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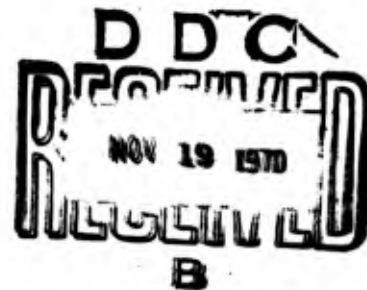
**RETENTION OF SCIENTISTS AND ENGINEERS IN
THE AIR FORCE: A MODIFIED MODEL FOR
INTERPRETING CORRELATES OF CAREER INTENT**

By

James M. Thomas
University of Nebraska at Omaha

PERSONNEL RESEARCH DIVISION
Lackland Air Force Base, Texas

June 1970



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AIR FORCE SYSTEMS COMMAND
Lackland Air Force Base, Texas**

FOREWORD

Data reported in this study were collected while James M. Thomas, then First Lieutenant, USAF, was on active duty at the Personnel Research Division. The report was written while the author was at Iowa State University, Ames, Iowa. He is now a member of the Psychology Department at the University of Nebraska at Omaha.

The research was conducted under Project 7719, Research and Development on Reliability, Adaptability, and Effectiveness of Air Force Personnel; Task 771908, Factors Related to Effective Utilization of Personnel Selection Procedures and of Selection Systems.

This report has been reviewed and is approved.

John G. Dailey, Colonel, USAF
Commander

ABSTRACT

The primary purpose of this research was to identify factors related to career intentions of Scientists and Engineers in the Air Force. A secondary purpose was to examine the assumptions underlying general organizational retention research for relevance to Air Force retention studies. A literature review was conducted and a theoretical discussion of the typical assumptions in retention research was presented. Several of these assumptions were shown to be questionably applicable to Air Force retention research. A survey of Scientists and Engineers in the Air Force was then analyzed and interpreted using a modified model based on the theoretical discussion. Results of the survey suggested that career-oriented Scientists and Engineers may have a different need structure than their non-career-oriented counterparts. Needs for managing and applied research seemed to characterize the career-oriented Scientist, while needs for pure research and scientific achievement seemed to characterize the non-career-oriented Scientist. Career-oriented officers were generally more optimistic about satisfying important needs while in the Air Force, and they preferred a professional-officer identity to a professional-Scientist identity. Modest correlations between various aspects of active duty experience and career intent suggest that pre-commissioning attitudes, particularly their sources and relative impact on career decisions, should be investigated further. Career-oriented Scientists and Engineers may start out career-oriented and their active duty experiences simply sustain that orientation. Likewise, the non-career-oriented Scientists and Engineers may simply perceive active duty experiences as supporting their initial attitudes regarding a military career. This leaves only the initially undecided group to be significantly influenced by the quality of their active duty experiences.

SUMMARY

Thomas, James M. *Retention of scientists and engineers in the Air Force: A modified model for interpreting correlates of career intent.* AFHRL-TR-70-27. Lackland AFB, Tex.: Personnel Research Division, Air Force Human Resources Laboratory, June 1970.

Problem

The primary purpose of this paper was to present the results of a survey completed by a group of Air Force Scientists and Engineers in order to identify factors related to their decisions regarding a military career. Prior to examining the results, theoretical issues were discussed dealing with the relevance to the Air Force of several assumptions underlying general organizational retention research. The secondary purpose of this paper was to suggest a modified set of assumptions for interpreting relationships observed in Air Force retention research since many of the assumptions underlying general retention research do not seem to apply.

Approach

Following a literature review to identify variables affecting the career decisions and job satisfaction of Scientists and Engineers, a survey was constructed by the Personnel Research Laboratory in cooperation with a project officer on the Air Force base to be surveyed. The survey consisted of a background information section, several items dealing with issues of general relevance to the career decision of officers, and several items specifically relevant to the career decision of Scientists and Engineers. The survey was distributed through normal channels at the base by the project officer. All officers on the base were surveyed, and 70 percent of the survey were returned for analysis. The data reported in this paper were obtained from surveys completed by 321 Scientists and Engineers.

Relationships were examined between each of the variables and the response made to one survey item dealing with the career intent of the respondent. Prior to the analysis, a detailed examination of the literature was made to test the adequacy of the assumptions underlying the typical organizational retention study. Many of these assumptions were found to be inadequate for interpreting results from an Air Force sample. A modified set of assumptions was suggested, supported by available data, and then applied to the interpretation of the Scientist and Engineer survey data.

Results

Career-oriented officers did not differ greatly from non-career-oriented officers in terms of the importance they attached to most job-related general needs. However, these two groups did appear to differ in the importance they attached to three need areas closely related to the major differences between a military and a civilian career. Ratings of the possibility of satisfying these general needs revealed that career-oriented officers had greater optimism regarding future satisfaction of their needs in the Air Force than did non-career-oriented officers. When needs specifically related to Scientists and Engineers were examined, two need patterns emerged. Career-oriented officers rated research management and applied research higher in importance than did non-career officers, whose needs were stronger in areas of pure research and scientific achievement. Even in these specific need areas, the greater optimism of career-oriented officers was apparent. Proper utilization was clearly related to career intent. There was also an indication that proper utilization may mean different things to career and non-career-oriented officers, since the two groups appear to have different need patterns. A strong relationship was found between career intent and preferred professional identity; non-career-oriented officers tended to prefer a professional-Scientist or Engineer identity over the professional-officer identity. Several other items support the possibility that leaving the Air Force is an action consistent with the officer's primary role preference and may represent a way of reducing role conflict. There were, in addition, significant relationships between career intent and the attitudes of others exerting influence on the role performance of the officers. Career decisions apparently are influenced by the wife, parents, and supervisor of the Scientist or Engineer. There were significant correlations between career intent and items dealing with the officer's evaluation of

his co-workers, peers, and supervisors. The career-oriented officers were more optimistic than the non-career officers about the competence and quality of future role set members. Role restrictions imposed by Air Force organizations had a negative impact on career intent, and again the restrictions seemed to be most bothersome to the officer with a professional Scientist or Engineer identity who desired a research career rather than a management career. The confusion of two sources of authority, one based on rank in the organization and the other based on knowledge or expertise, was significantly related to career intent. Non-career officers significantly preferred colleague supervision to rank authority supervision. Upward mobility through promotions was related to career intent. Non-career Scientists and Engineers had little desire to move into positions requiring a decrease in research activity and an increase in managerial activity. The difference in optimism between career-oriented and non-career-oriented officers was clearly shown in the significant impact on career intent of reassignment uncertainty. Current reassignment policies seem to be incompatible with the professional-scientist orientation of non-career officers. Surprisingly little relationship was found between career intent and merit promotion variables although the optimism of career-oriented officers was clearly visible. The status of a military career did not systematically relate to career intent. Status was related to career intent only when the items dealt with supervision by civilians.

The results raised numerous questions for future research, particularly when viewed from the frame of reference provided by the modified model. The important area of research suggested by this paper involves identifying the sources of pre-commissioning career attitudes, the stability of these attitudes, and the impact of these attitudes relative to the impact of active duty experiences.

Conclusions

1. A decision to stay in, or to leave, the Air Force is a career decision which may or may not be related to active duty experiences.
2. A modified model based on sociological and psychological considerations seems more appropriate than the typical organizational retention model for interpreting the results of military retention studies.
3. On a variety of variables studied, career-oriented Scientists and Engineers revealed a need structure divergent from the non-career-oriented Scientists and Engineers. The primary difference seemed to be a managerial, applied research orientation on the one hand and a pure research, scientific achievement orientation on the other. The Air Force career seems most desirable to officers with the former orientation.
4. Career-oriented and non-career-oriented officers agree on the importance of many needs, but the career-oriented officer is more optimistic about attaining satisfaction of these needs while in the Air Force.
5. Research is needed to identify the sources and relative impact of attitudes formed prior to commissioning, since these attitudes may contribute greatly to the decision regarding an Air Force career.

This summary was prepared by J.M. Thomas, University of Nebraska at Omaha.

TABLE OF CONTENTS

	Page
I. Introduction	1
II. Organizations and Turnover	1
Organizations as Contrived, Open Social Systems	1
Organizations as Competitors for Scientific and Technical Input	1
Frames of Reference for Investigating Turnover	2
III. The Meanings of Turnover	3
Turnover as a Reflection of Unrewarding Experiences	3
The Typical Retention Model	3
Assumptions Underlying the Typical Retention Model	4
Critical Comments Regarding the Typical Retention Model	4
Implications for Military Turnover Research	5
Turnover as a Reflection of Pre-Service Socialization	5
The Modified Retention Model	5
Support for the Modified Retention Model	6
IV. The Organizational Dilemma Among Professionals in the Air Force	9
The Organizational Dilemma	9
Some Basic Concepts	9
Alienation and the Professional	10
Chronic Conflict for Professionals in Organizations	11
Identification of Correlates of Career Intent Among Air Force Scientists and Engineers	11
Purpose and Method	11
Sample	13
Results	13
V. Summary and Conclusions	27
References	28

LIST OF TABLES

Table	Page
1 Percentage in Each Career Intent Category Reporting Various Parental Attitudes	8
2 Correlations Between Career Intent and Ratings of the Importance and Possibility of Attaining General Job Rewards or Conditions	15
3 Correlations Between Career Intent and Ratings of Importance and Possibility of Attaining Specific Job Rewards or Conditions	16

List of Tables (Continued)

Table	Page
4 Correlations Between Career Intent and the Match Between Expectations and Reality	17
5 Correlations Between Career Intent and Items Referring to Officer Utilization	18
6 Correlations Between Career Intent and Items Related to Role Conflict and Professional Identity	19
7 Correlations Between Career Intent and Items Reflecting Influence of Role Set Members	20
8 Correlations Between Career Intent and Items Referring to Competence of Peers and Supervisors	21
9 Correlations Between Career Intent and Items Referring to Freedom and Organizational Role Restrictions	22
10 Correlations Between Career Intent and Items Regarding Colleague Supervision	23
11 Correlations Between Career Intent and Items Dealing with the Nature of Upward Mobility in the Air Force	23
12 Correlations Between Career Intent and Items Related to Reassignment Uncertainties	24
13 Correlations Between Career Intent and Items Related to Merit Promotions	25
14 Correlations Between Career Intent and Items Dealing with Status of Officer and Air Force Career	26

LIST OF FIGURES

Figure	Page
1 Hypothetical representation of the relative effect of military experience on career decisions of officers having different career intentions at time of commissioning	6
2 Average career intent at time of commissioning and time of the survey for officers from various commissioning sources	7

RETENTION OF SCIENTISTS AND ENGINEERS IN THE AIR FORCE: A MODIFIED MODEL FOR INTERPRETING CORRELATES OF CAREER INTENT

I. INTRODUCTION

Turnover is a basic problem for many organizations. The Air Force is no exception. This paper reports an attempt to identify some of the factors involved in the rather high turnover rate among a particularly crucial subset of Air Force officers—the Scientists and Engineers.

As a point of departure, there is a discussion of the nature of organizations and the importance of turnover, particularly for the Air Force. This is followed by consideration of the meanings of turnover and the presentation of a modified model for turnover research in military organizations. Finally, the results of a survey of a group of scientific and engineering officers are presented. This survey examined relationships between career intent of officers on active duty (i.e., their stated intent with respect to making the Air Force a career) and a variety of social and psychological variables.

II. ORGANIZATIONS AND TURNOVER

Organizations as Contrived, Open Social Systems

An organization is a type of social system. As a social system, it consists of the patterned activities of a number of individuals (Katz & Kahn, 1966). Organizations are thus dependent upon the presence of people (Argyris, 1962). Katz and Kahn (1966) stress this point frequently and make the statement that "... human effort and motivation is the major maintenance source of almost all social structures (p. 9)." Turnover represents loss of people; although an organization can have a very high rate of turnover and still survive, it is not generally considered to be a desirable characteristic for organizational effectiveness.

Organizations should be regarded as open systems (Katz & Kahn, 1966). One implication of this point of view is that organizations depend on their environment for survival. An open system must import energetic input from its environment. This input includes not only the raw materials to be processed, but also the people necessary for maintaining the social system. As a result, most organizations include a maintenance subsystem whose primary function is preserving the larger

system. This maintenance subsystem attends to the problems of attracting personnel into the organization and keeping them functioning effectively in it. These are necessary, though not sufficient, conditions for organizational survival.

The goal of the maintenance subsystem is survival of the organization. Several devices are used to accomplish this function. They include selective recruitment, indoctrination or socialization, and rewards or sanctions (Katz & Kahn, 1966). In view of the dependence of organizations on people, the primary concern of the maintenance subsystem is achieving a balance between human input, retention, and turnover. The organization must not only attract members, it must also retain them. Since social organizations in our time and culture have moved toward a reward system, rather than a punishment system, for holding members, turnover problems are usually regarded as evidence of inadequate organizational attractiveness. More specifically, excessive turnover represents a failure of the maintenance subsystem.

In addition to being social and open systems, a third important characteristic of organizations is their contrived nature. They are man-made and not biological systems (Katz & Kahn, 1966). In most cases they are held together by a control system and psychological inducements, rather than being held together in a biological or symbiotic relationship. Establishing and defining an inter-related pattern of organizational roles in no way guarantees that human beings will take these roles or remain in them. Most students of organizations assume that people must receive or expect to receive rewarding experiences as organizational members if the organization is to persist. This premise guides much of the research and policy making related to organizational turnover.

It is the contention of this paper that military organizations should modify this assumption, or basic model. There are reasons to believe that rewarding experiences will not necessarily lead to a reduction of voluntary turnover in the military.

