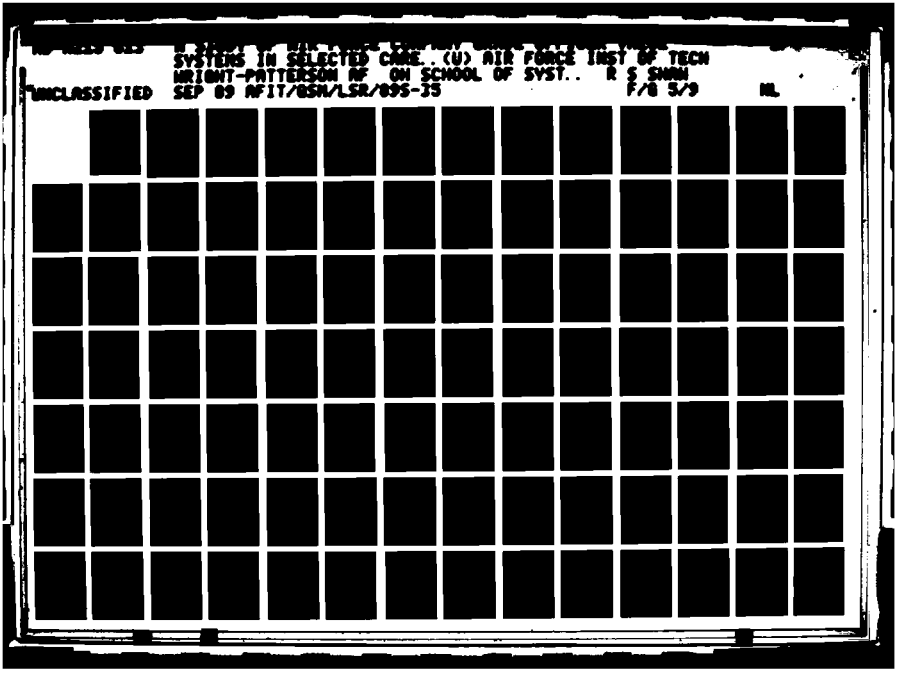
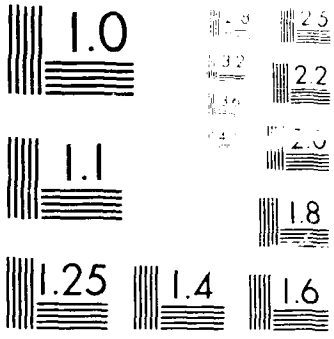
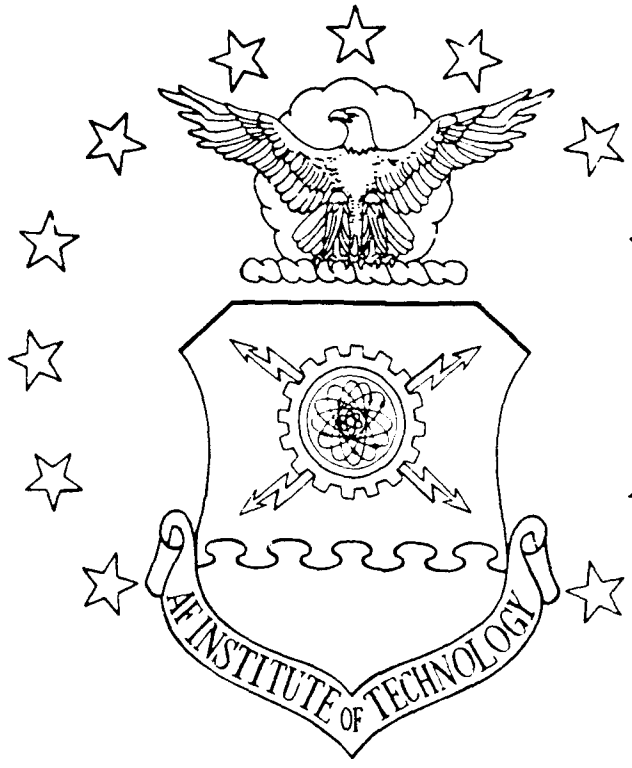

SYSTEMS IN SELECTED CORE.. (U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AF OH SCHOOL OF SYST.. R S SHAW
UNCLASSIFIED SEP 89 AFIT/GSM/LSR/89S-35 F/G 5/9 NL


1.0
1.1
1.25
1.4
1.6
2.2
1.8



A STUDY OF AIR FORCE COMPANY GRADE OFFICER VALUE SYSTEMS IN SELECTED CAREER FIELDS AND THEIR CORRELATION WITH CAREER INTENTIONS

THESIS

Robert S. Shaw II, B. S.
Captain, USAF

AFIT/GSM/LSR/89S-35

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY
AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

AFIT/GSM/LSR/89S-35

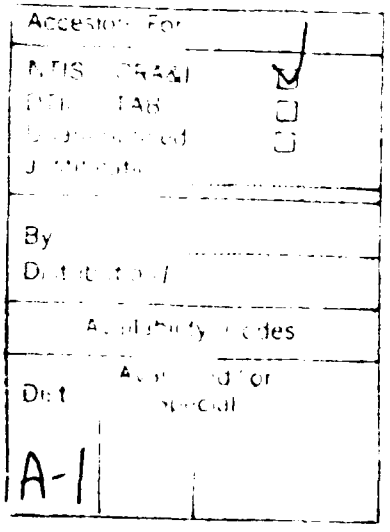
A STUDY OF AIR FORCE COMPANY GRADE OFFICER VALUE SYSTEMS IN SELECTED CAREER FIELDS AND THEIR CORRELATION WITH CAREER INTENTIONS

THESIS

Robert S. Shaw II, B. S.
Captain, USAF

AFIT/GSM/LSR/89S-35

The contents of the document are technically accurate, and no sensitive items, detrimental ideas, or deleterious information is contained therein. Furthermore, the views expressed in the document are those of the author and do not necessarily reflect the views of the School of Systems and Logistics, the Air University, the United States Air Force, or the Department of Defense.



AFIT/GSM/LSR/89S-35

A STUDY OF AIR FORCE COMPANY GRADE OFFICER VALUE SYSTEMS IN SELECTED CAREER FIELDS AND THEIR CORRELATION WITH CAREER INTENTIONS

THESIS

Presented to the Faculty of the School of Systems
and Logistics of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Systems Management

Robert S. Shaw II, B.S.
Captain, USAF

September 1989

Acknowledgements

I would like to express my thanks to Dr. John Muller, my thesis advisor, for his inciteful guidance in accomplishing this study. He managed to keep me on track when I otherwise might have gotten off. I would also like to thank Captain Donald Lussier at the Air Force Manpower and Personnel Center for his invaluable assistance in determining the population that was the focus of this study. Last, but in no way least, I would like to thank my wife Vicki, for without her support, patience, and love I might not have been able to weather the storm.

Table Of Contents

List of Figures

List of Tables

Abstract

The purpose of this study was to investigate the correlation between the personal values of Air Force company grade officers and their decision of whether or not to remain in the Air Force for a career. The study objectives were to determine whether officer value systems are correlated with different levels of career intent, to determine if these value systems are unique, and to synopsize the past research into Air Force officer values conducted at AFIT. The study is based on the findings of this past research which showed that officers in different career fields and as a group do possess unique and measurable value systems.

The study focused on company grade officers in six career fields chosen to represent the range of possible career intentions from positive to negative. Using a written survey officers were asked to rank two sets of 18 terms used to represent personal values in terms of importance. Non-parametric analysis was used to assess the level of agreement in these rankings for subgroups of officers in each career field expressing different levels of career intent (favorable, undecided, and unfavorable), as well as the independence of these rankings across career fields.

The study found that officers who expressed a common level of career intent also shared a common set of values, and these sets of values differed from those shared by officers expressing a different level of career intent. The study also found that different subgroups

of officers, when separated by job type and level of career intent, exhibit no only common but also unique value hierarchies. These findings should be considered preliminary because of the limited sample of career fields and the insignificant sample sizes of several of the subgroups studied.

A STUDY OF AIR FORCE COMPANY GRADE OFFICER VALUE SYSTEMS IN SELECTED CAREER FIELDS AND THEIR CORRELATION WITH CAREER INTENTIONS

I. Introduction

General Issue

Maintaining a quality officer corps is of major concern to all of the armed forces, including the Air Force. It is important because it affects the ability of the services to perform their missions. One of the primary ways in which the officer corps is maintained is by encouraging trained, seasoned officers already on active duty to continue serving for an extended period, perhaps even until eligible for retirement.

And yet the retention rates of officers in many career fields in the Air Force, especially in critical jobs such as pilot and engineer, have fallen below 50 percent (18). Secretary of the Air Force Edward C. Aldridge has said that, in the case of pilots, the Air Force needs a retention level of 60% to keep its pilot force stable (15:4). According to Secretary Aldridge, "We are losing more pilots than we are graduating and we cannot sustain a force with that kind of problem" (15:16). By the end of fiscal year 1988, the pilot retention rate had fallen from 48% to 43% and the retention rate for military engineers had fallen by 18% from what it was just three years ago (14:10, 7:59). These falling rates represent a trend that has continued since 1984, and which threatens to continue into the mid 1990s (14:10; 7:59).

Air Force leaders today face a major issue: how can they counter falling retention of one of the Air Force's critical resources, namely its people? And, once they develop alternatives to address the retention problem, how do they choose the one(s) that will maximize the retention of qualified officers given that there is only a certain amount of money to spend? This research program was designed to provide useful, new information that could be used to address that second issue.

Problem Statement

In the past, various methods of improving retention have been implemented by the Air Force with varying degrees of success. Currently the Air Force is offering some pilots a bonus of $12,000 to extend their commitment past the 14 year point. Some Air Force leaders feel that the bonus is the best way currently to address the retention problem (15:4). Others feel that there is something wrong with the way the Air Force is approaching a solution to the problem of retention. Air Force Chief of Staff General Larry D. Welch has stated that senior commanders ". . . regard with "distaste" paying pilots more to stay on active duty in a bidding war with the airlines" (15:16). General Welch has said that the Air Force is going to concentrate on retaining pilots who want to remain in the service (15:16).

These views appear to address the idea that personal values play a major role in an officer's decision to remain in or separate from active duty. This idea is not new. In a report on career opportunity

and commitment of officers published in 1964, the following statement appeared:

> A young man, by virtue of his values and the available opportunities, enters an occupational pipeline. If the occupation permits gratification of values relative to other possible opportunities (whether the values be specific to the military,for example, "defending my country," or general to society, for example, salary and "fringe benefits"), the officer is likely to remain in the service [29:259].

The specific problem this research addressed is the following: are the personal values that an Air Force officer holds significantly correlated with that officer's intention to remain in the service for a career? In other words, are values important in career decisions?

Research Design

This study was designed to explore the relationship between personal values and career commitment of Air Force company grade officers in different career fields. It was a continuation and expansion of research previously accomplished at the Air Force Institute of Technology (AFIT), primarily that of Captains Frank Dethloff and Dennis Doucet. In 1978 they conducted a limited study of the effect that conflicts between pilots' values and organizational values had on those pilots' career intentions. Much of the methodology of this study was modeled after their work. A synopsis of their research can be found in Chapter II of this thesis.

Purpose. The primary purpose of this research was to create new knowledge about how Air Force officers' personal values impact their decisions about making the Air Force a career. This knowledge could then be used by Air Force leaders as another criteria for judging the probable worth of a proposed retention program. It could also be used

for choosing between alternative programs to achieve the maximum likely increase in retention, or to design new retention programs. The secondary purpose of this study was to synopsize the research into Air Force officer values previously conducted at AFIT.

Objective. This study had two main objectives. The first was to determine whether officer value systems are correlated with different levels of career intent (positive, negative, or neutral). The second was to investigate whether the value systems of officers who exhibiting different levels of career intent differ depending on the job they do. The objective of the research synopsis presented in Chapter II was two-fold: to demonstrate the basis for the current study; and to provide to future researchers a summary of the methods already used in Air Force officer value study as well as the findings and conclusions made from this research.

Research Hypotheses. This study was designed to address two specific hypotheses concerning personal values and career intent.

1. The value hierarchies (systems) of Air Force company grade officers who intend to remain on active duty are significantly different from those of officers who opt to separate from the service or those who are undecided about a career.

2. The value systems of officers who exhibit a certain level of career intent are common within a job specialty, but differ between specialties.

Investigative Questions. The following questions were used to guide the study in order to address the research hypotheses.

1. Is there a significant difference in the value systems of officers who express positive, neutral, or negative career intentions?

2. Do the value systems of officers who express a certain orientation of career intent differ among job specialties?

3. What methods exist to measure value systems and career intent and how reliable are they?

4. What research has been conducted in the past on Air Force officer values and how does that prior knowledge impact this study?

Classification. This was a formal study designed to test the stated research hypotheses. It was descriptive and correlational in nature in that it sought to discover and clarify the relationship between an officer's values and career intent. It relied on written surveys administered by mail to gather data in the field on a cross sectional sample of the population. This population consisted of Air Force company grade officers in various career fields chosen to provide full coverage of the spectrum of career intentions, from completely favorable towards a career to completely unfavorable.

Justification

Values are important determinants of human behavior. According to Andrew F. Sikula, values serve at least three functions (28:306). They allow a person to make inferences about personal relationships with objects yet to be encountered (28:306). They also provide expectations about those objects, thus directing personal perception and behavior (28:306). Finally, they provide for alternative choices of action in a given situation (28:306). According to Rokeach "The reason social psychologists have long been interested in them is that they are presumed to be the main genotypes that underlie or determine social behavior" (25:122).

This research was important because it sought to define the relationship between an officer's values and a particular behavior, in this case the decision of whether or not to make the Air Force a career. It was also important because it built upon a base of knowledge already generated by other researchers on the composition of Air Force officer value systems. It allowed for a better understanding of the role that values play in Air Force officers' lives, both professionally and personally. Lastly, this research was important because it provided new information with which to judge the merits of programs designed to impact in a positive way the retention of Air Force officers.

Scope

This study addressed specific groups (by career field), within the larger population of all Air Force company grade officers. It considered job specialties that historically exhibit both high and low retention rates because by doing so the research encompassed the entire range of career intention orientations from positive to negative. Pilots, navigators, engineers, physicians, lawyers, and air weapons directors were chosen for study. This study was further limited to company grade officers that were stationed on active duty at locations within the continental United States.

Limitations

This study had two important limitations. First, because it did not consider the entire population of Air Force company grade officers, caution should be exercised in generalizing the results and conclusions from this study to the larger population. Second, problems in

obtaining statistically significant sample sizes for several of the subgroups used in this research limited the resulting statistical significance of some of the research findings. This limitation is explained in more detail in Chapter IV.

Assumptions

This study was performed with the following assumptions.

1. Values can be defined to the extent that a surveyed sample of people will assign generally the same meaning to each of the defined terms.

2. These defined values are ranked by each individual into some internal order that can be determined through investigation.

3. Values do have a significant impact on the behavior of individuals.

Background

While theories abound on the nature of human values, this section concentrates on describing the two that have played a dominant role in the research conducted at AFIT into the nature of Air Force officer values and value systems. A comprehensive synopsis of the previous value research conducted at AFIT, which forms the historical and empirical base for this study, is presented in Chapter II.

Rokeach. In 1973, Milton Rokeach offered the following definition of a value:

> A value is an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence [25:5].

This definition was based on the decision that a study of human values will be more useful if it concentrates on what values people are said to possess rather than what values are assigned or attributed to a particular object (25:4-5). In constructing his approach to studying values, Rokeach invoked a number of concepts and techniques that characterize his research (25:5-11).

Value Endurance. Human values are seen to have two sides, an enduring quality and a relative quality (25:5-6). The enduring quality of a value means that it is relatively stable through time. The relative quality accounts for the fact that values can and do change and that some values are more important than others (25:6).

Value and Belief. Rokeach felt that values were in fact a particular type of belief, specifically that type termed a prescriptive or proscriptive belief (25:7). These types of beliefs referred to personal judgments that certain actions are more desireable than others (25:7).

Value Types. Rokeach defined two types of values, instrumental and terminal. Instrumental values are beliefs about preferred modes of conduct while terminal values concern desired end-states of being (25:7). He believed that these types of values interact and thus both must be considered in any theory of human values (25:7).

Values and Preference. Rokeach saw values as representing two types of preferences (25:9-10). First, a value is a preference for one mode of behavior or end-state over another when two opposite behaviors or end states are compared (25:10). Second, values represent preferences for certain behaviors or end-states over others when

compared to the set of values a person has as a whole (25:10). Thus the values a person holds represent a ranked set of preferred behaviors and end-states of being.

Value Functions. Rokeach also believed that a person's values performed certain functions (25:12-17).

1. Values act as standards that guide personal conduct in all situations (25:13).

2. Ranked values provide the basis for resolution when conflict arises between two or more values in a person's value system (25:13).

3. Values can motivate action in the sense of long term goals. Rokeach noted that "Instrumental values are motivating because the idealized modes of behavior they are concerned with are perceived to be instrumental to the attainment of desired end-goals" (25:14).

Other Concepts. Rokeach contrasted the concept of values with a number of other terms. Attitudes were defined as a group of beliefs centered around a specific object or situation (25:18). He also stated that a value transcends objects and is a standard for behavior while an attitude is not (25:18). Values are different from norms because norms deal with specific situations, deal only with modes of behavior, and are external to the person (25:19). Values are not needs, but instead are a representation and transformation of personal need and societal demands (25:20). Finally, a value is not an interest, yet an interest is a manifestation of a value. In fact, interests tend to resemble attitudes more in the sense that they present a particular orientation toward a particular object or activity (25:22).

Value Measurement. Rokeach not only theorized about value systems, but also felt that active research into human values and value systems would be of great benefit in understanding human behavior (25:26). He spent a considerable amount of time developing a means to measure values, and in doing so considered three approaches to measuring values (25:26). One method involved observing a person's behavior in controlled situations in order to draw conclusions about their values and value systems. He rejected this approach as being to expensive and time consuming (25:26). A second method allowed the person to describe what his values are, but this method was rejected do to the chance that the respondent would be unable or unwilling to describe them adequately enough for analysis purposes (25:27).

The approach that he finally settled on required the respondent to rank in order of importance two sets of 18 terms that were thought to be an appropriate representation of a general set of instrumental and terminal values (25:27-30). These values are listed in Table 1. The survey that employed these lists was viewed by Rokeach as a general instrument that could be used in a variety of studies on human values. Uses of the survey included studying value system stability, value system change, value similarities and the importance of single values to behavior (25:31-38,51).

Two final points concerning Rokeach's approach to studying values should be noted. First, it is assumed under this approach that each person has a small number of terminal and instrumental values (25:18). Second, from research conducted using this approach, it was evident to Rokeach that subsets of the 36 values listed in Table 1 are more

Table 1

Rokeach's Terminal and Instrumental Values

Terminal Values	Instrumental Values
1. A comfortable life	1. Ambitious
2. An exciting life	2. Broad-minded
3. A sense of accomplishment	3. Capable
4. A world at peace	4. Cheerful
5. A world of beauty	5. Clean
6. Equality	6. Courageous
7. Family Security	7. Forgiving
8. Freedom	8. Helpful
9. Happiness	9. Honest
10. Inner Harmony	10. Imaginative
11. Mature Love	11. Independent
12. National Security	12. Intellectual
13. Pleasure	13. Logical
14. Salvation	14. Loving
15. Self-respect	15. Obedient
16. Social recognition	16. Polite
17. True friendship	17. Responsible
18. Wisdom	18. Self-controlled

(25:27-30)

significant predictors of different behaviors than others, and thus not all 36 play a part in every human behavior (25:162).

England. George England felt that value research was important because he believed that personal value systems have a significant impact on the behavior of people (12:2). Among other things, he believed that values influence interpersonal relationships, perceptions of situations and problems, decisions about solutions to problems, and the limits of ethical behavior (12:2). England considered values and a person's value system to be relatively stable over time and viewed that value system as ". . . a relatively permanent perceptual framework which shapes and influences the general nature of an individuals behavior" (12:2).

England felt that any approach to value theory and measurement is affected by four characteristics (12:2). The *conceptual nature* of values in a particular approach lies on a continuum from the preferential to the normative. Normative approaches concentrate on the obligatory nature of values while preferential treatments look at values from the standpoint of needs, desires and interests (12:2). The second characteristic, the level of *generality* or *abstraction,* deals with the level of specificity of the values being studied (12:3). Very specific values are studied in relationship to definable phenomena, while abstract values are studied when concentrating on the broader conceptual nature of cultures (12:3). The third and fourth characteristics of various approaches deal with the *measurement problems* associated with values and the *purpose* for which values are being studied (12:2).

Keeping these four characteristics in mind, England developed a theoretical framework for studying values. This model itself possesses certain characteristics which are defined below.

Potential Values. These are all the possible values which a person or group can have (12:6). This set is divided into two classes of values, weak and conceived.

1. Weak Values. These are values that tend to have very little impact on behavior (12:6).

2. Conceived Values. These values are ones that will likely result in some behavior and consist of three types. *Operative* values are values that have the greatest chance of resulting in a behavior (12:6). *Intended* values are perceived as important but have a lower probability of resulting in a behavior because the situation may

intervene (12:6). *Adopted* values are values which are not truly personal but which come from the situation (i.e., values imposed on the person by the situation) (12:6).

Behavior Influence. England's model provides for two ways in which the values defined above can affect behavior.

1. Behavior Channeling. This refers to the direct influence of operative values on behavior. In this mode, operative values direct behavior away from paths that would result in conflict with the operative values of the person (12:6). For instance, a person who values honesty would find it very difficult to lie to or deliberately mislead someone.

2. Perceptual Screening. This represents an indirect influence on behavior. It refers to the method by which situations with which a person are confronted are filtered by personal values, which in turn result in perceptions of the situations unique to the individual (12:7).

Environmental Influence. The model presupposes that values are but one way in which behavior can be influenced, and that values and behavior should be studied in the context of the environment in which they occur (12:7)

Value Measurement Using his theoretical base as a starting point, England developed what he called the Personal Value Questionnaire (PVQ). The PVQ was designed:

> . . . on the rationale that the meanings an individual attaches to a carefully specified set of concepts will provide a useful description of his personal value system, which may in turn be related to his behavior in systematic ways [12:7].

Designed to measure the personal value systems of American managers, the original PVQ consisted of 66 concepts arranged in five classes (12:8,11). Each concept is rated on two scales by each respondent, one measuring importance of the concept and the other meaning of the concept (12:11). The questionnaire also included questions that measured different types of behavior, work effectiveness, and demographic information (12:11). An example of the concepts in each class included on the PVQ are shown in Table 2.

Table 2

Examples of PVQ Concepts

Goals of Business Organizations	Groups of People
Employee Welfare	Government
High Productivity	Managers
Organizational Efficiency	Me
	My Boss

Personal Goals of Individuals	Ideas Associated with People
Achievement	Ability
Dignity	Compassion
Job Satisfaction	Trust
Success	

Ideas About General Topics

Authority
Change
Equality
Risk

(12:11-13)

Conclusions. England's approach differs from Rokeach's mainly in the way in which a person's values are measured. Both assume that values and value hierarchies are relatively fixed phenomena that act as

guides and provide influence over the way in which people perceive the world and the way in which they react to the situations they encounter. Both assume that the study of values is an important method for understanding the behavior of people, and both have developed tools with which this research can be carried out.

Definitions

Several of the terms that are central to this study will now be formally defined. These definitions were used to guide the development of the research methodology and the analysis of the data, as well as the conclusions drawn from the data analysis.

Values. The definition of values offered by Rokeach and presented on page 8 of this thesis will be used in this research.

Value Systems. Based on the ideas of Rokeach and England, a value system is defined as the ordered grouping of all personal values which a person holds, hierarchically ranked in order of importance to that person as guiding beliefs in his or her life.

Career. For this study, career is defined as remaining on active duty in the Air Force for a sufficient period of time so as to be eligible for full retirement benefits upon separation from the service.

Summary

A continuing concern in the Air Force are the low retention rates of officers in many career fields. One of the problems Air Force leaders face in dealing with this issue is in choosing methods that maximize the retention of officers. Since it is felt by many that personal values have a significant affect on behavior, it seems reasonable to assume that knowledge about how values impact career

decisions would be of great use in choosing between alternative retention plans or approaches. This research was designed to study the correlation of personal values with levels of career intention in certain career specialty groups of Air Force company grade officers. The purpose of this study was to create new knowledge about values and career choices in the hopes that it would provide more insight into the relationship between the two, and perhaps provide more information that could prove useful in choosing alternative retention programs in the future.

II. Literature Review

Introduction

This literature review has three purposes. The first is to offer in one document a synopsis of the research conducted at AFIT over the past 17 years into the values and value systems of various groups of Air Force officers. The objective of this synopsis is to present to future researchers a summary of the research methods, findings and conclusions to date on Air Force officer values for their use in further studies. The second purpose of this review is to demonstrate that a theoretical and methodological base exists for the current study. The final purpose of this review is to show that empirical evidence exists to support the contentions of this study, namely that personal values affect the behavior of Air Force officers and that different groups of officers possess unique value systems.

