Comments and Survey Critique

The survey generated a variety of comments in addition to the data requested. Certain themes frequently recurred. Fighter unit commanders often mentioned a need to look at experience value in terms of sorties more than flying hours, pointing out that a fighter pilot might learn more and increase the value of his contribution accordingly in 250 hours of dissimilar air combat training than a transport pilot might learn flying routine transatlantic shuttles for 1,000 hours. Some variation of the hypothesized equations from chapter one which was based on

sorties might be better suited for fighter use. A "sortie" is considered as a takeoff, approach, and landing, and may be as short as a few minutes or as long as several hours in length.

Flying hours alone would favor the transport crew member over the fighter crew in valuation, as would a more expensive to operate aircraft over a less expensive one. Is a T-37 instructor pilot's contribution worth less per hour than that of a C-141B copilot simply because the C-141B is much more costly to operate? In an effort to deal with this question, the actual cases dealt with in chapter 3 are calculated with multi-place aircraft flying time valued with, and without, division by the number of officer crew members on a normal crew.

The survey was criticized for vague wording and insufficient identification of purpose. The sparse introduction was purposely written to minimize the time required in answering the survey. It was a tradeoff between informing and inundating. Three commanders who returned the survey refused to fill it out for reasons of length and complexity. I purposely did not specify the other components of the cost to give or withhold an assignment to help focus their attention on the value of these officer's rated experience only. Should the study be expanded by further research, the researcher should specify that the value to be computed would be a part of a greater total

which would include training, education, and other cost figures.

The difference (or lack thereof) specified between cost and value was also a source of frequent comment. It might cost X dollars to train a fighter pilot but his value might be immeasurable should he be the one to intercept an incoming bomber.

A very valid shortcoming was often identified by several commanders. Nowhere in the formula is the subject of combat time addressed. It was purposely avoided for two reasons.

First, the study is focused on rated officers with six to eleven years service. Using September 1972 as a cutoff, and adding one year for pilot or navigator training and about four months for weapons system specialty training, the cutoff for combat experience becomes roughly 1 January 1974. Following the 1973 ceasefire in Viet Nam there was little combat experience to be had, other than during the Mayaguez incident in 1975. Consequently, there is currently (and hopefully shall continue to be) little actual combat experience in this group of aviators.

Second, although I have no combat experience, I have had limited exposure to the simulated combat environment of Exercise Red Flag, as a crew member, tactics officer, and detachment operations officer. It is my belief that such experience is considerably more valuable than day-to-day

local training, but that different individuals absorb the lessons of the experience at highly varied rates depending upon the circumstances of the day's missions. This would make such multipliers as proposed herein much more difficult to support. The resultant values assigned by a survey such as this one might well be considerably more subjective than those already presented.

A specific technical failing was the lack of a basic navigator or electronic warfare officer multiple due to inadvertent oversight. It was originally intended that the blank for "basic aircraft commander" should read "basic crew position". This change would have increased the value of the survey. Additionally, greater differentiation of the subcategories in the multiplier question would have helped. There is considerable difference in skill, ability, and time spent in training between an element lead in fighters and a flight lead. This was not adequately provided for in the survey. Also, since electronic warfare officers were specifically identified, it would have been more useful to identify weapons system officers as well, rather than group the two together.

One final technical critique involves the percentages of instructors in each unit. Ranges of zero to five, five to ten, etc., would have been more helpful than the answers provided. The specific responses available made selection difficult for some in that their percentages often fell in

between values or their units were comprised entirely of instructors (Combat Crew Training Schools or Replacement Training Units).

While having provided some useful data and support for a portion of the hypothesized equations in chapter 1, the comments received in the survey often provided support for the training, education, and career potential value portions as well. Commanders who disagreed with the formula for rated experience value often pointed to its failure to account for these.

The most often seen remark about the proposed assignment of values for experience was the belief that such values were highly subjective and best assigned by the individual commander. This criticism is invalid however, since it has been shown by Schmidt, et al. (1979), that the use of these judgements in the context used by the present model is valid and reasonable. Subjective judgements of the type the commanders desire will enter into such decisions outside the limits of this model, in Officer Effectiveness Reports. This study is an attempt at providing an acceptable standard for flying experience valuation.

Career Potential Value Determination

A request was sent to HQAFMPC/MPCY for assistance in developing a table of promotion percentages for the most recent major and lieutenant colonel selection boards.

HQAFMPC/MPCY was asked to determine the most recent percentages of promotions to major and lieutenant colonel for officers who had completed one or more of the following:

Squadron Officers School
Air Command and Staff College
Instructor Crew Member Status
Evaluator Crew Member Status
Advanced Academic Degree(s)
Higher Headquarters Tour
Rated Supplement Tour

It cannot be overemphasized that completion of all of the above in no way guarantees or implies promotion to the next grade. They are simply indicators of the level of initiative generally common to promotees under the current system. The key determinant of promotion remains the Officer Effectiveness Report (OER). I considered it inappropriate to attempt to incorporate an OER index into the formula. With some individuals who have been under a quota system for the highest ratings (the now defunct controlled OER system) competing for assignments with others who have not been subject to quotas, it would be virtually impossible to develop a satisfactory scheme for such an index. The above indicators were chosen as a convenient substitute in that their completion is readily apparent to the personnel assignment officers at AFMPC when the choices are made.

Given the extraordinarily heavy workload HQAFMPC/MPCY was operating under at the time, they were unable to comply

with my request. Consequently, the next best alternative was to take the historical promotion opportunity for officers in each year group and the point (in years and months) at which they advanced to major and lieutenant colonel. Using these percentages as reasonable probabilities of an individual's promotion, and multiplying them times current annual pay and allowances for majors and lieutenant colonels, expected values in current dollars were determined for each year of service remaining. Summing these for the remainder of a 20 year career would give a rough figure for a minimum career potential value. (For examples of the model using actual case data, see chapter 3).

Table 3: Historical Promotion Rates To O-4 & O-5

Year	Lieutenant Colonel (O-5) Percentage	Lieutenant Colonel (O-5) Promotion Point	Major (O-4) Percentage	Major (O-4) Promotion Point
1982*	75	15 yrs 11 mos	90	11 yrs 9 mos
1981	75	15 yrs 9 mos	90	11 yrs 9 mos
1980	75	15 yrs 8 mos	90	11 yrs 7 mos
1979	70	16 yrs	80	11 yrs 9 mos
1978	70	16 yrs 4 mos	80	11 yrs 9 mos
1977	70	16 yrs 2 mos	80	11 yrs 5 mos
1976	70	16 yrs 3 mos	80	11 yrs 6 mos
1975	70	16 yrs 5 mos	80	11 yrs 2 mos
1974	70	16 yrs 3 mos	80	10 yrs 10 mos

*Service estimate
Percentages are the cumulative opportunity for an officer to be selected to the next highest rank.
Promotion point = total years and months of service for the "due course" officer who is promoted with his or her original year group.
Data extracted from Air Force Times, Aug 31, 1981, p. 14.

A captain on flying status (over 8 years service), with dependents, living off-base, makes $35,865.24, exclusive of Variable Housing Allowance. A major on flying status (over 12 years service), with dependents, living off-base, makes $40,620.84 per year, exclusive of Variable Housing Allowance. A lieutentant colonel on flying status (over 16 years service), with dependents, living off-base, makes $46,820.04 per year, exclusive of Variable Housing Allowance. (All figures for pay and allowances are from the Air Force Accounting and Finance Office at Wright-Patterson Air Force Base, Ohio.)

Given the above figures, in approximating the value of an officer's career potential, it would be a relatively

simple matter to take the specifics of an individual's case and compute an expected value.

The above derived figure would most likely be challenged as grossly undervaluing the potential career contributions of a rated Air Force officer. It possesses the virtue of being objectively reproducible by all who use it and the additional virtue of probably undervaluing all categories equally, therefore still presenting a representative, if not exact, picture. Since the industry standard seems to be to pay a person no more than half their actual worth to the company (Hunter & Schmidt, 1983, p. 476), such a figure might comfortably be doubled without serious objection. Determination of a universally acceptable formula for this portion of the model would be extremely difficult at best.

Training and Education Costs

The least difficult portion of the model to substantiate is that devoted to training and education costs. One need only access the Cost and Management Analysis Offices of the major air commands responsible for the training and education involved to find the answers in current dollars.

Table three provides the cost per flying hour for C-130, C-141, F-4, F-16, B-52, and KC-135 aircraft. The figures were provided by HQ MAC, HQ TAC, and HQ SAC,

respectively. They are either the actual FY82 costs, or the best approximations of them at the time as indicated. These six aircraft were the ones originally chosen for the commander's survey. Data provided for the T-37, T-38, and T-43 were necessary to evaluate the sample cases in chapter 3.

Table 4: Flying Costs Per Hour By Selected Aircraft

Aircraft	Flying Cost Per Hour		
C-130(by model)	$1,469 E	$1,521 H	
C-141B		$3,225	
F-4(by model)	$3,352 D	$3,368 E	$3,435 G
F-16		$3,135	
B-52(by model)	$6,983 D	$7,057 G	$6,159 H
KC-135		$3,911	
T-37		$ 374	
T-38		$ 876	
T-43		$1,202	

Data extracted from AFR 173-13, "USAF Cost and Planning Factors", 1 February 1983

With the above cost figures for flying hours, the remaining required figures for the model are initial and upgrade training costs and education costs. Table 5 below provides current cost estimates for applicable initial flying and upgrade courses. Table 6 provides the current costs for applicable education courses. Again, determining an individual's training and education costs becomes simply a matter of referencing the current table of costs and summing those applicable to the person being evaluated.

Table 5: Applicable Flying Training Course Costs

Air Training Command Courses

Undergraduate Pilot Training	$321,778	1.
Navigator Training		
Undergraduate Navigator Training	$79,004	1.
Follow-on Training		
NBT ASQ 38	$35,635	1.
NBT ASQ 48	$34,787**	1.
Electronic warfare officer	$31,150	1.
Primary Instructor Training		
T-37	$ 80,277	1.
T-38	$154,381	1.
Basic Aircrew Survival Training*	$3,118	1.
T-43 Pilot Training, Initial	$51,569	5.