Organizations as Competitors for Scientific and Technical Input

Organizations are open systems dependent on maintenance input. They are not held together by symbiotic or biological relationships; thus, they find themselves in open competition for highly

variable human resources. Drysdale (1968) emphasizes this "free market" competition and stresses the fact that the Air Force is neither unique nor exempt in this regard. To survive as a social system, the Air Force must attract and hold members. To do this it must compete effectively in a supply and demand situation that favors the human resource. As Drysdale points out, the cream of the supply, particularly with regard to scientific and technical capabilities, tends to go where the most desirable compensation is offered. The short supply of scientific and technical resources combines with the great demand for their talents to make this a crucial problem for all organizations.

It is not known whether the Air Force suffers from this problem to a greater or lesser degree than its competitors. It is known that officials concerned with Air Force mission accomplishment repeatedly stress the critical nature of the turnover problem among their Scientists and Engineers. For example, in 1965, Frederick Seitz, Chairman of the Defense Science Board, highlighted the need for retention of scientific and technical officers in order to fill the need for technically trained high-ranking officers (Drysdale, 1968). Any organization relying on promotion from within must retain adequate numbers to fill management positions. A further example comes from a statement by General Schreiber, former Commander of Air Force Systems Command (Drysdale, 1968). As the primary user of Air Force scientific and technical resources, he considered retention of Scientists and Engineers among junior officers as a must for the continued accomplishment of the Air Force mission in general, and the mission of Air Force Systems Command in particular.

For organizations, in general, survival demands an adaptive subsystem responsible for meeting the requirements of a changing environment (Katz & Kahn, 1966). In the Air Force, this is the crucial function of research and development. It is clear that survival of the Air Force, as is true of other organizations, demands retention of technically trained human resources capable of serving as an adaptive subsystem, in order to meet the demands of a changing environment.

The Air Force is an open, contrived social system, and there is clear evidence of concern for retention of quality personnel, particularly Scientists and Engineers. Even the personnel policies of the Air Force Systems Command emphasize the problem of retaining this scarce human resource in a competitive market that allows great mobility

from organization to organization (Drysdale, 1968). Yet, in spite of this concern, it is equally apparent that the Air Force has not been able to curtail turnover among Scientists and Engineers (Lang, 1964).

Attempts to explain this failure begin with the assumption that the experiences of organizational members must be rewarding if they are to stay in the system, especially if they have the freedom to move in and out of the organization (Zald & Simon, 1964; Katz & Kahn, 1966). This assumption underlies most turnover research in both military and non-military organizations. Based on this assumption, the question is frequently asked, what can the organization (Air Force in this case) do to reduce the loss of already scarce Scientists and Engineers? Attempts to answer this question have tried to identify variables related to turnover, or in many cases, career intent. The survey to be discussed later was just such an attempt, but there have been several others. Drysdale (1968) presents a summary and review of a number of other studies conducted with samples of Air Force officers.

Frames of Reference for Investigating Turnover

There are at least two frames of reference available for the study of organizations and the behavior of people in them (Katz & Kahn, 1966; Miller, 1964). Psychology is one frame of reference commonly employed. Katz and Kahn (1966) are not satisfied with the results of various applications of this approach, since it includes an apparent inability or unwillingness to deal with the facts of social organization and social structure. They claim that psychologists tend to ignore the social context in favor of an individualistic orientation, as if behavior occurs in social vacuum. The second frame of reference is that of sociology. Miller (1964) states that the demands made by the social structure of the organization may be more important than personality in determining the behavior of a worker. Katz and Kahn (1966) are not happy with this point of view either. They object to the tendency of sociologists to treat the superorganic or collective level without regard for individual differences.

Both of these criticisms are probably exaggerated, but nevertheless, Katz and Kahn (1966) make a cogent plea for an open system theory which combines the best of these two frames of reference. They clearly question the justification for preserving the sanctity of specialized disciplines in the social sciences. They argue that the

distinctions between sociology and psychology are more a result of concepts than a result of the nature of the data at the empirical level. The two disciplines seem to be utilizing different levels of generalization in the concepts they apply to the same phenomena, namely, the behavior of human beings (Katz & Kahn, 1966). In line with this eclectic point of view, both psychological and sociological variables were included in the study to be reported in this paper.

III. THE MEANINGS OF TURNOVER

Turnover as a Reflection of Unrewarding Experiences

The Typical Retention Model

It was noted earlier that Katz and Kahn (1966) stress the importance of rewarding experiences as a basis for holding members in an organization. Zald and Simon (1964) imply that the military is no exception. Attempts to find the causes of turnover in both military and non-military organizations rely heavily on this basic assumption. It is apparent that both psychologists and sociologists expect to find a relationship between turnover and the nature of experiences provided by organizational membership.

Although the product of these organizational experiences is variously called job satisfaction, alienation, morale, etc., these concepts all seem to be referring to the same empirical phenomenon—an attitude, or affective state, related to membership in the organization. Price (1968), in his recent collation of social science knowledge about organizations, considers satisfaction (or dissatisfaction), alienation, and morale to be synonymous. Further, he regards morale as the degree to which an individual's motives are gratified.

Psychologists and sociologists will, in all likelihood, bristle at such loose treatment of their concepts. The fact remains, however, that both disciplines are dealing with an affective state, or attitude, the source of which is assumed to be organizational membership. For simplicity, morale is the term used in this paper to refer to the affective state produced by organizational membership. The intention behind this callous pooling of concepts is not to discredit the differences in nuance or depth of meaning between them, but rather, to justify the combined use of both psychological and sociological variables in the study of turnover.

The typical approach in turnover research involves collecting descriptions from, or assessing the attitudes of, a group of people with regard to a variety of organizational variables. Morale is inferred from these data. The various attitudes, descriptions, or evaluations are then related to actual turnover at a later date, or to a statement of current intentions regarding future membership in the organization. In Air Force studies, career intent, the latter criterion, is most frequently used.

Recent reviews of the literature (Brayfield & Crockett, 1955; Herzberg, Mausner, Peterson, & Capwell, 1957; Fournet, DiStefano, & Pryer, 1966) tend to agree that turnover is usually found to be negatively and significantly related to various measures of morale. People who leave organizations, or those who intend to leave, are usually significantly lower in morale than people who stay, or intend to stay. These reviews appear to support the typical model regarding the relationship between organizational membership and rewarding experiences. Although most of the studies in these reviews were conducted in non-military organizations, Drysdale (1968) presents a summary of similar studies on Air Force turnover. It is clear, therefore, that the same model is being used in both military and non-military research.

A discomfiting fact about turnover research is noted by Lyons in an unpublished manuscript, and also by Katz and Kahn (1966). After reviewing a large number of turnover studies completed as of 1965, Lyons concludes that there are numerous cases in which a significant relationship between morale and turnover is not found. This is especially true when group and organizational levels of analysis are used. Moreover, among the studies in which a significant relationship is found, there appears to be no discernible pattern of variables consistently related to turnover across studies.

In part, this finding may be due to the incredible variety of measures used to assess morale. Use of the term job satisfaction is a case in point. There seems to be little consistency among job satisfaction studies in terms of the variables included in the measures used. It might also be true that the typical model is not universally applicable. Significant relationships between morale and turnover may not always exist, even among non-military organizations.

In view of these findings, it seems appropriate to examine some of the assumptions underlying the typical model of turnover, particularly as they relate to the military situation.

Assumptions Underlying the Typical Retention Model

Approaching voluntary turnover in the military as a function of morale assumes that the same model applies to both military and non-military organizations. This, in turn, assumes that the decision to remain in a military organization is the same in nature as the decision to remain in a non-military organization. This carries with it all of the basic assumptions made by the model itself.

The most important underlying assumption of the model is that morale, and presumably retention, is a function of the experiences the individual has while he is a member of the organization. Drysdale (1968) documents this assumption by noting the goal of most turnover research. In most cases the investigator is trying to identify areas where improvements are needed in order to make organizational membership more attractive or pleasant. Drysdale supports his claim by citing actual improvements in the Air Force resulting from this kind of research.

Another implicit assumption of the model is that the decision to leave or remain in the organization is free to vary and is thus sensitive to the affect produced by experiences during membership. The implication is that a decision to stay in an organization is not just an extension of attitudes developed prior to membership. Stated in a slightly different form, the model assumes that a decision to remain in an organization is made while the individual is a member of that organization, and not before. In military terms, these assumptions imply that a decision to make the Air Force a career is made as a result of, and during, the active duty period.

Applying the typical model to both military and non-military organizations assumes that voluntary turnover means the same thing in any organization. It is the hypothesis of this author that these assumptions may not apply to military organizations. The implications of these assumptions may not be valid, and the typical retention model may not be entirely appropriate for the military situation.

Critical Comments Regarding the Typical Retention Model

To pursue this hypothesis, one might speculate about the difference between a decision to remain in a military organization and a decision to remain in a non-military organization. The former is essentially a vocational or career decision—a decision to

become a professional military officer (Zald & Simon, 1964; Janowitz, 1964). Is this the same as a decision to pursue some specific career as a member of organization A rather than organization B? Possibly not!

An individual's decision to remain in the military is not just an organizational choice; Lang (1964) and Janowitz (1964) make this point indirectly by referring to the military professional. Lang stresses the lifetime career commitment involved in the decision to remain in a military organization. Additional evidence comes from Drysdale (1968), who argues for separation of the scientist and manager aspects of a military career. This is an indication of one possible difference between deciding to be a scientist in the military and simply choosing to be a scientist in one non-military organization rather than another.

Deciding to remain in the Air Force is a career or vocational decision; a vocational decision, according to Roe (1964), is a developmental process, tied to personality development and not dependent on one choice made at one point in time. The decision to pursue one's chosen vocation in one organization rather than another is probably less a matter of personality development than is the choice of the vocation in the first place.

Extending this reasoning to the issue at hand, one would expect cultural influences, or socialization, to play a greater role in turnover among military organizations than among non-military organizations. Whyte (1961) devotes considerable attention to the relationship between culture and career decisions. With regard to the military, cultural influences would operate by establishing a career intent before the individual enters the service. Further, these prior attitudes and intentions would moderate the effect of actual military experience.

The difference between military and non-military organizations in this regard is an empirical question. It is hypothesized that cultural influences, in the form of attitudes and intentions prior to organizational membership, have a greater impact on turnover in military organizations than in non-military organizations. Zald and Simon (1964) make a similar statement. If such is the case, several of the assumptions in the typical retention model would not apply to the military situation.

Retention and its converse, turnover, are the behavioral bases for inferences regarding attitudes toward the organization, or in the military, toward

a career. Actual military experience can, therefore, be viewed as a persuasion attempt. This is related to a discussion by Breer and Locke (1965) which considers task experience as a source of attitudes. This point of view agrees with the typical model, but carries it one step farther. If the hypothesis regarding the effect of socialization is correct, those to be persuaded by military experience hold pre-existing attitudes ranging from extremely favorable, through neutral, to extremely unfavorable.

Social psychology provides an abundance of literature on persuasion that seems relevant at this point. For example, Secord and Backman (1964) conclude that people holding extreme attitudes are more difficult to persuade than those holding neutral attitudes. They also note that attempts to change attitudes are resisted in several ways. Some of the resistance mechanisms are labeled selective perception, selective interpretation, and selective exposure. All of these mechanisms would operate to keep an initially extreme career attitude from changing. Lowin (1968) discusses the importance of "unfreezing" crucial attitudes before organizational experiences will have much influence.

Further, relevant literature exists on the effects of coercion in attitude change. Cohen (1964) concludes that a minimum of coercion is likely to be more successful than greater degrees of coercion, particularly when the persuasion attempt involves exposure to actual task experience. As Kelman suggests, coercion produces compliance but not identification or internalization (Secord & Backman, 1964).

In the military situation, at least in recent years, a large proportion of the input has been coerced (Zald & Simon, 1964). Applying Cohen's findings, it is unlikely that an extremely negative or positive attitude toward a military career would be altered by actual experience. By way of comparison, non-military organizations receive input that is less coerced, if not entirely voluntary, so once again the military and non-military situations do not seem to be synonymous. Caution is urged in applying the same retention model to both types of organizations.

Implications for Military Turnover Research

Definite implications for military turnover research can be derived from the discussion of the typical retention model. First, it seems clear that the typical model should not be applied to the military situation unless it is modified to take into account attitudes of the members formed prior to their entrance into the organization. Second, in

the absence of control for premembership attitudes, investigators of military turnover should not expect large relationships between retention and various aspects of organizational experience. These implications are elaborated and discussed in the next section.

Turnover as a Reflection of Pre-Service Socialization

The Modified Retention Model

In view of the previous critical comments, it would seem appropriate to state a modified model for attempts to relate morale and turnover: Voluntary turnover in the military situation is a function of attitudes formed prior to organizational membership, as well as attitudes formed during active duty experience, and the relative effect of active duty experience will depend on the pre-service attitudes. This model, is illustrated by the hypothetical curve shown in Figure 1, which represents the relative effect actual military experience has on individuals at each point along a continuum of pre-service career intent. The positive and negative aspects of military experience should have the greatest impact on those who enter the system completely undecided about a military career. By the same token, actual experience should have the least effect on those who enter the military with firmly established career intentions.

The actual shape of the curve remains to be determined by empirical evidence, but it is not likely that the ends of the curve will reflect complete absence of effect due to actual experience. There are at least two reasons for this. First, there must be allowance for error of measurement in the assessment of original career intent (Zald & Simon, 1964). Second, there must be allowance for unusual cases in which particularly important rewarding and unrewarding experiences cause a change in career intent.