This review is presented as a descriptive summary of the research conducted on Air Force officer values and value systems at AFIT since 1972. It is comprised of ten different thesis summaries, presented in chronological order by thesis publishing date. The summaries are followed by an overall summary of the conclusions from these studies. Each individual thesis summary is comprised of four parts. The background section covers the purpose, theoretical and problematical basis, hypotheses, and limitations of the study as well as a summary of concepts used by the author(s) in the research. The next section summarizes the methodology used, and includes a description of the sample, measurement tools, and statistical analysis performed. The

final two sections synopsize the overall findings and conclusions of the study. Because this summary is presented as a descriptive review of past work, no attempt is made to judge the validity of the studies reviewed or their findings and conclusions.

Dalbey, 1972

In December 1972, Captain Stephen B. Dalbey published the first in a series of AFIT theses on Air Force officer values that would span the time period from 1972 to 1988. Dalbey's thesis, A Pilot Study of the Personal Value Systems of United States Air Force Officers, was the first in a group of five studies published from 1972 to 1974 that applied the theories and methods of George England to the study of Air Force officer value systems.

Background. The basic purpose of Dalbey's study was to discover what the personal values of Air Force officers were without making any attempt to predict behaviors based on his results. (i.e., it was a descriptive study only) (8:4). In addition to his primary purpose, Dalbey outlined the following specific objectives for his research.

1. To determine a hierarchy of personal values of United States Air Force Officers;
2. To identify and explain, within the reference of personal and organizational variables, the differences in the personal value systems of Air Force officers; and
3. To compare basic data on the personal value systems of Air Force officers with those of previous research dealing with the personal value systems of United States Naval officers and American managers. [8:4]

Basis. In justification of his research, Dalbey notes that many benefits could be gained from the study of values. Dalbey states that by studying and understanding personal values, Air Force leaders would gain further insight into the behavior of officers (8:1-3). In

addition, this understanding would help in reducing conflicts within the group, and in fostering congruence between an officer's individual values and the group values of the Air Force as an organization (8:1-3).

Both the methodology that Dalbey used to study personal values and the theoretical basis from which that methodology was derived were developed by George England (8:30). As a way of further demonstrating the potential utility of value study, Dalbey notes six generalized conclusions developed by England from his initial studies of American managers. He states that these conclusions are ". . . equally valid for officers in the United States military establishment" (8:27). Dalbey summarizes these conclusions as follows:

1. Personal value systems can be meaningfully measured,
2. Certain groups of people tend to have characteristic general value patterns although there are individual differences,
3. Personal values influence behavior,
4. Personal value systems influence and are influenced by one's organization,
5. Personal value systems affect the conflict and harmony between individuals in organizations (and within organizations), and
6. Understanding one's values may well be helpful in resolving differences between what one believes and what one is. [8:28-29]

Concepts. Dalbey discusses several concepts relevant to value study and the views on these concepts held by several value researchers. Specifically, he discusses the various definitions that exist for values, the theories of how values are acquired, and some of the various classification schemes developed for personal values. He also discusses England's value theory, reviewing the concepts mentioned in Chapter I of this study.

Dalbey begins his concept discussion by citing several different definitions for values and by noting that no one has been

able to agree on any one definition (8:12). However, he notes that two common themes can be found throughout these definitions. One is that ". . . values are somehow related to behavior" (8:13). The second is ". . . the concept that the relationship between values and behavior is somehow structured or ordered" (8:13). Based on these common characteristics, Dalbey then presents the definition of values which he used in his research. Specifically, Dalbey states:

> Personal values are abstract concepts, existing in a hierarchy of prepotency, which shape and influence the general nature of individual behavior. The extent to which a personal value influences behavior is determined by the position of the personal value within the hierarchy of prepotency. [8:14]

He goes on to differentiate between values, traits, and attitudes. According to Dalbey, the literature differentiates traits from values because, while a trait is a ". . . generalized tendency to act", it applies no direction to a behavior(s), and is not hierarchically ranked with other traits, as are values (8:14). He also states that traits are actually ". . . behavioral tendencies reflecting the interaction of the values and the environment of an individual" (8:14). He notes that in the literature, attitudes are not attributed the same hierarchical nature as values and are in fact considered to be more specific and more closely tied to a particular object than are values (8:14-15).

The second concept Dalbey discusses is that of value acquisition. He reviews several views on value acquisition for the reader, and notes several important points from value acquisition theories. First, he states that value acquisition is viewed as a process, not a single event (8:15). In other words, values can be learned, thought about, and changed as a person goes through life

(8:15). Second, he notes that the most permanent values in a person's value system are learned while as a very young child, primarily from the child's parents (8:15). Once a person grows, the value system is affected by the outside environment and by individuals other than the person's parents and immediate family (8:15). Finally, Dalbey states that changes in a person's initial value system are caused by the interaction of that person with the outside environment (8:16). He notes that these changes are viewed in terms of a re-ranking of the values in the system rather than as a substitution of new values for the original ones (8:16).

The final concept that Dalbey reviews concerns the types of classification schemes for values found in the literature. Several of the classifications he reviews are based on the primary orientation of the person which, according to Dalbey, describes their primary interest and in turn defines the types of values that are important to them (8:17). Another type of classification which he discusses briefly is based on a value's particular significance to behavior. He uses as his example England's four types of values (8:20).

Limitations. Dalbey states that his study was bounded by a number of limitations. He sampled only a portion of the officers at one location, Wright-Patterson Air Force Base (WPAFB), and thus the results may not be indicative of the entire Air Force (8:9). He also emphasizes that the structure of the survey instrument used in the study (England's PVQ) and the fact that the survey was anonymous did not allow for follow-up or clarification questions to be asked of the respondents (8:10). This limited the amount of information that could be gathered during the research project (8:10). In addition, several

of the people surveyed requested assistance in completing the questions, suggesting that there may have been some problem in interpretation of the questionnaire (8:10). Finally, Dalbey notes that the PVQ did not measure any absolute level of importance for a given value concept to an individual (8:10). He implies from this that individual comparisons (one on one) would be difficult if not impossible to make using this approach (8:10-11).

Methodology. Dalbey's methodology was based on the work of George England, and consisted of three phases. Phase one was the development of the concepts that he would use in his version of England's PVQ for his research (8:30). Phase two was the validation of the concepts chosen in phase one (8:30). Phase three was the development and distribution of the actual PVQ used in the research, plus the collection and analysis of the survey responses (8:30)

Survey Instrument. Dalbey used a two part survey to conduct his research. The first part contained the PVQ (8:30). The second part of Dalbey's survey was basically a demographic questionnaire that was used to ". . . differentiate between sub-groups within the overall sample to determine if any value system differences existed" (8:36). In describing his questionnaire, Dalbey notes the following characteristics of the general PVQ.

1. It utilizes two measures of the valuation of a concept, based on a method of meaning measurement developed by Charles Osgood using "bipolar adjectives" called the semantic differential (8:31). According to Dalbey England felt that using two measures ". . . would be more effective in predicting likely behavior than would either mode alone" (8:33).

2. The first measure, the power mode, measures directly how important a concept is to a person on a three point scale from high to low importance (8:31-33).

3. The second measure, the descriptor mode, provides for three possible descriptions for the meaning of each concept (pleasant, successful, and right). This mode provides a means of measuring the meaning of a concept to an irdividual (8:33). The descriptor information is used to classify respondents into one of three "primary orientations" each of which is ". . . a general scheme of evaluation and indicates a predetermined tendency toward action" (8:33). These orientations (affect, pragmatic, and moral-ethical) are then used to determine which of the three descriptors is the primary one for the respondent (8:34). A person with an affect orientation would judge things in terms of concepts related to pleasant and unpleasant, while a pragmatically oriented person would act based on concepts related to successful and unsuccessful (8:34). The person with a moral orientation would find concepts related to right and wrong most important to their behavior (8:34). A respondent with a mixed orientation (which is allowed for in England's approach) has no primary descriptor (8:34).

4. According to Dalbey, by using both the power information and the primary descriptor information it is possible to categorize each of the respondent's values into one of England's four categories (operative, adopted, intended or low relevance) (8:34-35). This classification yields the respondent's value system, since the categories are hierarchical in nature (8:34-35).

Dalbey notes that he did not actually use the PVQ developed by England. Instead he used the same format and substituted concepts chosen by Dalbey and others at AFIT (8:30). Nowhere in the study does he explain why he developed new concepts, however it can be surmised from the description of this development that he did it in order to include in his questionnaire concepts that were relevant to Air Force officers (8:37-44).

The PVQ development phase of Dalbey's research consisted of three steps. The first was an intensive literature review and interview period used to derive an initial list of 255 value concepts (8:37). Once this list was generated, Dalbey and some fellow classmates who would also be using the new PVQ in their studies met with their research advisor, Major T. R. Manley, to discuss the list. The purpose of the meeting was to reduce the length of the list by eliminating redundant concepts, concepts which might elicit set answers from the respondents, and concepts they considered to be very low in importance (8:37-38). The meeting resulted in a trimmed list of 153 concepts, which were categorized into six groups. These groups included the categories **Ideas Associated with the Goals of Organizations**, **Personal Goals of Individuals**, and **Ideas Associated with the Military** (8:38-40).

Phase two of Dalbey's research was a validation effort that was used to further trim the list for the final form of the questionnaire (8:38). Dalbey used a pilot questionnaire containing the 153 concepts to assess the relative importance of each concept to Air Force personnel (8:38). The pilot survey was sent to 114 resident AFIT students, faculty, and staff as well as 20 WPAFB personnel. According

to Dalbey, the AFIT personnel were representative of Air Force personnel in general because "Most of the AFIT personnel had recently come to AFIT from virtually all major commands in the Air Force" (8:38). By analysis of the responses to the pilot questionnaire, Dalbey narrowed the list of 153 concepts to 67 (8:42). This final list was then modified to add certain concepts, such as **job security** and **authority**, which made the PVQ more congruent with England's past research and research being conducted by Dalbey's advisor, Dr. Manley (8:42). The final list used in the PVQ generated by Dalbey included 77 concepts categorized into the six classifications mentioned above (8:42-44) Using England's format, Dalbey included the final list as part one of his questionnaire (8:44).

Analysis. The only statistical analysis performed by Dalbey consisted of a chi-square dependency analysis of the demographic variables in relation to each of the value concepts to check for possible dependent relationships (8:49-51). The rest of the analysis consisted of developing a composite hierarchy of value concepts for the sample, generation of primary orientation and orientation ratios (i.e. proportion of pragmatic, moral, and affect orientations within the sample), and classification of values into operative, intended, adopted, and low behavioral relevance categories (8:44-49).

Results. 180 of the 372 questionnaires were returned for a 48% rate of return (8:53). Overall Dalbey found that the primary orientation of the respondents was pragmatic (39%), followed by a nearly equal proportion of individuals with a moral-ethical orientation (38%), and much smaller proportions of mixed (17%) and affect (6%) orientations (8:53). He compared his results to those found by England

in his research on Naval officers, American managers and union leaders and noted that "The distribution of the primary orientations of Air Force officers did not coincide with any of the other three groups" (8:53,59). The closest match was with Naval officers, and the largest differences were with union leaders (8:59).

The ten most and ten least significant operative values for Air Force officers according to Dalbey's results are listed in Table 3 below in rank order (first to tenth and 68th to 77th) (8:64). Dalbey summarizes the value measurement data with the following statement:

> In general, Air Force officers tended to place the highest importance on value concepts associated with Goals of Organizations. The five value concepts associated with Goals of Organizations were ranked within the highest ranked 30 value concepts in Table IX. On the average, these five value concepts were operative values for 40% of the officers. [8:66]

Table 3

Dalbey's Sample Operative Value Rankings

Top 10:	Bottom 10:
1. Job Knowledge	68. Race Relations
2. Judgement	69. Job Security
3. Job Proficiency	70. Competition
4. A Sense of Responsibility	71. Obedience
5. Delegation of Authority Commensurate with Responsibility	72. Offense
	73. Rank
	74. Money
6. Mission Accomplishment	75. Living Conditions
7. Dedication	76. Prestige
8. Initiative	77. Change
9. Integrity	
10. Professionalism	

(8:64)

Dalbey reported that many of the value concepts failed the chi-square test for independence for some or all of the various demographic

variables tested (8:67). The demographic variables that demonstrated dependence with one or more of the value concepts on the survey were time-in-service, grade, age, college degree, education level, marital status, number of dependents, present command, job specialty, Professional Military Education (PME) Level, flight crew position, and type of commission (8:66-95).

Conclusions. Based on the findings from his analysis of the study data, Dalbey draws a number of conclusions concerning the values of Air Force officers. First, he states that "The overall orientation of the Air Force officers at Wright-Patterson Air Force Base is an equal mix of pragmatic and moral-ethical orientations" (8:113). He attributes the differences in orientation proportions between his study and those of England concerning managers and union leaders to the composition of the sample and the types of people attracted to the various fields (8:113). According to Dalbey, "The primary orientation of Air Force officers is relatively insensitive to personal and organizational variables" (8:113).

In addition to this stability of orientation, Dalbey concludes that "Air Force officers tended to place the highest value on value concepts associated with Goals of Organizations" (8:114). He states that individual values, unlike orientations, are subject to dependency on at least some of the demographic variables measured (8:115). While personal variables seemed to impact more values than did organizational values, he states also that ". . . Air Force related value concepts were more susceptible to influence by personal and organizational variables than were more general value concepts . . . " (8:115-116). He also concludes that "In general, primary orientation influenced the

importance of more value concepts associated with Characteristics of Other People than those value concepts associated with other topics" (8:117).

Dalbey ends his conclusions section by reiterating his view that value study can reveal important information to Air Force leadership. He states that value study helps to reveal what influences Air Force officer behavior, and in addition helps to delineate differences between groups of officers (8:117).

Markisello, 1973

In October of 1973, Captain Dennis F. Markisello published an AFIT thesis titled Analysis of Personal Value Systems and Operative Goals of SAC Minuteman Missile Maintenance Officers. This study continued the work of Dalbey by applying his techniques to the study of a particular subgroup of Air Force Officers.

Background. Markisello's stated purpose was to ". . . gain insight and understanding of SAC Minuteman missile maintenance officers through a study of their personal values and operative goals" (20:9). He outlined four major objectives for his study, the first of which was to identify the value hierarchies of Strategic Air Command (SAC) Minuteman missile maintenance officers (20:9). The second objective was to identify the hierarchy of operative goals of Minuteman missilemen (20:9). The third sought to compare those goals with official SAC goals for missilemen (20:9). The final objective was to determine if SAC missileman maintenance officer values are dependent on demographic variables (20:9).

Basis. Markisello states in his opening chapter that the SAC missile maintenance officer is a major player in maintaining the readiness of the Air Forces's strategic missile arm (20:1-2). He cites his experience as a Combat Targeting Team Chief and Instructor in noting that morale and discipline problems, as well as a low retention rate, existed within the corps and that these problems are of ". . . vital concern to Air Force policy makers" (20:6). Markisello states that one of the causes of these problems may be conflict between the goals and values of individuals and the policies and decisions of the organization they are in (20:6-7). He then states that this possibility is not certain, however, due to a lack of knowledge concerning missile maintenance officer values (20:7). The primary problem driving his research was this lack of understanding, and he felt that studying maintenance officer value systems and the goals that motivate them would provide insight to help correct the problems mentioned above (20:8).

Concepts. Markisello notes that his research into values was based, as was Dalbey's, on the work of England (20:13). He goes on to make observations about value definitions similar to those made by Dalbey, and then quotes England's definition of values for use in his study as follows: "A personal value system is viewed as a relatively permanent perceptual framework which shapes and influences the general nature of an individual's behavior" (20:13). He later states that the idea of the hierarchical nature of values should be added to the definition for use in his research (20:15).

Although a major portion of Markisello's research involved studying the values of Minuteman missile officers, a large part also

dealt with measuring the operative goals of those same officers. In his discussion of concepts related to the study, Markisello develops a definition for goals and reviews the goal theories and research of both George England and his thesis advisor, Major T. Roger Manley.

Markisello adopts a working definition of organizational goal by first noting that goals can and have been defined as either specific ends or as constraints on action (20:20-22). He uses this fact to differentiate between goals and objectives, which in his opinion are two different things (20:22). According to Markisello, goals are long range in nature, are quite general, and imply the existence of a set of constraints that an action must follow (20:22). He goes on to say that objectives in contrast refer to the short range, are specific in nature, and imply a measurable result (20:22). Once he makes this distinction he adopts the definition of H.A. Simon as his definition of organization goal:

> The goal of an action is seldom unitary, but generally consists of a whole set of constraints the action must satisfy. It appears convenient to use the term 'organizational goal' to refer to constraints, or sets of constraints, imposed by the organizational role, that have only an indirect relation with the personal motives of the individual who fills the role. More narrowly, 'organizational goal' must be used to refer particularly to the constraint sets that define roles of the upper levels of the administrative hierarchy. [20:21]

Markisello also defines and differentiates between two types of organizational goals, *official* and *operative*. He quotes Charles Perrow in defining official goals as those that are printed in official documents such as charters and regulations and that state the overall purposes of the organization (20:23). He again quotes Perrow in defining operative goals as the actual goals utilized by the organization to carry out its operations (20:23). Markisello goes on

to note that while operative goals often reflect official goals, they can also be different from and conflict with official goals (20:23).

At the end of this discussion, Markisello describes an operative goal classification scheme developed by George England that categorizes operative goals in terms of their relevance to behavior (20:24). *Maximization criteria* are operative goals used by an individual to develop alternative courses of action, and they have the greatest affect on behavior (20:24). *Associative status* and *intended* goals are both used by an individual to evaluate the alternatives generated by the maximization criteria, and each has a progressively smaller affect on behavior (20:24). Markisello refers to these goals as "primary" and "secondary" "testing criteria", respectively (20:24). The last category, *low relevance goals*, have very little affect on behavior (20:24).

Once he completes his discussion of goal definition, Markisello moves on to review a theory of decision making developed by Manley that relates goals and values into a behavioral model. In this model, according to Markisello, action is motivated by either the environment, the operative goals of the organization, or the operative values of the individual (20:25-26). This motivation takes the form of the generation of alternative courses of action or behavior (20:25-26). These alternatives are then tested against the various types of operative goals and against adopted and intended values to arrive at a decision (20:25-26). The decision itself results in ". . . either a formulation of policy or some specific action" (20:25).

Markisello notes that within the model, the different types of goals can shift in emphasis over periods of time. This means that

at one point in time a given operative goal may be a maximization criteria, and at another point it may shift in importance and become an associative status or intended goal (20:27). According to Markisello, Manely felt that this shifting can make it difficult to identify and study goals over short periods of time with any confidence in the results of the study (20:27).

Markisello also describes Manley's idea of "goal hostility" as occurring when the alternatives generated are not accepted by an individual (20:27-28). This occurs when the individual perceives a conflict between his personal value system and the actions demanded by his role in the organization (20:27-28). Markisello states that this conflict ". . . could seriously damage the individual and/or organization" (20:28).

As a capstone to his conceptual review, Markisello summarizes the results of studies conducted by both England and Manley into personal values and organizational goals. He states that England's work on American managers revealed that those managers studied had a pragmatic primary orientation (20:28-29). He also notes that England's later work showed that union leaders and Naval officers had a moralistic primary orientation, while college seniors had differing orientations depending on their field of study (20:29). In addition, England's studies of Japanese, Indian, Australian, and Korean managers demonstrated that cultural factors had a significant impact on the primary orientations of the individuals studied (20:29-31). Finally, Markisello notes that England tested the predictive ability of his theory and procedures by studying Indians' reactions to proposed job

incidents, and that 76% of the behaviors England predicted prior to the test matched the actual responses of the test subjects (20:31).

Markisello states that Manley tested his theory of decision making (in relation to values and operative goals) by studying managers of the New York Telephone company (20:34). He notes that Manley's results indicated that the primary orientation of the telephone company managers was moral-ethical, which did not agree with England's study of American managers (20:34). Markisello indicates that Manley believed this difference to be common for public utility organizations, and that the differences in the samples he and England used may have significantly affected the findings of the two studies (20:34). Markisello points out that Manley found differences in value and goal rankings for different levels of managers and also discovered that personal rather than organizational demographic variables were the ones that significantly affected goal valuation by the managers studied (20:35).

Limitations. Markisello notes a number of limitations to his study. The first was that the group studied was limited only to wing and squadron level missile maintenance officers assigned to the Minuteman weapons system (20:10). This was done because "The primary concern of this study is the examination of the actual managers of the line maintenance activities" (20:10). Other missile system maintenance officers were omitted from the study to reduce the complexity of the research and because the majority of missile maintenance officers were in the Minuteman force at the time (20:11). He states that NCOs and enlisted personnel were not studied in order to limit the scope of the

study and so as not to "cloud" the results (20:10). He also notes the lack of follow-up questions and the relative nature of the PVQ as limitations (20:11-12).

Methodology.

Sample. The study population consisted of 283 Minuteman missile maintenance officers. The sample size was 168, which according to Markisello ". . . is considered to be an adequate representation of the composition of the wing/squadron missile maintenance officer force" (20:64). Markisello does not explain how the sample was chosen.

Survey Instrument. Markisello used the same questionnaire as Dalbey, but modified it with Manley's goal questionnaire for his research (20:41). The goal section of Markisello's survey followed Manely's format, which in turn matched the format used in the value section (the PVQ) of the questionnaire (20:43, 204-213). The goals included in that section were developed using an approach almost identical to that used by Dalbey to generate his list of value concepts for the PVQ (20:43-46). The primary difference in the procedures was that Markisello's initial list of goals was sent to SAC Headquarters missile maintenance staff personnel for validation and review. These people were asked to choose the ten goals and objectives they felt were most relevant for study (20:45). The final list generated by this process included 33 goals and objectives and these were in turn included on the final form of the questionnaire (20:46). Markisello notes that the classification of goals relates to the behavioral relevance of those goals to a group while the classification of values relates to the behavioral revelvance of those values to an individual (20:52).

Analysis. The data from the value portion of the questionnaire was evaluated in the same way as Dalbey's data. This analysis included the determination of primary orientations and the classification of the individual's value concept responses into operative, adopted, intended and low relevance values which were in turn used to determine that person's value system (20:47-54).

The goals and objectives data was analyzed in the same manner as the value data, and the goals were classified into one of the four types of goals defined by England (20:51-52).

Markisello used the same kind of chi-square analysis as Dalbey did to check for dependency between the demographic variables and the value concepts, but he also checked for dependency between the goals and the value concepts (20:54).

Results. Markisello states that the most prevalent primary orientation for SAC Minuteman missile maintenance officers was moral-ethical; mixed orientation was tied with pragmatic for second place (20:139). The primary orientation of missile officers paralleled that of both England's Naval officer group and Manley's telephone company managers (20:67). Markisello notes that there was a very close similarity in relative percentages for all four orientation categories between maintenance officers and telephone managers, though the absolute percentages differed slightly (20:67). The results indicated "basic agreement" with Dalbey's findings, though Markisello makes no further comparison because of the small sample used by Dalbey (20:67).

Markisello presents the hierarchy of values he developed for the aggregate sample (20:69-70). The highest and lowest ranking values in this composite hierarchy are presented in Table 4 below. Markisello

Table 4

Highest and Lowest Ranking Values
for Minuteman Missile Maintenance Officers

Top 10		Bottom 10	
1.	Integrity	68.	Enthusiasm
2.	Welfare of Personnel	69.	Command Position
3.	Delegation of Authority	70.	Education
4.	National Security	71.	Rank
5.	Trust	72.	Prestige
6.	Honor	73.	Aggressiveness
7.	Mission Accomplishment	74.	Living Conditions
8.	Job Proficiency	75.	Offense
9.	My Subordinates	76.	Money
10.	Dedication	77.	Change

(20:69-70)

notes that "Eight of the top twelve concepts are related to the moral-ethical primary orientation" (20:140). He further states that seven of the top 12 values are also in the top 12 values of Dalbey's study, though with different relative rankings (20:75-76). The five values in the overall group's top 12 that were not in the maintenance top 12 are **job knowledge**, **judgement**, **initiative**, **professionalism**, and **ability** (20:79). The five values rated in the top 12 by maintenance officers that were not in the top 12 for the overall study were **welfare of personnel**, **national security**, **honor**, **my subordinate**, and **self-discipline** (20:79-81).

Overall, support of official goals was noted in the results, with a few exceptions. Markisello notes that maintenance officers did not value maximizing the number of missiles on alert at the expense of the quality of the maintenance actions performed (20:142-143). Also, support of official retention goals was not indicated by the results (20:143). In terms of seven unofficial goals included in the

questionnaire, he indicates that only one showed significant behavioral relevance. That was the desire to make individuals feel valued and to foster teem spirit and identification (20:143). Among the six remaining, free time and promotions ranked slightly lower while minimizing time in the field, scheduling educational programs, winning competitions and maintaining like appearance standards all had low relevance (20:143).