*Part of the cost figure for Air Force Academy graduates. Do not add to their figures.
**FY81 figure. FY82 data not available.

Military Airlift Command Training Courses

C-130		
Initial Pilot Qualification	$43,400***	2.
Formation Airdrop Training	$70,500***	2.
Tactical Airlift Instructor	$62,150***	2.
Initial Navigator Qualification	$77,550***	2.
Instructor Navigator Qualification	$41,850***	2.
C-141B		
Initial Pilot Qualification	$113,300***	2.
Aircraft Commander Qualification	$69,550***	2.
Aerial Refuel Qualification	$193,600***	2.
Instructor Aircraft Commander	$51,150***	2.
Pilot Airdrop Qualification	$101,500***	2.
Navigator Initial Qualification	$25,400***	2.
Navigator Airdrop Qualification	$21,000***	2.

*** ALL MAC FIGURES ARE ESTIMATES. FY82 FIGURES NOT YET AVAILABLE.

Tactical Air Command Courses

	Fixed Cost /	Per Add. Student	
Fighter Lead-In Training Pilot	$123,847	$81,485	3.

Navigator/WSO	$ 13,464	$10,076	3.

F-4	Fixed Cost	/ Per Add. Student	
Pilot	$790,349	$598,819	3.
Instructor Pilot	$328,104	$248,635	3.
Weapons System Officer	$502,352	$380,259	3.
Instructor WSO	$163,030	$123,556	3.
F-16			
Pilot	$1,000,463	$768,588	3.
Instructor Pilot	$ 260,122	$198,715	3.
Transition Course	$ 394,408	$304,254	3.

Fighter Weapons Instructor Course

F-4	Fixed Cost	/ Per Add. Student	
Pilot	$544,742	$433,802	3.
WSO	$478,010	$371,930	3.
F-16			
Pilot	$1,076,240	$863,393	3.

(All TAC figures are minimum estimates with student pay added in)

Strategic Air Command Courses

B-52	B-52G	B-52H	
Initial B-52 Pilot Training	$232,184	$249,592	4.
Aircraft Commander Upgrade	$227,531	$247,574	4.
Instructor Pilot Training	$ 95,458	$103,672	4.
Navigator Training	$205,250	$214,043	4.
Radar Navigator Upgrade	$218,859	$236,110	4.
Instructor Navigator Upgrade	$ 73,309	$ 78,495	4.
Initial Electronic Warfare Officer Training	$228,208	$234,712	4.
Instructor Electronic Warfare Officer Training	$ 72,753	$ 78,073	4.

KC-135		
Initial Pilot Training	$156,102	4.
Aircraft Commander Upgrade	$156,819	4.
Instructor Pilot Upgrade	$ 86,441	4.
Initial Navigator Training	$146,664	4.
Instructor Navigator Training	$ 64,836	4.

1. (HQATC/ACMC, Note 4)
2. (Martin, Note 5)
3. (Hanagan, Note 6)
4. (Paserello, Note 7)
5. (Smithfield, Note 8)

Table 6: Officer Education Costs, By Course

Precommissioning Source Costs		
Officer Training School		
Male	$8,130**	1.
Female	$7,653**	1.
Reserve Officer Training Corps		
2-yr Cadet Stipend	$12,285	1.
2-yr Non-stipend	$ 8,846	1.
4-yr Cadet Stipend	$27,216	1.
4-yr Non-stipend	$15,914	1.
United States Air Force Academy		
	$150,370	2.
**FY81 figures. FY82 data not available.		
Professional Military Education Courses		
Squadron Officers School		
Residence	$11,775.79	3.
Correspondence	$ 171.00	3.
Air Command and Staff College		
Residence	$64,214.22	3.
Correspondence	$ 213.00	3.
Seminar	$ 385.00	3.
Air War College		
Correspondence	$ 2,262.00	3.
Air Force Sponsored Advanced Academic Degrees		
Air Force Institute of Technology		
On Campus Masters		
Typical Logistician	$65,970	3.
Typical Engineer	$82,921	3.
On Campus Engineering		
Ph.D.	$168,256	3.
Civilian Instution		
Masters	$51,323	3.
Ph.D. Program	$106,286	3.

1. (HQATC/ACMC, Note 4)
2. (Jacobus, Note 9)
3. (Tyner, Note 10)

With the data collected and analyzed, the model was

then tested on actual cases. The following is a summary example of the model using inputs from the first case in chapter 3.

Rated Officer Specialty: T-38 Instructor Pilot (IP)
Background: 1,850 hrs C-130 time, former C-130 IP
1,410 hrs T-38 Instructor time
SOS and ACSC completed
Desired Assignment: C-141 Aircraft Commander

Cost to Withhold (Cw) = TC + ExpV + CpV

Training Costs (TC) to date:	$664,729
Experience Value (ExpV):	$3,296,602
Career Potential Value (CpV):	$340,099
Loss to Air Force if Withheld:	$4,301,430

Cost to Give (Cg) = TCa1 + TCa2 - Ia2

Cost to train replacement (TCa1):	$2,709,944
Cost to train in new job (TCa2):	$116,089
-Individual Assignment Value (Ia2):	Unknown
Cost to Air Force For Assignment:	$2,826,033

Cw > Cg by $1,475,397. Give assignment or lose almost 1.5 million dollars in experience and ability.

CHAPTER III

MODEL TEST

Rated personnel assignment officers at HQAFMPC from the tanker and airlift assignment sections provided sixteen example cases for analysis (Layne, Note 11; German, Note 12). Of the sixteen cases provided, five were eliminated from consideration because the individuals did not yet have six years service when they quit. In addition to the eleven remaining cases, one AFIT student who had presented the same demand for an assignment was included.

The fighter assignment section decided not to provide sample case data. They felt that the model "appears to be incompatible with a decision to give an officer his choice of assignment in lieu of threatened separation from active duty"(Huddle, Note 14). In the letter received which explained their decision, the greatest shortcoming of the model was highlighted; the desired assignment simply is often unavailable to give.

> In the assignment process, the Rated Officer Review Board makes every attempt to fill valid Air Force requirements with qualified volunteers. When all sources of available volunteers are exhausted, the most eligible nonvolunteer is selected for assignment. Since the vacant requirement must be filled, the cost of losing a nonvolunteer to separation in lieu of assignment, though undoubtedly high, is not a consideration. Your model suggests that officers who threaten to quit if assigned as nonvolunteers, should only be moved as volunteers due

> to cost factors; but for some assignments there may never be any volunteers. (Huddle, Note 14)

The model can offer no help in those cases where the assignment simply cannot be had. However, the TAC argument had two faults: 1. Their focus is on the assignment and not the individual as it is in the model, and 2. They do not acknowledge that the model applies only to some officers.

Model Test Limitations

There is no way to know if the cases analyzed comprise a representative sample of the individuals who present HQAFMPC with kind of ultimatum on assignments addressed in this model. Since responses were collected from only two of several possible sources of assignment data, due to personnel turnover (and subsequent loss of "corporate memory" in such matters) or a desire not to participate, it seems likely that the cases collected do not represent a good cross section upon which to base conclusions about the model's validity.

The model was tested on the data provided which required several assumptions to be made which efect the validity of the results. Specific numbers of hours flown per year in each aircraft were not known and therefore had to be averaged. Where Professional Military Education (PME) and advanced degrees had been completed, there was no indication whether they were in-residence or correspondence

programs. There was also no indication of commissioning source. In each case, the lowest cost to the government was assumed. Where advanced degrees were possessed, they were assumed to have been acquired at the individual's expense.

The model was further limited by the lack of specific promotion probability data relative to the individual's own efforts at self-improvement (PME, advanced degrees, etc.). While specific potential values might be increased or decreased by these more accurate probabilities, the overall changes in costs to withhold assignments probably would not have been excessive. For example, increasing promotion probabilities by .1 for both major and lieutenant colonel (probably a major accomplishment in itself) would have increased Career Potential Value by $47,386.93. In no case analyzed would that have changed the model's recommendation.

When applying the data to the model, it became apparent that if the individual was to be replaced by someone minimally qualified to hold their same Air Force Specialty Code (AFSC), the model would recommend that the desired assignment be given to retain the individual's experience. Yet, assignments are not always made where the choice is simply to give the job to a newly qualified crew member with the proper AFSC.

Filling the vacancy which an individual creates upon reassignment or leaving the service usually entails taking

another individual with an experience level greater or less than the first and placing that person into the now vacant position. It was not possible to know the experience records of the individuals replacing those in the cases studied. Consequently, it was not possible to include their experience value (as would be determined by the model) in the cost of giving the assignment.

To circumvent this problem, the individual's experience in his or her most current aircraft was chosen, along with a certain number of years flying in that position, to determine the desired minimum replacement experience level to be included in the cost to give the assignment. The number of years was determined by the number needed to equal the time multipler for the experience multiple the individual possessed in his or her present position.

For example, if an individual was a KC-135 aircraft commander, a number of years as a copilot had to be completed before upgrade could occur. Those years, along with the number of years needed to match the time value multiplier for experience were included in the minimum acceptable replacement figure. It takes four years in any one position to equal the maximum time value multiplier for any position (experience value assumed to continue increasing for three years after first year of duty in a position). If the individual had not progressed beyond a

given qualification level after reaching four years in it, average annual flying time accumulated beyond that point was not counted in minimum desired replacement value determination.

The time value multiplier presented another problem in application in that its form had to become

```
((previous year's total value) *
(1 + (annual increase * percent of year served)))
```

Otherwise, had the time value multiplier been less than one, it would have unfairly undervalued time spent in a higher level of experience in the same position.

Testing the model under these limitations and assumptions yielded was accomplished using the following cases.