Figure 1 can also be interpreted as a plot of expected correlation coefficients between morale and either career intent or actual turnover for samples of officers at each point along the continuum of initial career intent. It should be apparent that attempts to relate evaluations of active duty experiences (morale) to career intent, or actual turnover, will be attenuated by the effect of pre-service attitudes. The correlations will be lowered by the relatively small effect that active duty has on those individuals entering the service with firmly established career intentions. To some extent, this model may also apply to non-military organizations, but the degree of attenuation

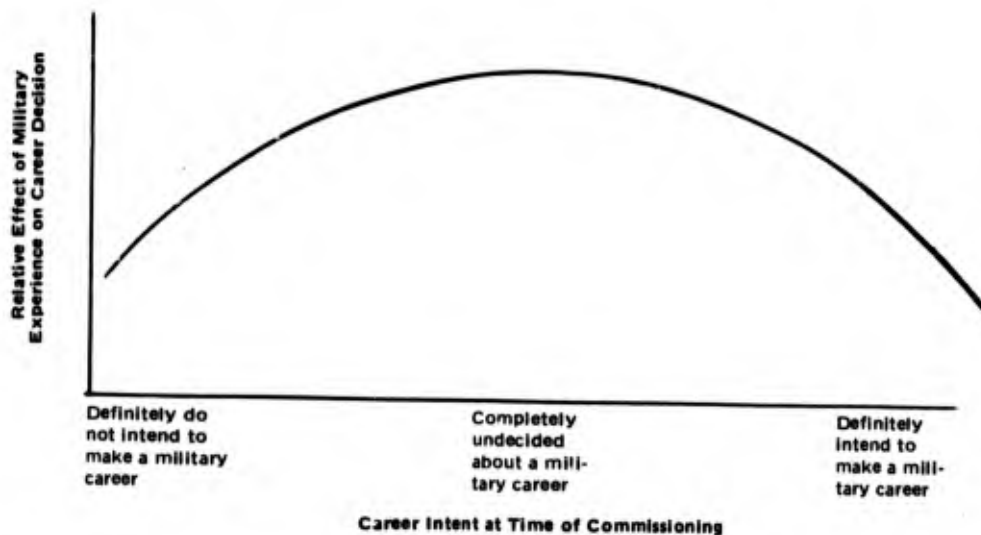


Fig. 1. Hypothetical representation of the relative effect of military experience on career decisions of officers having different career intentions at time of commissioning.

Support for the Modified Retention Model

In addition to the foregoing general arguments, there is substantial evidence in military turnover research to offer post hoc support for the modified model. In general, this support consists of the following data: differences in retention among the various sources of officer input; stability of initial career intentions; evidence of socialization and family pressures; evidence of occupational inheritance; relationship between satisfaction with present assignment and career intent; and the apparent need for the draft as a source of input coercion. Each of these areas of support is examined individually.

1. *Differences between sources of officer input.* Katz and Kahn (1966) note the importance of formal indoctrination programs used by organizations to instill psychological membership. In the military, the indoctrination of officers is delegated to the various sources of officer input, such as the service academies, Reserve Officer Training Corps (ROTC) programs, and Officer Training School (OTS). Zald and Simon (1964) document the stronger career commitment found among service academy graduates than among ROTC graduates in all services. Lovell (1964) and Lang (1964) report similar findings. Evidence of different retention rates among Air Force officer sources can be found in Ewing and Alvord (1965) and in Ewing (1967). These reports summarize several studies showing consistent differences between graduates of different officer training programs in terms of their career intent at the time of commissioning.

The study reported in this paper also lends support to the modified model. Figure 2 presents the average career intent, both at the time of commissioning and at the time of the survey, for a sample of Scientists and Engineers from each of the various commissioning sources.

Although average career intent of officers from all sources apparently increased from the time of commissioning, there were clear-cut differences among the input sources at both points in time. The ROTC and the OTS commissioning sources provided officers who were, on the average, significantly less career oriented than officers from the other sources (t tests were significant at $p < .05$), both at the time of commissioning and at the time of the survey.

These data must be interpreted with caution. Career intent at the time of commissioning was actually assessed at the time of the survey, or in other words, some length of time after commissioning. The officers were asked to recall what their career intent had been at commissioning. The possibility of error due to simple forgetting, or even deeper distortions of memory, cannot be ignored (Zald & Simon, 1964). The magnitude of the error, if any, is not known, but caution is urged in drawing conclusions from these data. The important point for this discussion is the confirmed existence of differences between officer input sources in terms of career intent, both before and after active duty experience.

Consideration of the reasons for these differences suggests at least two alternatives. First, it is

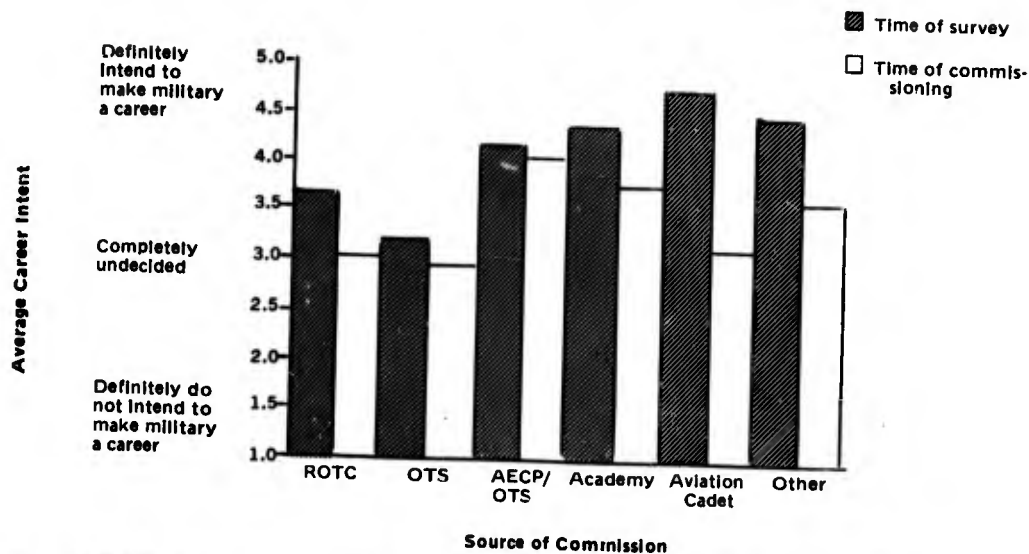


Fig. 2. Average career intent at time of commissioning and time of the survey for officers from various commissioning sources.

possible that these various input sources are not equally effective in their attempts to instill psychological membership or career commitment. This is probably true, but a more likely explanation is preselection of input to these various sources. It is widely recognized that the initial input to service academies is highly selected as well as intensely indoctrinated. The rigors of academy training result in an output even more strongly career oriented than the input. The now defunct Aviation Cadet program produced pilots almost exclusively. Having a pilot's rating was strongly related to career intent in the present survey, and flying was the most frequently mentioned reason for becoming an Air Force officer. Positive career intent was, therefore, the most prevalent attitude among officers from this source. The Airman Education and Commissioning Program (AFCP/OTS) produces officers from the enlisted ranks. Volunteers for this program were willing to spend a normal officer's tour on active duty (four or five years) in addition to the time spent as an enlisted man, suggesting that they had a career motivation even before they were commissioned as an officer.

In sum, the differences in retention rates of the various input sources support the notion that career intent, for some proportion of the officer corps, is determined prior to active duty experience. Career intent may, in fact, be determined prior to indoctrination attempts by the various input sources. The extent to which career intent is determined by the exposure to military life provided during officer training is not known, but

the relative effectiveness of indoctrination programs during officer training probably hinges on the nature of the input to the training program. In the same way, active duty experience may be effective in persuading an officer to make the Air Force a career, but only if he is receptive to the possibility of being influenced.

2. *Stability of career intent.* If socialization processes create an intention regarding a military career before entry into the organization, and if this intention is relatively unaffected by actual experiences, one would expect to find evidence of attitude stability over time. Ewing and Alvord (1965) report several Air Force studies that indicate career motivation is indeed stable and relatively insensitive to active duty experience. For example, they report a 1962 study by Alvord in which he found that the actual rate of retention among ROTC officers closely approximated the rate predicted by career intent statements prior to active duty. These investigators also present evidence from a 1956 study by Flyer, indicating that career intent stability may be one-sided. In examining the effect of a flight training program, Flyer found that students who stated they had no intentions of making a career in the Air Force rarely changed their minds, while students who were initially favorable toward an Air Force career shifted toward unfavorable attitudes in large numbers. Flight training is probably one of the significant decision points for those who intend to stay in the Air Force if they like flying.

These studies imply that actual turnover, or career intent at some point in time after entrance into the Air Force, can be predicted by knowing the individual's pre-service career intent. For the sample of Scientists and Engineers in the present study, the correlation between initial career intent and career intent at the time of the survey was .30 ($p < .01$). This means that there was a significant tendency for these officers to report the same career intent for pre-commissioning and current points in time. Interpret this relationship with caution in view of the method used to assess initial career intent. Zald and Simon (1964), using a similar recall design, conclude that initial career intent is only slightly related to later intent. See also Hardin (1965) regarding recall studies.

Conclusive evidence of the stability or instability of initial career intent will have to come from a longitudinal study in which initial career intent is obtained at the time of commissioning instead of assessing it by recall at some later date. Such a study is under way in the Air Force, but enough time has not elapsed for actual turnover data to be collected. At the end of the first year of this study there was a shift away from the career-uncertain category and also a trend away from the positive career intent category (Ewing, 1967). Separate correlations computed between initial career intent and career intent at the end of one year, for each of the commissioning sources, ranged from .47 to .62. Stability of initial career intent varied, as expected, among the input sources, but again this was probably the result of both preselected input and quality of indoctrination. This longitudinal study adds further support to the modified model by demonstrating the apparent stability of initial career intent, even in the face of active duty experience.

3. *Occupational inheritance.* The general literature on vocational choice supports the notion that socialization influences the choice of careers, at least in terms of the major categories—professional, managerial, skilled, and unskilled. Gross (1964) summarizes this literature and concludes that there is a definite tendency for a son to be found in the same broad vocational category as his father.

Specifically relevant to the military situation is the relatively low turnover rate found by Lang (1964) among officers who have a family tradition of military service. He also found differences in rate of retention among officers from different social classes. The reasons for this are undoubtedly complex because a number of variables are related to social class. These include education level, as well as perception of the social status and mobility of a military career. Zald and Simon (1964) suggest that military career choices, more than most occupations, have been nourished in family and regional traditions. They also suggest that a military career represents a choice of a disciplined and dangerous career, seemingly isolated from the major values of American society.

In view of this support for socialization and occupational inheritance, it was hypothesized that the officer's perception of the attitudes of his parents regarding a military career would be significantly related to career intent. This was not the case in the present study. The correlation between these two items was only .09, indicating that career intent at the time of the survey was not systematically related to perceptions of parental attitudes. Initial career intent was even less related to parental attitude.

Table 1. Percentage in Each Career Intent Category Reporting Various Parental Attitudes

Parental Attitude	Percent in Present Career Intent Category		
	Definitely or probably do not intend to make an AF career (N = 65)	Completely uncertain about an AF career (N = 37)	Definitely or probably intend to make an AF career (N = 232)
Blank or not applicable	0	3	4
Parents somewhat or extremely displeased about Air Force career	20	22	21
Not sure how parents feel (felt)	55	32	20
Parents somewhat or extremely pleased about Air Force career	25	43	55

Table 1 presents a collapsed two-way distribution showing the trend of the responses to the items concerned with parental attitude and present career intent. It should be noted that 28 percent of the sample reported uncertainty with respect to parental attitude, while an additional 3 percent said the item did not apply because their parents were deceased. Table 1 reveals that 55 percent of the officers indicating a probable or definite intent to make the Air Force a career also reported favorable parental attitudes. In contrast, only 25 percent of the officers indicating probable or definite intent not to make the Air Force a career reported favorable parental attitudes. It is interesting to note that 55 percent of the officers intending to leave the Air Force reported lack of certainty about parental attitude, while only 20 percent of the officers intending to stay in the Air Force reported lack of certainty about parental attitudes. In spite of the low correlation, responses to these items seem to support belief in the importance of socialization processes in the choice of a military career.

4. *Satisfaction with present assignment.* Operating under the assumptions of the typical retention model, one would expect to find a strong relationship between career intent and satisfaction with present assignment. The literature reviews by Brayfield and Crockett (1955), Herzberg *et al.* (1957) and Fournet *et al.* (1966) indicate that this is frequently the case in non-military organizations. Such a relationship follows from the expected influence of job experience on organizational membership. The modified retention model predicts not a strong relationship but, rather, an attenuated relationship between measures of immediate job satisfaction and retention.

The present survey included a question regarding overall satisfaction with present assignment. The correlation between this item and career intent at the time of the survey was .13. Although this correlation was significant ($p < .05$), it certainly does not indicate a large relationship and is, therefore, interpreted as supporting the modified model.

5. *Military in our culture.* Katz and Kahn (1966), in their open-system view of organizations, note that systems adapt to their environment. In an effort to cope with external forces, systems attempt to acquire control over them. The draft is a form of control used by the military, and according to Lang (1964), it is necessary for survival of the system. He speculates that the military services would probably encounter difficulty on a completely voluntary basis. With regard to military

turnover problems, Lang concludes that many of the recruits procured under draft pressure are not career motivated, which means high turnover is likely and manpower problems chronic. Zald and Simon (1964) regard entrance into the officer corps as one step from coercion for many. The need for this coercion is further testimony to the difference between military and non-military organizations, and to the existence of attitudes regarding a military career that are not directly a product of organizational membership.