Conclusions. Markisello makes the following conclusions regarding the results of the study. First, he states that the primary orientation of Minuteman missile maintenance officers is moral-ethical, and that it is most similar to Manley's telephone company findings (20:147). Next he concludes that **change** as a value concept has the lowest affect on the behavior of individuals in the sample out of all the concepts measured (20:147). He goes on to state that **integrity** is the value concept with the highest relevance to maintenance officer behavior (20:148).

Markisello also concludes that, with a few exceptions, maintenance officers support the official goals of SAC missile maintenance organizations (20:148-149). He states that maintenance officer focus is more on quality of repair than on number of missiles on alert, and that they value highly being members of a team (20:148-149). He also states that there does not appear to be any major discontinuity in goal perception between the SAC IG and missile maintenance officers, and therefore this is probably not a cause for low marks on IG inspections (20:149-150).

Finally, Markisello states that few dependencies exits between goal valuations and demographic characteristics. Primary orientation

has the most significant affect on these valuations (20:150). Also, job satisfaction scores very by a large margin depending on what function in the missile organization the officer is performing (20:150).

Bagley, 1973

In December, 1973 Captain Larry C. Bagley published a thesis titled A Study of the Personal Values and Operational Goals of Minuteman Missile Operational Career Field. Like Markisello, Bagley continued the work started by Dalbey by studying and analyzing the value systems of a particular group of Air Force officers.

Background. Bagley states that the purpose of his research was to describe the personal value systems and operative goals of strategic missile operations personnel and not to predict their behavior or to judge the results he obtains (4:7). In addition, he sought to determine what values and goals may be common among the various jobs in that group (4:7). Bagley also outlined five objectives for his research. The first was to define and describe the ranked value systems of missile operations officers (4:7). The second was to develop a hierarchy of operative goals (4:8), and the third was to compare the operative goals of missile officers to the official goals of the SAC (4:8). The fourth was to identify operative goals that motivate behavior in order to enhance morale and retention (4:8). And finally, the fifth objective was to determine what dependency may exist between values, goals, and demographics (4:8).

Basis. Bagley based his research primarily on the work of England, Manley, and Dalbey (4:8). Bagley restates England's

definition of values and then cites seven assertions drawn by England on the impact that values have on behavior. He states that used these as assumptions for his study (4:8-9). These assertions, as stated by Bagley, note that personal values can affect an officer's perceptions, his decisions, his interactions with others, the level of conflict with organizational goals, the boundaries of ethical behavior, and the officer's success both personally and within the organization (4:8-9). In addition, according to Bagley, England asserts that value studies provide a basis for comparison among groups (4:8-9).

Concepts. Three important concepts were central to the research Bagley carries out in this study: personal values, operational goals, and conflict. In his discussion of values, Bagley reiterates many of the points made by previous researchers. However, he does note two interesting points about value system acquisition not yet covered in prior studies.

First, he notes that personal values can become distorted in two ways (4:21). Because values are taught through implication, there is a chance that the person learning the value may misunderstand or misconstrue what is being taught (4:21). Also, as people grow older they must interact with more sources of values, and these multiple sources may transmit conflicting messages (implications) about values, causing conflict and confusion (4:21-22). Second, Bagley cites several authors as saying that most people have a number of inconsistencies in their value systems due to these conflicts, but that they are seldom aware of their existence because they don't think about their values explicitly very often (4:22).

Unlike Markisello, Bagley defines goals more in terms of the ends sought to satisfy a need or needs rather than as constraints on action (4:33). Specifically, he defines a goal as ". . . the ends for which the individual or the organization is striving, and may be means to achieve a more distant goal, or may be a set of constraints used to select an alternative of action" (4:36). He also notes that goals are a factor of decision making and describes the differences and interactions between official and operative goals (4:33-37). In concluding his discussion on goals Bagley notes that Herbert Simon's view of goals as either alternative generators or alternative testers was the basis for England's four types of operative goals (already described by Markisello) (4:37-39). He then states that the overall goal of his sample group, the Minuteman organization, is defending the nation, and outlines 11 official goals for Minuteman missile wings and 13 official goals for squadrons that he developed from a review of SAC manuals (4:40). These official goals cover topics such as training, readiness, mission accomplishment and planning operations (4:40-42).

The final concept reviewed concerns conflict between personal values, individual goals and organizational goals. Bagley notes that conflict can arise between individuals, individuals and groups, or between groups (4:42). He then cites several authors in noting that individual conflicts can occur when: congruence is not achieved between individual needs and organizational demands, when personal and group goals differ, or when people's abilities are not challenged by the group (4:42). He goes on to cite James March and Herbert Simon in noting that group conflict can occur ". . . because of differences in goals, differences in perception of interrelationships, and because of

a need for joint decisions" (4:42-43). Finally, Bagley discusses the result of value and goal conflict. He states that conflict can result in ". . . frustration and contraproductive behavior" (4:43). He cites several authors in noting that an individual's reaction to conflict can take several forms including resignation from the organization, increased emphasis on advancement, apathy, and attempts to change organizational goals (4:43). Management's reaction to conflict may be in the form of more centralized control or ". . . increasing the number of pseudo-human relations programs" (4:43).

Limitations. Bagley outlines a number of limitations to his study of missile operations officers. He notes that the entire population was not sampled, but because the sample was randomly selected and statistically significant, the affects of this limitation were minimal (4:16). He states that SAC missile crews were resistant to responding to the questionnaire because they had already been involved in numerous prior surveys and had seen little if any of the results of those studies (4:16). Bagley minimized this problem by personally distributing the survey and answering questions about the study (4:16).

Bagley was the first AFIT researcher to note that the concepts included in the PVQ could have different meanings for different people (4:15). He states that "Many comments were made about the "vague concepts" and "vague descriptors" that did not fit the concepts" (4:17). He notes that the structure of the PVQ measures only those concepts included by the researcher, and thus is open to bias in the concepts included or excluded (4:17). The affects of this possible biasing of the concepts was minimized by using an expert panel to

screen the concepts before inclusion in the questionnaire. (4:17). Finally, Bagley notes the relative nature of the power mode and the lack of any means of measuring absolute importance for concepts as limitations (4:17).

Methodology. Bagley states that the instrument used in his study was the same one used by Dalby and Markisello, and that his methodology was based on England's theories and methods (4:74-76). It was clear from a review of the methodology section that Bagley also applied an identical type of analysis to the data as had both Dalbey and Markisello (4:64-73). Bagley's study consisted of four phases: the development of the values and demographics for use in the questionnaire, the development of the goals and objectives questions for the questionnaire, the administration of the questionnaire, and the collection and analysis of the responses (4:47). The sample consisted of 813 officers. 134 surveys were sent to six bases, but one base's responses were not included in the study because the surveys were distributed late (4:76). Therefore the sample size was effectively reduced to 653 (4:76). No mention was made of how the sample was selected.

Results. Of the 653 surveys Bagley distributed, 392 were returned (4:77). Bagley compared the demographics of his sample to Dalbey's sample and England's Naval research and concluded that:

> In general, one can say the Missile personnel tend to be younger, of lower rank, have a higher proportion of married officers than in Dalbey's sample of AF officers, and England's sample of Naval officers. [4:77]

Also, he notes from the comparison that:

> Based on this sample, the Missile force was generally a non-rated, reserve officer force with a more non-engineering background, less PME experience, fewer overseas tours, and less inclination toward a career in the Air Force than the sample surveyed by Dalbey. [4:81-82]

From a comparison to previous studies, Bagley states that Minuteman missile officers have a primarily moral-ethical or mixed orientation, while Air Force officers, SAC IG officers, Naval officers and American managers all exhibit primarily pragmatic or moral-ethical orientations (4:82). He goes on to say that the high percentage of mixed orientations for Minuteman officers is "highly significant" in comparison with the relatively low percentage of mixed orientation for the overall (Dalbey's sample) group (4:82). He also notes that most of the Minuteman officers with mixed orientation were under 35 years of age (4:82). Finally, he states that Minuteman officers have a lower mean and median score for job satisfaction than the overall group, indicating lower job satisfaction (4:84).

The top ten and bottom ten ranked values for Bagley's composite value hierarchy for missile operations officers are shown in Table 5. Bagley made a comparison of the top 10 Minuteman officer values with the SAC IG officer data he received by administering the questionnaire to IG personnel. In addition, he compared his results to those obtained by Dalbey (4:87-89). He notes that "The ten values ranked highest by Minuteman officers coincide more closely with those of AF officers than with those of the SAC IG" (4:87). The values of **trust**, **fairness**, **national security**, **welfare of personnel**, and **self-discipline** were ranked in the top 10 by Minuteman officers but were not in the top 10 of Dalbey's sample (4:87). In addition, eight of the values in

Table 5

Highest and Lowest Ranking Values
for Minuteman Missile Operations Officers

Top 10		Bottom 10	
1.	Sense of Responsibility	68.	Living Conditions
2.	Integrity	69.	My Boss
3.	Trust	70.	Obedience
4.	Delegation of Authority Commensurate with Responsibility	71.	Competition
		72.	Change
5.	Job Knowledge	73.	Prestige
6.	Fairness	74.	Rank
7.	National Security	75.	Aggressiveness
8.	Welfare of Personnel	76.	Money
9.	Job Proficiency	77.	Offense
10.	Self Discipline		

(4:85-86)

the missilemen's top 10 were not in the top 10 for the SAC IG sample. The most significant differences in this group were for the values of **trust** (ranked 60th for the IG sample), **fairness** (31st), **job knowledge** (47th), and **job proficiency** (50th) (4:89).

Bagley presents and discusses the results of his demographic analysis and notes some interesting points. He concluded that the values were affected by 5 classes of demographics and personal variables: age related variables (number of years in the Air Force, grade, age, and current job), career intentions, type of commission, job satisfaction score, and the individual's primary orientation (4:89-96). In addition, different values were dependent on age variables above and below 30 years of age. Older officers saw dependency for values such as **professionalism** and **discipline**, while younger officers saw dependency for such values as **trust**, **choice**, and **self-confidence** (4:90). He also notes that the values **national**

security, honor, professionalism, and responsibility were dependent on career intentions, job proficiency, professionalism, and dedication were dependent on regular commission, and trust was dependent on a reserve commission. (4:90).

In order to compare individual goals to the official goals of SAC organizations, Bagley associated the squadron and wing goals he developed with eight general official goals for SAC Minuteman organizations (4:96). He then associated the survey goal questions with one of the eight official goals, as well as four personal (unofficial) goals categories for those goals on the survey that did not fit one of the official goal categories (4:99-101). For example, survey goals such as "To fill training squares" and "To report events on crew log" were associated with the official goal of "To Organize, Train, and Maintain Forces" while survey goals such as "To be acknowledged as a leader" and "To receive the ICBM Launch Certificate" were associated with the unofficial goal of "Personal Recognition" (4:100-101). Once he had finished these associations, Bagley developed and showed goal hierarchies for SAC IG and Minuteman operations officers in order to compare and contrast them and to point out possible conflicts. The SAC IG hierarchy was thought to represent the ranking of official goals in terms of operational goals for SAC missile operations (4:102-109). He also showed which of these goals were of the four operative goal categories for each group (4:102-109).

In comparing the goal hierarchies of the two groups, Bagley notes the following. Three out of four of the maximization criteria for the IG group were also maximization criteria for missile officers (4:103,107,109). These were "To be promoted on merit", "To be really

ready for EWO", and "To be able to approach the commander with problems" (4:103,107,109). Four of the goals ranked as maximization criteria for operations officers were found to be low relevance goals for IG officers (4:109). These goals were "To allow a fair chance of advancement regardless of race, color, creed, or sex", "To maintain a reasonable family life", "To have control of own career", and "To work in a friendly and warm environment; one in which you know your boss will back you up" (4:109). Bagley concludes that these differences may be one source of conflict between official and operative goals (4:109). He also notes that in each of the other levels of goals there are differences that might cause conflict. For instance, he notes that two mission oriented goals that are in the associative status category for IG officers are in the lower behavioral relevance category of intended goal for missile operations officers (4:111). These two goals, "To enforce strict personal appearance standards" and "To have maximum 'green' time" may be sources of conflict between operational and the staff personnel (4:111).

In general, according to Bagley, the analysis indicates that both IG and missile officers ". . . support the official goals of the organization, and goals of both groups tend to be in agreement" (4:112). He notes that both groups emphasize personnel oriented official goals over mission oriented official goals (4:112).

Bagley states that the major personal variable that indicated dependence with the goals was the primary value orientation of the officer, while demographic and personal variables such as age, career intention and type of commission showed a lower number of dependencies. (4:113-18). He then makes several interesting observations about this

analysis. He notes that goal congruence exists for lieutenant colonels and above and for lieutenants and captains, but a lack of congruence is evident between majors and all other ranks (4:121-122). In addition, according to Bagley staff personnel at squadron level exhibited a lack of congruence with the goals of other organizations (4:122).

Conclusions. Bagley comes to the following conclusions concerning the results of his study. First he states that "Minuteman missile officers predominantly have either a Moral-Ethical primary orientation or a mixed orientation" (4:127). He also concludes that a ranked value system can be determined for missile operations officers (4:127).

According to Bagley, there is what he terms a "generation gap" in certain values for the group studied. Such values as **professionalism** and **discipline** are operative for larger percentages of officers over 30 than for those officers under 30, while just the opposite is true for values like **trust** and **self-confidence**. According to Bagley these differences present potential sources of conflict for people in the missile operations career field (4:128).

A ranked system of operative goals for Minuteman officers can be determined using England's methodology and the PVQ (4:128). According to Bagley some potential for conflict exists between missile operations officers and SAC IG members. Some of the operative goals classified as maximization criteria for one group are classified as having low behavioral relevance for the other group and vice versa (4:129). He states that overall, the official goals of SAC are supported by operations officers, however official goals oriented toward personnel tend to be more operative than mission oriented goals (4:129). The

relatively low operative ranking of training goals seems to indicate that ". . . training programs may be in need of improvement and/or restructuring" (4:129).

Bartholomew, 1973

Also in December of 1973, Lieutenant Colonel Charles Bartholomew presented an AFIT thesis titled Personal Value Systems and Career Objectives of Men Vis A Vis Women Air Force Officers which explored the personal value systems and career objectives of both male and female Air Force officers. This thesis was the fourth in a series of five studies of officer values presided over by Major Manley at AFIT.

Background. The general objective of Bartholomew's research was to ". . . increase understanding of the personal values of Air Force women as compared to Air Force men and to improve understanding of the relationships between personal values and career objectives" (5:12). In addition, he states that three corollaries to this primary objective were also relevant to the study. One was "To examine and compare the personal value systems of Air Force men and women" (5:12). The second was to generate a hierarchy for the 39 career objectives included in the study for both Air Force men and women and to compare the two rankings (5:12). The final corollary objective was to identify demographic dependencies for values and goals for women in the Air Force (5:12). As well as the primary objective, Bartholomew notes that a secondary purpose of the study was to investigate the reliability and validity of the PVQ developed by Dalbey and Manley (5:12).

Basis. Bartholomew notes that women at that time were becoming valued members of the Air Force and that ". . . women are seen

as an important and valuable personnel resource, deserving of as much attention and as intelligent as their male counterparts" (5:2). Bartholomew goes on to say that with all the clamor for women in the work place, competition to draw them to one job or another would increase and that the Air Force, if it wanted to recruit good people in the quantities it desired, would need to implement well thought out recruiting programs (5:4). His argument was that "Effective recruiting and retention policies should be based on a sound understanding of the target population" and that this understanding should be based on research into the values and goals of women (5:4-5). However, according to Bartholomew such information was not prevalent and thus a need existed for his research (5:4-5).

Like all of the previous work at AFIT up to that point, Bartholomew based his study on the work of England and spends a large part of the initial chapter reviewing his theory and methodology. He notes that he expanded on Dalbey's approach by including in the PVQ a section on career objectives, in order to focus the current study in that direction (5:11). In addition, his approach to measuring and studying career objectives paralleled the work of Manley (5:36). Bartholomew also states three assumptions upon which his study is based. First, he assumed that both England's and Manley's methodologies may be used to "meaningfully categorize" the values and value systems of women in the Air Force (5:13). He also assumed that the respondents to the survey represent a ". . . valid, unbiased sample of the population to whom the questionnaire was sent" (5:13). Third, he assumed that the reliability and partial validity as demonstrated by

the sample are applicable to larger and more diverse populations and samples (5:14).

Concepts. Based on Manley's work, Bartholomew developed a methodology to study career objectives. Within this method are the following concepts, as defined by Bartholomew.

According to Bartholomew, career objectives marked by the respondent on the survey as high in importance and with the primary descriptor ranked first are termed *operative objectives* (5:38). These operative objectives are said to be "effective motivators" in that they cause the person to behave in such a way as to move toward attaining these objectives (5:38).

Adopted objectives are those objectives which are marked by the respondent as "not high importance" but which have the primary descriptor ranked first (5:38). Bartholomew states that these objectives are "less internalized" by the individual meaning that they hold little personal relevance but are seen as being important to the organization (5:38). He hypothesizes that two types of objectives would fit in this category:

1. The first type is represented by career milestones, such as completing PME. These milestones are probably not valued highly, especially by younger officers, but are perceived to be valued by the organization (5:39). Bartholomew states that "Such objectives are probably not particularly effective as motivators but are likely to be retained in any case since they presumably serve other purposes for the Air Force" (5:39).

2. The second type are objectives perceived by the individual as satisfied by the work environment, and are thus of low

importance because of this satisfaction (5:38-39). Bartholomew hypothesizes that these could become very important (for relevance to behavior) if the satisfaction is not continued, but that attempts to make these particular objectives more attainable to the individual would probably not have much affect on productivity or career intent (5:39-40).

Intended objectives are ranked high in importance but the primary descriptor is ranked second or third (5.40). Bartholomew states that such objectives ". . . may be conceptualized as socio-culturally approved or induced but not relevant to the primary organizational focus of the individual" (5:40). He hypothesizes three ways in which such objectives could come to exist:

1. The objective is an important one that can be satisfied outside of the organization. Bartholomew states that these objectives are "motivationally irrelevant" (5:40).

2. The objective is parallel to some secondary aspect of the organization (not defined by Bartholomew) (5:40). According to Bartholomew, this type can be a ". . . fairly effective motivator . . ." (5:40-41).

3. The objective is important but is not satisfied by the organization in which the person functions (5:40). According to Bartholomew, this type of objective should not be ignored by the organization; it is ". . . a most urgent and likely candidate for corrective action" (5:41). He notes that this class of intended objectives is not easily discovered using the England methodology and suggests that certain questions may at least help to discover their existence (5:41). These questions are: 1) Might this group of

respondents reasonably expect satisfaction of this objective on the job?"; 2) "Is there evidence that satisfaction of this objective is not reasonably attainable?"; and 3) "Do AF policies or those of the specific organization tend to thwart this objective?" (5:41).

Finally, Bartholomew concludes his conceptual discussion by stating that objectives marked as low in importance with the primary descriptor ranked second or third have little behavioral relevance to the individual (5:41).

Methodology. As already mentioned, Bartholomew's approach to this research was based on the methods of both England and Manley, as well as Dalbey's research. He used England's goal measurement methodology unchanged, and used the same approach as Manley to measure the ". . . behavioral relevance of various career objectives to male and female officers of the U. S. Air Force" (5:37).

Sample. The sample included all line specialties where ". . . significant numbers of women officers are found" (5:14). Bartholomew states that the sample of women was stratified, and that the sample size for women was 562 (40% of the population) (5:14). An equal number of men in the same specialties and commands were used as a control group (5:14). Bartholomew considered stratified sampling the "logical sampling procedure" for his study because it accounted for major groupings within the population and provided sufficient samples of each group (5:52). This method therefore allowed for meaningful comparisons among and between the various groups (5:52).

He makes the following points about the stratified sample. The strata for this study were Air Force specialties (jobs). Ten different specialties were included in the survey after exclusion of

overseas commands (5:52). He states that a minimum sample of 25 from each specialty was required for meaningful comparisons, but doesn't say why (5:52). He notes that, after applying an assumed 50% survey response rate, the sample size was calculated to be 582 for the ten specialties across six major commands (5:52). Commands with less than 25 women assigned were not considered in the population (5:52). The commands represented were Air Defense Command (ADC), Air Training Command (ATC), Air Force Systems Command (AFSC), Air Force Communications Command (AFCS), Tactical Air Command (TAC), and SAC (5:52-53).

Bartholomew states that the purpose of the control sample was as a comparison group used to control the determination of womens' career objective valuations (5:54). This was accomplished through a comparison with those identically determined for the all male control group (5:54). He states that this method was used because most of the literature reviewed to develop the objectives used in the study was related to men in the Air Force rather than women, and Bartholomew decided that "It seemed probable that a large portion of this information base would also be applicable to the recruiting and retention of women" (5:54).

Survey Instrument. Bartholomew's questionnaire was divided into three parts. The first part was the PVQ developed by Dalbey (5:43). The second part of his survey contained a total of 39 career objectives developed through a process of literature search, evaluation, and screening similar to that used by Dalbey (5:46). The third part was the demographic survey developed and used by Dalbey and was unchanged except for reformatting of the questions (5:50).

Limitations. Bartholomew points out five limitations to the research methodology employed in this study. First, the sample did not include women recruits or unsuccessfully recruited women, thus the data from the sample group is not necessarily representative of the values and goals of the entire "target recruiting population" (5:15). The study also did not include enlisted women or recruits, thus the results may have limited direct use in developing recruiting policy (5:15). Second, the sample excluded the Medical Service Corps officers for two reasons: the then proposed expansion in women was to occur mostly in line jobs, and Bartholomew believed that the value concepts in the study for line officers would not be very relevant to medical officers (5:15).

Bartholomew notes further that the study was anonymous and thus no follow-up interviews were conducted. A chance for the respondents to provide open-ended comments with their responses was provided in the survey (5:15). The fourth limitation was that the male sample, due to its nature as a control for the female sample, was probably not indicative of Air Force male officers as a group (5:16). The final limitation was that the reliability and validity studies were limited in size and sample composition due to limited time available (5:16).

Results. 680 of the 1065 mailed questionnaires were returned and 630 contained usable data (5:71). Bartholomew reports that when he compared his results and analyzed Dalbey's and Manley's results in terms of sex and value orientation, in all three cases, woman ". . show a greater tendency towards moral-ethical orientations. . ." (5:79). He

does note however that the relative percentages for each type of orientation for both men and women are approximately equal for all three studies (5:78).

Bartholomew also compared the composite value hierarchies for men and women. The top ten and bottom ten values for men and women are shown in Table 6. Bartholomew notes that the similarities between the

Table 6

Highest and Lowest Ranking Values for the Composite Male and Female Officer Groups

Top 10 Values

	Men		Women
1.	Mission Accomplishment	1.	Sense of Responsibility
2.	Initiative	2.	Integrity
3.	Job Proficiency	3.	Job Proficiency
4.	Professionalism	4.	Trust
5.	Delegation of Authority	5.	Fairness
6.	Job Knowledge	6.	Judgement
7.	Trust	7.	Welfare of Personnel
8.	Ability to work with People	8.	Mission Accomplishment
9.	Integrity	9.	Self-discipline
10.	Sense of Responsibility	10.	Job Knowledge

Bottom 10 Values

	Men		Women
68.	Choice	68.	Obedience
69.	Recognition	69.	Recognition
70.	Competition	70.	Living Conditions
71.	Rank	71.	Change
72.	Aggressiveness	72.	Aggressiveness
73.	Offense	73.	Rank
74.	Living Conditions	74.	Competition
75.	Change	75.	Offense
76.	Money	76.	Prestige
77.	Prestige	77.	Money

(5:80-83)

two rankings are more notable than the differences, with six of the top ten and nine of the bottom ten being identical between both groups (5:84). He conducted a Spearman rank correlation analysis on the rankings which yielded a value of 0.81, indicating a strong relationship between the two hierarchies (5:84). In discussing the differences he notes that men find 45 of the concepts more operative (behaviorally relevant) than women while women find 30 more relevant (5:84-85).

Based on his hypothesis that values and objectives can be identified as effective motivators, satisfiers and sources of frustration based on their position in the hierarchy, Bartholomew analyzed both samples for just such items (5:92-127). Motivators would be considered the operative values and objectives, adopted values and objectives would be considered the satisfiers, and intended concepts and objectives would be considered the sources of conflict (5:92).

He first analyzed the value hierarchies and noted that 18 values were found to be motivators for men and 16 for women using the selection rule that the concept must be operative for 35.5% of the women or 36.8% of the men (5:92,94,96). Motivating concepts for both men and women are very similar. Bartholomew summarizes the analysis by saying that men and women officers are best motivated when they are given important jobs with appropriate responsibility; when they are allowed to develop and progress in those jobs;, and when they are allowed to work with and help other people while doing their jobs (5:93).