Table 7: Case Data

Abbreviations:
CP: Copilot AC: Aircraft Commander IP: Instructor Pilot
EP: Evaluator Pilot N: Navigator IN: Instructor Navigator
RN: Radar Navigator R.S. Ext.: Rated Supplement Extension
U: Undivided Costs D: Divided Costs

Case No.	Current Position	Desired Position	Years & Flying Hrs	AFMPC Decision	Individual Decision
1.	T-38 IP	C-141 CP	9/3050	Withhold	Remain
2.	KC-135 CP	KC-135 AC	6/1080	Withhold	Depart
3.	KC-135 IP	KC-135 IP	10/2500	Withhold	Depart
4.	KC-135 N	KC-135 N	6/1030	Withhold	Depart
5.	KC-135 AC	KC-135 IP	6/1624	Withhold	Depart
6.	KC-135 AC	KC-135 AC	6/1607	Withhold	Depart
7.	T-43 IP	C-5A AC	9/3249	Withhold	Remain
8.	KC-135 EP	KC-135 EP	10/1949	Give	Remain
9.	C-130 N	R.S. Ext.	7/1360	Withhold	Depart
10.	C-130 N	T-43 IN	7/2463	Withhold	Depart
11.	KC-135 AC	Unknown	6/1644	Give	Depart
12.	B-52 RN	AFIT	7/1865	Give	Remain

Case No.	Cost to Withhold	Cost to Give	Recommended Decision	MPC Choice/ Outcome	Model Validity
1.D	$4,301,430	$2,826,033	Give	Withhold/	
U	$6,456,571	$2,826,033		Remained	Invalid
2.D	$5,217,704	$4,144,508	Give	Withhold/	
U	$13,784,037	$11,129,029		Departed	Valid
3.D	$5,787,498	$5,448,884	Give	Withhold/	
U	$15,207,819	$14,130,482		Departed	Valid
4.D	$2,471,654	$1,537,010	Give	Withhold/	
U	$6,041,100	$4,264,580		Departed	Valid
5.D	$3,064,816	$2,323,080	Give	Withhold/	
U	$6,256,881	$5,515,145		Departed	Valid
6.D	$3,483,692	$3,035,196	Give	Withhold/	
U	$8,150,387	$7,628,232		Departed	Valid
7.D	$4,957,363	$1,924,377	Give	Withhold/	
U	$12,323,497	$3,251,853		Remained	Invalid
8.D	$4,751,021	$4,514,466	Give	Give/	
U	$12,302,388	$12,065,833		Remained	Valid
9.D	$1,549,094	$1,071,422	Give	Withhold/	
U	$3,137,942	$2,660,270		Departed	Valid
10.D	$3,028,387	$1,073,791	Give	Withhold/	
U	$6,327,865	$2,856,287		Departed	Valid
11.D	$3,045,670	Unknown	N/A	Give/	
U	$6,297,682	Unknown		Departed	Unknown
12.D	$4,534,867	$4,194,107	Give	Give/	
U	$18,770,746	$18,429,986		Remained	Valid

Case Number	Withholding Costs Minus Giving Costs By Case	
	Divided Values	Undivided Values
1.	Model Invalid	Model Invalid
2.	$1,073,196	$2,655,008
3.	$ 338,614	$1,077,337
4.	$ 934,644	$1,776,520
5.	$ 741,736	$ 741,736
6.	$ 448,496	$ 522,155
7.	Model Invalid	Model Invalid
8.	$ 236,555	$ 236,555
9.	$ 477,672	$ 477,672
10.	$1,954,596	$3,471,578
11.	Unknown Amount	Unknown Amount
12.	$ 340,760	$ 340,760
Totals	$6,546,269	$11,299,321
Averages	$ 727,363	$1,255,480

Figures above in cases 8 and 12 represent combined savings to USAF of $577,315 since assignments were given and individuals remained. The remaining cases represent losses of $5,968,954 if experience value is divided and $10,722,006 if undivided since the desired assignments were withheld and officers separated from service.

For each case, flying total flying time in each aircraft type was provided, and some cases broke out flying hours in each qualification level. Often individuals wanted the same kind of job at a new base.

Variable Value Computation

Values for Training and Education costs (TC), Experience Value (ExpV), and Career Potential Value (CpV), were established for each individual using the worksheet format shown in Figure 1. Training costs associated with an assignment the individual presently had and did not want to keep (cost to train a replacement, TCa1), and training costs to qualify the individual in their desired new position

(TCa2) were established using the worksheet format in Figure 2 (page 86). If the estimated minimum acceptable experience level for an individual's replacement differed from their own experience level, the value was calculated on the second worksheet also. The specific numbers used to evaluate Case 1, the T-38 instructor pilot, are shown in Figures 1 and 2.

Figure 1: Withholding Cost Worksheet

TRAINING & EDUCATION COSTS

Precommissioning Source Cost	$8,846.00
(Source unknown. Two year ROTC Assumed.)	
Undergraduate Flying Training (Pilot)	$321,778.00
Basic Aircrew Survival Training	$3,118.00
Initial C-130 Pilot Training	$43,400.00
Upgrade to C-130 Aircraft Commander	$70,500.00
(Tactical Airlift Qualification)	
Upgrade to C-130 Instructor Pilot	$62,150.00
Primary Instructor Training, T-38	$154,381.00
Squadron Officer School	$171.00
(Correspondence Assumed)	
Air Command & Staff College	$385.00
(Correspondence Assumed)	
TOTAL TRAINING & EDUCATION COSTS:	$664,729.00

EXPERIENCE VALUE DETERMINATION

Position	Flying Hours	Cost/ Hour	Qual. Mult.	Time Mult.	Time In	
C-130 CP	600	1,429	1	1	1 yr	$857,400.00
C-130 CP	600	1,429	1	1.2576	1 yr	$1,078,266.24
C-130 AC	450	1,429	1.2628	1	1 yr	$812,043.54
C-130 IP	200	1,429	1.6970	1	1 yr	$485,002.60
T-38 IP	352.5	876	1.5714	1	1 yr	$485,232.61
T-38 IP	352.5	876	1.5714	1.09	1 yr	$528,903.55
T-38 IP	352.5	876	1.5714	1.1881	1 yr	$576,504.86
T-38 IP	352.5	876	1.5714	1.2950	1 yr	$628,390.30

TOTAL VALUE OF CREW AIRCRAFT EXPERIENCE:	$3,232,712.38
CREW EXPERIENCE VALUE IF DIVIDED BY BASIC CREW:	$1,077,570.79
(Three rated officers on C-130)	
TOTAL VALUE OF NON-CREW AIRCRAFT EXPERIENCE:	$2,219,031.32
TOTAL VALUE OF EXPERIENCE (UNDIVIDED):	$5,451,743.70
TOTAL VALUE OF EXPERIENCE (DIVIDED):	$3,296,602.11

CAREER POTENTIAL VALUE DETERMINATION

Year Group: 1974 O-4 Promotion Pt: 10.833 yrs Prob: .8
O-5 Promotion Pt: 16.250 yrs Prob: .7

	Average Years Left	* Salary	* Probability	
O-3	1.8333	* $35,865.24	* 1.0	= $65,751.74
O-4	5.4167	* $40,620.84	* 0.8	= $176,024.72
O-5	3.7500	* $46,820.04	* 0.8 * 0.7	= $98,322.08

TOTAL CAREER POTENTIAL VALUE:	$340,098.54
TOTAL DIVIDED COST TO WITHHOLD ASSIGNMENT:	$4,301,429.65
TOTAL UNDIVIDED COST TO WITHHOLD ASSIGNMENT:	$6,456,571.24

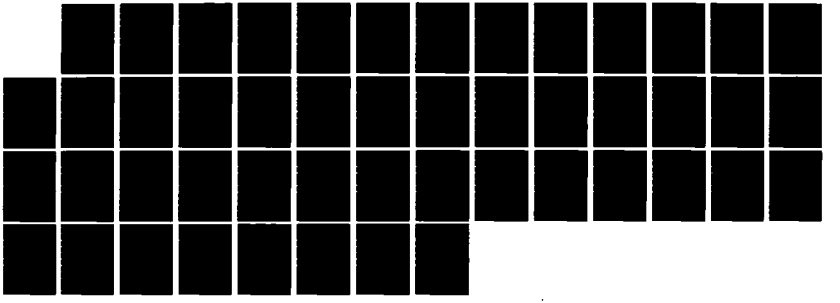
The costs for the training and education courses listed were taken from the tables in chapter 2, as were the multiples used for qualification levels and time in each level. Flying times were averages for the total times spent in each qualification level. Consequently, the individual's actual experience value under the model would be over or undervalued to the extent that such annual averaging differed from actual experience. Since there was no clear preference for dividing or not dividing experience value among the number of rated officers on a basic crew in a multi-place aircraft, the figures for both approaches are provided.

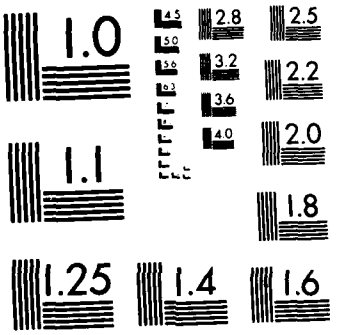
For Career Potential Value, the appropriate promotion probabilities for each rank were multiplied by the number of years expected to have been spent in each, along with their representative salaries, to determine an expected value at each rank. These were added together to form a total for CpV.

Once the cost of withholding a desired assignment under the model (Cw) was established, the next step was to use the worksheet in Figure 2. to establish a cost of giving the assignment.