A similar stand is taken by Gustafiero (1965) who claims that current societal emphasis on commercial values and business success leads to the belief that choice of a military career is a weak choice representing an attempt to avoid the realities of a competitive society. He goes on to suggest that this is one reason why ROTC graduates rarely enter the service with the idea of pursuing a military career.

Research is needed to confirm or deny Gustafiero's statements, but he does illustrate the possible impact of societal influences on the military career decision. The need to draft men for service suggests, by its very existence, that the reasons for high military turnover may have their roots in cultural tradition and socialization processes. One would hardly expect three to five years of active duty, even if extremely rewarding, to overcome the influence of roughly twenty years of socialization.

IV. THE ORGANIZATIONAL DILEMMA AMONG PROFESSIONALS IN THE AIR FORCE

The Organizational Dilemma

Same Basic Concepts

The modified retention model for military organizations is an attempt to place the role of active duty experience in proper perspective. The effect of organizational membership is conditional. It depends, in part, upon the initial commitment, or career motivation, of the individuals being studied. The model does not imply that turnover is completely unrelated to experience. Further, the model is not an attempt to deny the impact of the organizational dilemma. This important concept, frequently encountered in organizational literature, would certainly have its place in the career decision of those who are initially undecided. In addition, firmly established initial career motivation may be a product of pre-service perceptions of the dilemma associated with membership in a

military organization. The research presented in this section was an attempt to examine various aspects of the organizational dilemma as perceived by a sample of professionals (Scientists and Engineers) in the Air Force.

The organizational dilemma is defined by Etzioni (1964) as the inevitable strain between organizational needs and personal needs. This strain takes several forms: rationality vs. non-rationality; discipline vs. autonomy; formal relations vs. informal relations; management vs. workers. Argyris (1960, 1962) describes the organizational dilemma as a lack of congruency between the needs of a healthy individual striving for maturity and the demands made by the organization. He stresses specialization, directive supervision, and managerial controls as sources of the incongruency.

The importance of this dilemma stems from the impact it has on the members of organizations, and alienation seems to be the common theme in discussions of this impact. For example, Argyris (1962) takes the position that organizational demands force man to separate from himself. Similarly, W.F. Whyte (1961) refers to the dehumanizing impact of organizational strategy and the resulting alienation from self that occurs, particularly in lower echelon jobs. In other terms, Katz and Kahn (1966) see organizational roles as deliberate attempts to reduce human variability. More specifically, they see roles as a means of reducing contamination due to the personality of the worker. In his well known book *Organization Man*, W.H. Whyte (1956) directly attacks the conformity, or reduced variability, produced by suppression under organizational pressures. It is noteworthy that Whyte does not restrict this discussion of conformity to lower echelon employees.

The references cited are certainly not exhaustive, but they serve to illustrate two important points. First, organizational membership may have a negative impact on self-integration, self-esteem, and self-expression. In fact, this impact may be an inevitable result of organizational membership (Etzioni, 1964). Second, the impact is most clearly seen in and most commonly illustrated by lower echelon jobs. Although, it is not explicitly restricted to any single organizational level, the concept of alienation is rarely applied to professionals in organizations.

Alienation and the Professional

Students of organizations, like W.F. Whyte (1961) and Argyris (1960), have a tendency to

illustrate the impact of organizational membership by focusing on the most clear-cut examples. For this reason research on alienation has dealt primarily with individuals in jobs offering little opportunity for self-expression or self-actualization. There has also been a tendency to concentrate research in organizations with an assembly line, or in general, where the principles of scientific management have been maximized (Argyris, 1960).

These two qualifying conditions, and the trends in alienation research to date, might lead one to the conclusion that professionals are not likely to be alienated by organizational membership, at least not as much as workers on the assembly line. Slight support for this tentative conclusion can be gathered from definitions of the word professional, such as the one by Gross (1964). In his definition, Gross notes that a professional does work at the opposite pole from the repetitive routine of the assembly line worker. At first glance it would seem that alienation should not exist among professionals. There are reasons to regard this conclusion with suspicion, however.

Swados, as cited in Wrenn (1964), does not limit his use of the term alienation to factory workers alone. Swados believes that the sense of dreariness and the impersonalization of work are real for the office worker and the professional, as well as for the man on the line. Although Wrenn (1964) reacts defensively to the possibility that alienation can be found among middle class and professional employees, Cohen (1965) confirms Swados' notions by documenting the feelings of alienation among white-collar employees in a public employment agency. Cohen concludes from personal experience and participant observation that pressures in the organization, particularly in the form of managerial controls, bring dysfunctional results. These results occur as the employees adapt informally to encroachments on the individuality of their role performance.

One further source of evidence regarding the impact of organizational membership on managerial and professional employees is the high rate of turnover among college graduates during their first few years of employment. Schein (1968a) states that the dropout rate among highly educated men and women runs higher, on the average, than among blue-collar workers hired out of the hard core unemployed. Shapero (1968) refers to an unnamed nationwide study which found that 19 percent of the scientists and engineers who left a company had been there less than six months, 35 percent less than a year, and 85 percent less than

five years. Although these figures do not refer to percentages who leave organizations, it is interesting to note how soon turnover occurs. Schein (1968a) reports that 73 percent of a sample of management school master's degree graduates changed jobs at least once within the first five years after graduation. These figures are probably not limited to voluntary turnover only; therefore, inferences regarding morale must be made with caution.

It is interesting to note that Herzberg *et al.* (1957) report similar results. They found that the low point of morale commonly occurs in the 20-to-30 age group and, in each age group, among the employees with only a few years of company tenure. It is also noteworthy that most Air Force officers complete their obligated tour of duty, and thus have their first opportunity to leave the service, within five years after entering active duty. Combining these results suggests that Air Force officers probably experience the greatest alienation (or lowest morale) and the greatest desire to leave the military during their first year or two of active duty. Ewing (1967) has longitudinal data to partially support this contention. The impact of the organizational dilemma seems to occur soon after the individual enters the organization, at least among managerial level employees.

The nature of this impact is still unclear. Argyris (1960) and Herzberg (1968) are of the opinion that organizations perpetuate and reward immaturity by ignoring man's psychological need for growth. On a more empirical level, Schein (1968a, 1968b) has collected data on the reasons for the high turnover observed in his sample. He found that college graduates rapidly experience conflict between values established during their education and the values guiding the organization they join. (Oddly enough, the rational ideals of the graduates collide with irrational organizational values). The importance of Schein's finding is increased by the fact that he was studying management school graduates. One might hypothesize that this clash of values is even greater for graduates of scientific and engineering disciplines. The discussion to this point gives good reason for expecting alienation among professionals.

Chronic Conflict for Professionals in Organizations

There are a number of references concerned with sources of potential conflict for professionals in organizations. Only a few are cited here to set the stage for the study of Air Force Scientists and Engineers.

Moore and Renck (1957) conclude that professionals are chronically frustrated by a conflict between their expectations and values as professionals and the opportunities to achieve their ambitions in an organizational situation. One reason for this frustration is that non-professionals in superordinate organizational positions exert control over professionals in order to avoid being exploited by them (Gross, 1964). This control system in many organizations establishes a conflict between two bases of authority—knowledge on the one hand and bureaucratic position on the other. Further, Gross notes that supervision and evaluation by non-professionals is an especially irritating aspect of organizational membership for professionals because they face loyalty and identity conflicts in their supervised role performance.

Identity conflict and the resulting confusion are elaborated in a discussion by Katz and Kahn (1966). Potential conflict exists when an individual is only partially involved in a system. He can become confused regarding which system he is psychologically in at any moment. This partial involvement is the rule rather than the exception, so many organizations try to establish greater psychological commitment. One way of doing this is to establish an organizational ideology and make demands for loyalty to this ideology. Professionals tend to find this boring, and they adhere to the professional ideology that data win (Katz & Kahn, 1966). The conflict that arises in role performance under these conditions has been labeled a problem in "priority of commitment" (Katz & Kahn, 1966).

None of the references cited refer directly to alienation when discussing professionals. Fortunately, Weber provides the conceptualization necessary to make this point directly. Weber begins with Marx' famous notion of alienation in the working class. Marx claimed that the working class was being alienated from the means of its own production. By simple extension, Weber concludes that scientists in organizations are alienated from the means of inquiry (Etzioni, 1964). The next question is, what impact does alienation have on Scientists and Engineers in the Air Force?

Identification of Correlates of Career Intent Among Air Force Scientists and Engineers

Purpose and Method

The global purpose of this study was to identify factors related to satisfaction or dissatisfaction

with the Air Force. Specifically, a survey was designed to investigate a variety of local and Air Force-wide variables hypothesized to be related to each of two criteria. Two criteria were used because it was felt that affect toward the Air Force could be separated into satisfaction with present assignment and a more general criterion called intentions regarding an Air Force career. Although this paper deals only with correlates of career intent, the survey was designed to provide information of interest to one specific commander and his staff regarding local or base-level sources of dissatisfaction. It was presumed that the survey would identify factors under the control of local management that might be related to satisfaction with present assignment and to career intent as well. The focus of the survey was primarily on the local system and the Air Force system as a whole, rather than on the characteristics of individual officers.

The research instrument was designed by civilian and military psychologists at the Personnel Research Laboratory, Lackland Air Force Base. They worked in conjunction with a staff officer and the Junior Officer Council at the base to be surveyed. For purposes of anonymity, the base is referred to as Base X.

The survey was distributed during the period from September to November 1965 by the staff officer assigned to the project at Base X. It was sent to every officer on the base through the usual base mail channels. Upon completion, the surveys were returned to the staff officer on the base, who then mailed them back to the Personnel Research Laboratory for analysis.

Although the instructions insured anonymity, the officers were asked to give the last four digits of their serial number for purposes of comparing the characteristics of those returning the survey with those not returning a completed form. This comparison was made by matching the serial numbers and present grades on the surveys returned against a list of serial numbers and grades provided by the Base X personnel officer. No attempt was made to identify names or trace responses to individual officers, and there was no attempt by the researchers to follow up or stimulate return. In view of the desire for anonymity of the survey, it is not known what action, if any, was taken at Base X.

There were three sections in the survey. Section A was composed of 19 biographic and demographic items identifying pertinent characteristics

of the sample. It was included in order to test some hypothesized relationships between these types of variables and the two criteria.

Section B contained several types of items. There were 15 items, in multiple-choice format, dealing with attitudes toward general issues, satisfaction with the present assignment, and career intent. These items were followed by seven open-ended questions eliciting written responses regarding sources of satisfaction and dissatisfaction with present assignment, reasons for becoming an Air Force officer, and pertinent questions in need of answers before a career decision could be made. The next two items, in combination, were called the Importance-Possibility Scale (Harding & Bottenberg, 1962). The two items contained identical lists of 23 general job rewards, such as adequate job security and competent supervision. The first item asked for a rating of each job reward in terms of importance to the respondent. The second item asked for a rating of the possibility of obtaining each reward in the Air Force. Both ratings were made on five-point scales. The final item in section B was a list of 36 specific areas frequently found in previous Air Force surveys to play an important part in officer attitudes. The list referred to specific aspects of military service, such as quality of base housing and wearing of the uniform. The respondents used a five-point scale to indicate the importance they attached to each item in reaching their career decision; then they indicated the weight of each item in their decision, whether it was positive, neutral, or negative. All officers were instructed to complete sections A and B.

Section C, completed by Scientists and Engineers only, contained 20 items in multiple-choice format designed specifically to investigate a variety of factors hypothesized to be related to the career attitudes of Scientists and Engineers. Section C also contained a modified Importance-Possibility Scale which differed from the scale in section B in two ways. First, 26 job rewards or conditions were used; second, these were specifically oriented toward Scientists and Engineers instead of being generally applicable to all officers.

After completing sections A and B, each officer made his own decision with respect to section C. He based his decision on the survey instructions, which said that any officer whose primary or duty Air Force Specialty Code (AFSC) was 5516 or 5585 and any officer whose AFSC began with 25, 26, 27, 28, or 29 should complete section C. This definition of Scientific and Engineering officer was derived in consultation with the staff officer at

Base X. These Air Force Specialties represent the major areas in which Scientists and Engineers are utilized by the Air Force. Medical and dental officers are not included in this operational definition.

Sample

A total of 488 surveys were returned, representing a 76.5 percent return. Of these 488, 19 were rejected because of incomplete data and an additional 20 because the officers carried medical or dental specialty codes. The sample remaining for analysis contained 449, or 70 percent, of the original Base X population.

As expected in a survey of this length, there were a number of cases containing blank items. In order to avoid losing all of the data for these cases, estimated values were recorded for occasional omitted items. The estimated value for an omitted item was the mean response to the item by all officers with group membership characteristics in common with the officer who omitted the item; that is, officers from the same source of commission, in the same junior officer vs. senior officer category, and in the same Scientist and Engineer vs. non Scientist and Engineer category.

Data presented in this report include only the responses made by Scientists and Engineers to all sections of the survey. Of the 324 surveys returned by Scientists and Engineers, 3 were incomplete, leaving an *N* of 321 for analysis. The sample was primarily composed of officers in the following categories: lieutenants, 48 percent; captains, 35 percent; regular commissioned status, 63 percent; not rated for flying, 71 percent; married, 76 percent; commissioned through ROTC, 56 percent; between the ages of 20 and 29, 55 percent; between the ages of 30 and 39, 33 percent; on active duty less than 36 months, 37 percent; on active duty longer than 119 months, 34 percent; some college training through the Air Force Institute of Technology, 62 percent; either a primary or duty AFSC beginning with 26, 45 percent, or with 28, 45 percent; nature of present job described as research, 33 percent, or as development/engineering, 40 percent; education beyond the Bachelor's degree, 60 percent; engineering major, 63 percent; physical science major, 30 percent.