Bartholomew then analyzed the career objective hierarchies for motivators, satisfiers and sources of conflict. Bartholomew's results

indicated that men place more value on achievement, while women seem to ". . . value a supportive, stable, controllable environment. . ." (5:97). Both groups value fair and equal treatment, and the significance of the individual's contribution to the work environment (5:97). An in-depth analysis of the women's upper quartile (35.5%) objectives found that women value understanding what is expected of them in their jobs, as well as understanding the reasons and purpose of their job (5:102). They also highly value a fair chance and equal opportunity in their Air Force jobs (5:103). In addition, women value having control over their assignments, and they also value progressive, challenging careers and achievement, though perhaps to a slightly less degree then men (5:104-105). Finally, women value maximum possible autonomy and independence from their supervisor when performing their jobs, and they also value quality medical care, challenging jobs, friendly work environments, and the ability to make significant contributions to the mission (5:105-109).

Bartholomew also discusses the low relevance goals for both men and women. These are the ones which he contends recruiting and retention policies should not stress because they would have little affect on behavior (5:110-120). These objectives include: tours of duty in combat areas, assignments in foreign countries, retirement in time to have a second career, association with other Air Force personnel, membership in a proud unit, and working in job free of high pressure (5:110-120).

Bartholomew then identifies possible sources of conflict for both values and objectives. These are intended values and objectives and as stated earlier are high in importance but with the primary descriptor

ranked other than first. He notes that these may in fact be one of three classes mentioned earlier: irrelevant, secondary motivators, or sources of conflict (5:120). Bartholomew identifies based on his criteria that **achievement** and **dignity** may be sources of conflict for women based on equal opportunity reasons (5:120-124).

In an overall comparison of the male and female samples, Bartholomew reports that women seem more concerned with equal opportunity and status than men, and that they also value friendliness, stability, and security more highly than men (5:127-129). These characteristics are similar to those of the unmarried male officers. (5:136). On the other hand, men tend to value achievement related concepts more than women, as well as those associated with competition (5:129). Bartholomew also notes that woman seemed to "internalize" the purposes of the organization more than men, meaning that they place more value on the purpose of the organization than do men (5:136). He also states that the data indicated that men value the opportunity to carry out family responsibilities more than women (5:137).

Finally, in a review of the demographic analysis, Bartholomew notes that many of the demographic variables, among them age, job specialty, marital status, level of PME, and commission type, showed dependency with one or more value concepts or career objectives (5:137-185).

Conclusions. Bartholomew reaches the following conclusions based on the results of his research.

1. Female officers have a primary orientation that is moral-ethical, followed by a lower proportion that are pragmatically oriented and even lower proportions that are affect or mixed (5:194).

Male officers are primarily pragmatic in orientation, followed by moral-ethical and then affect and mixed (5:195). In addition, he concludes that women are more normative in their approach to their jobs and are more inclined because of their primary orientation to base decisions in terms of right and wrong than are men (5:195).

2. Male and female officers appear to be motivated by similar value concepts (5:195). Motivators common to both sexes include accomplishing a job perceived as important; jobs which allow a considerable amount of autonomy, responsibility, and initiative; and jobs that require the person to work with others as well as allowing consideration to be shown to subordinates (5:195-197). Additional motivators would be an environment which allows the individual the chance to develop both competence and professionalism in the job, as well as situations and work environments which do not challenge or contradict the internalized personal values of the individual (5:197).

3. Certain goals are also common motivators for men and women: equal opportunity for advancement, challenging work, involvement in important jobs, a consistent promotion system that yields some predictability and control over a career, and quality medical care (5:196). However, Bartholomew states that ". . . the single most important motivator for both men and women officers is the content of their jobs" (5:197).

4. Equal opportunity policy, medical care quality, and consistent personnel policy are prime candidates for conflict for both male and female officers (5:197).

5. Female officers in general share several characteristics. They take to heart (internalize) the purpose of the organization more than

male officers (5:198). They value combat tours more highly then men, and value important and challenging work as much as men (5:198). Younger female officers (less than four years active duty) are more positive about a career in the Air Force than younger male officers (5:198). Female officers also value active social lives and new friends more than male officers, and do not place great value on regular hours and a work environment which does not put much pressure on those in it (5:199).

6. Commonly emphasized characteristics such as travel, adventure, proud military units, and early retirement in recruiting and retention programs are not highly valued by the sampled officers (5:199). According to Bartholomew this would seem to indicate that these objectives are currently being met by the service, and that new recruiting and retention programs should concentrate on other aspects of military life to be really effective (5:199).

7. Achievement, faster promotion rates and more high level promotion opportunities are valued more highly by male officers. In addition, involvement in family and its associated responsibility and salary levels are more important to male officers than female officers (5:200-201).

8. Female officers who are generally satisfied with their jobs value achievement as a motivation factor as well as internalize the organization's purpose (5:201). Women officers who value achievement as a motivator also tend to have positive career intentions (5:201). Programs allowing more flexible career paths for women may encourage these woman to pursue Air Force careers (5:201).

9. Younger officers, both male and female, exhibit a higher proportion of mixed orientations and negative career intentions than other groups (5:201). Bartholomew concludes that "They also exhibit lower job satisfaction scores and seem to reject values which are associated with achievement and their Air Force organizations" (5:201).

10. He states that "Single women officers are more positively career intended than married ones" (5:202). Also, female officers in the communications specialty are less satisfied with their careers than other officers; women intelligence officers and women in TAC also exhibit this characteristic (5:202). He also concludes that women place less value on mobility in their jobs than do male officers. While this suggests that stability is highly valued, the study found that female officers who had remained at one place for a long period of time place more value on security and less on the work being performed (5:203).

Madia, 1974

In October of 1974, Captain John A. Madia published an AFIT thesis titled A Study of Personal Value Systems and Job Satisfactions of United States Air Force Officers. This study was the last in the series guided by Major Manley, and represented an attempt to pull all the information thus far gathered on Air Force officer values into one place, in order to gain insight into the entire Air Force officer corps.

Background. The purpose of Madia's study was to integrate the results of the other AFIT researchers already mentioned in this synopsis to ". . . increase the understanding of the personal value

systems and feelings of job satisfaction of a range sample of Air Force officers" (19:12). The study had four objectives. The first was to identify the distribution of value orientations among the combined sample of officers (19:13). The second was to develop a hierarchy of values for the sample (19:13). The third was to test the developed hierarchy for dependencies on demographic variables and job satisfaction scores (19:13). The final objective was to determine an overall measure of job satisfaction and identify any dependencies of this measure on demographic variables, as well as determine the pattern of those dependencies (19:13).

Basis. Madia's work was based on England's, Manley's and the other AFIT researchers' studies (19:5). Madia made several assumptions for use in his research. First, he assumed that Manley's adaptation of England's methodology is valid for use in defining the value systems of Air Force officers (19:14). Second, he assumed that Manley's adaptation of the Hoppock four question method of measuring general job satisfaction (used in all of the previous AFIT studies) is valid (19:14, 12). Third, he assumed that the data gathered by the other researchers remained valid for use in this study (19:14-15).

Concepts. All of the material that Madia reviewed on value definition, acquisition, and classification had been covered by previous researchers also. Based on this review he does however present his own definition of personal values:

> Personal values are abstract ideas, concerning modes of conduct or states of existence, which influence the general nature of human behavior. The extent to which a personal value influences an individual's behavior is determined jointly by the position of the value in the person's hierarchy of value preferences and by the value's relevance to the situation. [19:20]

He also reviews some new information on the relationship between values and needs. He cites several authors, including Maslow, in concluding that needs are the prime motivator of human behavior, and he refers to these needs as "fundamental goals" (19:22-23). He describes two frameworks for needs, Tolman's and Maslow's, and notes that both classify needs in terms of the environment (basic needs such as food), society (needs such as love), and cultural (needs such as the desire to be thin) (19:23-25). He also notes that Maslow defined a fourth class of needs that relates to an individual's desire to better himself, and that he also envisioned a rank ordering to needs such that higher level needs remain unsatisfied until lower level needs had been met (19:25). This discussion leads up to Madia's statement that the underlying relationship between needs and values is that values are objects or abstractions which are potentially capable of fulfilling needs (19:26).

Madia continues his concept discussion by describing different theories of job satisfaction after stating that ". . . there is general agreement that the satisfaction or thwarting of expectations has pronounced effects on employee motivation" (19:27). He states that it is these motivational affects of job satisfaction that are the reason it is studied (19:27). He then notes the certain implications of job satisfaction theories. First, he points out that the individual is considered the source of the motivation for all of his actions (19:34). Next, he states that rewards are vital for fostering feelings of satisfaction on the job, but that effective rewards are tied to performance, not some other characteristic of the individual (19:34-35). Madia also notes that these rewards must be legitimate

and it appears that rewarding higher order needs may be successful since in modern organizations most lower order needs are already met (19:35). According to Madia, another implication of these models is that factors other than job satisfaction, such as environmental affects, contribute to employee retention (19:35).

In conclusion Madia states that previous studies have shown little correlation between productivity and job satisfaction and this may be due to one of two possibilities. Either productivity does not lead to satisfaction of personal goals or awards in organizations are impacted by things other than performance (19:37). Madia notes also that people who exhibit low job satisfaction can be motivated to perform by the existence of future rewards (19:37-38).

Limitations. Madia points out the following limitations to his study. First, the combined sample may not be indicative of the overall population of Air Force officers due to the limited nature of the samples used by the other researchers and the methods used to build those samples (19:15). He notes that no single identifiable sampling procedure was used in generating the various samples used in this study (19:15). He notes that all of the samples except for Bartholomew's were from very specific subgroups within the entire population of Air Force officers (19:15). He also points out that rated personnel are not represented to any extent in any of the samples (19:12).

Second, he notes that because the studies were anonymous and the questionnaire highly structured, clarifying and follow-up questions were not asked of the respondents, thus limiting the insight otherwise possible from the studies (19:16). In addition, he states that some of the studies incorporated personal distribution of the questionnaires,

thereby introducing a chance that some of the respondents may have communicated with one another and biased the results (19:16). However, Madia discounts this as a minor limitation (19:16).

Finally, Madia states that the modified Hoppock job satisfaction questions only measure relative job satisfaction (19:17). Therefore no measure of absolute satisfaction was conducted which precluded comparing satisfaction scores among individuals in the sample groups (19:17).

Methodology. Madia's study consisted of three parts. The first was the retrieval of previous study data bases and the merging of those data bases into a single group of data for this study (19:52). The second was the analysis of the resulting data base in terms of values and value orientations (19:52). The final part was the analysis of the data base in terms of job satisfaction (19:52). He utilized England's methods for analyzing the personal value systems of the aggregate sample (19:38-46). Madia used the data from previous AFIT theses to conduct his research. The data was from the studies done by Dalbey, Markisello, Bagley, and Bartholomew (19:53). The data were in reduced form when Madia received them, meaning that value hierarchies, categorization and primary orientations for each sample had been computed, as well as job satisfaction scores for each respondent in each sample (19:53).

Sample. The research sample was built by combining the samples of the previous four studies and consisted of 1321 officers, representing a wide mix of demographics including age, rank, time in service, sex, career intent, job specialty, education and PME, marital status, and commands (19:70-76).

Madia notes some deficiencies in the sample that he says limit the application of the study results. First, rated officers and those on flight crew status were not highly represented (19:75,77). Second, the proportion of women officers in the sample was higher than existed (at that time) in the Air Force (19:77). Third, racial minorities were not well represented (only approximately 3% of the sample), and Madia suspected that it was higher in the Air force overall (19:77). Fourth, officers from SAC Minuteman units were predominant in the sample, and MAC and TAC flying units were under-represented (19:77). Finally, officers with job specialties involved with aircraft operations were under-represented (19:77-78).

Madia described the typical officer of the sample (using median responses to the questionnaire) to be a male captain between 26 and 30 years of age with a reserve commission from ROTC or OTS. In addition, this captain had not completed any PME, was married with one child, was not rated, and was assigned to a SAC missile unit. He had not had any overseas tours but did have positive career intentions (19:79).

Analysis. The analysis of the value data was conducted in two parts. The first part was comprised of the determination of primary orientation, orientation distributions, and value hierarchies for the combined sample (19:53). The second part was a statistical analysis of the results from these determinations (19:53). Determining the primary orientation and orientation distributions for the sample was simplified since the data already contained the primary orientations of the respondents. These individual orientations were counted and the relative proportion of each type computed (19:53).

Value hierarchies were constructed for the sample as a whole and for the portions of the sample that demonstrated high and low job satisfaction (19:54). Contingency table analysis was used to ascertain dependencies of the value concepts on demographic variables (19:55). Spearman's rank coefficient was calculated for the two job satisfaction value hierarchies to determine whether they were significantly different (19:58).

Job satisfaction scores were analyzed in a two step process. In the first phase the distribution of job satisfaction scores was determined and the demographic variables were reviewed for any that seemed to have an affect on the scores (19:59). In phase two, a two step statistical analysis of the results of phase one was accomplished (19:59).

The first part of this analysis was the construction of a histogram of job satisfaction scores and calculation of the mean and upper and lower quartile scores (19:59). Madia used these quartiles apparently arbitrarily, to mark the portions of the distribution exhibiting high and low job satisfaction (19:59). Histogram distributions were also constructed for all demographic variables with populations of more than 40 individuals in order to gain insight into how the satisfaction scores varied within the sample, and about the characteristics of the groups exhibiting high and low scores (19:60). Madia hypothesized that a respondent's demographic information could be used to predict that person's job satisfaction score. This assumed that the demographics of the study presented enough information for the prediction of job satisfaction scores (19:61). He used stepwise regression analysis to test this hypothesis (19:61).

In part two, contingency table analysis, means tests, and goodness-of-fit tests were all used by Madia to identify the subgroups of the sample whose job satisfaction scores differed significantly from those of the aggregate sample (19:62-63). Contingency analysis was used to determine dependency on demographic variables, while both the means test and the chi-square goodness-of-fit test were used to determine differences among groups (19:64-67).

Results. Madia makes the following observations about the aggregate sample. He notes that a majority of Air Force officers have moral or pragmatic orientations; that unsatisfied officers have a higher proportion of mixed orientations; and that satisfied officers have even proportions of moral and pragmatic orientations (19:80, 82). He also compares the entire sample and upper/lower quartile groups to England's study of Naval officers and American managers. According to Madia, Naval officers have a similar proportion of morally oriented officers, but generally have a higher amount of pragmatic orientations and a lower level of mixed orientations than any of the Air Force groups (19:80). He also notes that Air Force officers had a relatively higher percentage of affect orientations than the other two groups (19:80). In addition, American managers had a much higher percentage of pragmatic orientations than the overall Air Force group and a much smaller level of mixed orientations than the overall and unsatisfied Air Force groups (19:80).

Madia created a composite value hierarchy for the aggregate group. The ten highest and lowest ranked values from that value system are presented in Table 7. Madia then grouped the values rated high and low in the hierarchy into four categories for further analysis these

Table 7

Highest and Lowest Ranking Value Concepts
for Madia's Aggregate Sample

Top 10	Bottom 10
1. Integrity	68. Obedience
2. Sense of Responsibility	69. Recognition
3. Job Proficiency	70. Competition
4. Trust	71. Aggressiveness
5. Delegation of authority commensurate with responsibility	72. Living Conditions
	73. Rank
	74. Change
6. Mission accomplishment	75. Offense
7. Job knowledge	76. Prestige
8. Initiative	77. Money
9. Welfare of personnel	
10. Fairness	

(19:84-86)

groups being ego-centered values (e.g. **integrity**), socio-economic (e.g. **fairness**), military (e.g. **mission accomplishment**), and professional (e.g. **dedication**) (19:87-88).

His purpose in doing this was to gain insight into the motivational forces of the Air Force officer (19:87). He notes from these groupings that officers value **integrity**, **responsibility**, **trust** and **honor** more highly than **prestige**, **recognition**, and **ambition**, indicating that personal ethics is a driving force in Air Force officers (19:89). Also, **welfare**, **fairness**, and **cooperation** are valued highly while **competition**, **living conditions**, and **money** are not. Madia suggests that the low rankings of money and living conditions seem to indicate a general satisfaction with these concepts and that the Air Force would be more successful at motivating officers if they concentrated on more highly rated concepts such as those associated

with personnel welfare (19:90). Madia states that officers generally value doing a good job but do not significantly value job security, command position, or rank (19:92-93).

After completing his general discussion of the value hierarchy, Madia moves on to compare the values of the groups exhibiting high and low quartile job satisfaction scores. Madia notes that seven of the top ten values for both groups were the same, as were five of the bottom ten (19:94). The computed Spearman rank indicated that there was a statistically significant similarity between the two group hierarchies (19:94). He does note some differences in the rankings, and summarizes this comparison by saying that dissatisfied officers tend to rank value concepts concerning social issues more highly than satisfied officers, while the satisfied officers value more highly concepts related to professionalism and the job (19:94). In terms of needs, Madia states that dissatisfied officers seem to be motivated by Maslow's safety and belongingness needs while satisfied officers seem to be motivated by esteem and self-actualization (higher level) needs (19:95).

In reviewing his demographic analysis of values, Madia notes that all but three (major command, race, and TDY days in past year) demographic variables indicated a dependent relationship with at least one value concept (19:98). The variables with the largest number of dependent relationships were time-in-service, grade, career intentions, level of PME, commission type, job satisfaction level, and primary orientation, which accounted for more than 65% of the relationships

found (19:98-99). Primary value orientation by far had the most relationships, followed by career intentions, grade and job satisfaction (19:98-99).

Madia's second phase of analysis was concerned with looking at the distribution of job satisfaction scores for the sample and trying to determine differences in groups as well as a prediction equation for satisfaction. He states that the job satisfaction scoring method developed by Hoppock and used in these studies yields a numerical score from 4 to 28, with low score indicating low satisfaction and high scores indicating high satisfaction (19:114). Based on this scoring range, Madia created a histogram distribution for the job satisfaction scores of the entire sample (19:115-116). The mean score was 17.85 with a standard deviation of 4.65 (19:115-116). Madia also noted that the resulting distribution was bimodal, with the primary mode at a score of 21 and a lesser or secondary mode at the score of 13 (19:116). The upper bound for the lower quartile was a score of 14, while the lower bound for the upper quartile was a score of 22 (19:117). Once he had created the score distribution, Madia then moved on to compare demographic groups within the sample.

Mean satisfaction scores were computed for each of the demographic subgroups and compared to the mean of the overall sample in order to determine if any differences existed (19:117-123). The demographic variables sex, race, and college degree did not demonstrated any dependence with satisfaction scores, but all of the others did (19:118-120). From this analysis Madia noted several interesting characteristics. He states that in general, younger officers had lower mean scores than older officers (19:118). Also, he states that career

intentions and satisfaction scores followed common sense, with the negatively career minded officers scoring a mean of 13.43 and the positively intended officers scoring a 19.5 (19:119). Those officers who were undecided about a career were just below the sample mean at 16.57 (19:119). By command, Madia notes that officers in SAC scored just below the overall mean with a 17.27, but that officers in AFSC scored above the mean with a 19.32 (19:119). By type of commission, he states that officers with regular commissions were above the mean at 19.05 while reserve and ROTC officers were below the mean at 17.24 and 17.13 respectively (19:120, 122). Finally, Madia notes that officers with a mixed primary orientation scored a 16.12, while those with a pragmatic orientation scored 18.6 (19:120, 122).

In a comparison of the satisfied and unsatisfied groups to the overall distribution of scores, Madia notes that the distribution of scores for officers with less than 2 years service is not very different from the overall sample, but that the distribution for officers with 3-4 years service showed 34% unsatisfied and only 18% in the satisfied range (19:124-125). In contrast the distribution for officers with 21-30 years showed 45% satisfied and 11% unsatisfied (19:125). Also, he notes that major was the only grade group that demonstrated a significant difference from the aggregate with fully 30% of that group having scores in the satisfied range (upper quartile) (19:125). By command, Madia notes that SAC officers as a group displayed 31% unsatisfied and 21% satisfied, while the AFSC officers showed 30 percent satisfied. Fully 67% of AFSC officers were in the upper half of the score distribution (19:126). Madia concludes this

section of the analysis discussion by stating that most of the officers with mixed primary orientations satisfaction scores in the middle of the score range (19:128).

Madia's attempts to determine an equation to predict job satisfaction based on demographic variables were not successful. After extensive analysis, Madia was only able to achieve an *R* square value of 0.1268, and he was forced to conclude that this part of the analysis was "fruitless" (19:129, 131). It was obvious to him that much more than the 24 variables included in the study affected satisfaction (19:131).

Conclusions. Based on his results, Madia makes a number of conclusions. He states that there are significant differences among groups of officers of different ages, and the age related demographic variables accounted for most of the dependent relationships with value concepts found by the analysis (19:132). He also concludes that the primary orientation and mix of orientations is similar to that of Naval officers, as measured by England (19:133). The primary orientation of Air Force officers is moral-ethical which indicates an emphasis on right and wrong in decision making (19:133). Also, a "sizeable segment" of Air Force officers have a pragmatic orientation, suggesting that their decisions are based on success oriented considerations (19:133).

The behavior of officers in the Air Force is strongly influenced by personal ethics considerations, reflected in the number of operative values for the sample that are ethically oriented (19:133). Madia states that the presence of these attributes, such as honor and integrity, in individuals and the organization may not be explicitly

motivators of behavior, but there lack ". . . might well prove a demotivating force" (19:134). He also concludes that performance related values are more highly regarded by officers than the concepts of living conditions and money, indicating that awards tied to performance factors are likely to be a greater motivating force than awards based on these other concepts (19:134).

Madia states that officers in general do not value highly the concept of military pride, and Madia speculates that this may be due to the emphasis on pride connected with appearance standards (19:135). Officers do highly value professionalism and Madia proposes that emphasis on this value would be more effective in causing officers to accept Air Force standards (19:135-136). Finally, Madia concludes that no "predominantly dissatisfied groups" appear to exist for officers with more than five years of service, and the value systems of satisfied and dissatisfied officers do not differ significantly (19:136). Satisfied officers tend to value more highly concepts related to the Air Force, while unsatisfied officers tend to value more highly socially oriented concepts (19:137).

Schlatter and Mitchell, 1976

In September of 1976 the first in a series of independent studies (unlike the set of five guided by Manley) was published by Major John Schlatter and Captain James Mitchell. This thesis, titled Personal Value Systems of USAF Non-Rated Aircraft Maintenance Officers, was also the last to utilize the England methodology and the first to study a group of officers directly related with aircraft operations.

Background. Schlatter and Mitchell state that the objective of this study was to investigate how the value systems of aircraft maintenance officers had changed, if at all, during the years just prior to the study (26:20).

Basis. According to Schlatter and Mitchell, past value studies had indicated that the values of officers follow certain orientations (26:3). They note that these studies followed one of three approaches, namely historical research, attitude surveys, or value measurement using surveys, and they go on to review two of the more notable historical study efforts.

According to Schlatter and Mitchell, Huntington determined through research that the military as a profession possesses a unique set of values that sets it apart from other professions (26:3). He gave this set of values the label "military ethic" (26:3). They note that Huntington further concluded that officers in the military profession would share common values because of their profession (26:4).

They also note that Janowitz proposed that military officers can be categorized into two broad value orientations, that of the "military manager" and the "heroic leader" (26:5). They also state that Janowitz theorized that the ratio of managers to leaders in today's military is greater than it was in the past (26:5). The authors note that Janowitz believed that the increasing use and complexity of technology in the military, the effect of the draft that forced civilian life oriented individuals into the military, and empirical data from personal interviews and document reviews all support his contentions about shifting value orientations (26:5-6).

The authors then briefly review past survey research into officer values, including England's Naval studies and the work done by Madia and the other AFIT researchers. They note Madia's reservation that his sample may not be representative of all Air Force officers (26:17). They also note Madia's finding that the orientation of Air Force officers and that of Naval officers in England's study are similar (26:18). Schlatter and Mitchell also state that these findings indicated a possible connection between personal values and the profession of the individual (26:18).

Schlatter and Mitchell used this review of the past officer value research to lay the basis for their study. First they state that Madia's work and that of the others represents initial groundwork, but that more research is required because of the limitations of the samples and sampling methods used (26:18). They also note that the findings of these earlier studies, namely that military officers are primarily of either ethical or pragmatic orientation, parallel Janowitz's two theoretical types of officers, managers and leaders (26:19). Based on this, Schlatter and Mitchell hypothesize that:

> . . . the "military manager" views his profession as a job and thus, in pragmatic orientation terms, will tend to view those values considered important as also being on a "success-failure" continuum. The "heroic leader" views his profession as a calling and thus, in moral-ethical terms, will tend to view those values considered important as also being on a "right-wrong" continuum." [26:19]

They state that this connection paves the way for research, using scientific techniques and methods, for testing Janowitz's hypothesis that the ratio of managers to leaders in the military has increased over time (26:19-20). They also note that the earlier AFIT studies used less than rigorous statistical methodologies and that this

fact put their findings in question (26:20). In concluding this discussion, Schlatter and Mitchell state that their study would add to the body of knowledge on officer value relationships by applying systematic research techniques to the problem (26:20).