AD-A134 393 A MODEL FOR DETERMINING THE COST OF GIVING OR WITHHOLDING A DESIRED ASSIG..(U) AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF SYST.. M J SNEDEKER 2/2

UNCLASSIFIED 28 SEP 83 AFIT-LSSR-6-83 F/G 5/9 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Figure 2: Giving Cost Worksheet

TRAINING COSTS OF ASSIGNMENT NOT WANTED (TCa1)

Is a PCS required for the replacement? Yes					$2,789.30
Replacement must have had:					
Commissioning Source					$8,846.00
Undergraduate Flying Training (Pilot)					$321,778.00
Basic Aircrew Survival					$3,118.00
Primary Instructor Training, T-38					$154,381.00
Estimated Minimum Acceptable Replacement Experience: 4 yrs & 1,400 T-38 IP hours					
Annual Flying Hours	Cost Per Hour	Qualification Multiple	Time Mult.	Time In Job	
352.5	876	1.5714	1	1 yr	$485,232.61
352.5	876	1.5714	1.09	1 yr	$528,903.55
352.5	876	1.5714	1.1881	1 yr	$576,504.86
352.5	876	1.5714	1.2950	1 yr	$628,390.30
Total Estimated Experience Cost					$2,219,031.32
TOTAL TRAINING COSTS, ASSIGNMENT NOT WANTED:					$2,709,943.62

TRAINING COSTS OF ASSIGNMENT DESIRED(TCa2)

Is PCS Required? Yes	$2,789.30
Training Required:	
C-141 Pilot Training, Initial	$113,300.00
Total Training Cost of Desired Assignment	$116,089.30

TOTAL COST TO GIVE THE ASSIGNMENT:	$2,826,032.92
MINUS UNDIVIDED COST TO WITHHOLD:	- $6,456,571.24
SAVINGS TO AIR FORCE BY WITHHOLDING:	- $3,630,538.32
(Savings negative, recommend giving assignment.)	

TOTAL COST TO GIVE THE ASSIGNMENT:	$2,826,032.92
MINUS DIVIDED COST TO WITHHOLD:	- $4,301,429.65
SAVINGS TO AIR FORCE BY WITHHOLDING:	- $1,475,396.73
(Savings negative, recommend giving assignment.)	

In this case, the AFMPC decision was to withhold the desired C-141 pilot assignment. The individual remained on active duty. Since the model recommended a decision contrary to the AFMPC decision and the resultant outcome favored the Air Force (the individual was retained as a productive resource), this case appears to invalidate the

model as a way to predict the least cost alternative to enhance retention of rated officers. The logic for validity under all possible cases is listed in the table below:

Table 8: Model Assignment Logic

Cost to give		Cost to withhold		Give	Withhold
Greater Less		Less Greater		X	X
Model Choice	MPC Choice	Individual Stayed	Individual Separated	Model Valid	Model Invalid
Give	Give	X		X	
Give	Give		X		X
Give	Withhold	X			X
Give	Withhold		X	X	
Withhold	Withhold	X		X	
Withhold	Withhold		X	X	
Withhold	Give	X			X
Withhold	Give		X	X	

As shown previously in Table 7, the model recommended that the assignment desired be given to the individual, except where the assignment wanted by the individual was unknown. In that case, HQAFMPC offered the individual their desired and second choice of assignment but were refused on both. While the sample may not be representative, it is interesting to note that in seven of nine cases (77.78%), stated intentions to leave if not given the desired assignment were carried out. When comparing the results from Table 7 and the assignment logic in Table 8, the model appears to recommend a valid choice in eight of twelve cases.

Although presumably correct, it seemed unusual that not one of the desired assignments appeared unreasonable under the model. Would there be an instance where the model would not recommend the desired assignment?

A proposed hypothetical case was tested using an Air Force C-130 aircraft commander with 1,500 hours in the aircraft, of which 900 were accumulated in three years as a copilot and the balance in another two years as an aircraft commander. The proposed case asked if the model would recommend giving such a pilot a requested change of assignment to F-16s. Using the same experience level as the minimum acceptable replacement for the individual, it would have been nearly $600,000 too costly to the Air Force to allow the change. The assignment would have been withheld under the model.

While the testing discussed provides some results to evaluate the model with, the value of those results is called into question by the assumptions that had to be made about experience levels of replacement crew members. It can also be questioned based on mixing some FY 1983 costs for training with some FY 82 costs. Still, if the actual selected replacements were more or less experienced, the model would have valued them accordingly and recommended giving or withholding the assignment in accordance with the logic in Table 8.

It cannot be known in which instances the desired

assignment was available. Air Force requirements must be filled, whether they represent the preferences of rated crew members or not. However, where assignments are available, the model may be useful in determining whether or not it would be cost-effective for the Air Force to offer the individual the assignment. In the cases examined here, the losses to the Air Force ranged between $5,968,954 and $10,722,006 on the individuals who left after being denied their desired assignment. With the average potential loss to the Air Force from withholding assignments running roughly between three quarters of a million to one and one quarter million dollars per person, it becomes apparent that savings to be derived from giving assignments where they can be made available can be substantial indeed.

CHAPTER IV

DISCUSSION

Before the proposed model can be judged valid, it needs to be subjected to further development and more rigorous testing. While this effort remains for some future researcher, certain difficulties in attempting to apply the model need to be resolved:

1. For instructors and other crewmembers whose multiples were established as greater than 1.0 times the cost of an hour's operation of their aircraft, should all the time logged since upgrading to that status be counted at that higher multiple, or only those hours logged fulfilling that particular duty? For example, an instructor pilot who flies but does not instruct logs time as an aircraft commander or copilot. Should that time be credited toward his or her total value figure at more than the rate for the basic crew position filled? Though not asked in the survey, such a question might well raise disagreement among those who would value people for comparison under this model. Would not a low total instructor time for a crew member who fulfilled primarily staff duties be justification for lower valuation of that person's flying experience than that of the instructor who flew daily as an instructor? While the

argument could go both ways, for simplicity the model assumes that flying accomplished after upgrade to a higher level should all be credited at that higher multiple. Since it is not uncommon for instructors to offer suggestions and information on non-instructional rides, it at least seems plausible to suggest this treatment of their flying experience value after upgrading.

2. Once an individual upgrades in an aircraft and then is transferred to another, should their multiplier stay at the same level or decrease? While basic instrument procedures are largely uniform throughout the Air Force (with exceptions for varying cockpit instrumentation), and while all Air Force flying is governed by certain key regulations, there is far from complete carryover from one aircraft type to another. An instructor in C-130s who transfers to C-5s would spend time as a copilot before being upgraded. It therefore seems logical that the multiplier for time spent in the new, less qualified position in a different aircraft would be reduced accordingly.

The probable accelerated upgrading which an instructor in a previous aircraft would enjoy would tend to counterbalance the temporary reduction of the multiple. In the model tests in the previous chapter, the assumption was made that the multipliers should be reduced to the one for the crew position in which the person was currently serving. The intent was to avoid unfairly compounding the

value given to one person's experience in an aircraft over another person's based on the first individual's previous experience in a different aircraft.

3. If the numbers of flying hours and years rated service at upgrade are not available, how can a value for flying experience be accurately determined from the model? It cannot be determined accurately. It can only be approximated by using the directives of the major air command involved which state minimum flying hour requirements for upgrade to those positions. Time in individual aircraft types and dates of upgrade become critical for determining a value under the model. The assumptions made in the previous chapter about averaging flying hours per year flown in each position may not be valid, either, in that flying time may not be accumulated at a constant rate.

4. The nature and scope of flying training varies with the passage of time and the changing environment in which the rated officer can expect to operate. When coupled with changing dollar costs and dollar values how can one year's training be compared with the next? The assumed answer here must be that the current cost for the course most like the one the individual being compared attended is to be used. Presumably the individual initially trained in F-4s ten years ago has acquired most of the more current information in the present F-4 training curriculum during

his tours in fighters as part of the Air Force's strong efforts to keep crew members trained in the most up-to-date tactics and procedures. Further, since a replacement for the individual can not be had without similar training, the current course cost provides the most convenient basis for comparison. To take the cost from years ago and adjust it for inflation through successive years could well over or undervalue training in comparison to that given today with presumably better information available.

5. When determining the cost of a replacement for the individual, how shall such a cost be determined? Would it be exactly the same as what it cost for that individual to begin with, or would it be something less, on the order of what it would cost to minimally qualify someone to take that position? While replacements must be secured on an individual basis, it may or may not be possible to know the cost of the next likely candidate for the job. Most likely, the next person on the list will be known. It would then probably be more accurate to evaluate the cost of giving the assignment desired in terms of the model-determined value of the individual selected to fill the assignment which was refused or being vacated by the first individual.

Evaluation

Even with the actual case data to test the model, an accurate evaluation of its validity for use as a decision

tool cannot yet be made. While in two thirds of the cases tested it appears to recommend the proper course of action, the sample selected and the data available on that sample hardly constitute a sufficiently large number to judge the model's validity as a device to enhance retention while reducing training and education costs. Any further evaluation must be restricted to the nature of the model itself.

For the model to be employed successfully, the individual using it must have access to a considerable amount of data which has been conveniently arranged for quick, reliable analysis. With the number of assignments being made daily by HQAFMPC, people responsible for them have little time for complex formulae and extensive calculations. This fact then makes a computer program to apply the model to existing data a virtual necessity. A great deal of information from personnel records is already available to the assigners at cathode ray tube (CRT) displays. A program which would tap the individual's different records as well as cost data on training and assignments desired (including periodic updates) in order to compute the needed figures does not seem beyond existing Air Force capabilities. Few if any inputs other than the individual's name, social security number, and assignment desired should have to be fed into such a program for a printout of the model's recommendation and factors

considered. Without the use of a computer and appropriate software, such a formula would be a cumbersome and time-consuming exercise.

As earlier addressed, it can effectively be argued that such a model would grossly undervalue the career potential value of a rated officer. Since all of the indicators selected represent accomplishments well within the reach of virtually all flying officers, how can such a formula take into account unknown future events which may shape and develop the most valuable future Air Force careers? Given the current state-of-the-art, it cannot. The career potential value figure suggested by the model must then be an estimate, open to reevaluation on the basis of new indicators as they are developed.