The extent to which this sample represents Air Force Scientists and Engineers in general is not known. Generalization of results must be made with caution. The nature of the mission at Base X suggests that this sample is probably unique in many respects.

Since the rate of return for all officers on Base X was 76 percent, it seemed necessary to compare the cases in the sample who returned the survey with those who did not. Two comparisons were possible, one based on grade and the other based on AFSC. The grade, or rank, distribution for all officers on the base was used to establish expected frequencies for comparison against the frequencies obtained in the sample of completed surveys. A chi square test of the discrepancy between expected and observed frequencies was not significant, suggesting that the group returning completed surveys was representative of the base population, at least in terms of grade. This chi square was based on the total officer population at Base X. Since 70 percent of the base population and 72 percent of the sample returning completed surveys were Scientists and Engineers, it was assumed that grade distribution of the Scientists and Engineers in the sample did not differ significantly from the grade distribution of all Scientists and Engineers on Base X.

The second comparison between sample and population involved the proportion of Scientists and Engineers in the sample. The proportion of Scientists and Engineers in the base population was used to establish an expected frequency against which the sample frequency could be compared. The chi square was not significant, indicating that the sample was representative of the base population, at least in terms of the proportion of Scientists and Engineers included.

Exactly how well the Scientists and Engineers in the sample represented the Base X population of Scientists and Engineers in respects other than grade is not known. Of major importance is the fact that the representativeness of the sample in terms of career intent is not known. It is possible that officers low in career intent would not bother returning the survey, but their survey responses would be the only source of information to establish this as a fact.

Results

The survey combined psychological and sociological points of view regarding morale and turnover. Although there are instances of item overlap, the integrity of these two frames of reference is maintained in the presentation of data. The results are presented under headings based on the major psychological and sociological concepts underlying the survey content. Each of the following concepts are discussed individually: satisfaction of needs; pre-service expectations; division of

labor; role conflict and role identification; role set pressures and influence; role set evaluations; role restrictions on freedom; bases of authority; upward mobility and role demands; reassignment system; promotion system; and status.

Inclusion of an item under one heading rather than another was a matter of judgment, and not the result of empirical factoring or clustering of correlation coefficients. The items discussed under each heading merely reflect the author's judgment regarding the intent of the items.

1. *Satisfaction of needs.* Many psychologists approach the study of morale and turnover with a need-satisfaction model (Vroom, 1964). They view turnover and low morale as indications that needs are not being satisfied (Price, 1968). In this survey, two different scales were used to examine the expected relationship between career intent and the perceived possibility of satisfying general and specific needs while in the Air Force. These measures, the Importance-Possibility Scales, reflect the assumption that important needs must be satisfied, whether now or in the future, if an individual is going to remain in an organization (Harding & Bottenberg, 1962). The focus on possibilities of future need satisfaction derives from discussions of the vocational or career nature of a decision to remain in the military.

There are several ways of scoring an Importance-Possibility Scale (Drysdale, 1968). Typically, the two ratings of each need are combined in some additive or multiplicative formula, and the derived score is then examined in relation to career intent or turnover. These methods cover up some important sources of data, however. There are at least two questions that can be asked of these scales. First, is career intent related to the importance attached to each need, and second, is career intent related to the perceived possibility of satisfying each need while in the Air Force? In this section precisely these two questions are examined.

Separate correlations were computed for each need, one based on the importance ratings and one based on the possibility ratings. Career intent was used as the criterion for both correlations. Table 2 presents these relationships for the general needs in the Importance-Possibility Scale of section B of the survey. Table 3 presents the correlations for the specific needs in the Importance-Possibility Scale of section C.

Table 2 reveals seven significant correlations between importance ratings and career intent. A significant correlation indicates that the particular

need was rated systematically different in importance by officers having different intentions regarding an Air Force career. A positive correlation indicates a systematic tendency for career-oriented officers to rate the need higher in importance than do officers who are not career oriented. As shown in Table 2, the majority of the general needs were not significantly related to career intent, at least not when importance ratings were considered.

It is interesting to note that three of the significant correlations were for needs specifically related to the difference between a military and civilian career—early retirement, settling down in a certain area, and having a say in what happens to you. Those officers likely to remain in the Air Force rated early retirement, work their families can be proud of, prestige or social status, job security, and keeping busy higher in importance than did officers indicating an intent to leave the service. Officers who do not intend to make a career of the Air Force rated settling down in a certain area and having a say in what happens to them higher in importance than did career-oriented officers. Low correlations for the other items can be interpreted as an indication that career- and non-career-oriented officers did not differ systematically in the importance they attached to these needs.

Table 2 clearly shows that the possibility ratings were much more predictive of career intent than were the importance ratings, since 10 of the 22 correlations were significant ($p < .01$). The average correlations were .14 and .08 for possibility and importance ratings respectively. In every case, the significant correlations indicated a greater optimism, with respect to finding need satisfaction in the Air Force, among the career-oriented officers than among the non-career-oriented officers. This raises an interesting question. Why would some officers be more optimistic than others?

One explanation is that the respondents were basing their career decision on different amounts and kinds of information. Officers have different active duty experiences, and they also have access to different amounts and sources of career information. It is reasonable to assume, then, that optimism and pessimism are logical, veridical conclusions for both types of officers in view of what they know and have experienced. But, there is another possible reason for differences in the cognitive component of an attitude.

Attempts to maintain a pre-service belief could also explain these differences. Selective perception, selective interpretation, and selective

Table 2. Correlations Between Career Intent and Ratings of the Importance and Possibility of Attaining General Job Rewards or Conditions

Job Reward or Condition	Correlation with Career Intent	
	Importance	Possibility
Adequate job security	.14*	-.11
Work under consistent and intelligent personnel policies	.02	.10
Have a say in what happens to you	-.14*	.28**
Feel that you are accomplishing something	.06	.23**
Do a great deal of traveling	-.04	-.07
Become proficient in specialized type of work	-.05	.21**
Be in a competitive situation	.00	.25**
Obtain a good salary	.02	.22**
Have a definite work schedule	-.01	.02
Settle down in a certain area	-.26**	.06
Be promoted on the basis of ability	.06	.16**
Spend a lot of time with my family	-.01	-.02
Advance at a fairly rapid rate	.02	.02
Be able to retire at an early age	.22**	.00
Have competent supervisors	.09	.24**
Make a lot of money	-.02	.01
Be given recognition for work well done	.10	.11
Continue flying ^a	--	--
Do work which my wife and family can be proud of	.15**	.21**
Have prestige or social status	.18**	.05
Keep very busy	.13*	.25**
Frequent change of duties	.00	.09
Interesting and challenging work	-.02	.38**

^aOmitted due to excessive blanks.

*Significant at .05 level.

**Significant at .01 level.

exposure would bias, or attenuate, the influence of active duty experience. It is possible that officers sharing common experiences and having exposure to the same sources of career information while on active duty could develop different career attitudes and expectations through the operation of these belief maintenance mechanisms. Optimism and pessimism, then, are probably a function of both veridical perceptions and perceptions distorted to maintain belief system congruity. There is an obvious need for research on the sources and content of belief systems that officers hold. Such research should consider both pre-service and active duty sources.

Table 3 contains correlations between career intent and ratings of each of the specific needs oriented toward Scientists and Engineers. Compared with results in Table 2, many more of the

importance ratings in Table 3 were significant. This suggests that specific need statements may be more sensitive to individual differences and less sensitive to social desirability than are the general need statements.

There appear to be two distinct need patterns present in the significant correlations of Table 3. Those officers likely to make the Air Force a career tended to rate needs related to managing, applied research, and success as an Air Force officer higher in importance than did officers not intending to stay in the Air Force. On the other hand, non-career-oriented officers tended to rate needs related to research duties, pure research, colleague supervision, and success as a Scientist or Engineer higher in importance than did career-oriented officers. An Air Force career seemed to be least appealing to those officers having the

Table 3. Correlations Between Career Intent and Ratings of Importance and Possibility of Attaining Specific Job Rewards or Conditions

Job Reward or Condition	Correlation with Career Intent	
	Importance	Possibility
Achieve success as a Scientist/Engineer	-.12*	.18**
Have freedom to formulate my own research ideas	-.15**	.18**
Conduct longitudinal or long term research	-.07	.07
Do research/engineering work only	-.13*	.08
Become a manager of other Scientists/Engineers	.19**	.15*
Do college teaching	-.05	.04
Publish research in journals of my profession	-.18**	.20**
Do predominantly pure or basic research	-.17**	.02
Have funds readily available for my research	-.09	.00
Work with recognized and highly qualified associates	.00	.20**
Have freedom from organizational deadlines	-.07	-.06
See the results of my work applied in practical situations	.14*	.18**
Move up in my field without becoming a manager	-.14*	.06
Maintain the strict research and work standards of my profession	-.08	.20**
Obtain more formal education	-.09	.09
Solve concrete, practical problems faced by my organization	.21**	.24**
Work under colleague supervision (as opposed to rank authority supervision)	-.42**	.01
Be in a position to evaluate the work of other Scientists/Engineers	.12	.22**
Have access to complete reference material sources	-.02	.17**
Achieve success as an Air Force Officer	.56**	.12*
Manage large scale projects and contracts	.27**	-.05
Do predominantly field or applied research	.12*	.00
Make a contribution to the advancement of knowledge in my profession	-.05	.21**
Have adequate facilities available	-.02	.06
Receive technical guidance from associates and supervisor	-.12*	.31**
Make a significant contribution to the mission of the Air Force as a Scientist/Engineer	.25**	.16**

*Significant at .05 level.

**Significant at .01 level.

strongest scientific or research orientation, and most appealing to those officers desiring a combination of research and management activity. This issue is elaborated in the discussion of upward mobility. Once again, in view of the definite managerial orientation the Air Force expects of all career officers, Scientists and Engineers included, the significant items were those that most clearly distinguish between a military and a civilian career.

The possibility of obtaining these specific rewards or job conditions also predicted career intent rather well. Table 3 contains 14 significant correlations out of 26 possible. The optimism-

pessimism distinction visible in the general needs was also apparent in the more specific needs. As was true in Table 2, among the possibility ratings, all of the significant correlations were positive. A positive correlation indicates greater optimism among career-oriented officers than among non-career-oriented officers.

Both Tables 2 and 3 contain some items related significantly to career intent on only one of the two ratings. This suggests that both importance and possibility ratings can make some unique contribution to the prediction of career intent. A possible next step in this research would involve

using multiple linear regression in an attempt to capture the policy of Scientists and Engineers as they weigh the importance and possibility of satisfying these needs in reaching a career decision (Christal, 1967). In such a study, it seems likely that both sets of ratings would contribute items to the regression equation.

2. *Pre-service expectations.* It was hypothesized that career intent would be related to the degree of congruity between pre-service expectations and the reality of active duty. Presumably, those officers for whom reality was a disappointment would tend to have lower morale and thus be more likely to leave the Air Force at the first opportunity. On the other hand, those officers finding the reality of active duty more pleasant than expected would have higher morale and thus be more likely to remain in the Air Force. Table 4 presents the correlations between career intent and three items related to the match between expectations and reality.

Contrary to the hypothesis, none of the correlations were significant. Such would be the case if expectations were not important in the career decision, but the findings with regard to possibility ratings suggest that this is not a likely explanation. Another possibility is that both career-oriented and non-career-oriented officers found reality to be in agreement with expectations, or had no expectations to begin with. The means for the items in Table 4 support this explanation. On the average, officers in this sample found reality to be congruent with their expectations.

Table 4. Correlations Between Career Intent and the Match Between Expectations and Reality

Survey Item	Correlation with Career Intent
Have you found life in the Air Force to be in agreement with the expectations you had before accepting your commission?	-.02
How does the technical competence of the officer Scientists/Engineers in your organization compare with the expectations you had prior to your assignment to Base X?	.03
How does the professional work you do compare with expectations you had prior to your assignment to Base X?	.08

These interesting and unexpected results offer post hoc support for the importance of pre-service attitudes. One would predict from studies of attitudes and perception that officers entering the Air Force with strong attitudes for, or against, an Air Force career would tend to perceive reality in agreement with their expectations. To do otherwise would require restructuring their belief system, and strong beliefs tend to be maintained. The low correlations in Table 4, therefore, provide post hoc support for the modified retention model discussed earlier, since it appears that career intent was little influenced by active duty experience, even when the latter was better or poorer than expected. The loss of Scientists and Engineers does not seem to be due to a discrepancy between reality and expectations. Most officers found reality congruent with expectations, and when it was not, it had little effect on their career intent. It should be added that finding reality to be poorer than expected might have a greater impact than finding reality to be better than expected. This is a hypothesis for further research.

A third explanation for the low correlations in Table 4 rests on the phenomenological frame of reference against which an officer evaluates reality. Finding reality to be poorer than expected does not necessarily mean that reality is dissatisfying or disagreeable. By the same token, finding reality to be better than expected does not necessarily mean that reality is satisfying or agreeable. An item of this type does not establish a standard of comparison. Both career-oriented and non-career-oriented officers can report finding reality better than expected and still differ in their evaluation of an Air Force career, in which case, there would be no correlation between career intent and the expectancy-reality match.