Concepts. Schlatter and Mitchell discuss the concepts involved with value theory, value acquisition, and value definition, but do not cover any new ground. They do discuss the work of Rokeach and cover the characteristics of his theory and approach already discussed in Chapter I of this study (26:9-10, 18-19).

Methodology. Schlatter and Mitchell based their study of values on the approach taken by England, and utilized the PVQ from the Naval studies to measure the values of their sample group.

Sample. According to the authors, the research hypothesis is based on the theory that the shift in the orientations of officers from pragmatic to ethical are caused by forces introduced by the culture, the organization, and the individual (26:33). They state that they were capable of controlling these forces only through the use of a representative sample of the appropriate population. They also state that they were able to better control the organizational affects by selecting for the study a subgroup from the total population of officers (26:34). The population chosen was that of non-rated aircraft maintenance officers. It was restricted to non-rated officers in order to avoid the personal and career forces that may have caused rated officers to switch into that particular career field (26:34).

The population consisted of 1,971 maintenance officers, and the sample size was determined to be 392 (26:36). The sample was divided into eight cells by number of years of service in two year

intervals except for the last group, which covered the 14 to 20 year range. 20% of the population in each cell (which accounted for an assumed 50% survey response rate) was randomly selected, using computer generated random numbers, as the sample from that cell (26:34-37).

Survey Instrument. Schlatter and Mitchell describe the development of the PVQ used by England in the Navy studies which they used in their study (26:25-26). They note that the instrument was developed using a process which included a literature review, screening by experts, and pilot surveys to reduce the number of concepts to the minimum possible (26:25). This process yielded a total of 86 concepts that were included in the final form of the PVQ administered to the Navy sample group (26:25-29). They also note that this version of the PVQ contained a forth descriptor, traditional, to account for the possibility that people might value a concept because it was rooted in the past (26:26, 15). In addition, the pleasurable descriptor was deleted from the PVQ used in their study because few in the pilot study chose it as a response (26:26). Schlatter and Mitchell report that the Navy test-retest for reliability resulted in an average reliability of 0.83 for the importance scale and 0.73 for the descriptor scale, as well as a reliability of 0.80 for primary orientation (26:29).

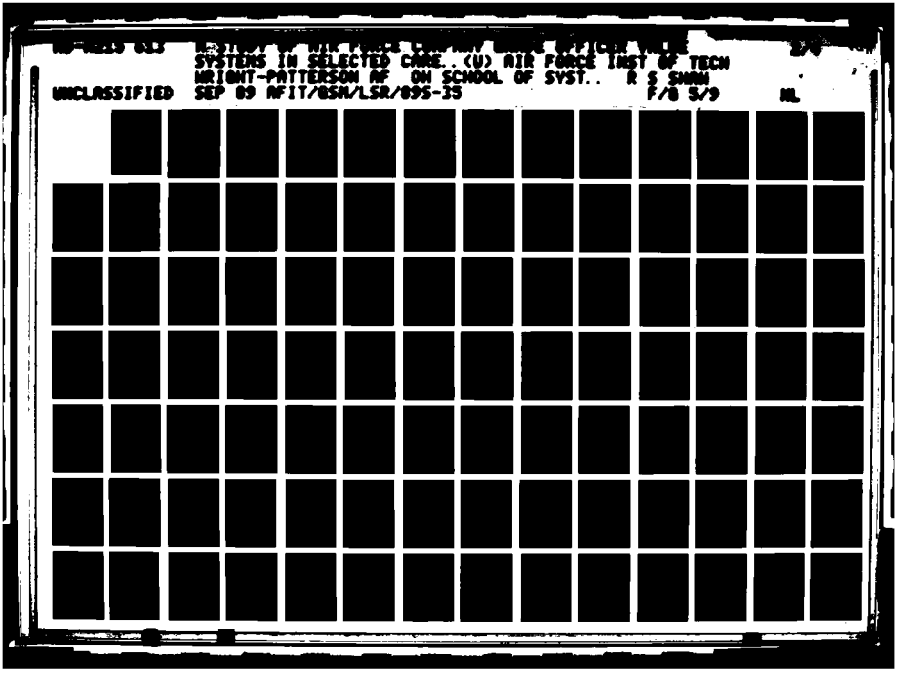
After describing the content of the Naval studies PVQ, Schlatter and Mitchell state several assumptions about its validity. They assume that the concepts included in the survey were chosen using a systematic method using screening by experts and pilot surveys to test for relevance (26:30). They also assume that it was logically developed from England's theories on values (26:30). In addition, they assume that the results of the Navy studies supported prior work by

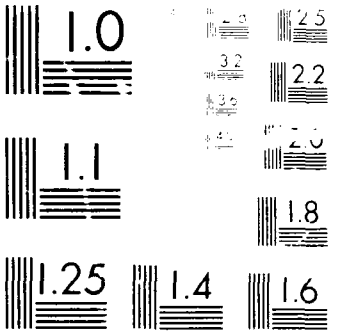
England in terms of comparable results, by tending to indicate that the instrument could be used to predict behavior (26:30).

Schlatter and Mitchell note that they altered the Navy PVQ to be compatible with their study (26:31). They retained most of the concepts it contained but deleted those specifically tied to sea duty such as seamanship (26:31). The value "shipmates" was substituted by the term "co-workers" to retain the concept connoted by these words, though they admit that the meanings of the two terms are not identical (26:31). They also deleted the descriptor "traditional" from their version of the PVQ because according to them it was not often significant in the results of the Naval studies. However, both the right and successful descriptors were retained (26:32). Schlatter and Mitchell then assume the same validity for their version of the PVQ as was assumed for the Naval studies instrument (26:33). As a final note about their version of the survey, the authors state that ten demographic questions and four questions on job satisfaction were included for the purposes of creating a data base for further research but were not used for any analysis in their research (26:39).

Analysis. Schlatter and Mitchell first considered using a chi-square test to test the research hypothesis, but rejected this approach for two reasons. They state that the chi-square test requires a minimum number of responses in each cell to be valid, and that the expected number of mixed orientations was too low to meet this criteria (26:40). They also note that the test only indicates the presence of association, not the direction or extent of that association (26:40).

Based on these arguments, Schlatter and Mitchell decided to use simple linear regression to test their hypothesis, and they justify


SYSTEMS IN SELECTED CARE..(U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AF OH SCHOOL OF SYST.. R S SHAW
UNCLASSIFIED SEP 89 AFIT/GSM/LSR/89S-35 F/G 5/9 NL


1.0
1.1
1.25
1.4
1.6
1.8
2.2
2.5

the use of a parametric technique on non-parametric data by stating that the ". . .percentages of Moral-Ethical orientations in each cell could be used as best estimate ratio level data points" (26:40). They note that they calculated the proportion of Moral-Ethical orientations for each cell by comparison to the pragmatic orientations only, ignoring any mixed orientations that might be present, since they were interested in comparing the relative proportions of those two particular orientations only (26:41). The independent variable for the regression test was *years-of-service*, and the dependent variable was *proportion of moral-ethical orientations*. The null for the test was that there was not a positive relationship between orientation and years of service, and rejection of the null would indicated that there was a positive relationship (26:41-42).

Schlatter and Mitchell also concluded from researching the literature that Janowitz's hypothesis would be supported if a rate of change in orientation proportion was found to be at least eight percent (26:42). They state that this rate translated into a regression coefficient of 0.01, so that if a coefficient of at least that much was calculated from the data, the study would provide evidence in support of Janowitz's contention (26:42).

Results. 207 usable surveys were returned for a 53% overall return rate, but two of the year groups (4-6 and 10-12 Years) were below 50% (26:46). Schlatter and Mitchell state that the regression performed on the data failed to support the hypothesis. They calculated a coefficient of -0.03 which they state implied an inverse relationship from that assumed by the hypothesis (26:48-49). They also

note that a Spearman rho of -0.45 was calculated, further refuting the hypothesis and implying an inverse relationship existed between years-of-service and moral orientation (26:49).

Schlatter and Mitchell note several possible causes for the results that they obtained. First they state that the hypothesis may in fact be correct, but the sampling techniques induced enough error in the data to disguise this fact (26:49-50). Schlatter and Mitchell concluded that there was a low probability that this had occurred (26:51). They also state that the hypothesis could be wrong due to inconsistent logic or omissions in its formulation (26:50). They go on to note that two considerations of Janowitz's research were omitted when the sample was chosen.

According to the authors, Janowitz studied officers of general and admiral rank, as well as military academy graduates. Their study however, concentrated on field and company grade officers, and they state that an insignificant number were academy graduates (26:52). Schlatter and Mitchell also note that Janowitz's theories were based on decades of sociological trends, while their study covered only the most recent 20 years (26:52).

They state that error may have been induced in the data due to the fact that the study was evaluating a hypothesized change over time from one point in time (26:52). They also note that the assumption that values are relatively stable over time may be incorrect and that this could have impacted the data (26:53). Schlatter and Mitchell mention that Janowitz's hypothesis may be applicable to the officer force as a whole, but that there may be some characteristic of the sample that

would cause people in it to shift orientation towards the pragmatic (26:53-54). They did further analysis of the data in relation to the demographics to determine if this was the case (26:54).

Finally, the authors state that the instrument used may not have been sensitive enough or may in fact be less valid than assumed, and they also explored this further to determine if this was the case (26:55).

Schlatter and Mitchell state that the results of this study in terms of orientations, when compared to the results of Madia and England's Naval and U.S. manager studies, showed that the distributions of orientations for maintenance officers is much closer to that of managers than other Air Force or Naval officers (26:56). They note that previous officer studies contained less than 2% maintenance officers, and suggests that this similarity to managers is more evidence that maintenance officers do in fact have a pragmatic primary orientation (26:56).

The authors analyzed the proportion of pragmatic orientations that existed for each of the demographic subgroups in the sample and noted the following. Pragmatic proportion remained relatively constant regardless of grade (26:58). Significant differences were noted between commands, but they discount them due to the relatively low number of officers in the sample that represented each command (26:59). ROTC graduates had a higher proportion of pragmatic orientations than OTS graduates by nearly 10%, and a full 30% over academy graduates, suggesting that ROTC graduates have a greater tendency towards a pragmatic orientation (26:60-61). A positive trend was noted between level of education and the proportion of pragmatic orientations

(26:61). Also, the authors note that a higher proportion of pragmatic oriented officers rated education as an operative concept than did morally oriented officers (26:61). They state that the officers with regular commissions had a significantly higher proportion of pragmatic orientations than did those with reserve commissions (26:63). And analysis by age group indicated that pragmatic orientation proportions actually decrease as one ages (26:67-68). However, Schlatter and Mitchell note that the limitations of the sample may disallow application of this result to the general population of Air Force officers (26:68).

The authors then reviewed the results of their more in-depth analysis aimed at determining if the PVQ was insensitive to orientations or if its validity was questionable (26:68-78). They noted that the high number of mixed orientations seen in the data were due to the decision rules developed by England for determining primary orientations (26:69). They hypothesized that this may have been due to the fact that the primary mode only allowed three responses on the high to low importance continuum, and that more sensitivity may have been gained if a larger number of responses had been allowed (26:69-70). Schlatter and Mitchell simulated this possibility by changing 10% of the actual responses that were initially marked average importance to high importance (26:70). The results of the simulation noted a significant reduction of mixed orientations, but they also supported the original ratios in the data of pragmatic to moral orientations suggesting that the sensitivity of the instrument does not significantly affect the measurements taken (26:71).

The authors go on to discuss the validity of the instrument and note several issues. Since no other instrument was used to measure the same sample in conjunction with the PVQ, objective analysis of validity was not possible, and the authors relied on a subjective search for inconsistencies in the data that might point to problems with validity in the instrument (26:73). The first inconsistency discovered concerned the relationship between primary orientation and job satisfaction. They note that the literature suggests that ". . . a relationship should exist between value orientations and job satisfaction" (26:74). They also state that this proposition, in conjunction with the supposition that the maintenance field is predisposed towards officers with pragmatic orientations, would manifest itself in a higher job satisfaction score for the officers with pragmatic orientations than for those with moral orientations (26:74). Schlatter and Mitchell found, however, that the job satisfaction scores were nearly equal for both groups (26:75).

A more significant discrepancy was related to valuation of the concept promotion (26:76). The authors state that "Since the concept strongly relates to an indicator of "success" for pragmatic officers, it was anticipated that there would be a greater proportion of pragmatic officers holding this concept as an operative concept" (26:76). They then hypothesized that, because of the importance of the 10-12 year point in an officers career (promote or separate if passed over twice), there should be a higher proportion of pragmatic officers holding promotion as operative near that point (26:77). However, the reverse was found to be true in the data, with this group having the lowest proportion holding the concept as operative. Schlatter and

Mitchell contend that this result poses " . . . a serious question concerning the instrument's validity.", since they could pose no logical explanation for the results (26:79).

Conclusions. Schlatter and Mitchell come to the following conclusions. First, they state that the hypothesis of the study was not supported, therefore all conclusions made from the study are limited to the sample of maintenance officers in the study (26:82). Next, they state that the trend in the sample data towards pragmatic orientations may be due to some factor of the maintenance career field that favors this orientation (26:82). The authors also conclude that, while not conclusive, the logical inconsistencies noted in the data suggest that the validity of the instrument is open to question. (26:82). Further, any question of validity is serious since it impacts the meaning of any data measured with the instrument (26:83). They also state that analysis points to a possible lack of sensitivity in the power mode of the PVQ, but it also indicates that this lack may not have had any significant impact on the results study (26:83). Finally, they conclude that, while not providing data in support of the Janowitz hypothesis, the study did provide further insight into value inquiry, and that it provided useful information for further research in the field (26:83).

Hopkins and Scheideman, 1976

A second AFIT thesis was also published in September of 1976, by Captains Leonard Hopkins and James Scheideman. This thesis, titled Value Profile of the Air Force Contracting Officer, represented the first study into Air Force officer values completed at AFIT to utilize

the theories and methodology of Milton Rokeach for measuring and interpreting the value systems of individuals and groups.

Background. The purpose of Hopkins and Scheidemans' thesis was to gain insight into the behavior of Air Force contracting officers through the study of their personal value systems. They state that they hoped to obtain information that could be useful in the selection of these officers (16:3, 6-7). In addition, they note two specific objectives for their study. The first was to ascertain whether or not contracting officers posses a unique value system (16:7). The second was to identify that value system if it existed (16:7). They also imply that they had a third objective, that of comparing Air Force contracting officer value hierarchies to the perceived ideal ranking of values for a contracting officer as developed by Hopkins and Scheideman (16:20).

Basis. Hopkins and Scheideman state that contracting officers play a very important role in the procurement of systems for the Air Force, and that selection of individuals who can perform effectively in this position is a critical step in realizing efficient operation of the procurement system (16:1-2). They contend that understanding of the behavior and motivating factors of the contracting officer would allow for improvement of this selection process (16:2).

The study itself is based on the value theories of Milton Rokeach's (16:4-6). The authors note that research into values has shown that there is a relationship between a person's value system and their chosen occupation, in that a particular set and ranking (system) of values will cause a person to chose a given occupation over others (16:6). Hopkins and Scheideman contend that if such a relationship

were true for contracting officers, then by identifying the values and value system of the contracting officer it should be possible to use this information to aid the selection of people for this particular career field (16:6).

The authors also apply several assumptions to their study. First, they assume that the set of personal values is relatively small and measurable (16:7-8). Second, they assume that values are ranked within the person's value system in order of importance (16:8). The third assumption is that value systems are distinctive for occupations and the value system of a contracting officer is unique to that job although it may be similar to that of Air Force officers in general (16:8). The final stated assumption is that the Rokeach Value Survey (RVS) is an accurate means of measuring the values a person holds (16:8).

Concepts. The authors review the basic ideas concerning values but do not discuss anything in relationship to value concepts not already covered by previous researchers. Some interesting new information is discussed concerning the relationship of values to attitudes, however.

Hopkins and Scheideman first describe the relationship between attitudes and behavior by noting their importance in determining the behavior of the contracting officer (CO) (16:12-13). They note that ". . . the CO is usually described in terms of his effectiveness as a negotiator, and that the tools of negotiation can be learned but that true skill at negotiation depends on personal characteristics" (16:12). The authors cite W. H. Riemer in noting that personal attitudes are viewed as being the determinant of how skilled

an individual becomes (i.e. someone with a positive attitude towards his job will work harder to become good at it) (16:13). They then define the relationship between attitudes and values by noting that Rokeach views an attitude as a group of beliefs that are focused on an object or event, while a value is comprised of one belief focused on states of existence or types of behavior (16:13). Hopkins and Scheideman state that according to Rokeach, values are the building blocks of attitudes because they provide the basis for judging a thing or situation as good or bad, which results in an attitude about that thing or situation (16:13). They also cite Rokeach in saying that while the number of values in a person's value system may be small the corresponding amount of attitudes that person could have is quite large, perhaps in the thousands (16:13). The authors conclude by noting that since values are the key elements of attitudes attitudes can be measured by measuring values (16:14).

Hopkins and Scheideman then explain the concept of the "profile" for Air Force contracting officers used in their study (16:14-15). The profile would describe the value ranking of Rokeach's 36 values in terms of the way an ideal contracting officer would rank them (16:14). In order to determine this ideal ranking, Hopkins and Scheideman applied the RVS to four people ". . . with extensive experience as former contracting officers . . . ", including two AFIT faculty members and two former AFPRO contracting officers (16:14). They asked each person to rank the values in terms of how they thought the values would be ranked by the "ideal CO" (16:14). The median rankings they obtained for each list of 18 values was used to construct

the composite value hierarchy that could be attributed theoretically (in terms of expert opinion) to the ideal contracting officer (16:14-15).

The authors note that two terminal values and three instrumental values were consistently ranked highly by the experts (16:15). They review current literature to show that these values are ". . . deemed to be critical to an effective [X] (16:15-20). They cite Chester Karass in stating that ". . . the most effective negotiators are those who seek to satisfy the higher order needs related to achievement and self-esteem (16:18). They report that in experiments to determine the effectiveness of contracting officers Karass found that people with high esteem were less susceptible to persuasion and that in relation to negotiation contracting officers ". . . with the highest aspiration levels achieve the greatest successes (16:18)." Hopkins and Scheideman note that the literature states that the government contracting officer should be aggressive when reviewing and negotiating proposals, and they state that this trait is reflected in the instrumental value **ambitious** (16:15-16). They note also that the contracting officer is most dissatisfied by the conflicts he encounters on the job, and that consistency and rationality are a means of dealing with this conflict (16:16). These traits are reflected in the instrumental value **logical** (16:16). They note finally that Karass found in his studies that the most capable negotiators were ones that not only had high aspirations but that were skilled at the process of negotiation (16:20). This quality of the contracting officers is reflected in the high ranking of the value **capable** (16:19-20).

Limitations. The authors state that the study is limited to contracting officers at Aeronautical Systems Division (ASD) WPAFB, and that consequently the results should not be generalized to contracting officers throughout the Air Force (16:8-9).

Methodology. Hopkins and Scheideman considered three different methodologies for their study. These methods were behavior observation, direct questioning, and value surveys (16:24). They did not use behavior observation, which is the observance of behavior in controlled situations upon which inferences are drawn about the subject's behavior, due to limitations in time and money (16:24). They state that direct questioning may cause the respondent to withhold answers or to answer only selected questions due to the type of information being sought, and thus this option was also eliminated from consideration (16:24). Finally, they cite England, Dalbey and Matt[illegible] in stating that another approach is to use an instrument based on the semantic differential to measure values, but that these questionnaires can be complex and confusing to the respondent. According to the authors, this presents the possibility that the answers provided by the respondents may not reflect their true values (16:24).

Basis. Hopkins and Scheideman chose the Rokeach Value Survey, and consequently Rokeach's approach to value measurement, for a number of reasons. First, the only reference the respondent can use in ranking the values on the survey is that person's own value system (16:25). Second, the survey's simple design asks only that the respondent rank two lists of 18 concepts (16:25). Third they contend that, since the survey measures relative rankings of values and not their absence or presence in the value system, this instrument is in

fact another application of Osgood's semantic differential (16:25). Fourth, they cite Rokeach in stating that the values included on the survey are ". . . reasonably comprehensive while still avoiding a burdensome ranking test for the subject" (16:25). They again cite Rokeach in stating that he used a process of review and elimination to reduce lists of both terminal and instrumental values that were initially hundreds of concepts long (16:26). They also note that Rokeach determined test-retest reliabilities for the terminal and instrumental values and that they were 0.75 and 0.65 respectively (16:26). Finally, they state that social pressures causing the respondent to rank values in terms of social acceptance versus true feelings was shown by Rokeach to be of no consequence in the value survey.

Sample. Hopkins and Scheideman chose three Air Force specialty career codes for investigation that were involved in the procurement of supplies and services for the Air Force (16:21). This choice resulted in a population of 1,292 individuals. The sample was chosen for convenience and was comprised of the officers in these three specialty codes that were currently based at WPAFB. This resulted in a sample of 109 individuals (16:22). The authors did not consider this sample representative of all Air Force contracting officers since they had chosen it out of convenience. They state that unspecified . . . variations in duties performed at ASD compared to other Air Force procurement organizations, . . ' limited the conclusions regarding the data gathered to the sample population only (16:22).

Analysis. The Kendall coefficient of concordance was used to test the research hypothesis by measuring the degree of agreement for

the rankings of both terminal and instrumental values among the individuals in the sample (16:29). The authors used the median rank as a measure of central tendency in the ranking of each value and these median ranks were used to develop the composite hierarchies used to test the hypothesis (16:30). They also used the composite value rankings to compare the data to other studies. The median test using a chi-square statistic was used to test for differences in the rankings of the different samples (16:30).

Results. Hopkins and Scheideman note that the 61 respondents to the survey were all male, ranged in grade from lieutenant to lieutenant colonel, and were representative of all three specialty codes under study (16:31-32). The value for the Kendall coefficient calculated for the sample supported the hypothesis that the individual rankings were similar, thus supporting the research hypothesis that contracting officers have a common value system (16:36). The composite rankings developed by the authors for both terminal values and instrumental values are taken to be representative of the common value system of Air Force contracting officers (16:38). The five top and bottom ranked values from these composite hierarchies are shown below in Table 8.

In addition to developing these composite rankings, the authors compared them to the rankings developed by Rokeach from samples of all Americans and college graduates (16:38, 41-46). Because the respondents to the survey were all males, the authors limited their comparison to only the males in the American sample (16:38). No such division of the college sample was used (16:38). They found a number of significant differences between the rankings of the various groups. They found the greatest differences in the terminal value a world at

Table 8

Highest and Lowest Ranking Values
for Air Force Contracting Officers

Terminal Values

Top 5	Bottom 5
1. Self-Respect	14. Equality
2. Family Security	15. Social Recognition
3. A Sense Of Accomplishment	16. A World Of Beauty
4. Freedom	17. Pleasure
5. Wisdom	18. Salvation

Instrumental Values

Top 5	Bottom 5
1. Honest	14. Helpful
2. Responsible	15. Cheerful
3. Courageous	16. Polite
4. Capable	17. Clean
5. Ambitious	18. Obedient

(16:39-40)

peace and the instrumental values **logical** (for American males) and **capable** (for college graduates) (16:45). **A world at peace** was ranked twelfth by contracting officers but first by both American males and college graduates (16:41). **Logical** was ranked eighth by contracting officers and sixteenth by American males (16:43). **Capable** was ranked fourth by contracting officers and ninth by college graduates (16:43).

Conclusions. Based on the study results, Hopkins and Scheideman draw the following conclusions. First, within the limits of the sample, the hypothesis that contracting officers share a common value system was supported by the sample data (16:47). Second, given that values are stable over time, the comparison to Rokeach's 1968 study of Americans yielded valid results (16:47). A larger number of

significant differences in value rankings were discovered when the sample was compared to males versus when it was compared to college graduates, indicating that the education level of the contracting officer has a large influence on the value system of that individual (16:48). The authors also conclude that the results of this study are consistent with the prediction that contracting officers would rank certain values fairly highly in their value systems (16:51). The terminal values **self-respect** and **a sense of accomplishment** were ranked first and third in the composite terminal hierarchy, while the instrumental values **capable**, **ambitious**, and **logical** received composite ranks of fourth, fifth, and seventh (16:51). Finally, the authors conclude that of the values that were predicted as characteristic of contracting officers, the values that most distinguish a contracting officer from civilians are **self-respect**, **capable**, and **logical** (16:52).

Dethloff and Doucet, 1978

Captains Frank Dethloff and Dennis Doucet published the thesis titled A Study of Pilot's Value Systems and Their Effect on Career Intentions in September of 1978. This was the first and only study at AFIT to specifically look at values in relationship to career intent, and was the second to utilize the methodology of Rokeach.