Finally, and perhaps most critically, suppose the model suggests that the cost to give an assignment is, for example, $50,000 less than the cost to withhold? Suppose it were one dollar less? How great a difference would an assigner need to see to be comfortable with a decision recommended by the model? An F-16 instructor pilot with a thousand total fighter hours could easily be worth several million dollars to the Air Force under this formula. Perhaps that individual wants a three or four year break from flying offered by an AFIT or rated supplement assignment. The AFIT assignment might only cost $65,000, and the cost for a minimally qualified replacement for this

individual might clearly weight the model in favor of the individual's request. If the assigner has a position which must be filled, regardless of the individual's preference, the model would not be of much help as a decision tool, except perhaps to rank order the costliness of individual choices for a particular assignment or the costs of putting various individuals into that assignment.

A simple larger total on one side than on the other may not be strong enough to support the recommende decision. It must be, as always, the assigner's be judgement as to whether a desired assignment is given withheld. No formula or model can hope to replace th judgement, nor should it be used for such a purpose. Circumstances may well exclude the desired assignment to begin with. At best, a model can be used to offer support for or against a decision, based upon a known and agreed upon set of parameters. It is upon the key phrase "known and agreed upon" that my conclusions and recommendations are based.

Conclusions and Recommendations

If a model such as proposed in this study is to be of value to the Air Force, it must be useful to those who assign rated aircrew members. It should therefore reflect wide agreement as to its accuracy and credibility as a measure of both an individual's value to the Air Force, and

the cost of risking the loss of that individual's experience. Although a majority of the commanders surveyed agreed with the proposed formula for experience value, and a number who did not pointed out the need to account for the other items addressed in the hypothesized equations, I do not feel that what has been done here demonstrates enough support for use of the model in its present form. It must first be tested to show whether or not it would provide valid recommendations under actual cases. Such testing remains for additional research.

Despite the objections and difficulties with model raised earlier in this study, it must be pointed out that keeping highly trained and experience people in the Air Force saves the taxpayers a great deal of money and greatly enhances Air Force mission capability. The model developed in this study will quite probably result in substantial savings to the Air Force if employed. While there may be debate about the legitimacy of assigning a dollar value to an individual's experience, there can be little debate about the value of a better trained and seasoned force with which to defend the nation. If such a force can be had for less money, it is worth further investigation and effort.

Further, it must be noted that this model is conservative in each particular for which assumptions are made. The lowest probable dollar value has been chosen in each instance where value selection might be questioned.

Training values for newly commissioned officers were assumed to be the lowest possible cost to the Air Force in all cases. Experience values were provided that reflected both undivided and divided values so as to allow evaluation of the effects of both approaches on the outcomes under the model. Career potential values derived using the model appear quite conservative in light of Hunter & Schmidt's (1983, p. 476) finding that people generally produce at about twice the value of what they are paid. Such restrained use of the factors involved in computing costs consequently considerably understate the loss to the Air Force when a rated officer departs the service.

A valuation system which clearly identifies the factors and values used in making assignment recommendations would dispel much of the uncertainty and "mystery" surrounding the process for the individual and serve as a tool to assist the assignment officer in making the assignment decision. An officer who wanted to change weapon systems could be shown in concrete terms why such a move would or would not be cost-effective for the Air Force. Armed with the knowledge of how the system worked, the rated officer force might well be more satisfied with the way the system operated. They would individually have a greater opportunity to influence those things important to getting the assignment they truly desired. Their success or failure in trying for an assignment might then be more a function of

their own efforts.

If the model were employed, it would most likely result in at least a slightly larrer proportion of officers receiving their desired assignments at a critical point in their careers. To receive such "special consideration" from the system at a time when the pressure to leave the service may be greater than the pressure to stay may be the deciding factor which raises and sustains their commitment to a career in the Air Force.

For those individuals who make unreasonable demands upon the system, the model would give AFMPC indesputable justification for refusing such demands, despite the loss of the individual's experience and training. In those cases where the call is a close one to make, the values provided by the model might ease AFMPC's burden considerably.

So long as there exists the likelihood that the Air Force will lose a significant portion of its middle management rated officer force as a result of improving economic conditions, it will be necessary for the Air Force to search for ways to reduce those losses and preserve the trained cadre of rated experience in the event of war. That fact makes further research into this model both necessary and justifiable. The ultimate end product must be a convenient, acceptable product which will help the personnel assigners do their jobs while keeping a greater percentage of those who express their intent to leave unless given a

particular assignment. Certainly, the cost of such a product must be less than the value of the information it provides. However, should such a model prove a valid decision tool by recommending assignment decisions which result in fewer rated officers being lost to the civilian economy, the training and operational costs identified in chapter 2 which would be conserved would most likely make such a model worth the cost to implement it. Given that the model proves valid for rated officers, it then could be applied to other officer specialties with appropriate modifications for experience and career potential values.

APPENDICES

APPENDIX A

UNIT COMMANDER SURVEY

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE MANPOWER AND PERSONNEL CENTER
RANDOLPH AIR FORCE BASE, TX 78150

21 JUL 1983

REPLY TO ATTN OF: MPCYP

SUBJECT: Request for Survey Approval (Capt Snedeker)

TO: AFIT/LSH

1. Your request for survey approval has been reviewed in two parts for administration by both this office and the Rated Officer Career Management Branch, Lt Col McIlvoy, as well as MPXA, Maj Monaco.

a. Part One - Unit Comander Survey: The Unit Commander Survey appears to be a good effort and is approved for administration contingent upon the inclusion of questions submitted by MPXA. We ask that you work directly with Maj Monaco (MPXA) in this effort. Changes, if minor, may be conveyed to this office telephonically, however, we do require a final copy of the instrument for our files. In addition to providing us with a copy of the results, a copy should be sent to MPXA as well. The survey control number assigned to the Unit Comander Survey is USAF SCN 83-43 (expires 30 Sep 83).

b. Part Two - Rated Officer Survey: The Rated Officer Survey is not approved for administration. An assignment process based on weighting assignment value is not viewed at this time as a viable inclusion to the assignment process. Therefore, at present, no need for this data exists. As you know, assignments to rated requirements are not a variable, regardless of cost. In order to maintain combat readiness, aircraft crew assignments must be filled, however, if the member has an updated AF Form 90, he/she stands a better chance of getting their personal preference.

2. Questions regarding these matters may be directed to Sandra Paulson, AV 487-2449.

FOR THE COMMANDER

BERT K. ITOGA, Lt Col, USAF
Chief, Research & Measurement Division

Cy to: Capt Snedeker
8429 Indian Mound Dr
Dayton, OH 45424

UNIT COMMANDER SURVEY USAF SCN 83-43

This is a survey designed to determine the value of a rated officer's experience in the six-to-twelve year group. This survey is part of an effort to improve the assignment process and the retention of officers in this year group. Your answers will be compared and combined with other commander's inputs in similar units to determine an estimate of the value of these officers' experience. Your responses will be held in strict confidence.

Thank you for taking the time to answer the survey. Your experience as both a commander and senior rated officer makes your inputs particularly valuable.

Please answer the following questions by either circling the statement that most closely reflects your beliefs, or filling in the blanks where listed.

1. What type of aircraft does your unit fly? (Please specify the type after the category, e.g., "transport_____ C-141.")

a. attack_____.
b. bomber_____.
c. fighter_____.
d. tanker_____.
e. transport_____.
f. helicopter_____.
g. utility_____.
h. reconnaissance_____.
i. special/other_____.

Please indicate how you feel about the following statements:

2. "The value of an individual's flying experience is a combination of how many flying hours he or she has in what type(s) of aircraft, and how many years of rated experience he or she has as well."

a. strongly agree
b. agree
c. neither agree nor disagree
d. disagree
e. strongly disagree

3. "Although there are exceptions in rare cases, generally speaking, the higher the qualification level of the rated crew member, the more valuable his or her contribution to my unit and the Air Force."

a. strongly agree
b. agree
c. neither agree nor disagree
d. disagree
e. strongly disagree

4. "In a multi-place aircraft, you should divide the cost per hour to operate the aircraft by the number of rated crew members aboard to determine a value for each hour of flying time's experience for the individual rated crew member."

a. strongly agree
b. agree
c. neither agree nor disagree
d. disagree
e. strongly disagree

5. "Since some aircraft types cost much more to fly than others on a per hour basis, a factor must also be included for years of rated service so that a pilot or other crew member in one aircraft does not automatically receive higher valuation than another based on aircraft type alone."

a. strongly agree
b. agree
c. neither agree nor disagree
d. disagree
e. strongly disagree

6. "It is not correct to divide the cost per flying hour by the number of officer crew members to determine the cost of an hour's rated experience in a particular aircraft. You must use the same figure per hour for each crew position."

a. strongly agree
b. agree
c. neither agree nor disagree
d. disagree
e. strongly disagree

7. "Instructors are selected for their experience, leadership, instructional ability, and skill in their crew position beyond that of their contemporaries."

a. strongly agree
b. agree
c. neither agree nor disagree
d. disagree
e. strongly disagree

8. "Evaluators in all rated positions have flying experience and skills generally superior to their instructor contemporaries."

a. strongly agree
b. agree
c. neither agree nor disagree
d. disagree
e. strongly disagree

9. "If a basic crew member's experience is worth a given dollar amount in a crew position, you should estimate the value of an instructor or evaluator crew member's experience as some multiple greater than 1.0 times the basic crew member's figure."

a. strongly agree
b. agree
c. neither agree nor disagree
d. disagree
e. strongly disagree

10. "The contributions and experience of basic line crew members are generally not as valuable than those of instructor crew members."

a. strongly agree
b. agree
c. neither agree nor disagree
d. disagree
e. strongly disagree

For the remainder of the questions, please circle the answer you feel is most appropriate, or fill in an answer of your own.