Dr. T.F. Lyons, after reviewing this paper, suggested another possible explanation for these low correlations. He noted that this kind of item includes a recall element similar to the recall required on the pre-commissioning career intent item. The respondent must compare the present situation against his recollection of expectations held in the past. Zald and Simon (1964) have raised several objections to this recall technique. Similar criticisms can be found in a study by Hardin (1965). It is possible that these low correlations are a reflection of the random error introduced in the expectations variable by the recall method used.

Whatever the explanation, Table 4 clearly indicates that career intent was not related to the responses obtained for these items.

3. *Division of labor.* A frequently used concept in the study of organizations is division of labor. Price (1968) makes a distinction between routinized division of labor, as typically found in production operations, and specialized division of labor, which refers to dividing the overall task of the organization into specialized responsibilities requiring the use of specialists. He finds that routinized division of labor is dysfunctional for morale, while specialized division of labor is functional. The Air Force attempts to utilize officers in a system of specialized division of labor, but this does not guarantee high morale, and in fact, it may be a source of unfulfilled expectation.

Air Force officer utilization is based on a system of Air Force Specialty Codes (AFSC). These AFSCs indicate the general area of responsibility to which an officer may be assigned. There are specific AFSC for Scientists and Engineers. Unfortunately, it is possible for an officer to have a primary AFSC in one area, while formally and informally being assigned responsibilities not technically covered by this AFSCs. Extrapolating from Price (1968), utilization of officers in their proper specialties should be functional for morale and therefore related to career intent, at least within the limits posed by the modified model of military retention. It was hypothesized that proper utilization would be especially important for Scientists and Engineers, many of whom have completed advanced education in preparation for a professional career. This group of officers, being in high demand both in and out of the military, can easily go elsewhere to pursue the work for which they are prepared if the Air Force fails to utilize them properly.

For Scientists and Engineers, proper utilization might include utilization of education, provision of opportunities for growth, and provision of opportunities to make a contribution to the mission of the organization. Table 5 presents correlations between career intent and a variety of items related to utilization as a specialist.

According to Table 5, education level was significantly and positively correlated with career intent. This was not expected, but the nature of the sample offers an explanation. This sample contained a large proportion of officers with education beyond the Bachelor's degree (68 percent). It also contained a large proportion (62 percent) who reported they had received some education through the Air Force Institute of Technology (AFIT). AFIT is a voluntary program frequently used by officers to obtain advanced education. Those who volunteer are willing to accept an extension of their obligated tour of duty and, thus, tend to be career oriented. The correla-

Table 5. Correlations Between Career Intent and Items Referring to Officer Utilization

Survey Item	Correlation with Career Intent
Educational level	.12*
How much of your total job could be done by someone having less education than you?	.08
Would you recommend a career in the Air Force to a college student about to graduate in your academic area and at your educational level?	.40**
Assuming satisfactory promotion progression and corresponding increases in responsibility, would you remain in your present type of work as a chosen career (either in or out of the AF)?	.22**
How important is it to you to work in the area of your college major (highest degree)?	-.11
Do you feel the work you are currently doing makes a contribution to the mission of your organization?	.06
Is the work you are doing contributing to your growth and competence as a professional scientist/engineer?	.02
Are you generally satisfied with the extent to which your educational background is being utilized?	.16**
Are you doing the type of work you wanted to do when you decided on your academic major (highest degree)?	.11
How much of your duty time is spent doing work that is related to your formal professional education (highest degree)?	-.04
To what extent do you expect that your formal education (highest degree) will be utilized to your satisfaction in your next permanent change of station assignment?	.24**
Do you feel that your formal education would be better used by a civilian employer than by the Air Force?	.28**

*Significant at .05 level.

**Significant at .01 level.

tion in Table 5 probably reflects the positive career attitudes prevalent among those officers with advanced education through AFIT. It is hypothesized that a negative correlation between

career intent and education level would have been obtained if this sample had not contained such a large percentage of former AFIT students among those with advanced education. The entire Scientist and Engineer sample seemed to be more career oriented than one typically finds in an Air Force study. Approximately 70 percent indicated probable or definite intent to make a career of the Air Force. This hardly agrees with the generally low retention rate for Scientists and Engineers found in other studies.

The items in Table 5 provide further insight regarding the relationship between utilization and career intent. Satisfaction with present utilization of education was significantly related to career intent. It is interesting to note, however, that the item dealing with the importance of working in the area of their college major was not significant, and neither were any of the other items referring to the present assignment. It is also interesting that the largest correlations were found for items with a future, or career, orientation (such as expected utilization in the next assignment), and for items comparing civilian and military utilization. The pessimism of non-career-oriented officers was contrasted with the expectations of career officers. The latter tended to feel that the Air Force, both now and in the future, will utilize their education satisfactorily, or at least as well as civilian organizations.

There is some evidence to suggest that proper utilization has a different meaning for career-oriented officers than it does for non-career-oriented officers. For example, notice the nearly significant negative correlation between career intent and the importance of working in the academic major area. This indicates that there was a slight tendency for career-oriented officers to be less concerned than non-career-oriented officers about utilization of formal education. This agrees with the earlier finding that career-oriented officers have a need pattern favoring a research-management combination. These officers may not have based their evaluation of utilization as heavily on education as the more research-oriented non-career officers did. Results in Table 5 suggest that whatever utilization meant to the officer, he was more likely to be career oriented if he experienced or anticipated proper utilization by the Air Force.

4. *Role conflict and role identification.* As noted earlier, an important part of the organizational dilemma for a Scientist or Engineer is the conflict between loyalty to profession and loyalty to the organization (Gross, 1964; Katz & Kahn, 1966). Drysdale (1968) claims that the service expected of Air Force officers includes scientific

Table 6. Correlations Between Career Intent and Items Related to Role Conflict and Professional Identity

Survey Item	Correlation with Career Intent
Do you feel there is any conflict between your role as a Scientist (Engineer) and your role as an AF Officer?	.26**
Do you prefer to identify yourself as an "Air Force Officer" first or as a "professional" Scientist/Engineer first?	.51**
Do you think that increased emphasis on the "professional Officer", military atmosphere, and Air Force "esprit de corps" aspects of AFSC would increase the desire of more Scientific/Engineering Officers to make the AF a career?	.36**
How important is it to you to achieve success as a Scientist/Engineer?	-.12*
What is the possibility of achieving success as a Scientist/Engineer while in the Air Force?	.18**
How important is it to you to achieve success as an Air Force Officer?	.56**
What is the possibility of achieving success as an Air Force Officer while in the Air Force?	.12*

*Significant at .05 level.
 **Significant at .01 level.

and technical work as well as the "proper duty required of Air Force officers (p. 3)." In this regard, Gustaferrero (1965) cites Air Force Regulation 36-23 which states that managerial responsibility is inherent in each officer's position. It is clear that the Air Force wants a combination leader-scientist who will move upward in the hierarchy and assume more and more management responsibilities.

It was hypothesized that Scientists and Engineers experience conflict between their professional role and their officer role, and that this leads to lowered morale among those preferring their professional-scientist identity. Table 6 presents the correlations obtained between career intent and several items related to this identity—role conflict. All of the items in Table 6 were significantly related to career intent, suggesting that career-oriented officers either perceive less

role conflict, or adapt to it by preferring to identify themselves as military officers (thus reducing their commitment to their profession), or both.

It is clear that career-oriented officers tended to rate the possibility of achieving success as a Scientist or Engineer, while in the Air Force, higher than those intending to leave the service. Apparently, career-oriented officers felt that success as an Air Force officer and success as a Scientist or Engineer are more compatible than did non-career-oriented officers. Consistent with these other items, career-oriented officers also tended to feel that increased emphasis on the professional military aspects of duty in Air Force Systems Command would increase retention of Scientists and Engineers, while non-career-oriented officers tended to feel it would not.

Table 6, in total, supports the hypothesis that role and identity conflicts do exist for some Scientists and Engineers in the Air Force. Further, resolution of this conflict is systematically related to career intent. These results do not explain why some officers prefer one identity over another, but presumably this is a function of pre-service socialization, belief maintenance, and active duty experience. Research is needed to identify the relative impact of each source of influence on the identity preference of Scientists and Engineers.

5. *Role set pressures and influence.* In a book by Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964), there is a discussion of various sources of pressure, influence, conflict, and stress which operate to shape the role performance of organizational members. For the most part, these pressures are exerted by other people, usually significant in the life and work of the individual. These people may be either inside or outside of the organization. Collectively, they are called the individual's role set. One specifically relevant point made by Kahn *et al.* (1964) is that members functioning in positions near the boundary of the organization are subjected to considerable influence by role set members outside of the organization. Further, these extra-organizational sources of influence may conflict with sources of influence inside the organization. Scientists and Engineers may experience conflict between external pressures and pressures emanating from within the organization.

In order to apply these role set notions to the question of career intent among Air Force officers, it is necessary to identify the individuals or groups likely to be influential in determining a career decision. Obviously, there are several sources of influence that could be investigated. This survey

Table 7. Correlations Between Career Intent and Items Reflecting Influence of Role Set Members

Survey Item	Correlation with Career Intent
Which of the following would best describe the attitude of your wife or fiancé if you decide to make a career of the Air Force (if you have already decided to make a career, how did she feel)?	.41**
Which of the following would best describe the attitude of your parents if you decided to make a career of the AF (if you have already decided to make a career, how did they feel)?	.10
How would you rate your immediate supervisor in his loyalty to mission and the Air Force?	.20**
What is the general opinion of members of your profession about working for the Air Force?	.14*

*Significant at .05 level.

**Significant at .01 level.

included items dealing with perceived attitudes of wife (or girl friend), parents, and members of the officer's profession. One other item examined the effect of supervisor's loyalty to the Air Force mission. Table 7 presents correlations between career intent of the officers and their perceptions of attitudes held by these various role set members.

Four of the five correlations were significant. The officer's perception of his wife's attitude was clearly related to career intent. Although parental attitude seemed to exert relatively little influence, this low correlation may be deceiving because a large proportion of non-career officers indicated they did not know how their parents felt. The wife's attitude may be more important in any case, since it is more salient.

Another important, though subtle, influence was revealed by the significant correlation between career intent and the rating of supervisor loyalty to the Air Force mission. There was a tendency for career-oriented officers to rate their supervisors higher in mission loyalty than did non-career-oriented officers. This does not necessarily mean that the non-career-oriented officers actually had supervisors with questionable loyalty. This is a matter of perception again, and it could be

another example of perceptual distortion for purposes of maintaining belief system congruity. There is a possibility, however, that supervisory officers having a preference for their scientist role could reinforce any tendency their subordinates might have to maintain their professional Scientist and Engineer identities. As has been reported, this identity was significantly related to career intent. It is even easier to speculate about this happening to officers under civilian supervisors. A civilian supervisor might well prefer that his subordinate officers avoid letting their officer roles interfere with the research effort of his unit. He may even reinforce their views about the negative aspects of officer role demands. Further research will be necessary to determine the impact of the supervisor's orientation, but it is clear that career intent among Air Force Scientists and Engineers was related to their perception of supervisor's loyalty to the Air Force mission. This line of reasoning is consistent with industrial research on the supervisor's impact on the managerial style of his subordinates (Fleishman, Harris, & Burt, 1955).

The norm of the profession regarding an Air Force career is probably vague to most Scientists and Engineers, and yet, the item dealing with the attitude of the profession was significantly related to career intent. The mean response to this item indicates that most officers in the sample either did not know the norm, or, the profession was indifferent regarding an Air Force career. The significant correlation is probably best interpreted as an indication of belief system congruity on the part of those falling at the two extremes of the career intent continuum. It might be a reflection of supervisor influence, too, since he would be one of the major sources of information regarding the general opinion of the profession. Peers would be another source, and college professors another, but information was not collected to ascertain their direct influence on career intent. These results suggest another area where further research might provide insights regarding the career orientation of professionals.

6. *Role set evaluations.* It is becoming increasingly clear that members of the role set inside the organization play an important part in determining member morale. In studies of job satisfaction the supervisor and co-workers are frequently found to be major sources of positive or negative affect, since they play an important part in the distribution of formal and informal rewards (Katz & Kahn, 1966). Several items in the survey dealt with evaluations of role set members, particularly in terms of competence. Table 8 lists these items and their correlations with career intent.

Table 8. Correlations Between Career Intent and Items Referring to Competence of Peers and Supervisors

Survey Item	Correlation with Career Intent
How do you feel the technical competence of the Officer Scientists/Engineers in your profession compares with that of their counterparts in civilian occupations?	.15*
How important is it to you to have competent supervisors?	.09
What is the possibility of having competent supervisors while in the Air Force?	.24**
How important was quality of officer associates in making your career decision?	.09
Did quality of officer associates have a positive, negative, or neutral weight in your career decision?	.14*
How important is it to you to work with recognized and highly qualified associates?	.01
What is the possibility of working with recognized and highly qualified associates while in the Air Force?	.20**
How important is it to you to receive technical guidance from associates and supervisor?	-.12*
What is the possibility of receiving technical guidance from associates and supervisor while in the Air Force?	.31**

*Significant at .05 level.

**Significant at .01 level.

Several of the items in Table 8 were significant. The items showing greatest relation to career intent were those dealing with expectations regarding future role set members. The importance ratings were not related to career intent; but compared with non-career-oriented officers, career-oriented officers tended to be more optimistic in rating the possibility of having competent supervisors, working with recognized and competent associates, and receiving technical guidance while in the Air Force. Officers intending to leave the Air Force were less likely than career-oriented officers to feel that Air Force Scientists and Engineers compared favorably with their counterparts

in civilian organizations. There were no items in the survey asking directly about satisfaction with members of the present role set, but one might infer dissatisfaction among those intending to leave the Air Force since future expectations would, in part, be based on current experiences.