Background. Dethloff and Doucet note that their study is divided into five parts, and they present an objective for each one. The primary objective of part one was to determine if certain defined groups of pilots within a specified class at Squadron Officers School (SOS) had a common value system (10:19). The second part's objective was to determine if these same groups shared a common perceived

organizational value system (10:20). Part three's objective was to determine for the groups whether a common value system was shared across commands and across different career intentions (10:20). The fourth part's objective was to determine if perceived organizational value systems were similar, as in part three, across command and career intention (10:20). The objective of the final phase of the study was to identify the level of agreement between the pilots' personal value systems and their perceived organizational value systems from the perspective of both major command and career intentions (10:20).

Basis. The authors note that research has shown a connection between feelings of alienation from an organization for an individual and the perception on the part of that individual that his personal values and those of the organization are in conflict (10:2). They state that the Air Force is experiencing a problem retaining pilots, and that conflict between Air Force and pilot values might be causing it. According to the authors, this possibility needs to be investigated (10:2-3).

Their study was based on a number of assumptions. These assumptions are quoted below:

1. There are a limited number of values that a person possesses.
2. All people possess the same values, but in different degrees.
3. Values are hierarchically organized by the individual.
4. The source of human values can be traced to culture, society, its institutions, and personality.
5. Values affect the individuals behavior in any social setting. [10:22-23]

Concepts. As in previous works already reviewed, the authors review the various aspects of value theory including definitions, characteristics, acquisition, and formation (10:3-7). They point out several interesting qualities of values not discussed by the other

researchers. They note that values can be looked at in two ways, either as the specific evaluation of an object, or as standards for making evaluations (10:3). They cite Robert Weaver, a faculty member at AFIT at the time, as stating that values in terms of criterion are the most important in ". . . social scientific analysis" (10:3). The authors also cite Morris Massey in stating that values become relatively stable once a person reaches their 20s, and that only significant events (such as family deaths) will affect these values enough to change them (10:6). Finally they note that the literature indicates that values are affected by society at three levels (10:6). Values can be affected on a general level by social expectation, or on a specific level by the location and/or the situation (10:6-7).

The authors also point out several interesting features of value conflict. They cite Massey again in noting that several different value systems may be operative in an organization due to the different ages of the individuals in the group (10:11-13). Massey, according to Dethloff and Doucet, states that people of different ages learned different value priorities, and that these different priorities are a source of conflict in organizations (10:12-13). Dethloff and Doucet also cite an article by Robert McMurry in the March 1975 issue of the Harvard Business Review in pointing out that value conflicts can occur within an individual's value system as well (10:13). These conflicts occur when the values learned from widely varying sources cause inconsistencies in the persons value system (10:13). They note that according to McMurry the typical way of dealing with these conflicts is that the individual represses all but one set of values for a given situation (10:13).

Dethloff and Doucet also discuss the relationship between values and occupation. They cite Merle Hokenstad as saying that values should have an impact on the profession or job that a person chooses to pursue such that a particular orientation will cause a person to favor certain professions over others (10:14). They go on to note Rokeach's attempts to confirm this contention through the study of college professors, policemen, and priests (10:14-15). According to the authors, in all cases Rokeach found that the individuals in each profession possessed unique and similar value orientations. This finding caused him to conclude that the person's value orientation predisposed him to a particular profession rather than social forces experienced once the individual was active in the profession (10:14-15).

Finally, the authors state that by measuring an individual's values and comparing them to perceived organizational values, it is possible to estimate the amount of alienation that person might feel once in the organization (10:16). They again cite Rokeach in noting that the greater the difference in values, the larger the level of alienation (10:16). Also, they state that "It is logical that alienation may cause an individual to quit his job and seek another profession" (10:16).

Hypotheses. Dethloff and Doucet present two guiding hypotheses for their research. The first states that all pilots, pilots from different commands, and pilots with similar career intentions who are members of SOS class 78B share common value systems (10:21). The second states that pilots in this SOS class who are from

the same command, and those with similar career intentions, have personal value systems which are congruent with their perceived organizational value systems (10:21).

Limitations. The authors note that, because this study was limited to the specific group of pilots who were members of SOS class 78B, the results of this study should not be applied to other groups of pilots or Air Force officers (10:22).

Methodology. Dethloff and Doucet used the Rokeach Value Survey for this study and make the following guiding assumptions. They assume that the RVS is valid and reliable and can be used for the purposes of the study (10:40). They also assume that anonymous responses would minimize the chance of the respondents biasing their answers and thus distorting the data (10:40). The third assumption they make is that the career intent question used in the survey provides reliable data (10:40). The final assumption states that modifying the personal value rankings to compute the Spearman rho statistic did not affect the rankings of the remaining values (10:40).

Sample. The population for the study was all pilots in SOS Class 78B with not more than eight years of service (10:29). Time-in-service was restricted so that the study would measure only pilots serving their first active duty commitment, including pilots undecided about a career past their first commitment (10:29). The entire population of 213 pilots was surveyed and thus constituted the sample for the study also (10:29).

Survey Instrument. Dethloff and Doucet review the characteristics of the RVS and note the following. They cite Rokeach in noting his findings that order effect and social desirability effect

are not operative in the survey (10:25-27). They again cite Rokeach in stating that the RVS is a reliable instrument for measuring personal and perceived organizational values (10:24, 27).

Dethloff and Doucet used a modified version of the RVS to measure the perceived organizational values of the sample (10:26-27). The modification consisted of removing the terminal values **mature love** and **salvation** and the instrumental values **cheerful** and **loving** from the survey which the authors did not believe were applicable to organizations (10:27). They used the standard RVS to measure the personal values of the sample (10:27) They utilized a modified version of a career intent question developed by Faye Schenk of the Air Force Human Resources Laboratory to measure a respondent's career intentions. This question originally measured intent on a five point scale, but Dethloff and Doucet changed it to a seven point scale for use in their research (10:27-28). The responses to the career intent question were divided into three major classes: intending to remain, undecided, and intending to separate (10:28).

In concluding their discussion of their survey instrument, the authors note that no attempt was made to send follow-up questionnaires to individuals that did not respond the first time it was distributed. This was done to avoid biasing the orderings of the respondents' answers (10:29).

Analysis. Dethloff and Doucet note that the responses of the RVS are ordinal in scale and require nonparametric statistics for analysis (10:29). The Kendall coefficient of concordance was used to asses the amount of agreement among the rankings for the individuals in the sample (10:30). This test was used for testing both research

hypotheses. The computed coefficients were tested using the chi-square test of independence where the null was that the rankings were unrelated (independent) (10:31-32). To test the correlation between personal and perceived organizational values, Dethloff and Doucet used the median score for each value to compute a Spearman rank correlation coefficient (10:33-38). They note that the two rankings must be identical in calculating the coefficient, so only the values from the personal list that were included in the organizational list were used to generate the composite rankings (10:34) This analysis was used to determine the level of agreement between personal and organizational value rankings for the sample as a whole, as well as across commands and career intentions (10:37). Finally, the Kruskal-Wallis statistic was computed and used to determine whether the value rankings for officers with different career intentions are similar (10:38-40). A chi- square test was again used to test the significance of these results (10:40).

Results. The authors state that 160 usable surveys were returned, sorted by major command, and then coded into a computer (10:41). Using the computer, frequency distributions and median ranks for all values as well as values for the Kendall and Spearman statistics were calculated (10:41). The remaining statistics were calculated by hand (10:41-42). The authors determined value hierarchies for both terminal and instrumental values for the aggregate group, for each command represented, and for each level of career intent (positive, undecided, and negative) (10:42-53). As an example of the rankings they obtained, the top five personal terminal and instrumental values for the aggregate sample are shown in Table 9 below.

Table 9

Highest Ranked Values
for Pilots of SOS Class 78B

Terminal Values	Instrumental Values
1. Family Security	1. Honest
2. Freedom	2. Responsible
3. Self-Respect	3. Capable
4. Happiness	4. Courageous
5. A Sense Of Accomplishment	5. Broad-minded

(10:43-44).

Dethloff and Doucet computed Kendall coefficient values for the aggregate sample and for the command and career intention subgroups. They found that for the aggregate sample both the personal terminal values and instrumental value rankings showed a common hierarchy (10:52). For each command represented (SAC, TAC, ATC, and Military Air Command (MAC)), the hierarchies for both terminal and instrumental values in both the personal and perceived organizational categories were shown to be common within that command for those individuals sampled (10:54,56). Also, within each category of career intent (positive, undecided, and negative), the authors found common hierarchies for terminal and instrumental values for both the personal and perceived organizational value categories (10:58, 61).

The authors computed the Spearman and Kruskal-Wallis statistics and obtained the following results. The common ranking for both terminal and instrumental values in both personal and organizational categories was confirmed (10:61-66). The rankings for both terminal and instrumental values are independent within each command when comparing the personal and perceived organizational values of the

pilots within that command (10:66). Pilots in each career group have a common value hierarchy for both personal and perceived organizational values (10:68-72). Finally, as with the command comparisons, the analysis found that for each career intent group the rankings of terminal and instrumental values are different when comparing personal values to perceived organizational values (10:72-74). The Kruskal-Wallis analysis of the career intent groups failed to indicate a difference in the rankings for both terminal and instrumental values for the different levels of career intent (10:74).

Conclusions. Dethloff and Doucet make the following conclusions about their study and the results of their analysis. First, they state that all pilots in the sample share a common value system (10:86). Second, they conclude that all pilots in the sample in a particular command share a common perception of the organizational values of their group (10:86). In addition, they state that "The identification of a common value system among pilots supports the contention that personalities within certain occupations and careers have unique value and value system characteristics" (10:87). They also state that ". . . the identification of a common value system can provide management with the insight to critically evaluate its personnel policies" (10:87).

Dethloff and Doucet then conclude that the "driving force" (top three) values for the sample were the terminal values **family security**, **freedom**, and **self-respect** and the instrumental values **honest**, **responsible**, and **capable** (10:87). They also state that organizational policies that are at odds with the highly ranked personal values of its

people will cause value conflict in those individuals, and managers should be aware of this possibility in order to minimize its occurrence (10:87-88).

The authors state that pilots with a particular career orientation share a common personal value system, as well as a common perception of organizational values (10:87,88). Also, pilots with a particular career intention have personal value systems that are different from the perceived organizational value systems they share (10:88-92). They conclude that the differences between the pilots personal value system and their perceived organizational value system suggest points of possible conflict between the individual and the organization (10:92). Finally, they conclude that similar differences exist among career intention groups for perceived organizational values (10:95).

McCosh, 1986

A full eight years elapsed between Dethloff and Doucets' study and the next thesis published at AFIT on officer values. In September 1986 Captain Carol McCosh published The Value Hierarchies of Selected Air Force Officers, the third thesis at AFIT to utilize the Rokeach approach to studying values.

Background. McCosh states that her research had three specific purposes. The first is to identify the differences between military and civilian values (22:3). The second is to identify the differences in values, if any, between officers with different sources of commission. (22:3). The third is to identify the differences in values, if any, between officers with different lengths of time-in-service (22:3).

Basis. The basis for this set of objectives is set in the fact that, according to McCosh, "Thus far, no attempt has been made to make comparisons between military and civilian value hierarchies nor to compare value hierarchies based on time in service or source of commissioning" (22:5). Her premise seems to be the contention that the value hierarchies of civilians and military officers are inherently different, and that there is in fact less variation (i.e. more commonality) in the value rankings for officers than there is for civilians (22:1-5).

Concepts. McCosh states that only two value theories are pertinent to her study, those of Rokeach and Kohlberg, and concentrates her literature review on them (22:7-14). She adopts Rokeach's definitions for value, value system, terminal value, instrumental value, and value hierarchy for use in her study (22:8). Her discussion of Rokeach's work contains nothing not already covered in previous studies, however she notes some interesting characteristics of Kohlberg's theory (22:7-14).

According to McCosh, Kohlberg classified values in terms of moral judgments using three different groups. These three groups represented three different levels of overall moral judgement (22:8). As the individual moves from the first level to the next and then to the next, he is moving from an other than self-oriented value structure to a self-oriented value structure (22:8). Interaction with the environment causes movement through the levels, and there is no assurance that an individual will achieve the higher levels of judgement (22:7). McCosh notes that Kolberg assumes relative stability

in the value set and a hierarchy of relative importance assigned to values once the higher levels of judgement are reached (22:8).

McCosh also cites the opinions of others that support the theories of Rokeach and the usefulness of value study for the military. She quotes Sam Sarkesian in noting his belief that the agreement of individual, military, and societal values is the key to achieving a tightly knit, effective military (22:10-11). She also quotes Weaver in citing his view that a common set of values is what binds the officer corps together (22:11). She concludes based on these opinions and on those of Rokeach on values and professions that indeed a common value hierarchy should exist for military officers (22:11).

According to Mccosh, the findings of Rokeach's studies indicate two things: that differences do exist in value systems for individuals from different portions of society, and that there are specific value hierarchies associated with particular professions which cause people to be predisposed to those professions over others (22:12-13). Again, Mccosh uses these findings to support her contention that Air Force officers possess a unique system of values (22:13).

Hypotheses. Mccosh states three hypotheses for her study. The first is that because ethics is taught to Air Force officers, the value systems of those officers should be more homogeneous than that of the civilian population (22:3). The second is that the different levels of instruction in ethics for Air Force officers depending on their source of commission implies that differences may exist in the value systems of these groups (22:3-4). The third is that officers with greater time-in-service have shared common experiences with their

peers longer than those with less time (i.e. field grade vs. company grade) and thus their value system should exhibit a higher level of homogeneity (22:4).

Limitations. McCosh outlines two limitations to her research. The first deals with the fact that she only studied Air Force officers, and excluded other services (22:4-5). The second is that the only value comparisons made were between field grade officers and company grade officers, which allowed a more "in-depth" look at the differences that may be present between these two groups (22:5).

Methodology. Mccosh justifies her use of the Rokeach approach by noting that by utilizing his survey and methodology, she will be able to compare her results to the values of civilians described in his research (22:14). She makes the following assumptions concerning her methodology. First, she assumes that the RVS is valid and reliable enough for use in the study (22:22). In addition, she assumes that "The random samples chosen will be representative of their respective populations" (22:22). The third assumption is that biasing of the data can be minimized by using an anonymous survey approach (22:22). Finally, she assumes that, based on Rokeach's assumption of value system stability, a valid comparison can be made between the results of this study and those obtained in Rokeach's 1968 study of Americans (22:22).

Sample. The study population included all Air Force officers, a total of 98,096 individuals (22:17). This population included 64,760 company grade and 33,336 field grade officers (22:17). McCosh notes that simple random sampling was used in each stratum of the population, which was stratified by grade (company and field) and

commission type (academy, ROTC, and OTS) (22:17, 19). She states that an 85% confidence level was used to select the sample sizes within cells, with an overall confidence level of 90% achieved for comparisons made across grade and commissioning source (22:17).

Survey Instrument. Mccosh notes that the version of the RVS she used and that used by Rokeach for his study were not exactly the same. One terminal value and one instrumental value were ignored during the analysis (**happiness** and **cheerful** respectively) to allow for a comparison of only similar values between the two studies (22:14).

Analysis. McCosh states that, using similar methods to those employed by Rokeach, composite value rankings were generated for each sample cell (commission source and grade) to allow comparison with Rokeach's results (22:18,20). She goes on to note that the ordinal nature of the data disallows parametric analysis (22:20). Because of the level of the data, McCosh chose the Kendal coefficient to assess the degree of agreement in the rankings for the various sample cells (22:20). She notes that the composite rankings were developed for each sample cell using the mean ranks for each value (22:20).

The chi-square test was employed to check for a common value hierarchy for each group (22:20-21). She notes that no statistical means was discovered that allowed for an assessment of the differences between value hierarchies. Because of this she developed a criteria based on the work of Boyle and McCall in their study of Air Force Academy class value hierarchies, to determine what differences were significant and should be investigated (22:21). This criteria states that a difference in a value ranking is significant if it is greater that two (22:21).

Results. McCosh states that she received 248 usable surveys, and used mainframe computers at AFIT to perform all statistical analysis on the data (22:23). She notes that the composite civilian rankings used for comparison in her study to the composite military hierarchies were derived from Rokeach's presentation of his study results (22:24). Composite rankings for both terminal and instrumental values were developed for the aggregate military and civilian samples, as well as for subgroups of the officer sample by grade and type of commission. Examples of some of these rankings are found in the following tables. The top five values for the composite terminal and instrumental value systems for the aggregate civilian and military samples is shown in Table 10 below. The top five terminal and instrumental values for the composite value hierarchies developed for company grade and field grade officers are shown in Table 11 below. Finally, the top five ranked values by source of commission are shown in Table 12.

McCosh reviews the results of her chi-square test of independence for the rankings in a given group and notes that in every case it indicated that each group (sample cell) has a common value hierarchy (22:24-25). In addition, a number of significant differences in value rankings were noted using the criteria mentioned earlier (22:38-39). Among the results she notes the following:

1. 14 of the 18 instrumental values differed between the aggregate civilian and military hierarchies (22:38). 13 of the 18 terminal values differed (22:38).

2. Only the instrumental value **polite** differed significantly between the company and field grade composite rankings, and only the instrumental values **ambitious** and **loving** differed across commissioning

Table 10

Highest Ranked Values for
the Military and Civilian Samples

Terminal Values

Military	Civilian
1. True Friendship	1. A World At Peace
2. A Sense Of Accomplishment	2. Family Security
3. Equality	3. Freedom
4. Pleasure	4. Self-respect
5. Mature Love	5. Wisdom

Instrumental Values

Military	Civilian
1. Forgiving	1. Honest
2. Helpful	2. Ambitious
3. Obedient	3. Responsible
4. Honest	4. Forgiving
5. Capable	5. Broad-minded

(22:26-27)

source groups (22:38). Five terminal values differed by grade while seven differed across commissioning source (22:38-39).

3. Four instrumental and four terminal values differed across commission source for field grade while six instrumental and nine terminal varied for company grade (22:38-39).

4. Obedient was ranked 12 spaces higher by the officer group in comparison to the civilian group (22:41).

5. Among the other differences noted in instrumental values for the military and civilian groups were **ambitious** (12 spaces higher for civilians), **clean** (nine spaces higher by civilians), and **courageous** (eight spaces higher by civilians) (22:41-42).

Table 11

Highest Ranked Values for
the Company and Field Grade Officers

Terminal Values

Field	Company
1. True Friendship	1. True Friendship
2. A Sense Of Accomplishment	2. A Sense Of Accomplishment
3. Equality	3. Equality
4. Pleasure	4. A Comfortable Life
5. Mature Love	5. An Exciting Life

Instrumental Values

Field	Company
1. Forgiving	1. Forgiving
2. Helpful	2. Helpful
3. Obedient	3. Obedient
4. Capable	4. Honest
5. Honest	5. Capable

(22:28-29)

6. Some of the terminal values determined to be different between the civilian and military samples were **pleasure** (ranked 12 higher by military), **family security** (ranked 12 higher by civilians), and **self-respect** (ranked 12 higher by civilian) (22:47-48).

7. The only significant difference noted for instrumental values between grade groups was for the value **polite** (ranked only three positions higher by field grade officers) (22:53). This implied that there is virtually no difference in the two rankings (22:53).

8. Five differences were noted for terminal values between the grade groups, indicating that an overall difference does exist between the two hierarchies but that this difference may not be too severe (22:53). No difference was greater than four positions (22:53-55).

Table 12

Highest Ranked Values by
Source of Commission

Instrumental Values

Academy	ROTC	OTS
1. Forgiving	1. Helpful	1. Forgiving
2. Obedient	2. Forgiving	2. Helpful
3. Helpful	3. Obedient	3. Obedient
4. Honesty	4. Capable	4. Honest
5. Capable	5. Honest	5. Capable

Terminal Values

Academy	ROTC	OTS
1. True friendship	1. True friendship	1. True friendship
2. Accomplishment	2. Accomplishment	2. Accomplishment
3. Equality	3. Equality	3. Equality
4. A world at peace	4. Pleasure	4. A world at peace
5. Wisdom	5. Mature love	5. Wisdom

(22:30-31)

9. Only two differences were noted for instrumental values across the commissioning types, which again suggests no differences in the hierarchies for the various groups (22:55-56).

10. Seven differences were found for terminal values in comparing the rankings of commissioning types. Among those differences noted were those for the values **a world at peace** (ranked nine higher by OTS and Academy over ROTC) and **freedom** (ranked five higher by Academy over ROTC and three higher over OTS) (22:56-57).

Conclusions. McCosh comes to the following conclusions regarding her study and its results. First, she states that:

> The findings clearly indicate a difference between the hierarchies of the civilian sample and the company grade and field grade officer sample. This agrees with Rokeach's findings regarding a self-selection process that predisposes an individual to a particular profession. [22:60]

Second, she states that because of minimal differences across the grade and commission type sample cells, the self-selection process for military members most likely occurs before entry into the service rather than through social forces in affect after entry (22:60). She also concludes that while desireable end states of existence (terminal values) may differ among groups of officers, the desired modes of behavior (instrumental values) are relatively similar across all groups (22:60). Finally, she concludes that commissioning source does not play a part in determining the value hierarchies of Air Force officers, which implies that the effort spent at the Academy and OTS to teach military professional values may be better spent in other areas (22:60).

Marumoto, 1988

In September 1988, Captain Glen Marumoto published the most recent AFIT study of Air Force officer values. Entitled The Study of Personal Values of Selected U.S. Army and Air Force Officers, this thesis was also accomplished using Rokeach's method of value inquiry. In this study Marumoto compares the values of Air Force officers to those of officers in another service to shed light on the possible similarities and differences between them.

Background. After briefly reviewing the work of England, Rokeach, and McCosh, Marumoto defines three purposes for his study. The first is to identify the values most important to both military officers and

civilians (21:7). The second is to identify the same thing for officers from different branches of the military (21:7). The third was to describe how these differences or similarities in values and value systems might be used in a definition of a ". . . good Air Force Officer" (21:7). He also states five specific objectives for the study:

1. Reestablish the difference, if any, between civilian values and officer values.
2. Describe the differences, if any, between Army officer values and Air Force officer values.
3. If differences exist, analyze them and explain them in terms of lifestyles, orientation, and training of the different groups.
4. Apply the analysis to the practical tasks of recruiting and training future Air Force officers.
5. Use the analysis to help improve and better define the way senior Air Force leadership views the current officer corps. [21:7-8]

Basis. Marumoto begins his thesis by stating that a major strength of the military lies in its officer corps, and that military officers can be likened to the upper levels of management in civilian organizations (21:1). He also states that values play a part in defining what characterizes "good" officers, which are implicitly part of a strong military force (21:1). He goes on to note that this study is based in large part on the contention of Dr. John Muller, Professor of Ethics at AFIT, that the Air Force is in fact a new organization, shaped by technology, apart and different from the Army (21:2). According to Marumoto, Dr. Muller suggests that what a first rate Air Force may need is better managers, versus an abundance of leaders as is present in the Army (21:3).

Marumoto then goes on to cite Janowitz to support this hypothesis, noting Janowitz's view that the proportion of "military

managers" to "heroic leaders" has increased as technology becomes more and more evident in the modern military (21:2). He notes that less than 8% of the personnel in the Air Force perform actual combat related functions, and that almost 80% of these people are officers. He also notes the sharp contrast with the army, where most of the combat troops are enlisted men (21:3). This leads him to hypothesize that this difference in structure may cause a difference in the values of the two groups (21:3). Marumoto contends further that a study of the value differences between these two groups will provide information that can be used in defining what constitutes an "Air Force" (21:3).

Concepts. Marumoto discusses the work of Huntington and Janowitz on military values, as well as reviewing the theories and studies of England and Rokeach. He makes the following points about Huntington's theories. According to Marumoto, Huntington saw the modern military as a profession with ". . . a unique expertise, corporateness, and responsibility" (21:10). He also notes Huntington's view that the relationship between civilians and the military in America has been anti-military (21:10). Marumoto states that Huntington believed that the conflict due to this adverse relationship is resolved in one of three ways: isolation of the military from society, shifting of military values towards those of civilians, or shifting civilian values more towards those of the military (21:10-11).

Marumoto states that, based on these modes of conflict resolution, Huntington developed a model of the relationship between the military and civilians. The model has two dimensions, *interaction* and *congruence* (21:11). The type of relationship described by the model changes as one moves from one combination of interaction and

congruence levels to another (21:11-12). For instance, a professional relationship as described by this model would be described by a high level of interaction (contact) between the civilian and military communities, as well as a high level of congruence (agreement) between the characteristics of the military and society (21:11-12).

Marumoto then cites Janowitz in noting his five proposed hypotheses to describe the changes in American military behavior. The first stated that the technical nature of modern war has caused a shift in the officer's approach to organizational authority from one of domination to one that emphasizes ". . . manipulation, persuasion, and group consensus" (21:12). Second, technology has also caused changes in the role of the officer, requiring him to acquire skills similar to his civilian counterparts, such as in communication and politics (21:12-13). The third hypothesis stated that officer recruiting has changed its focus from that of recruiting the elite to that of recruiting from more sections of the population, which in turn has ". . .increased the willingness to be accountable to civilian authority" (21:13).