11. What percentage of your rated crew force are instructors?

a. 5%
b. 10%
c. 15%
d. 20%
e. 25% or more

12. If more highly qualified crew members should have their experience valued at some multiple of the basic crew member's figure, what multiple would you use for the following?:

a. a basic, non-lead qualified aircraft commander _____.

(For fighter aircraft, this would be the basic crew position value of 1.0. But for multi-place cargo aircraft, would such a crewmember's experience be worth 1.1 times a basic copilot for example?)

b. an element/flight lead qualified aircraft commander _____.

c. an instructor pilot_____.

d. an evaluator pilot_____.

e. a lead qualified navigator_____.

f. an instructor navigator_____.

g. an evaluator navigator_____.

h. an instructor electronic warfare officer_____.

i. an evaluator electronic warfare officer_____.

13. If a multiple should be used for higher qualification, should it stay the same or change while an individual is qualified at a given level? For example, a first year instructor electronic warfare officer might be worth a multiple of 1.20 while a second year instructor might be worth a larger multiple, say 1.2 times 1.2, or 1.44.

a. increasing scale

b. constant

c. decreasing scale

d. increasing for_____years, then stays constant

e. increasing for_____years, constant for_____ years, then decreasing for_____years

f. decreasing for_____years, then stays constant

g. decreasing for_____years, constant for_____ years, then increasing for_____years

14. If you selected an increasing scale for the multiple, by how much would you increase it for each year as an instructor or evaluator_____? If you chose a decreasing scale, by how much would it decrease each year_____?

15. What do you think would be the most appropriate measure of the value of a basic qualification level crew member's experience to your unit for a year?

a. His or her training cost divided by an average number of years a rated officer in that crew position stays in service.

b. His or her flying time in a given year times the cost per hour to operate the aircraft.

c. His or her training costs, plus pay and allowances, divided by number of years served to date.

d. His or her training costs tp date, plus this year's pay and allowances plus cost per hour of flying time multiplied by the number of hours flown this year.

e. Some other measure: (Please indicate here what you think would work better, including any combination of the factors mentioned above.)

16. How do you feel about the following statement? "The total dollar replacement value of a six-to-twelve year rated officer crewmember's experience to the Air Force could be accurately estimated by taking the value of an hour of the basic crewmember's experience times the multiples I've identified above for the time they've spent at each level and adding them together. One hour of the basic crewmember's experience is worth the cost of flying the airplane for one hour."

Example: A C-130 pilot with six years experience and 3,000 flying hours has three years and 1,000 hours as a copilot and three years and 2,000 hours as a non-lead qualified aircraft commander. If the multiple for a non-lead qualified aircraft commander you selected above was 1.1, and you felt that the value of this pilot's experience increased by 10% each year, and the cost to operate a C-130 was $1,000 an hour, the experience value of this pilot would be:

1,000 hours * $1,000/hour = $1,000,000
+2,000/3 hours * 1.1 * $1,000/hour = $733,333
+2,000/3 hours * 1.1 * 1.1 * $1,000/hour = $806,666
+2,000/3 hours * 1.1 * 1.1 * 1.1 * $1,000/hour = $887,333

TOTAL EXPERIENCE REPLACEMENT VALUE: $3,427,332

a. Too complicated. A simpler and more accurate measure would be:

b. Complex, but probably a good approximation.

c. Would tend to overvalue experience.
Reduce by _____%.

d. Would tend to undervalue experience.
Increase by_____%.

17. Please add below or on the back any comments or suggestions you have to improve this survey or to better determine the dollar value of a rated officer's experience. Once again, thank you for taking the time to answer the survey. Your confidential responses will aid in determining the value of these officers to the Air Force and may help improve their assignment process as well.

APPENDIX B

MULTIPLIER MEANS, MODES, AND STANDARD DEVIATIONS

Multiplier Means, Modes, and Standard Deviations

By Aircraft Type

Numbers in sample size are numbers responding to question.

BQP = Basic Qualified Pilot
LQP = Lead Qualified Pilot (Element/Flight)
IP = Instructor Pilot
EP = Evaluator Pilot
LQN = Lead Qualified Navigator
IN = Instructor Navigator
EN = Evaluator Navigator
EWO = Electronic Warfare Officer
IEWO = Instructor Electronic Warfare Officer
SS = Sample Size
SD = Standard Deviation
MN = Mean
MD = Mode
* = Bi-modal

HELICOPTERS

UH-1F

	BQP	LQP	IP	EP
SS	2	3	4	4
MN	1	1.267	1.375	1.650
SD	0	.208	.435	.915
MD	1	-	-	-

UH-1N

	BQP	LQP	IP	EP
SS	7	7	7	7
MN	1.071	1.193	1.436	1.686
SD	.095	.169	.277	.438
MD	1	1.1	1.25/ 1.5*	1.5

CH-3E

	BQP	LQP	IP	EP
SS	1	2	2	2
MN	1.1	1.350	1.7	2.25
SD	0	.212	.424	1.061
MD	1.1	-	-	-

HH-1H

	BQP	LQP	IP	EP
SS	3	3	4	4
MN	1.067	1.167	1.3	1.450
SD	.058	.058	.141	.129
MD	1.1	1.2	1.2	-

HH-3E

	BQP	LQP	IP	EP
SS	2	2	2	2
MN	1	1.1	1.2	1.275
SD	0	0	0	.158
MD	1	1.1	1.2	-

HH-53

	BQP	LQP	IP	EP
SS	1	1	1	1
MN	1	1.1	1.3	1.5
SD	-	-	-	-
MD	-	-	-	-

<u>FIGHTERS</u>/<u>FACS</u>/<u>AWACS</u>

A-10

	BQP	LQP	IP	EP
SS	9	10	10	10
MN	1	1.320	1.690	1.720
SD	0	.210	.360	.413
MD	1	1.5	2	2/ 2.1*

AT-38

	BQP	LQP	IP	EP	LQN	IN	EN	EWO	IEWO
SS	2	2	2	2	1	2	1	2	1
MN	1	1.350	1.650	1.750	1.3	1.4	1.7	1.4	1.7
SD	0	.212	.495	.636	-	.141	-	.141	-
MD	1	-	-	-	-	-	-	-	-

F-4

	BQP	LQP	IP	EP	LQN	IN	EN	EWO	IEWO
SS	12	11	12	12	6	11	11	7	7
MN	1.017	1.605	2.121	2.296	1.317	1.809	1.946	1.6	1.793
SD	.058	.338	.624	.662	.172	.489	.532	.30	.502
MD	1	2/ 1.5*	2	2	1.2/ 1.5*	2	2.5	1.5/ 2*	2.5

F-5E

	BQP	LQP	IP	EP
SS	3	3	3	3
MN	1	1.667	2.333	2.333
SD	0	.289	.577	.577
MD	1	1.5	2	2

F-15

	BQP	LQP	IP	EP

SS	9	11	11	11
MN	1	1.436	1.846	1.973
SD	0	.301	.503	.639
MD	1	1.2	1.5	1.5

F-16

	BQP	LQP	IP	EP
SS	12	13	13	13
MN	1.042	1.285	1.569	1.631
SD	.144	.168	.320	.355
MD	1	1.2	2	1.5

F-100 & T-33

	BQP	LQP	IP	EP
SS	2	2	2	2
MN	1	1.3	1.6	1.6
SD	0	.141	.283	.283
MD	1	-	-	-

F-106

	BQP	LQP	IP	EP
SS	3	4	4	4
MN	1	1.275	1.575	1.725
SD	0	.171	.330	.556
MD	1	-	-	-

F-111

	BQP	LQP	IP	EP	LQN	IN	EN	EWO	IEWO
SS	5	6	6	6	5	5	5	4	4
MN	1	1.333	1.650	1.725	1.220	1.420	1.580	1.4	1.475

SD	0	.186	.315	.532	.192	.130	.259	.141	.126
MD	1	1.5	1.5/	-	-	1.5	1.5	1.5	1.5

E-3A

	BQP	LQP	IP	EP	LQN	IN	EN	EWO	IEWO
SS	0	1	1	1	1	1	1	1	1
MN	-	1.2	1.3	1.3	1.2	1.3	1.3	1.3	1.3
SD	-	-	-	-	-	-	-	-	-
MD	-	-	-	-	-	-	-	-	-

MULTIPLE FIGHTER TYPE UNITS

	BQP	LQP	IP	EP	LQN	IN	EN	EWO	IEWO
SS	4	4	4	4	4	4	4	4	4
MN	1	1.475	2.125	2.250	1.4	2.075	2.2	1.775	1.9
SD	0	.378	.629	1.190	.455	.699	1.236	.450	.821
MD	1	1.2	2	1.5	-	2	-	2	-

RF-4C

	BQP	LQP	IP	EP	LQN	IN	EN	EWO	IEWO
SS	9	8	8	8	7	9	8	7	6
MN	1	1.238	1.594	1.688	1.229	1.439	1.563	1.386	1.525
SD	0	.185	.251	.339	.214	.289	.306	.339	.289
MD	1	1.1/ 1.5*	1.5	1.5/ 2*	1/ 1.5*	1.3	1.3	1/ 1.8*	-

O-2

	BQP	LQP	IP	EP
SS	2	2	2	2
MN	1	1.2	1.450	1.7
SD	0	0	.071	.141

MD	1	1.2	-	-

OV-10

	BQP	LQP	IP	EP	LQN	IN	EN	EWO	IEWO
SS	3	3	3	3	2	2	2	2	2
MN	1	1.4	1.7	1.8	1.3	1.45	1.6	1.45	1.6
SD	0	.173	0.3	0.2	.141	.071	0	.071	0
MD	1	1.5	-	-	-	-	-	-	-

SAC AIRCRAFT (Other than strategic reconnaissance)

B-52

	BQP	LQP	IP	EP	LQN	IN	EN	EWO	IEWO
SS	11	11	11	11	10	11	11	11	11
MN	1.309	1.523	1.746	1.773	1.375	1.546	1.664	1.427	1.436
SD	.577	.841	1.094	1.095	.593	.826	1.115	.542	.533
MD	1.3	1.1/ 1.5*	-	1.3/ 1.5*	1.1	-	1.3/ 1.5*	1.1	1.2