7. *Role restrictions on freedom.* Organizations, of necessity, impose restrictions on role performance. Katz and Kahn (1966) note the importance of these role restrictions, especially for professionals who need freedom to plan and pursue research or technical work. Role restrictions may in fact reduce the capability of professionals to accomplish the innovations necessary for mission effectiveness. Argyris (1968) discusses the ironic, unintended, and circular impact that organizational controls have on the effectiveness of research organizations.

Table 9. Correlations Between Career Intent and Items Referring to Freedom and Organizational Role Restrictions

Survey Item	Correlation with Career Intent
How important was Government "red tape" in your career decision?	-.11*
Did Government "red tape" have a positive, negative, or neutral weight in your career decision?	.17**
Does the Air Force give you adequate freedom to plan, obligate resources for, and work to completion on your own scientific/engineering work?	.10
How important is it to you to have freedom to formulate your own research ideas?	-.15**
What is the possibility of attaining freedom to formulate your own research ideas while in the Air Force?	.18**
How important is it to you to have freedom from organizational deadlines?	-.07
What is the possibility of attaining freedom from organizational deadlines while in the Air Force?	-.06
How important is it to you to maintain the strict research and work standards of your profession?	-.08
What is the possibility of maintaining the strict research and work standards of your profession while in the Air Force?	.21**

*Significant at .05 level.

**Significant at .01 level.

Several types of role restrictions were examined in the context of this survey. It was hypothesized that career intent would be related to the freedom-restrictions dilemma faced by Air Force Scientists and Engineers.

Table 9 provides evidence regarding this hypothesis. Five of the nine correlations were significant. These items indicated that non-career-oriented officers tended to rate "Government red-tape" and freedom to formulate research ideas higher in importance than did career-oriented officers. The optimism of career-oriented officers was evidenced by their responses to the items dealing with the possibility of having freedom to formulate research ideas and maintaining strict research standards of their profession. Table 9 also indicates that two of the importance items did not differentiate between officers with varied career attitudes.

There is an inconsistency in these results if one considers the correlations obtained for the three items asking about the respondent's freedom to formulate, plan, and complete his own research. The importance and possibility ratings were significantly related to career intent, but the direct question regarding the present state of affairs was not. These results could be interpreted as reflecting a distinction between attitudes toward present assignment and attitudes regarding an Air Force career, since the item not related to career intent refers to the present assignment. This inconsistency does not detract from the significance of the other items. Scientists and Engineers in the Air Force varied in their opinions regarding organizational restrictions, and this variance was systematically related to career intent.

8. *Bases of authority.* Etzioni (1964) has an elaborate discussion of the use of knowledge and the inevitable conflict it produces in organizations. He attributes the strain to a lack of compatibility between the basic principles of administrative authority and principles of authority based on knowledge. The conflict ensues when the two bases of authority are not located in the same organizational position.

Etzioni feels that professional decisions are autonomous and not to be judged or sanctioned by an administrator of higher rank applying the rules and regulations of the organization. Unfortunately, the military demands subordination of professionals to administrative authority in order to insure mission accomplishment. The military is a prime example of the situation where research organizations are incorporated or established in an authoritarian structure (Etzioni,

Table 10. Correlations Between Career Intent and Items Regarding Colleague Supervision

Survey Item	Correlation with Career Intent
How important is it to you to work under colleague supervision (as opposed to rank authority supervision)?	-.42**
What is the possibility of working under colleague supervision (as opposed to rank authority supervision) while in the Air Force?	.01

**Significant at .01 level.

1964). The result is confusion and mixture of two bases of authority. The question is, what impact does this have on career intent among Air Force Scientists and Engineers?

Table 10 presents the two items in the survey dealing with this issue. There was a substantial negative relationship between career intent and the importance attached to working under colleague supervision as opposed to rank authority. Non-career-oriented officers systematically rated this higher in importance than did those intending to stay in the Air Force. There was no relationship between career intent and the possibility ratings for this item. Here is a clear case where non-career-oriented officers revealed a need structure different from that of career-oriented officers.

Colleague supervision implies an equalization, or at least a better balance, between knowledge and rank as bases of authority. It means that those in superordinate-subordinate relations interact as professional peers, with hierarchical or rank authority playing a minor role. Both career- and non-career officers saw less than average possibility of attaining such a situation in the Air Force. The career-oriented officers apparently accepted this fact and attached little importance to it. This would be consistent with their management orientation.

9. *Upward mobility and role demands.* Movement upward in most organizations involves increasing demands for administrative or managerial role performance. The Air Force is no exception (Drysdale, 1968). Etzioni (1964) suggests that this is dysfunctional for professionals. It creates a dilemma, since most successful professionals are not motivated to become administrators. He goes on to say that those who are willing to accept administrative roles are often less committed to professional values than are their

colleagues. Gouldner (1957-1958) found this to be the case in the academic community.

The solution to the dilemma is to find competent, professionally oriented administrators. This is precisely the type of officer the Air Force seeks to retain. For example, Gustaferrero (1965) claims that the Air Force has a greater need for professionally oriented managers than bench scientists, and every junior officer is regarded as a potential manager. The result is that an Air Force Scientist or Engineer can expect to be assigned to a management

Table 11. Correlations Between Career Intent and Items Dealing with the Nature of Upward Mobility in the Air Force

Survey Item	Correlation with Career Intent
Which ratio of managing to "bench" scientific/engineering work do you want in the job you hold 8 to 10 years from now?	.31**
How important is it to you to do research/engineering work only?	-.13*
What is the possibility of doing research/engineering work only while in the Air Force?	.08
How important is it to you to become a manager of other Scientists/Engineers?	.19**
What is the possibility of becoming a manager of other Scientists/Engineers while in the Air Force?	.15*
How important is it to you to move up in your field without becoming a manager?	.14*
What is the possibility of moving up in your field without becoming a manager while in the Air Force?	.06
How important is it to you to be in a position to evaluate the work of other Scientists/Engineers?	.12*
What is the possibility of being in a position to evaluate the work of other Scientists/Engineers while in the Air Force?	.23**
How important is it to you to manage large scale projects and contracts	.27**
What is the possibility of managing large scale projects and contracts while in the Air Force?	-.05

*Significant at .05 level.

**Significant at .01 level.

position at some period in his career. Gustafarro astutely suggests, however, that not all officers can be, or want to be, managers. He feels that a dual career channel would relieve the problem, since it would allow non-management-oriented Scientists and Engineers to advance beyond the rank of major, while staying in purely technical activity. Drysdale (1968) also suggests some type of separation between scientists and managers.

The implications of this discussion are clear. At present, there seems to be no place in the Air Force for Scientists and Engineers who desire advancement in purely scientific and technical roles. Again, the question is, what relationship does this situation have to career intent? Table 11 answers the question, in part.

The items in Table 11 indicate that this issue was significantly related to career intent. Eight of the eleven correlations were significant. Several of these items have already been discussed as illustrating the different need patterns of career- and non-career-oriented officers. The clearest indication of the importance of this issue appears in the substantial correlation for the item asking about the ratio of managing to "bench" scientific or engineering work desired in ten years. There was a systematic tendency for career-oriented officers to desire a greater proportion of managing in ten years than non-career-oriented officers desired. Support also comes from the significant negative correlation between career intent and the rated importance of doing research or engineering work only. Non-career-oriented officers systematically rated this item higher in importance than did career-oriented officers. The other significant items also support a conclusion that Scientists and Engineers in the Air Force varied in their desire for increasingly managerial roles, and this variance was systematically related to intentions regarding an Air Force career.

10. *Reassignment uncertainty.* Drysdale (1968) discusses the relative importance of having a voice in assignments. He suggests that this is a major issue for Scientists and Engineers because they perceive civilian employers to be more willing than the military to consult with professionals when reassignment is being considered. The concern of Scientists and Engineers centers on the perceived difference between military and civilian utilization systems and, particularly, differences in the degree of individual consideration given to each reassignment decision. Drysdale applauds the recent advances being made in the Air Force (ironically

Table 12. Correlations Between Career Intent and Items Related to Reassignment Uncertainties

Survey Item	Correlation with Career Intent
How important is it to you to have a say in what happens to you?	-.14*
What is the possibility of having a say in what happens to you while in the Air Force?	.28**
How important is it to you to settle down in a certain area?	-.25**
What is the possibility of settling down in a certain area while in the Air Force?	.06
How important is it to you to have frequent change of duties?	.00
What is the possibility of having frequent change of duties while in the Air Force?	-.09
How important was reassignment uncertainty in making your career decision?	-.22**
Did reassignment uncertainty receive a positive, negative, or neutral weight in your career decision?	.18**
How important is it to you to conduct longitudinal or long term research?	-.13*
What is the possibility of conducting longitudinal or long term research while in the Air Force?	.07

*Significant at .05 level.

**Significant at .01 level.

through computer technology) to individualize the assignment system, but the issue is still a point of unfavorable comparison for those trying to choose between military and civilian careers.

Table 12 confirms the importance of this issue and its relation to career intent. In addition to the items shown in Table 12, reference could be made to the items discussed previously dealing with utilization of education, since part of this reassignment issue involves uncertainty about the appropriateness of future utilization. In fact, reassignment uncertainty may refer to uncertainty about any of the variables discussed in this report, and therefore, it probably reflects the global optimism-pessimism dimension inferred from the other items in the survey.

The results clearly indicate that non-career Scientists and Engineers rated all but one of these items higher in importance than did Scientists and Engineers with an Air Force career orientation. At the same time, the career-oriented officers perceived greater possibilities for having a say in what happens to them, and they systematically rated reassignment uncertainty lower in importance than did non-career-oriented officers. These attitudes toward reassignment uncertainty, and the greater importance attached to longitudinal research by non-career officers, combine to suggest that a science-oriented need pattern, more so than a management-oriented need pattern, includes greater concern for a voice in future assignments.

11. *Promotion and evaluation systems.* Promotion can mean different things to different people. For some, it signifies recognition of actual or potential accomplishment. For most, it means an increase in pay or status, and thus it represents a basis for achieving equity between value of the employee and compensation paid by the employer. Promotion frequently means increased freedom, responsibility, and opportunity for self-actualization, but it may also mean a change of role demands in the direction of management or administration. Promotion can mean leaving one role set and entering another or, at least, changing positions relative to members of the existing role set. Some regard promotion as just another reward, useful for attracting high quality personnel and for motivating high quality performance. In this regard, it is interesting to note that rate of promotion is often used as an indication of individual success; at the same time, it is regarded as an organizational characteristic for use in evaluating possible employers. The common theme in most of these meanings seems to be merit.

Drysdale (1968) notes that promotion based on merit is generally cited as one of the most important factors in procurement, retention, and utilization of scientific and technical personnel. He goes on to imply that promotion based on something other than merit is dysfunctional for high quality performance and for retention of high quality Scientists and Engineers. He wisely notes, however, that calling for merit promotions and actually achieving them are quite different things. The problems involved in assessing merit are substantial in most situations, but evaluation of Scientists and Engineers is particularly difficult because of the innovative nature of their work and the scarcity of objective, explicit criteria. It would seem, then, that Air Force merit evaluation and

promotion systems should be related to the career intent of Scientists and Engineers. Table 13 presents correlations obtained for eight items judged to be relevant to the merit promotion issue.

Surprisingly, only two of the items were significantly related to career intent. Once again, the relative optimism of career-oriented officers must be noted. They tended to see a greater possibility of attaining merit promotions while in the Air Force than did non-career-oriented officers. They also considered the officer rating system to be higher in importance than did the non-career-oriented officers. This is understandable, since those intending to leave the Air Force would have little interest in the promotion or evaluation systems, while those committed to a career would be more concerned.

The relatively low correlations in Table 13 probably reflect two situations: general agreement among all in the sample and the ambiguous evaluation of the officer rating system currently in operation. Examination of the means and standard

Table 13. Correlations Between career Intent and Items Related to Merit Promotions

Survey Item	Correlation with Career Intent
How important is it to you to be promoted on the basis of merit?	.06
What is the possibility of being promoted on the basis of merit while in the Air Force?	.16**
How important is it to you to advance at a fairly rapid rate?	.02
What is the possibility of advancing at a fairly rapid rate while in the Air Force?	.02
How important is it to you to be given recognition for work well done?	.10
What is the possibility of being given recognition for work well done while in the Air Force?	.11
How important was the Officer rating system in making your career decision?	.22**
Did the Officer rating system have a positive, negative, or neutral weight in your career decision?	.08

**Significant at .01 level.

deviations for the non-significant items revealed that most of the officers in the sample felt it is important to be promoted on the basis of ability, to advance at a fairly rapid rate, and to be given recognition for work well done. They also agreed on the low possibility of rapid advancement in the Air Force. Table 13 also presents evidence of ambiguity in attitudes regarding the officer rating system. This ambiguity was reflected in the absence of any systematic tendency for officers with different career intentions to give this item different weights in their career decision. One implication of this finding is that positive and negative attitudes toward the officer rating system were shared by both career- and non-career-oriented officers. This means that opinions regarding the system for the evaluation of merit did not predict career intent. Rather, the impact of merit promotions came from the perceived role merit plays in the overall promotion system. Non-career-oriented officers saw less possibility of being promoted on the basis of merit in the Air Force than did the career-oriented officers.