Hypothesis four stated that two types of careers are present in the military. "Prescribed" careers are the routine or normal paths followed by officers as defined by the organization, while the "elite nucleus" is characterized by innovative thought and political skills (21:14). Most officers in the "elite nucleus" got there by way of "prescribed" careers (21:14). Finally, the fifth hypothesis states that the impact of the increased emphasis on the political role of the military officer has been the erosion of his concept of honor, which in

turn ". . . results in an officer less prepared to think for himself as only a military technician" (21:15).

Methodology. Marumoto briefly reviews some of the research into values that used the Rokeach methodology and that are pertinent to his study:

1. He notes Grube's work on manipulation of value systems through confronting an individual with inconsistencies in their values (21:23). He states that Grubes found that such confrontation lessens the level of inconsistency, but that no change occurred if no such inconsistencies were present (21:23-24).

2. He cites the work of Munson and Posner in attempting to describe the differences between managers and nonmanagers and successful and unsuccessful people using the RVS (21:24). He notes that their findings indicated that there are significant value differences between these groups (21:24).

3. He reviews the work of Dyer and Hilligoss who attempted to describe the differences in values between senior and junior Army officers and their findings that there were significant differences between the two groups (21:25).

4. Marumoto then cites the work of Oliver who compared the values of senior Air Force officers and Air Force Academy cadets and his finding that there were significant differences between the these two groups also (21:25).

5. Finally, he notes the work of Mccosh in studying the values of Air Force officers in comparison to civilians, and across grade and commission type. According to Marumoto, her findings indicated

differences between officers and civilian, and few significant differences across grade and commission type (21:26).

Survey Instrument. Marumoto is the first AFIT researcher to note the ipsative nature of the survey (21:28). He also notes Rokeach's predicted uses for the survey, including value counseling and vocational selection (21:28). Marumoto justifies the use of the RVS and Rokeach's methods by noting that consistency with prior research was a requirement of this study and therefore required that the RVS be used (21:29). He also cites Rokeach in noting RVS advantages and disadvantages:

1. Advantages. According to Marumoto, the RVS is simple to take and administer, interesting to the participant, and gives quantitative information on values (21:30). In addition, the purpose of the RVS is not disguised in any way, and it requires no training (21:31). He also notes that those critical of the survey for use in individual evaluation and application do believe the RVS to be useful in describing the value systems of groups of individuals (21:32).

2. Disadvantages. Marumoto cites as disadvantages the criticism of the ipsative nature of the RVS and the assumption, implicit in the RVS, that values have a strict ordering (21:31). In addition, he notes that generalized terms are used to describe the terminal and instrumental values and that this could lead to interpretation difficulties (21:31-32).

Sample. The population was comprised of all Air Force and Army officers at the Air War College and Army War College in 1988, which consisted of 150 and 188 senior officers, respectively (21:32). Marumoto notes that this group represented the best of both services

due to the acceptance criteria used for in-residence students at these colleges (21:32). He contends that this group would most likely hold values, if they exist, which are indicative of the services of which they are members (21:32). The entire population was used as the sample (21:32-33).

Analysis. The results of Marumoto's study were compared to the work already done by Dyer and Hilligoss at the Army War College and by Oliver at the Air War College (21:33). Specifically, Marumoto investigated value stability and differences in and between the two groups (21:33). The Spearman rho was used to test for correlation between the two groups in their value rankings (21:33-34). If differences were noted, 95% confidence intervals were generated around each of the values using their means to look for specific differences between individual values. If the confidence intervals did not overlap for a given value from both groups, it was assumed to differ between the two groups (21:34). Comparisons were made between the current populations, between the study populations and civilians, and between the current populations and the populations of the previous Air War and Army War College studies (21:35).

Results. Marumoto states that 115 surveys were returned from the Army War College (62% response), but problems prevented sampling of the current Air War College class. Because of this, he used the field grade results from McCosh's study for comparison (21:36). He considered this substitution appropriate since officers at the Air War College are a subset of Air Force field grade officers (21:37).

Marumoto derived the civilian value rankings from Rokeach's presentation of his study results published in his book The Nature of

Human Values, and took the other data for comparison directly from the presentations made by Dyer-Hilligos, Mccosh and Oliver. He created value rankings for all groups (21:37-38). He then calculated Spearman coefficients for each group to check for common rankings and reports the following:

1. In comparing the Army 1988 class and civilians Marumoto notes that this study found a difference only in instrumental values, while prior research had noted differences in both (21:40). He concludes that this means that Army officers today value different means of achieving the same ends, and contends that this finding supports the view of both Huntington and Janowitz that military values embody more civilian beliefs as officers become more senior in rank (21:40-41).

2. No difference was noted between the Army 1980 and [illegible] classes, suggesting support for Rokeach's view concerning stability of values and a hypothesis made by Dyer-Hilligos that Army leaders encourage promotion of others who have value systems like their own (21:41).

3. Marumoto states that no conclusive statement can be made about the Air War college 1982 class and field grade officers since Oliver did not use both parts (i.e. instrumental values section) of the RVS (21:41). He notes that the difference in terminal values found in the results is support for Janowitz's contention that his two types of career paths, prescribed and elite, are in fact different (21:42).

4. Both the Army 1980 and Air Force 1982 samples indicated differences with McCosh's group (21:42). Means analysis found that 11 of the 17 matched (terminal) values differed between Air Force field grade officers and the Air Force 1982 sample. Marumoto concludes that

the Air Force difference is due to the composition of the samples (McCosh's was broader and equaled Janowitz's prescribed group, while the Air War College sample equalled Janowitz's elite group) (21:48).

5. The Spearman rho results indicated a difference between the Army 1988 group and Air Force field grader officers in both value categories, again lending weight to Janowitz's theory (21:42). Nine of the 17 terminal values and ten of the 17 instrumental were different (21:48).

In concluding his discussion of the results, Marumoto states that the results did support objective one, to determine if differences between military and civilian values existed, but noted that the data indicated some similarity also existed (21:50). He also notes that the results indicated that differences between the services do exist which might be due to Janowitz's two types of officers and two types of careers (21:51).

Conclusions. Marumoto draws the following conclusions about the results of his research study. He concludes that the fact that value differences between civilians and officers would exist is intuitive to the nature of the profession and is supported by the results of this study and others (21:52). He also concludes that the differences between the services are most likely due to the different mission orientations of the services. According to Marumoto:

> In the performance of its mission, the Army must physically occupy and control large areas of land. This type of tasking lends itself to promoting the heroic leader that Janowitz describes. Add to this description the 200+ years of existence and tradition of the Army, one can easily predict the Army would have an emphasis on certain values. [21:53]

He goes on to compare this to the Air Force:

> The Air Force is responsible for air warfare and as such does not need to continually physically control the air in which it operates. The tradition of the Air Force is built around the pilot, an individual whose personal ingenuity and resourcefullness greatly contributes to the success of the mission. The Air Force, by its nature, operates some of the most sophisticated weapons in the world. The support and operation of such equipment lends itself to promoting and securing personnel who emphasize values different from the Army. [21:53]

He concludes that recruiting programs based on values would increase the level of retention and ease indoctrination into military life (21:53). He also concludes that value analysis would allow for better matches between individuals and jobs (21:53-54). Finally he concludes that value analysis could be used by senior Air Force leadership to better understand, guide and train the Air Force officer corps (21:54).

Summary

Over the past 17 years several studies have been conducted at AFIT into the nature of the personal values and value systems of Air Force officers and their supposed relationship to other personal characteristics of these officers such as goals and job satisfaction levels. These studies have focused on describing the value systems of both the aggregate population of Air Force officers as well as the value systems of specific subgroups within this larger population. Subgroups were identified in terms of many characteristics including sex, job specialty, level of career intent, and level of job satisfaction. Several findings were common among the studies.

It was shown repeatedly that the overall group of Air Force officers possessed a hierarchy of values that was unique to that

profession, although other groups did possess similar characteristics. It was also shown that the value systems and primary orientations of subgroups within the overall group of Air Force officers were unique to those subgroups. Beyond this it was determined that subgroups tend to share a similar set of values and a common value system. In addition it was determined that the values an officer holds are dependent on many types of demographic variables including sex, grade, time-in-service and education level. These findings demonstrated that it is possible to differentiate between subgroups and the characteristics of those subgroups (such as career intent and job satisfaction) by the values that they found important.

The importance of these studies is evident in the consistency of their findings and the relationship of those findings to value theory. If, as most value scholars seem to believe, values do in fact significantly affect behavior, then by understanding the values of an individual or group it seems reasonable that this information could be used to predict the behavior of that group or individual. The fact that various groups of Air Force officers with similar characteristics repeatedly demonstrated common value systems suggests that it might be possible to predict the behavior of those groups by measuring their values. Further, if as some of these studies have suggested, values are in fact motivators of behavior and of the decisions between alternative actions, it ought to be possible to predict these characteristics as well by measuring values.

The past research at AFIT into officer values and value systems has paved the way for this kind of predictive research. The current study is an attempt to move in that direction. By investigating the

correlation between values of specific groups and career intent, this research is setting the stage for future predictive studies that would attempt to predict a level of career intention given a specific value system. If fruitful, these studies might suggest ways in which Air Force leadership could shape its policies and programs to foster more positive levels of career intent among its officer corps, thus increasing the retention level of this group. Also, these types of studies could be expanded to cover other characteristics of officer groups, such as the level of job satisfaction, with the same aim of determining ways and means of significantly encouraging or discouraging these characteristics among Air Force officers.

III. Methodology

Methodology Selection

Selection Criteria. The methodology selected for this study was based in large part on the work of Dethloff and Doucet. Since they utilized Rokeach's methods and instrument, it seemed appropriate to use them for this study also. Before fully accepting the Rokeach approach, however, certain other specific criteria were also considered. These criteria were:

1. Consistency with past research on Air Force values.
2. The validity of the theoretical model.
3. The reliability and validity of the survey instrument.
4. The findings of independent reviewers in relation to the validity and reliability of the model and the survey instrument.
5. The frequency of use by other researchers in the field of value study as a measure of its acceptance.
6. The relative simplicity of administrating and completing the survey instruments.

Consistency. One of the primary goals of this study was to be consistent with the approach taken towards the study of Air Force officer values to date as synopsized in Chapter II of this thesis. This precluded the development of a totally new approach and eliminated from consideration any methods not previously used in Air Force officer value research. Consequently, the only methods left to consider after applying this criteria were England's and Rokeach's.

Model Validity. In the researcher's opinion, both methods are based on a logical assessment of the theoretical relationship between values and individual characteristics and behavior, though England's development seems to be more rigorous. However, the researcher was also new to the entire subject of value inquiry, and did not feel qualified to critically assess the validity of each model. Rather, the researcher accepted that both theories were considered valid due to the fact that both have been used extensively in the study of values by a large number of other researchers.

Instrument Reliability. The reliability of the instrument used in each method to measure values was also used as a criteria in picking the approach used.

1. Personal Value Questionnaire (PVQ). The only data discovered on the reliability of the PVQ was generated by England during a series of studies he conducted on the values of Naval officers. During the development of the PVQ for this research, England conducted a test-retest reliability assessment by administering the survey twice over a period of two weeks to 100 Naval officers (13:25-27). Each concept on the PVQ was evaluated separately for reliability on both measurements made by the PVQ, the primary (power) mode and the secondary (descriptor) mode (13:26-27). The resulting median reliabilities for the 88 concepts on the PVQ were 0.83 for the power mode (importance scale) and 0.73 for the secondary mode (successful-right-traditional scales) (13:27-28).

2. Rokeach Value Survey (RVS). Several findings on the reliability of the RVS have been published. According to Cohen, a four week study of college students yielded a Spearman rho coefficient of

0.78 to 0.80 for the terminal value list and 0.70 to 0.72 for the instrumental value list (6:1031). After a period of 14 to 17 months, these reliabilities dropped into the sixty percent range for both terminal and instrumental values (6:1031). Cohen goes on to state that in his opinion these low reliabilities limit the use of the RVS for comparing one person' values to another's on an individual basis (6:1031). However, despite his negative feelings toward the used of the RVS as a means of assessing individual value differences, he does state that ". . . reliability, construct validity, and extensive norms are such as to make the RVS a useful research instrument in an early stage of value theory development" (6:1032).

Mueller describes two types of reliability assessments of the RVS. In the first approach, the stability over time of the rank orderings of the terminal and instrumental values for each respondent is measured (23:552). In the second approach, the time stability of the score for each value for each individual respondent is measured (23:552). For the first method, Mueller reports that for a three week to four month study of college students, the correlation coefficients for terminal values ranged from 0.76 to 0.80, while those for instrumental values ranged from 0.65 to 0.72 (23:552). For the second method, Mueller reports that the median reliability across the 18 terminal values was approximately 0.65 and the median reliability for instrumental values was 0.56 (23:552). Mueller asserts that it is this second set of reliabilities that should be used in comparing the RVS to other value inventory methods, and goes on to say that these reliabilities are very low in comparison to other methods (23:552). Because of this, Mueller states "Under no condition should

psychological measures with such low reliability be utilized in the interpretation or comparison of individual respondents" (23:552). However, like Cohen, Mueller says that this survey instrument is acceptable for describing and comparing the mean scale scores of various groups (23:552).

According to one AFIT researcher, Rokeach reports that a three week survey of 189 college students resulted in test-retest reliabilities of 0.75 for terminal values and 0.65 for instrumental values (16:26). Hopkins reports that Rokeach explained the lower instrumental score as being due to a greater variability in these types of values. In other words, terminal values are formed earlier in life and are thus more stable (16:26). Also, according to Hopkins, Rokeach hypothesized that there may be fewer terminal values, resulting in the respondent being more sure of the ranking for these values than for the instrumental values (16:26).

Instrument Validity. The validity of the instrument refers to the extent to which it measures what it claims to measure and to the reasonableness and applicability of the assumptions and applications tied to each instrument.

1. PVQ Validity. In a report on the development of the PVQ that was to be administered to Navy officers, England himself raises a number of interesting points about the validity of the PVQ. In commenting on the results of a study of 210 school administrators that used an early form of the PVQ, he states:

> There was some indication, however, that the orientation might have been a function of the concepts used in the instrument, and that a different sample of concepts might yield a different primary orientation [13:17].

In addition, England goes on to say:

> The validity data were not encouraging in that the scores and classifications of the PVQ had little or no relationship with or discriminatory power on a number of personal characteristic variables. The low relationships were likely caused by the homogeneity of the administrator group [13:17].

England does not elaborate further on these points and does not mention whether or not the final version of the PVQ addresses these concerns in any way. England did use a very comprehensive methodology to arrive at the list of concepts used on the PVQ. After initial research resulted in a list of 200 proposed concepts, he utilized seminars and pilot PVQ forms to reduce the list to 88 concepts (13:20-23). He then administered the revised PVQ to 100 Naval officers to assess the reliability of the instrument. Based on the results of that assessment, the final PVQ form for the Navy study consisted of 86 concepts (13:28).

2. Rokeach RVS. In marked contrast to the level of discussion in the literature on the validity of the PVQ, several researchers have revealed a number of specific issues concerning the RVS. The first and most prominently mentioned is that fact that the RVS is an ipsative measurement tool. Kitwood describes an ipsative test as one which ". . . requires a finite number of units to be rearranged within a prescribed framework" (17:1032-1033). Mueller points out the problem with ipsative measures by stating that because certain values are ranked high, others will be forced to be ranked lower. This characteristic forces the scores of the value ranks to be causally interdependent (23:552). Thus, according to Mueller, two respondents who equally value a particular term (in an absolute sense)

may assign different ranks to that term on the RVS depending on how many values are ranked higher than it by each person (23:552). So the RVS, because of its ipsative nature, ". . . implicitly attributes to all persons the same type of structure in their values, but provides no way of assessing the intensity with which they are held" (17:1033).

Another concern about the RVS is its strict ranking procedure. Because of this, the RVS implies a strict ranking of values within the individual's value system (17:1033). This only really works if values are mutually exclusive at a particular level, but the RVS does not require this (17:1033). As an example, Kitwood states that there is ". . . no necessary conflict between the terminal values of a world at peace, true friendship, inner harmony, and wisdom" (17:1033). The result is, according to Kitwood, a somewhat artificial ranking of the terminal and instrumental values (17:1033).

Several reviewers have raised questions about the terms contained in the terminal and instrumental value lists. According to Kitwood, the wording of the value descriptions is so abstract in some cases that they allow widely varied interpretation by various respondents (17:1033). Mueller also points out the problem of differing interpretations of the value terms by survey respondents. In comparing a study done by Mueller (1974) to replicate a Rokeach finding in which the Mueller study used specific descriptions of situations and events to represent the values (the RVS uses only the term and a brief description), he reports a correlation with the Rokeach findings of only 0.25 for one of the values studied an 0.39 for the other

(23:553). Mueller feels that this result supports the belief that the terms can be and are interpreted differently among respondents to the RVS (23:553).

Cohen states that the value space for the terminal and instrumental values was not studied in an empirical manner, and that the list of values was arrived at in primarily an intuitive manner (6:1031). Mueller also states that the lists were generated in an intuitive way and that the lists would probably not be the same if generated by someone else (23:551). Further, according to Mueller, Rokeach admits that the value categories are fallible in that there may be instances were some instrumental values are actually terminal values for some people (23:550,553). Also, there may be times when some terminal values may in fact be instrumental for the attainment of other terminal values (23:550,553).

Despite these numerous concerns, support is unanimous among the sources reviewed for using the RVS in certain types of situations. According to Kitwood:

> Despite these weaknesses, the Rokeach Value Survey is more directly concerned with the values, as philosophically understood, than most, if not all, other available instruments. It can at least be recommended as a general probe into values for use with respondents whose academic attainment is average or above [17:1033].

Cohen states that studies have shown that what he terms the 'infirmity' of the ipsative approach can be countered by the large sample sizes ". . . typically needed to produce statistically significant results", and goes on to recommend the RVS for use in early value theory development (6:1032). Finally, Mueller argues that:

> No other instrument measures as many values. Reliability is adequate for group comparisons, and the instrument is inexpensive. In addition, administration and scoring of the Value Survey are quick and easy [23:553].

It should be noted that the researcher believed that if this type of analysis were to be performed on the PVQ that similar results would be obtained, since it also provides limited definitions of the value concepts is purports to measure.

Independent Findings. No independent reviews of England's methodology were discovered, while a number exist for the Rokeach approach (Cohen, Kitwood, and Mueller). While this criteria is not critical in and of itself, it does suggest that the England approach is less well known (or less frequently used) than the Rokeach method. The reviews mentioned above are fairly recent relative to the time when both the England and Rokeach methods were developed (approximately 1970). Cohen and Kitwood reviewed the RVS in the 1978 volume of the Eighth Mental Measurements Yearbook, and Mueller's review appeared in the 1984 volume of Test Critiques, both of which contain extensive lists of published tests. This lends weight to the assumption that the England method is less widely used and accepted by the research community, but is not conclusive of a lack of acceptance of his method.

Frequency of Use. Of the 10 research studies reviewed in Chapter II of this thesis, six used the PVQ and England's methodology. Five were part of a integrated project carried out at AFIT from 1972 to 1974 that built on the results of the each of the parts in the project, thus requiring the use of identical methodologies for comparison purposes. Only one independent application of England's method was located, that being Schlatter and Mitchell's 1976 study of Air Force

aircraft maintenance officer values. The four other studies were all independent applications of Rokeach's method and the RVS. In addition, according to Mueller the 1978 Eighth Mental Measurements Yearbook mentions almost 200 references in which the Rokeach method and the RVS have been used or analyzed (23:554).

Relative Simplicity. The PVQ is, in its simplest form, a cumbersome survey. It usually comprises at least 10 pages of concepts plus instructions and whatever demographic questions the experimenter wishes to add. This complicated form can cause problems. In one instance of its use in an AFIT survey, several of the respondents to the PVQ requested assistance in completing the survey (8:10). This confusion may have caused some of the respondents to the survey to provide answers that ". . . did not correctly reflect the value systems of the respondents' (8:10). In contrast, the RVS is simple, quick and easy to fill out. Consisting of two pages, each with a list of 18 values which must be ranked once by the respondent, the RVS takes an average of 20 minutes to complete and administration and scoring are ". . . quick and easy" (23:554).

Chosen Approach. Based on the criteria listed above, and the fact that it is consistent with Dethloff and Doucets' study, the Rokeach method and instrument were chosen for this study. Despite its limitations, it was felt that the RVS offered the appropriate level of detail required for this research while retaining a degree of simplicity that makes it convenient to work with for both the respondent and the researcher.

Justification

This study requires that data be gathered on the responses of people to questions posed about values and career intent. The survey methodology is well suited to this type of research (11:158). An existing survey instrument was used in this study for two reasons. First, the Rokeach instrument is one of the tools that has been used to date in AFIT guided research into Air Force officer values. It was felt that using this instrument (as apposed to generating a totally new one) would provide a higher level of consistency with the results obtained from this previous research. Second, the Rokeach survey has shown a reasonable level of validity and reliability, and though certain limitations have been recognized in the instrument, it was felt that this survey would yield usable information for the level of research being conducted. This research then paves the way for more in depth looks at the nature of the relationships between values and career intent (a specific behavior) in future studies.

Survey Instrument

A copy of the instrument used in this study is provided in Appendix A. This survey, entitled The Company Grade Officer Career Value Survey, consisted of two parts. Part one included demographic questions and the career intent statement. Part two was the Rokeach Value Survey. This instrument is described below.

The Rokeach Value Survey. The Rokeach Value Survey consists of two lists of 18 values, one of them representing terminal values and the other representing instrumental values. These lists are accompanied by a short set of instructions that tell the respondent to

rank order each set of 18 values separately on the basis of their importance as guiding principles in the respondent's life (21:57). Form D of the RVS was used. Form D normally presents the respondent with 18 gummed labels for each list, on which are printed the 18 values for that list. To complete the survey the respondent simply peels of the labels one at a time and places them on the survey page in order form most important to least important. However, for this study the label approach was not used. Because the RVS is a copyrighted survey permission to utilize it for this research had to be obtained. Unfortunately, the price for copies of the RVS survey packet was prohibitively expensive. Therefore, rather than purchasing actual packets, permission was obtained to reproduce the RVS as part of the overall survey at a reduced charge. Do to this complication, the respondents were asked to mark in pencil or ink their responses to the RVS. Manual ranking of the values is an acceptable method of compleiting the survey (23:551).

Career Intent Statement. In addition to the RVS, the respondent was asked to complete a statement of career intent. The question initially considered to gage career intent was taken from survey PL3033/RCS-AFP-167, USAF Officer Active Duty Survey, administered as part of a research project conducted by Faye Shenk of the Air Force Human Resources Laboratory from 1969 to 1973. One of the purposes of the study was an attempt to develop a means of predicting junior officer career intent (1:1). To measure career intent, Shenk developed a five point scale using the following question:

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

a. definitely intend to make the Air Force a career.
b. most likely will make the Air Force a career.
c. even chance of making the Air Force a career.
d. most likely will not make the Air Force a career.
e. definitely do not intend to make the Air Force a career. [2:27-28]

Shenk grouped the responses to this question into three categories: favorable, uncertain, and unfavorable (1:2). The favorable category includes the definitely intend and most likely will responses. The uncertain category includes the even chance responses. The unfavorable category includes all responses in the most likely will not and definitely do not intend groups (1:2). This study was conducted over a five year span and surveyed the same group for each of the five years as to career intent (1:1, 3:1). The group was first surveyed prior to entering the service as second lieutenants. Shenk found that by the fifth year, correlation between expressed career intent (as measured by the survey) and actual career status (active duty, separated, or unaccounted for) was between 0.63 and 0.75, depending on commissioning source (3:7).

Based on this data, Shenk's question was submitted with the rest of the Company Grade Officer Career Value Survey for approval. However, the survey control office for the Air Force at Randolph Air Force Base required the use of a standard seven point scale question for measuring career intent (see the survey example in Appendix A for the wording of this question). Upon review, it was noted that this question simply expanded the range of answers posed by Shenk. It in fact reflects the question posed by Dethloff and Doucet in their study of pilot career intent (10:27-28). They too relied on the work of

Shenk to develop their career intent question (10:28). Based on this analysis, the career intent question, as reworded by the survey control office, was included in the final form of the company grade officer questionnaire.

Demographic Questions. In order to asses the nature of the sample, demographic questions concerning the respondents age, sex, rank and other variables were included in the survey. The questions were taken from the value survey used by Marumoto, because they provided for a wide coverage of items in a simple and straight forward manner (21:56). A question was added to determine Air Force Specialty Code in order to facilitate the analysis of the data. The other demographic questions were used to describe the respondents, but otherwise were not part of the overall analysis of the data.

Sample Design

In developing the sample that is used in this study, a five step approach, as suggested by Emory, was used. This five step method consists of answering the following questions (11:283).

1. What is the relevant population to the study at hand?
2. What type of sample will be used?
3. What is the sampling frame used to chose the sample elements?
4. What are the population parameters being studied?
5. What sample size is required for the study?