FB-111

	BQP	LQP	IP	EP	LQN	IN	EN	EWO	IEWO
SS	1	1	1	1	1	1	1	1	1
MN	1	1.5	2	3	1.5	2	3	1.5	2
SD	-	-	-	-	-	-	-	-	-
MD	-	-	-	-	-	-	-	-	-

KC-135

	BQP	LQP	IP	EP	LQN	IN	EN
SS	15	18	19	19	18	19	19
MN	1.153	1.242	1.485	1.584	1.206	1.366	1.424
SD	.159	.235	.278	.468	.213	.201	.305

MD	1	1.1	1.5	1.2/ 1.5*	1.1	1.2	1.2/ 1.3*

RC-135

	BQP	LQP	IP	EP	LQN	IN	EN	EWO	IEWO
SS	1	1	1	1	1	1	1	1	1
MN	1.2	1.3	1.5	1.6	1.2	1.5	1.6	1.5	1.6
SD	-	-	-	-	-	-	-	-	-
MD	-	-	-	-	-	-	-	-	-

EC-135

	BQP	LQP	IP	EP	LQN	IN	EN
SS	1	0	2	2	1	1	2
MN	1.1	-	1.35	1.25	1.1	1.1	1.35
SD	-	-	.212	.071	0	0	.212
MD	-	-	-	-	-	-	-

STRATEGIC RECONNAISSANCE

U2/TR-1

	BQP	IP	EP
SS	1	1	1
MN	1	1.5	1.6
SD	-	-	-
MD	-	-	-

SR-71

	BQP	IP	EP	LQN	IN	EN	EWO	IEWO
SS	1	1	1	1	1	1	1	1
MN	1	1.4	1.5	1.2	1.4	1.5	1.4	1.5
SD	-	-	-	-	-	-	-	-

MD	-	-	-	-	-	-	-	-

MAC AIRCRAFT (Non-helicopter)

C-5

	BQP	LQP	IP	EP	LQN	IN	EN
SS	5	3	5	5	4	5	5
MN	1.4	1.650	2.010	2.550	1.2	1.450	1.690
SD	.367	.737	.151	.986	.216	.361	.553
MD	1.2	-	-	-	-	1.5	-

C-9

	BQP	IP	EP
SS	2	3	3
MN	1.125	1.266	1.3
SD	.035	.116	.173
MD	1.15	1.2	1.2

CT-39

	BQP	IP	EP
SS	12	13	13
MN	1.254	1.654	1.715
SD	.339	.588	.726
MD	1	2.5	1.5

C-130

	BQP	LQP	IP	EP	LQN	IN	EN
SS	11	11	11	11	11	11	11
MN	1.191	1.362	1.550	1.775	1.343	1.541	1.766
SD	.192	.210	.262	.376	.206	.265	.379
MD	1/ 1.1*	1.3	1.5	1.5	1.3	1.5	1.5

C-141

	BQP	LQP	IP	EP	LQN	IN	EN
SS	11	11	12	12	10	10	10
MN	1.323	1.691	1.846	2.213	1.410	1.583	1.845
SD	.308	.497	.619	.922	.281	.396	.718
MD	1.5	-	2	2.5	1.5	-	1.3

HC-130

	BQP	LQP	IP	EP	LQN	IN	EN
SS	2	1	2	2	2	2	2
MN	1.05	1.2	1.2	1.3	1.1	1.2	1.3
SD	.071	-	.141	.141	.141	.141	.141
MD	-	-	-	-	-	-	-

MC-130

	BQP	LQP	IP	EP	LQN	IN	EN	EWO	IEWO
SS	1	1	1	1	1	1	1	1	1
MN	1	1.2	1.3	1.5	1.2	1.3	1.5	1.3	1.5
SD	-	-	-	-	-	-	-	-	-
MD	-	-	-	-	-	-	-	-	-

WC-130

	BQP	LQP	IP	EP	LQN	IN	EN
SS	1	1	1	1	1	1	1
MN	1.3	1.4	1.5	1.6	1.5	1.5	1.6
SD	-	-	-	-	-	-	-
MD	-	-	-	-	-	-	-

WC-135

	BQP	LQP	IP	EP	LQN	IN	EN
SS	1	1	1	1	1	1	1
MN	1.5	1.7	2.5	3.0	1.5	2.0	3.0
SD	-	-	-	-	-	-	-
MD	-	-	-	-	-	-	-

TRAINER AIRCRAFT

T-37

	BQP	LQP	IP	EP
SS	2	4	4	4
MN	1	1.650	1.8	1.950
SD	0	.436	.572	.759
MD	1	2	-	-

T-38

	BQP	LQP	IP	EP
SS	1	2	2	1
MN	1.1	1.1	1.2	1.15
SD	-	.141	.141	.354
MD	-	-	-	-

OTHER AIRCRAFT

NKC-135 & UV-18

	BQP	LQP	IP	EP
SS	2	2	2	2
MN	1	1.050	1.1	1.1
SD	0	.071	.141	.283
MD	1	-	-	-

APPENDIX C

INDIVIDUAL ASSIGNMENT VALUE

Individual Assignment Value

Part of the original intent behind the thesis was to determine the value to the individual rated officer of being given their choice of assignment in the six-to-eleven year group. While this researcher felt (as did others, particularly Polk, Note 1) that such a determination would be of value to the assignment process and overall retention, the survey instrument and subsequent effort to establish the value were disapproved. The specifics of the disapproval are as written below

> An assignment process based on weighting assignment value is not viewed at this time as a viable inclusion to the assignment process. Therefore, at present, no need for this data exists. As you know, assignments to rated requirements are not a variable, regardless of cost. In order to maintain combat readiness, aircraft crew assignments must be filled, however, if the member has an undated AF Form 90, he/she stands a better chance of getting their [sic.] personal preference (Itoga, Note 13).

To establish the value to the individual of being given his or her choice of assignment, a survey was developed and pre-tested which asked questions that would have categorized the respondents by aircraft type and crew position. It would have asked the individual rated officer to examine what choice of assignment was worth in dollar

terms. By asking the total figure the Air Force would have to reimburse the member for uncompensated move-related expenses, the survey was to have established a credible figure for each individual. These data would then be analyzed by measures of central tendency and major grouping values statistically compared for significant differences and trends. The values established would then have been subtracted from the cost to give an assignment as they would have represented a cost savings to the Air Force and the government.

The survey was to have been sent to 60 crew members in each rated specialty (pilot, copilot, navigator, and electronic warfare officer/weapon system officer, as applicable to the series aircraft) for the C-130, C-141, B-52, KC-135, F-4, and F-16. TAC, MAC, and SAC were chosen because their retention figures were neither the best nor worst in the Air Force, and because they represented the majority of rated officers in the six-to-eleven year group.

It would be inaccurate and unfair to both the assignment system and those who make it work to state or imply that the value the individual places on a particular assignment is not considered in the process. While a specific dollar value is considered immaterial to the determination, the individual's most desired assignment is made known to AFMPC on the front side of the AF Form 90, however. Individuals rank their first three choices there

for the personnel assignment officers to use in making their decisions.

While establishment of the specific dollar value to the individual of his or her choice of assignment is currently not viewed as a "viable inclusion", I would venture to predict that a dramatic turnaround in the economy and a very budget-conscious Air Force of the future may ultimately force its inclusion in the consideration process after all.

REFERENCE NOTES

A. REFERENCE NOTES

1. Polk, S., Major, USAF. Chief, Officer Retention Studies, HQ AFMPC, Randolph AFB TX. Personal communication, October 14, 1982.

2. Rindy, K., Captain, USAF. Rated Resource Manager, Bombers/Tankers, HQ AFMPC, Randloph AFB TX. Personal communication, December 22, 1982.

3. Schuman, J., Major, USAF. Chief, Officer Retention Studies, HQ AFMPC, Randolph AFB TX. Personal communication, December 22, 1982.

4. Anonymous, HQATC/ACMC, Cost & Management Analysis, Randolph AFB TX. Personal communication, March 11, 1983.

5. Martin, Joseph, Jr. HQMAC/ACMC, Cost & Economic Analysis Division, Scott AFB IL. Personal communication, June 1, 1983.

6. Hanagan, Michael. HQTAC/ACMC, Cost & Management Analysis, Langley AFB VA. Personal communication, May 1, 1983.

7. Passerello, Captain Stephen, USAF. HQSAC/ACMC, Cost & Management Analysis, Offutt AFB NB. Personal communication, May 1, 1983.

8. Smithfield, Cordell. HQATC/ACMC, Cost & Management Analysis, Randolph AFB TX. Personal communication, July 18, 1983.

9. Jacobus, Major, USAF. HQUSAFA/ACM, Cost Analysis, United States Air Force Academy CO. Personal communication, April 20, 1983.

10. Tyner, Irene. AU/ACM, Cost Analysis, Air University, Maxwell AFB AL. Personal communication, April 20, 1983.

11. Layne, Douglas, Captain, USAF. HQAFMPC/MPCROR4H, Randolph AFB TX. Personal communication, July 1, 1983.

12. German, Steven, Captain, USAF. HQAFMPC/MPCRORЗ, Randolph AFB TX. Personal communication, July 5, 1983.

13. Itoga, Bert K., Lieutenant Colonel, USAF. Chief, Research & Measurement Division, HQAFMPC/MPCYP, Randolph AFB TX. Personal communication, July 21, 1983.

14. Huddle, William R., Lieutenant Colonel, USAF. Chief, Fighter/Reconnaissance Career Management Section, HQAFMPC/MPCROR2, Randolph AFB TX. Personal communication, August 2, 1983.