12. *Occupational status.* Work has long been recognized as an important factor in the self-identity of man. One of the first questions strangers ask of each other has to do with the nature of employment. Knowing what kind of work an individual does tells us a great deal about his life, or so we think. Sociologists and philosophers contend that technology is eroding the meaning of work and, with it, the meaning of man (Ellul, 1967). Among other things, they point to the fact that occupational titles mean very little to people not directly connected with the occupations. It would seem that occupation should no longer be used as the measure of man, and yet, many feel that occupation is a fundamental index of status and social position (Wrenn, 1964; Gross, 1964). For example, Super, cited in Wrenn (1964), believes that occupation is the principal determinant of social status. This raises a question about the meaning of a military occupation. What is the social position or status of a military career?

As noted earlier, some feel a career as a military officer should be regarded as a profession in its own right. On the other hand, Gustafsson (1965) suggests that a military career represents a weak choice to many ROTC graduates. While there is evidence that youth hold a military career in higher regard than adults (Lang, 1964), it is difficult to assign an exact status with any degree of certainty. Undoubtedly, officers entering active duty hold a variety of opinions regarding the status of a military career. Since a decision to stay

in the military is an occupational choice, the question of perceived status should be relevant.

Officer training usually includes an attempt to instill pride in the status offered by a professional military career. Scientists and Engineers have received a similar indoctrination during their education as professionals, so they have available two sources of professional status. A career decision might be influenced by a preference for one status over the other. It is not known to what extent these statuses are compatible, but it is apparent, from data reported earlier, that career- and non-career-oriented officers systematically preferred different identities. The strong relationship between preferred identity and career intent suggests that there may be a perceived difference in status between professional officer and professional scientist. The survey included some specific questions related to this status question, and Table 14 presents the results.

Although four of the six items were significantly related to career intent, the results did not

Table 14. Correlations Between Career Intent and Items Dealing with Status of Officer and Air Force Career

Survey Item	Correlation with Career Intent
How important is it to you to have prestige or social status?	.18**
What is the possibility of having prestige or social status while in the Air Force?	.05
How important was the status of officer in eyes of civilians in making your career decision?	.14*
Did the status of officer in eyes of civilians have a positive, negative, or neutral weight in your career decision?	.02
How important was supervision by civilians in making your career decision?	.25**
Did supervision by civilians have a positive, negative, or neutral weight in your career decision?	-.21**
How do you think your status as a professional Scientist/Engineer compares with that of your peers who are not in the military?	-.02

*Significant at .05 level.

**Significant at .01 level.

offer strong support for the importance of status in the career decision. There was a tendency for career-oriented officers to rate the importance of status and prestige higher than did non-career-oriented officers. The same was true for importance ratings of officer status in the eyes of civilians, but the possibility of attaining status or prestige while in the Air Force was not related to career intent. The most unexpected result was the low correlation between career intent and the question dealing with a comparison between status of military and non-military Scientists and Engineers. The responses to this item suggest that being a military officer was not systematically viewed as increasing or decreasing the status of a professional Scientist or Engineer. Another possible interpretation is that the officers did not know how their status compared with their peers outside the military. In either case, career intent was not predictable, in this sample, from knowledge of perceived status differences.

Two items in Table 14 were designed to examine a source of irritation frequently mentioned in other studies of officer retention. Career-oriented officers seemed to resent being supervised by civilians. This feeling was evidenced by the significant correlations obtained for both items. It may be similar to an earlier statement that professionals resent being supervised by non-professionals. Whatever the reason, career-oriented officers rated this matter higher in importance than did non-career-oriented officers. There was also a significant tendency for career-oriented officers to give this question a negative weight in their career decision, or at least to rate it less positively than did non-career-oriented officers. Ratings of importance correlated $-.50$ with the weight assigned, indicating that this was an important negative element for career officers.

Speculating about these results, it seems probable that a career-oriented officer would prefer to be supervised by someone loyal to the Air Force mission and sensitive to the demands of the professional officer role. The root of this concern might be the conflict generated by the fact that, at the highest levels, civilians control our professional soldiers. The non-career-oriented officer, being less identified with the basic conflict, might have evaluated supervision with greater concern for competence and less concern for the civilian control issue with its status conflict ramifications. The fact that career-oriented officers found this to be an irritating issue suggests that it might be a concomitant aspect of the difference in the preferred identities noted earlier.

V. SUMMARY AND CONCLUSIONS

This paper presents an eclectic view of retention research in the Air Force. As an open, contrived social system, the Air Force must actively attempt to retain a scarce, but crucial, innovative subsystem—its Scientific and Engineering officers. Providing rewarding experiences is not likely to stem the outward flow of officers who entered the service with definite career intentions. The model applied by investigators of turnover in non-military organizations has been examined, and its relevance to Air Force retention is questionable.

Data from a survey of Scientists and Engineers suggest that officers with definite career intentions at the time of commissioning maintain their intent, and may view their Air Force experiences in a manner designed to maintain their initial beliefs. Optimism or pessimism regarding future membership in the Air Force seems to predict career intent for nearly every variable investigated. The obtained correlations were low, but often significant, as expected from the modified model. The questions of interest at this point have to deal with the sources of this optimism or pessimism. Vaguely, this paper suggests that pre-service "socialization" is a crucial variable in determining the initial, stable career intent of a substantial portion of the officer input. The challenge is to clarify and identify the sources of these pre-service attitudes. This will require a shift in focus from organizational experience as a source of attitude to pre-membership beliefs and their sources. The Air Force must realize that Scientists and Engineers are not just commissioned officers destined willingly for managerial responsibilities. Data in this study clearly show that all Scientists and Engineers do not necessarily want to be treated as potential managers, and that they have the mobility to choose another organization in which to pursue their technical careers.

In total, this research suggests that personality, as reflected operationally in ratings of the importance of various rewards and job conditions, may interact with organizational demands to orient an officer toward, or away from, an Air Force career. This interpretation must be conditional because it is based on correlational data, and the direction of cause and effect is not known. Research is needed to ascertain how and when these need patterns develop. Socialization processes operating both before and after the officer enters the service will probably share in the explanation.

REFERENCES

- Argyris, C. *Understanding organizational behavior*. Homewood, Ill. Dorsey Press, 1960.
- Argyris, C. *Interpersonal competence and organizational effectiveness*. Homewood, Ill.: Irwin-Dorsey Press, 1962.
- Argyris, C. On the effectiveness of research and development organizations. *American Scientist*, 1968, 56, 344-355.
- Borow, H. (Ed.), *Man in a world at work*. Boston: Houghton-Mifflin, 1964.
- Brayfield, A.H. & Crockett, W.H. Employee attitudes and employee performance. *Psychological Bulletin*, 1955, 52, 396-424.
- Breer, P.E. & Locke, E.A. *Task experience as a source of attitudes*. Homewood, Ill.: Dorsey Press, 1965.
- Christal, R.E. *Selecting a harem—and other applications of the policy-capturing model*. PRL-TR-67-1, AD-658 025. Lackland AFB, Tex.: Personnel Research Laboratory, Aerospace Medical Division, March 1967.
- Cohen, A.R. *Attitude change and social influence*. New York: Basic Books, 1964.
- Cohen, H. *The demons of bureaucracy*. Ames, Iowa: Iowa State University Press, 1965.
- Drysdale, T. *Improvement of the procurement, utilization, and retention of high quality scientific and technical officers*. PRL-TR-68-5, AD-677 196. Lackland AFB, Tex.: Personnel Research Laboratory, Aerospace Medical Division, June 1968.
- Ellul, J. *The technological society*. New York: Vintage Books, 1967.
- Ewing, Faye. *USAF officer career intent after first year of active duty*. PRL-TR-67-10, AD-664 037. Lackland AFB, Tex.: Personnel Research Laboratory, Aerospace Medical Division, August 1967.
- Ewing, Faye & Alvord, R.W. *USAF officer career decisions: Predictability of initial career intent*. PRL-TR-65-2, AD-613 333. Lackland AFB, Tex.: Personnel Research Laboratory, Aerospace Medical Division, February 1965.
- Etzioni, A. *Modern organizations*. Englewood Cliffs, New Jersey Prentice-Hall, 1964.
- Fleishman, E.A., Harris, E.F. & Burt, H.E. *Leadership and supervision in industry*. Columbus, Ohio: Ohio State Business Educational Research Monograph #33, The Ohio State University, 1955.
- Fournet, G.P., DiStefano, M.K. Jr.; & Pryer, M.W. Job satisfaction: Issues and problems. *Personnel Psychology*, 1966, 19, 165-183.
- Gouldner, A.W. Cosmopolitans and locals: Toward an analysis of latent social roles. *Administrative Science Quarterly*, 1957, 2, 281-306, 444-480.
- Gross, E. The worker and society. In H. Borow (Ed.), *Man in a world at work*. Boston: Houghton Mifflin, 1964, 67-95.
- Gustafarro, A. *A study in management development for military scientists assigned to the Air Force Systems Command*. Rept. No. APGC-TR-65-25, AD-464 160, Div. 23/1, 18/5, 23/5, April 1965.
- Hardin, E. Perceived and actual change in job satisfaction. *Journal of Applied Psychology*, 1965, 49, 363-367.
- Harding, F.D. & Bottenberg, R.A. *Attitudes and career intentions of Officer Training School students*. PRL-TDR-62-8, AD-289 872. Lackland AFB, Tex.: Personnel Research Laboratory, Aerospace Medical Division, May 1962.
- Herzberg, F. Motivation, morale and money. *Psychology Today*, 1968, 1, 42-45, 66.
- Herzberg, F., Mausner, B., Peterson, R.O., & Capwell, D.F. *Job attitudes: Review of research and opinion*. Pittsburgh: Psychological Service of Pittsburgh, 1957.
- Janowitz, M. (Ed.) *The new military*. New York: Russell Sage Foundation, 1964.
- Kahn, R.L., Wolfe, D.M., Quinn, R.P., Snoek, J.D. & Rosenthal, R.A. *Organizational stress: Studies in role conflict and ambiguity*. New York: Wiley & Sons, 1964.

- Katz, D. & Kahn, R.L.** *The social psychology of organizations*. New York: Wiley & Sons, 1966.
- Lang, K.** Technology and career management in the military establishment. In M. Janowitz (Ed.), *The new military*. New York: Russell Sage Foundation, 1964, 39-81.
- Lovell, J.P.** The professional socialization of the West Point cadet. In M. Janowitz (Ed.), *The new military*. New York: Russell Sage, Foundation, 1964, 119-157.
- Lowin, A.** Participative decision making: A model, literature critique, and prescriptions for research. *Organizational Behavior and Human Performance*, 1968, 3, 68-106.
- Miller, D.C.** Industry and the worker. In H. Borow (Ed.), *Man in a world at work*. Boston: Houghton-Mifflin, 1964, 96-124.
- Moore, D.G. & Renck, R.** The professional employee in industry. In R.T. Livingston and S.H. Milberg (Eds.), *Human relations in industrial research management*. New York: Columbia University Press, 1967, 138-150.
- Price, J.L.** *Organizational effectiveness: An inventory of propositions*. Homewood, Ill.: Irwin, 1968.
- Roe, A.** Personality structure and occupational behavior. In H. Borow (Ed.), *Man in a world at work*. Boston: Houghton-Mifflin, 1964, 196-214.
- Schein, E.H.** How graduates scare bosses. *Careers Today*, 1968, 1, 88-96. (a)
- Schein, E.H.** The first job dilemma. *Psychology Today*, 1968, 1, 26-37. (b)
- Secord, P.F. & Backman, C.W.** *Social Psychology*. New York: McGraw-Hill, 1964.
- Shapiro, A.** The official organization watcher's guide: What's going on in the parking lot. *Careers Today*, 1968, 1, 82-87.
- Vroom, V.H.** *Work and motivation*. New York: Wiley & Sons, 1964.
- Whyte, W.F.** *Men at work*. Homewood, Ill. Irwin-Dorsey, 1961.
- Whyte, W.H., Jr.** *Organization man*. New York: Simon & Schuster, 1956.
- Wrenn, C.G.** Human values and work in American life. In H. Borow (Ed.), *Man in a world at work*. Boston: Houghton-Mifflin, 1964, 24-44.
- Zald, M.N. & Simon, W.** Career opportunities and commitments among officers. In M. Janowitz (Ed.), *The new military*. New York: Russell Sage Foundation, 1964, 257-285.

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13. ABSTRACT

The primary purpose of this research was to identify factors related to career intentions of Scientists and Engineers in the Air Force. A secondary purpose was to examine the assumptions underlying general organizational retention research for relevance to Air Force retention studies. A literature review was conducted and a theoretical discussion of the typical assumptions in retention research was presented. Several of these assumptions were shown to be questionably applicable to Air Force retention research. A survey of Scientists and Engineers in the Air Force was then analyzed and interpreted using a modified model based on the theoretical discussion. Results of the survey suggested that career-oriented Scientists and Engineers may have a different need structure than their non-career-oriented counterparts. Needs for managing and applied research seemed to characterize the career-oriented Scientist, while needs for pure research and scientific achievement seemed to characterize the non-career-oriented Scientist. Career-oriented officers were generally more optimistic about satisfying important needs while in the Air Force, and they preferred a professional-officer identity to a professional-Scientist identity. Modest correlations between various aspects of active duty experience and career intent suggest that pre-commissioning attitudes, particularly their sources and relative impact on career decisions, should be investigated further. Career-oriented Scientists and Engineers may start out career-oriented and their active duty experiences simply sustain that orientation. Likewise, the non-career-oriented Scientists and Engineers may simply perceive active duty experiences as supporting their initial attitudes regarding a military career. This leaves only the initially undecided group to be significantly influenced by the quality of their active duty experiences.

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For organizations, but the degree of attenuation

Read . . . organizations, but the degree of attenuation should be less.