REFERENCES

A. REFERENCES

Atchinson, T. J., & Lefferts, E. A. The prediction of turnover using Hertzberg's Job Satisfaction Technique. Personnel Psychology, 1972, 25, pp. 53-64.

Aviators bonus okayed. Air Force Times, 13 July, 1981, 41, 4.

Beach, James L. An analysis of factors which contribute to effective personal property counseling for Air Force members. Unpublished master's thesis. LSSR 5-83, AFIT/LS, Wright-Patterson AFB OH, September, 1983.

Bonnell, R. A., & Hendrick, K. D. Factors influencing the turnover of rated United States Air Force Officers With less than eleven years of service. Unpublished master's thesis. LSSR 33-81, AFIT/LS, Wright-Patterson AFB OH, June, 1981. ADA 103254.

Buchanan, B. Building organizational commitment: The socialization of managers in work organizations. Administrative Science Quarterly, 1974, 19, 533-546.

DOPMA won't slow officer promotions. Air Force Times, 31 August, 1981, 42, 14.

Emory, C. W. Business research methods. Homewood IL: Richard D. Irwin, 1980.

Farrell, D., & Rusbult, C. E. Exchange variables as predictors of job satisfaction, job commitment, and turnover: The impacts of rewards, costs, alternatives, and investments. Organizational Behavior and Human Performance, 1981, 28, 78-95.

Gotz, G. A., & McCall, J. J. Estimating military personnel retention rates: Theory and statistical method. Santa Monica CA: Rand Corporation, 1980. R-2541-AF.

Gregory, R. A. Report of job attitudes. U.S. Air Force pilots. USAF Academy, Department of Behavioral Sciences and Leadership, November 1982.

Grusky, O. Career mobility and organizational commitment. Administrative Science Quarterly, 1966, 10, 488-503.

Gulick, C. E., & Laakman, H. E., Jr. An analysis of factors influencing the turnover of United States Air Force pilots in the six to eleven year group. Unpublished master's thesis. LSSR 4-80, AFIT/LS, Wright-Patterson AFB OH, June 1980. ADA 087084.

Hall, D. T., & Schneider, B. Correlates of organizational identification as a function of career and organizational type. Administrative Science Quarterly, 1972, 17, 340-350.

Harnett, Donald L. Statistical methods (3rd ed.). Reading MA: Addision-Wesley Publishing Company, 1982.

Hiller, J. R. Analysis of second-term reenlistment behavior. Santa Monica CA: Rand Corp., 1982. R-2884-MRA&L.

Hom, P. W., & Hulin, C. L. A competitive test of the prediction of reenlistment by several methods. Journal of Applied Psychology, 1981, 66, 23-39.

Hom, P. W., Katerberg, Jr., R., & Hulin, C. L. Comparative examination of three approaches to the prediciton of turnover. Journal of Applied Psychology, 1979, 64, 280-290.

Hrebiniak, L. G., & Alutto, J. A. Personal and role-related factors in the development of organizational commitment. Administrative Science Quarterly, 1972, 17, 555-573.

Hunter, J. D., & Schmidt, F. L. Quantifying the effects of psychological interventions on employee job performance and work productivity. American Psychologist, 1983, 38, 473-478.

Ilgen, D. R., & Seely, W. Realistic expectations as an aid to reducing voluntary resignations. Journal of Applied Psychology, 1974, 59, 452-455.

Kiesler, C. A., & Sakumura, J. A test of a model for commitment. Journal of Personality and Social Psychology, 1966, 3, 349-353.

Millard, C. A. Factors that affect the career decision of Marine Corps pilots and flight officers. Alexandria VA: Center For Naval Analyses, 1979. ADA 079419.

Mobley, W. H. Intermediate linkages in the relationship between job satisfaction and employee turnover. Journal of Applied Psychology, 1966, 62, 237-240.

Morse, W. J. Cost accounting: Processing, evaluating, and using cost data (2nd ed.). Reading MA: Addison-Wesley, 1981.

O'Reilly, C. A., & Caldwell, D. F. The commitment and job tenure of new employees: Some evidence of post decisional justification. Administrative Science Quarterly, 1981, 26, 597-616.

Porter, L., Crampon, W., & Smith, F. Organizational commitment and managerial turnover: A longitudinal study. Organizational Behavior and Human Performance, 1976, 15, 87-98.

Schmidt, F. L., Hunter, J. E., McKenzie, R. C., & Muldrow, T. W. Impact of valid selection procedures on workforce productivity. Journal of Applied Psychology, 1979, 64, 609-626.

Sheldon, M.E. Investments and involvements as mechanisms producing commitment to the organization. Administrative Science Quarterly, 1971, 16, 143-150.

U. S. Department of the Air Force. Officer career development. AFR 36-23. Washington DC: U. S. Government Printing Office. 1 December, 1979.

U. S. Department of the Air Force. USAF cost and planning Factors. AFR 173-13. Washington DC: U. S. Government Printing Office. 1 February, 1983.

Welsh, H. P., & LaVan, H. Inter-relationships between organizational commitment and job characteristics, job satisfaction, professional behavior, and organizational climate. Human Relations, 1981, 34, 1079-1089.

B. RELATED SOURCES

Marsh, R. M., & Mannari, H. Organizational commitment and turnover: A prediction study. Adminstrative Science Quarterly, 1977, 22, 57-75.

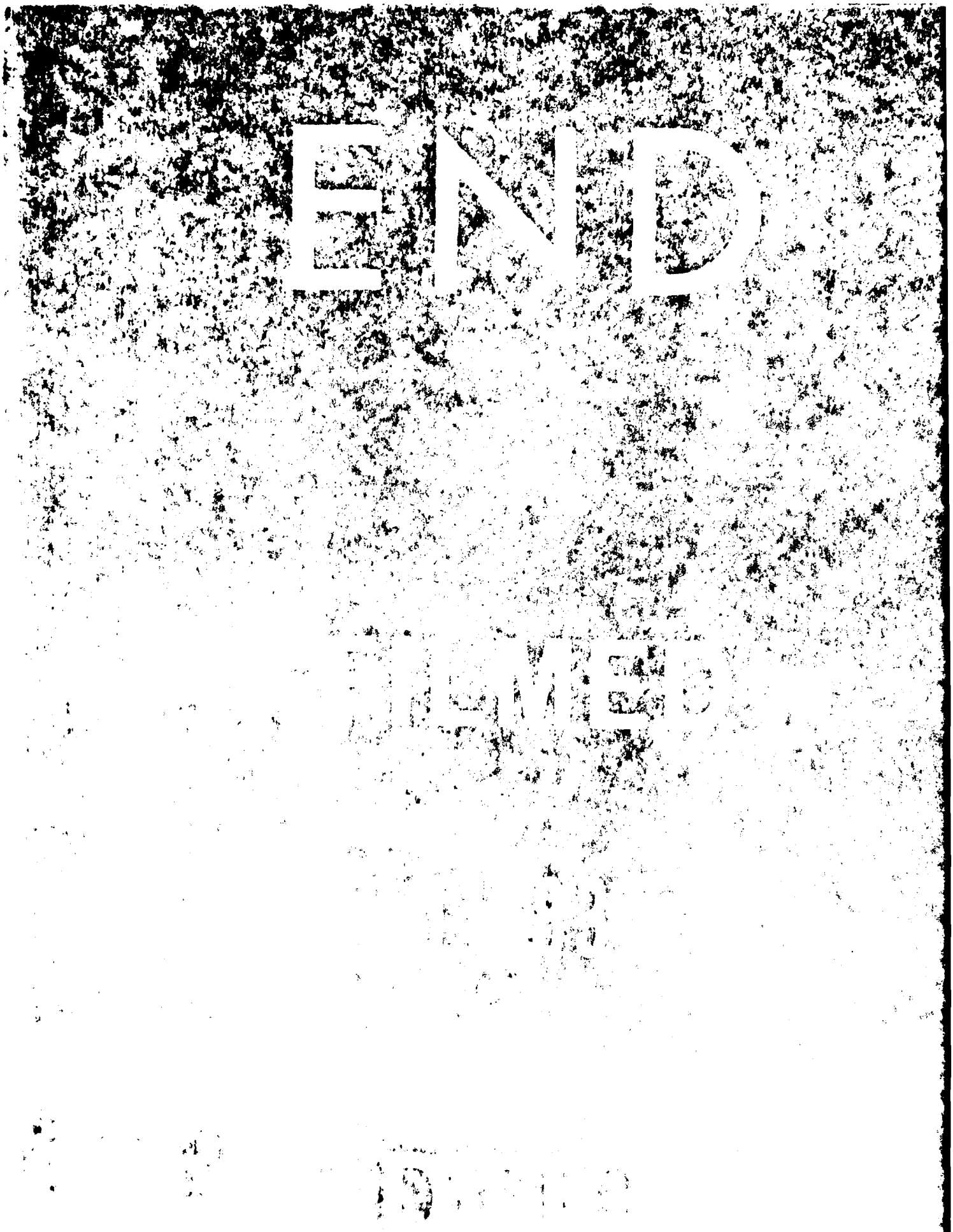
O'Reilly, C. A., & Caldwell, D. F. Job choice: The impact of intrinsic and extrinsic factors on subesquent satisfaction and commitment. Journal of Applied Psychology, 1980, 65, 559-565.

Pfeffer, J., & Lawler, J. Effects of job alternatives, extrinsic rewards, and behavioral commitments on attitude toward the organization: A field test of the insufficient justification paradigm. Administrative Science Quarterly, 1980, 25, 38-56.

Pritchard, R. D., Campbell, K. M., & Campbell, D. J. Effects of financial rewards on intrinsic motivation. Journal of Applied Psychology, 1977, 62, 9-15.

Schmidt, N., & McCune, J. T. The relationship between job attitudes and the decision to retire. Academy of Management Journal, 1981, 24, 795-802.

Wiener, Y., & Vaitenas, R. Personality correlates of voluntary midcareer change in enterprising occupations. Journal of Applied Psychology, 1977, 62, 706-712.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