The following sections describe the sample design for this study based on this five question approach.

Relevant Population. The relevant population consists of Air Force company grade officers in certain career fields based in the

continental United States. This population was chosen using the following criteria.

External Validity: Maximum application of the results of this study would result if the entire company grade officer corps was included in the population to be studied.

Nature of the Research: Because this study is exploratory in nature, a large heterogeneous population (in terms of variables such as career field, age, rank, education, duty location, sex, and others) would make the analysis so complex as to confound the results.

Resource Constraints: Monetary and time constraints would limit the number of surveys that could be distributed, collected, and analyzed.

Representiveness: The population must be of sufficient size and composition so as to adequately account for each level of career intention. Selecting, for instance, only company grade officers in career fields with historically low retention rates could result in data that only addressed one side of the spectrum of career intent.

The entire Air Force company grade officer corps was considered initially as the population, but upon further reflection this group did not adequately meet the last three criteria listed above. It was too large and geographically dispersed to meet the limited resources criteria. It also was very diverse and complex in terms of the variables which might affect career intent aside from personal values. These factors could obscure the results of the study in terms of revealing what affect values might have on career intent.

Therefore, a subset of the entire company grade officer corps was chosen to meet these restraining criteria. First, it was arbitrarily limited to company grade officers currently stationed in the Continental United States to meet the resource criteria. Next, only company grade officers in certain career fields were included in the chosen study population to limit its size and complexity. The selected career fields were chosen to provide coverage of the entire career intent spectrum. The method used in choosing the career fields included in the sample is described in the next section.

Population Elements. The actual career fields chosen as the population to be studied were chosen on the basis of average retention levels. Retention level is a good indicator of the aggregate career intent of various career fields (18). After several informal conversations with the advisor for this study, Dr. John Muller, it was decided to include career fields that exhibited both high and low levels of retention. By using this criteria for choosing career fields, a potential bias towards measuring only positive or negative career intent would be eliminated. This was important because one of objectives of this research was to compare the values of officers with positive career intent to those of with neutral or negative career intent. Such a comparison would not be possible if only one group were measured.

To determine the retention levels of various career fields in the Air Force, telephone contact was made with the Analysis Division of the Air Force Manpower and Personnel Center (AFMPC) at Randolph Air Force Base. According to AFMPC, officer retention is broken down into two major categories, one for line officers and one for non-line officers

(18). Line officers are further broken down by career field into rated and non-rated categories. Finally, non-rated career fields are separated into two groups, non-rated operations and mission support (18).

The measure of retention for officers in the rated and non-rated line categories is called the Cumulative Continuation Rate (CCR) (18). This value is measured from the end of an officer's first commitment (four years for non-rated line officers and six years for rated line officers) through the 11 year point (18). The 11 year point is used as the cutoff because it is felt that most officers in the Air Force have made their final decision as to whether to remain on active duty for a career by that time (18). The CCR is then calculated as follows:

1. For a given officer category, the proportion of officers remaining on active duty at the end of one year after their initial commitment to the Air Force has ended is measured (18). For instance, for non-rated line officers, whose initial commitment is four years, the measurement would be taken at the end of the fifth year of total active duty service (18).

2. This measurement is repeated at the end of the second year after the end of the initial commitment; at the end of the third year; and so on until the end of the eleventh year of total active duty service (18).

3. The CCR is then calculated as the product of these proportions (18). For example, the CCR for non-rated line officers is the product of seven separate proportion measurements (end of the 5th, 6th, 7th, 8th, 9th, 10th, and 11th years of active duty service). However, it should be noted that this measure is comprised of different numbers of

proportions depending on the category of officer being measured (18). For instance, the CCR for rated line officers, whose initial commitment is six years, is comprised of only five separate proportion measurements.

The CCR is thus a composite measurement of the proportion of officers who, after their initial commitment is over, will remain through the eleventh year of service and by inference thus make a career of the Air Force (18).

Since the time period that elapses for the CCR measure for each category is different, the retention measures are not directly comparable (18). Because of this, the retention levels for career fields in different categories do not represent the same absolute level of retention (18). A retention rate of 60% for pilots (based on five years of measurement) may represent a higher or lower series of yearly retention rates than does a retention rate of 60% for engineers (based on seven years of measurements). More importantly, this means that a 40% retention of pilots may represent a higher or lower rate than say 75% for doctors.

This difference suggested that to choose a representative population for this research in terms of career intent, the career fields chosen should be chosen relative to other career fields in their particular categories listed above, not across categories. Thus if the lowest rate for one category was 45% while the lowest rate for another was 75%, the career fields corresponding to these rates would be considered as representative of negative career intent, even though one was substantially higher than the other. Table 13 depicts the

retention levels for the various categories of officers since 1983, as obtained from AFMPC.

Table 13

Air Force Officer Retention Levels

Category	Type	Air Force Specialty Codes (AFSCs)	Retention Level by Fiscal Year (%)						
			83	84	85	86	87	88	89
Rated Line	Pilot	10XX thru 14XX	78	72	59	56	48	42	40
	Navigator	15XX and 22XX	86	75	78	74	75	71	73
Non-rated Line	Non-rated Operations	17XX thru 20XX	69	68	68	72	62	60	63
Non-rated Line	Mission Support	All other non-rated AFSCs	62	61	61	51	55	54	55
Non-rated Line	Mission Support	Engineers only (28XX, 55XX and 493X)	58	65	62	54	47	46	48

(18)

This data is for officers in the ranks of second lieutenant through lieutenant colonel. While no hard data was readily available on non-line officers, the force analyst at AFMPC stated that physicians and nurses on the average show a lower retention level than do other non-line career fields such as lawyers and chaplains (18).

Based on this information, the following career fields were chosen as the population of interest for this study: pilots (AFSCs 10XX thru 14XX), navigators (15XX and 22XX), engineers (28XX), air weapons directors (17XX), physicians (93XX thru 96XX) and lawyers (88XX).

Sample Type. In effect, two types of samples are included in this study. The population used in the study as outlined above is in fact a purposive sample of the entire company grade officer corps. According to Emory, a purposive sample is one that is chosen based on certain criteria (11:280). In addition, this population is a judgement sample because it was handpicked to conform to the stated criterion (11:280).

The actual sample of the study population was a stratified sample with strata based on the career fields listed above. Once stratified, a simple random sample was generated for each strata (11:306).

Sample Frame. The sample frame is the list of elements used to select the sample itself. The sample frame for this study was an ATLAS Data Base search conducted by Dr. Fenno of the Air Force Institute of Technology. This search generated a numerical count of the numbers of company grade officers in each AFSC under study currently assigned to locations within the CONUS.

Population Parameters: Two parameters are of interest for each sample group. The first is the composite ranking of values in terms of career intent. For example, what is the composite ranking of values for pilots who are strongly career oriented? The second parameter of interest is the proportion of each group that exhibit a strong career intent versus that proportion which exhibits weak career intent or that are undecided about a career.

Sample Size. If a population is a known finite size, Eq (1) can be used to calculate the appropriate sample size required for a stated level of confidence (9). The sample size for the entire population was calculated using this equation and the information obtained from the ATLAS Data Base search. The size of the various population career

$$n = \frac{N(z^2)p(1-p)}{(N-1)(d^2) + (z^2)p(1-p)} \qquad (1)$$

where:

n = sample size

N = population size

p = maximum sample size factor (.50)

d = desired tolerance (0.10)

z = factor of assurance (1.645) for 90% confidence level

groups is shown in table 14 and represents the results of the ATLAS database search. A total sample size of 67 was calculated using Eq (1) and the total population of 22,675 individuals. This represented a 90% confidence that sample would actually represent the population. The total sample size shown in Table 14 of 135 was calculated by assuming a 50% survey response rate and consequently doubling the calculated sample size of 67. Originally, a 95% confidence level was used to generate the sample, but this resulted in a total sample size of over 700 individuals (at a 50% response rate). The survey control office at MPC disallowed this large sample and asked that it be reduced, so the 90% level was utilized.

The strata sample sizes given in Table 14 were calculated using proportionate sampling, which bases the strata sample size on the ratio of the actual strata size to the size of the overall population (11:308). Each strata sample size was calculated by first determining what proportion of the total population the strata population

Table 14

Population and Sample Sizes

Air Force Specialty Code	Strata Population Size	Strata Sample Size
10XX thru 14XX	10267	61
15XX and 22XX	4698	28
17XX	1153	7
28XX	4539	27
88XX	487	3
93XX thru 96XX	1531	9
TOTALS	22,675	135

represented, and then multiplying the total sample size by that ratio. For instance, pilots (AFSCs 10XX thru 14XX) represented 45% of the entire population of 22,675 individuals. The strata sample size was calculated by multiplying 135 by 0.45.

Upon further analysis, it was noted that within strata, the sample sizes based on the required overall confidence of 90% and the use of proportionate sampling did not allow for statistically significant sampling of several of the career fields, notably the 17XX, 88XX and 93XX-96XX groups. Unfortunately, because of the restriction on the sample size imposed by the survey control group, this limitation was deemed to be unchangeable for this study.

Data Levels

The level of the data obtained from the survey instrument, both for the ranked values and the career intent data, are ordinal in nature, thus requiring non-parametric statistical analysis. A complete listing of the raw data in terms of responses to the RVS and the demographic questions is included in Appendix B.

Statistical Analysis

The following statistical analyses were conducted on the survey data to obtain the information needed to test the research hypotheses listed in Chapter I.

Data Reduction. The terminal and instrumental value responses obtained from the surveys were divided into three groups for each career field. These groups corresponded to the level of career intent as indicated by the respondents' answers to the career intent question. These three groups were developed following Shenk's approach [21]. These groups, called survey response groups in this study were identified in terms of career intent as favorable, undecided, and unfavorable (2:1). Following Shenk's procedure, but slightly modified to account for the two extra intent levels provided in the modified intent statement, the surveys were allocated to these three groups as follows:

1. All respondents who answered definitely will or probably will remain in the Air Force for career were assigned to the favorable group.

2. Those that answered definitely or probably will not remain for a career were assigned to the unfavorable group.

3. Those responding as undecided or leaning towards either remaining or separating were assigned to the undecided group.

This portioning of the surveys resulted in 18 distinct groups, three for each of the six career fields surveyed. Each category had a specific number of surveys in it. In addition to these groups, various demographic characteristics of the sample were noted.

Measurement Questions. Once the surveys had been divided into groups, a number of questions were asked about each group. The purpose of these questions was to focus the analysis on the differences in value hierarchies (if any existed) between company grade officers with strong positive career intent and those with neutral or strong negative career intent. These questions were:

1. Do the officers in each survey response category (favorable undecided, and favorable) for each career field share a common value hierarchy? For instance, do all physicians who indicated a favorable career orientation share a common value hierarchy?

2. Are the value hierarchies for officers in each career field different across the survey response categories? For example, do pilots who indicate a favorable career orientation have significantly different value hierarchies from pilots who are undecided or definitely against a career?

3. Do the value hierarchies for each survey response category differ across career field? For instance, is the value hierarchy of pilots with a favorable career orientation different from that of engineers with a favorable orientation? An unfavorable orientation? An undecided orientation?

Statistical Analysis Methods. The ordinal level of the ranking data collected in the surveys and the nature of the investigative questions listed above indicated that nonparametric statistical methods should be employed in the analysis of the survey results (11:386-389; 24:422-425).

Ranking Comparisons. The first investigative question involves the assessment of the strength of the association among a set of independent rankings for a given set of values (either terminal or instrumental, this method can be applied to both sets). The Kendall Coefficient of Concordance (denoted by *W*) was chosen as an appropriate statistic for this level and type of analysis. According to Siegel, this statistic is appropriate when measuring the relation among a number (more than two) of rankings of *N* items (27:229). In this study the Kendall *W* value would thus measure how well the individual rankings in each survey group agreed with one another. Strong agreement would imply that the group showing that agreement did indeed have a unique value hierarchy. No agreement would imply that each member of the that particular group had a hierarchy that was significantly different from the others, and thus a common hierarchy for that group would not exist. The significance of the Kendell coefficient for each group was tested using the chi-squared test (27:236). Each survey response category for each career field was analyzed separately for agreement among the rankings for terminal and for instrumental values.

Calculating *W*. The method used to compute the value of *W* for each survey response category is outlined below.

1. The first step in calculating *W* is to arrange the data in a *k* by *N* table where *k* is the number of independent rankings in the

sample and N is the number of items being ranked (27:231). In this study, N is 18 for both terminal and instrumental values.

2. Next, the ranks in each column of the table are summed. This value is represented by R_j where $j = 1$ to k (27:231).

3. The next step is to sum all of the R_j values and divide the result by N to obtain the mean R_j value (27:231).

4. Once this is accomplished, each R_j should be expressed as a deviation from the mean R_j and as a deviation squared.

5. Now the Kendall coefficient W can be calculated using Eq (2) (27:231).

$$W = \frac{s}{1/12k^2 (N^3 - N)} \qquad (2)$$

where:

s = the sum of the squared deviations

k = the number of independents rankings

N = the number of objects that were ranked

6. Siegel states that tied ranks will have a significant depressing affect on the W value if the proportion of ties is large (27:234). However, the RVS does not allow for the possibility of tied rankings. The respondent is forced to assign a unique rank to each value in the terminal list and in the instrumental list. Therefore tied ranks did not impact this analysis, and no correction for them was necessary.

Testing the Kendall *W* Values. A chi-square test is appropriate for testing the statistical significance of the calculated value of *W* (27:236). The purposed for testing the significance was to allow a level of confidence to be stated for the calculated level of association of the various sets of value rankings. The test was completed for each calculated value of *W* in the following manner.

1. For values of *N* larger than seven the appropriate chi-square statistic is calculated using Eq (3), where *N*, *k*, and *W* are as defined previously (27:236). In this case, since *N* is always equal to 18, Eq (3) was used for all the tests.

$$\text{chi-square} = k(N - 1)W \qquad (3)$$

$$\text{with df} = N - 1 \text{ (df = degrees of freedom)}$$

2. The null hypothesis for this test is that the *k* sets of rankings are independent (i.e. not related) (27:236, 24:252). The alternate hypothesis is that the sets of rankings are related, for a stated level of significance (27:236, 24:252). The level of significance used in the chi-square tests in this section was 0.05 for a 95% level of confidence.

3. The decision criteria for rejecting the null hypothesis used in this test is to reject the null in favor of the alternate if the calculated value of chi-square exceeds the critical value of chi-square at the given level of significance and degrees of freedom (27:236, 24:252). In this case, the critical chi-square value for each set of values (terminal and instrumental), with df = 18 - 1 = 17, and alpha = 0.05, is 27.59 (24:A-6).

4. Once a chi-square value was calculated for each *W*, this value was compared to the standard and the null was either accepted or rejected. Rejection of the null implies that, for a particular survey response group and career field, the calculated value of *W* accurately reflects the level of agreement among the rankings in that group to a level of confidence of 95 percent.

Interpreting the Kendall *W* Values. A high value for *W* implies very good agreement among the *k* sets of rankings for a given set of objects. A value of 1 implies perfect agreement (27:230). Further, a high value for *W* also implies that the *k* set of independent rankings are based on the same set of standards (27:237).

Composite Value Hierarchies. If the rankings within a survey response group were found to be related by the Kendall analysis and the Kendall value was found to be significant by the chi-square test, a composite value hierarchy for that group was then generated. Siegel cites Kendall in noting that ". . . the best estimate of the 'true' ranking of *N* objects is provided, when *W* is significant, by the order of the various sums of ranks *Rj*" (27:238). Thus the composite hierarchy was generated by rank ordering from smallest to largest the various rank sums *Rj*. An interesting result of this application is that it allows for ties among values in rank for the group, even though the Rokeach Value Survey does not allow for ties to occur among ranks for individual respondents. This implies that certain values may be equally important for a particular group as a hole.

Survey Response Groups. Using this approach, the sums of the rankings for the terminal values for a given survey response group were used to construct the composite hierarchy for that group. The

lowest sum would indicate the value ranked number one by the group. The next higher sum would indicate the second highest ranked value, and so on to the largest sum, which would represent the 18th or lowest ranking value for that group. This method was applied to the instrumental value list as well to obtain a composite hierarchy for those values. Ties among rank sums were assigned the same joint rank for which they were tied (e.g. if two values were tied for fifth place they both would receive a joint rank of five).

Aggregate Sample. For purposes of comparison and further analysis, the same method of testing for common rankings and for generating a composite value hierarchy was applied to several other groupings of the data. These groupings represented the entire aggregate sample (i.e. considering all job specialties) divided into the three career intent groups (favorable, undecided, and unfavorable). The rankings for each of these groups were tested for similarity using the Kendall approach, and if so then composite hierarchies were developed using the method outlined above. In addition, the rankings for the aggregate group (not divided by career intent level) for both sets of values was investigated in the same way.

Comparing Group Rankings. The second and third investigative questions amount to a comparison of populations (sets of rankings in this case) to determine if they are different from one another. The null hypothesis for each comparison would be that the populations did not differ. The Kruskal-Wallis Test is an appropriate method for making these types of comparisons when using non-parametric (ordinal) data (24:422, 27:184). The objective of these tests was to determine which survey response groups shared common value hierarchies (if any), and

which possessed unique hierarchies for terminal values, instrumental values, or both. In addition, it was of interest to determine if any of the survey response groups differed from the aggregate rankings described above. Each survey response group for each career field that yielded a significant value for *W* and thus showed a common value hierarchy for that group was compared using the Kruskal-Wallis test to all other groups having significant values for *W*. Since groups that did not yield significant values for *W* were assumed to have no common value hierarchies, they were not included in the comparison.

The Kruskal-Wallis Test. The Kruskal-Wallis test uses a chi-square statistic to compare two or more populations for equivalency (27:185). The following method was used to carry out the Kruskal-Wallis test for each set of comparisons, and is adapted from the general approach presented by Ott (24:422 - 425).

1. Two groups were tested at a time for equivalency. For instance, if favorable pilots, unfavorable pilots, and neutral physicians all yielded common value hierarchies within their groups, then three two way comparisons would be conducted (unfavorable pilots to favorable pilots, favorable pilots to neutral physicians, and unfavorable pilots to neutral physicians). The outcome of the tests would indicate whether, for example, the favorable and unfavorable pilot groups shared a common value hierarchy.

2. The general null and alternate hypotheses for the Kruskal-Wallis test are that the samples are drawn from identical distributions and that the distributions are not the same, respectively (24:423). The null hypothesis for these tests was that the two

distributions of rankings were identical. The alternate hypothesis was that the two distributions were not identical.

3. The decision rule for each test, based on a chosen level of significance of 0.10 (90%), was to reject the null hypothesis in favor of the alternate if the calculated value of the chi square statistic exceeded the critical value with degrees of freedom $df = c - 1$, where c is the number of samples (c equals two for each comparison made) (24:423, 27:185). In this case df always equals one since c is fixed. The critical value of chi-square for each test was 2.71 (27:249).

4. The Kruskal-Wallis test statistic is calculated using Eq (4) (24:423, 27:185).

$$H = \frac{12}{N(N+1)} \sum_{j=1}^{c} \frac{R_j^2}{n_j} - 3(N+1) \qquad (4)$$

where

n_j = the number of cases in the jth sample and $n_1 = n_2 = 18$ for this study.

c = the number of samples and is equal to 2 for each test run

N = the sum of the n_j

R_j = sum of the ranks in the jth sample

6. R_j for each sample is calculated by first jointly ranking all the cases in the n samples. In the case of ties, tied values are assigned the mean of the ranks for which they are tied (27:188 24:424). R_j is then the sum of the ranks for the n_j sample (27:18

24:423). In the case of ties, the value of H is significantly affected when more than 25 percent of the observations are tied, and new value of H correcting for this affect should be calculated (27:188, 24:422). In this instance the new value of H, designated H', is calculated using Eq (5) (27:188).

$$H' = \frac{H}{1 - (T/(N^3 - N))} \qquad (5)$$

Where

T = t^3 - t and t is the number of ties in a given group of tied scores

N is as defined in Eq (4)

7. Once a H (or H') value was calculated, it was compared to the critical chi-square statistic for an alpha value of 0.05 and the null hypothesis for the test was rejected if the calculated value was larger than the critical value.

Interpreting the Test Results. Acceptance of the null hypothesis of this test means that the test failed to find a significant difference in the distributions of the two groups tested. Acceptance of the alternate means that the two groups tested have different distributions, which implies that the populations from which the samples came are different in some way (27:184-194, 24:422-426).

Summary

The Rokeach methodology was chosen for use in this research after careful consideration of both it and England's approach. The choice was made using specifically defined criteria. The study population was

determined also using specific criteria, and is composed of Air Force company grade officers in several career field. The sample of 135 officers from six career fields was determined using quantitative techniques and proportionate random sampling of the stratified population. Nonparametric statistical analysis of the surveys was used due to the ordinal level of the response data. The Kendall coefficient was used to assess the similarity of value rankings for a given survey response group. These values were tested for significance using the chi-square test. Composite terminal and/or instrumental value rankings were constructed for all survey response groups and several aggregate groups using the sums of the individual rankings within those groups. These various composite rankings were then tested for similarity across groups using the Kruskal-Wallis test. The survey respondents were also described using the demographic responses from the questionnaire.

IV. RESULTS AND DISCUSSION

Survey

Administration. 135 surveys were distributed to the sample individuals by mail, and the respondents returned their completed surveys also through the mail. To assure the anonymity of the respondents, no record was kept of who the surveys were mailed to, although the survey cover letters were each personally addressed to the respondents. No control numbers (other than the overall Air Force Survey Control Number) were assigned by the researcher to the individual copies of the survey prior to their distribution. Upon receipt, each survey was first purged of anything which might identify the respondent (usually the cover letter, which was often returned with the completed questionnaire). A unique control number was then assigned to the completed questionnaire in order to allow reference to it and its data during the analysis if required.

Response. Of the 135 surveys distributed, 59 total were returned. Two of these were returned undelivered to the respondents because of incorrect addresses. Two were returned by respondents who refused to answer the survey. One stated that the survey was a waste of his time, while the other expressed the belief that the values on the list could not be rank ordered, implying that they were all equally important. This left a total of 55 completed surveys which contained usable data for this study, for a response rate of 41 percent. As is explained in the following section, this group will be referred to as Group 1 throughout the remainder of this study.

Survey Error. Upon receipt of the first responses from the survey, it was noted that an administrative error had been made on the part of the researcher when reproducing and distributing the questionnaire. The wrong version of the survey was inadvertently copied and distributed to the sample. A key demographic question, which asked the respondents to indicated their Air Force (job) Specialty code, was missing from the survey that was distributed. Without this question, it would be impossible to subdivide the responses by career specialty and thus compare career intentions and value systems across these specialties.

Because this was a completely anonymous survey, there was no way of contacting the respondents to get this information. It was determined by the researcher that the only way of obtaining a sample of various career fields was to readminister the corrected survey to another sample. The Air Force Survey Control Office at Randolph AFB was contacted for permission to do this. They allowed this re-administration for all career areas studied except for the pilots. They could not be re-surveyed due to quota restrictions set by that office on the number of pilots in a year's time that could be surveyed.

Because of financial and time limitations, the entire range of career fields was not re-surveyed. Instead, two of the remaining five were chosen for close study. The two career fields chosen were engineers (AFSC 28XX), and Air Weapons Officers (17XX). These particular career areas were chosen for two reasons. First, they exhibit, as shown in Chapter III, different levels of career intent. Second, they represent two different job types, one being primarily operations oriented and one being primarily support oriented. Eq (1)

from Chapter III was used to determine the statistically significant sample sizes for these two populations based on the population sizes given in Table 14 in Chapter III. This yielded a sample size of 23 individuals for each of the career fields at a confidence level of 85 percent. Based on an estimated 50% survey response rate, the aggregate sample size of the second group was thus 92 individuals (46 each for both career fields). This sample will be referred to as Group 2 throughout the rest of this study.

Group 2 Response. The 92 surveys for Group 2 were distributed almost immediately upon discovery of the problem which necessitated their release (approximately two weeks after release of the surveys to Group 1). Administration of the Group 2 surveys was identical to that used for Group 1, except that a capital letter A was printed on the Group 2 surveys in order to facilitate keeping the Group 1 and Group 2 responses separate during data reduction and analysis. The example survey in Appendix A is in fact the survey administered to Group 2, and the only difference between it and the Group 1 questionnaire is the addition of the career specialty question. Of the 92 surveys distributed, 48 were returned. Four of these were returned due to incorrect addresses, leaving 44 that contained usable data for the analysis. The return rate for Group 2 was thus 48 percent.

Data Reduction

After receipt, the raw survey responses were first entered into a micro-computer spreadsheet/database for storage and analysis purposes. Tables 36 and 37 of Appendix B contain the demographic responses for Groups 1 and 2, while Tables 38 through 41 contain the actual ranking

data. Further description of the content of these tables is included in Appendix B. Once the data had been entered, each group was divided into several subgroups by career field (for Group 2 only) and career intent level (for both Groups 1 and 2). Both groups were subdivided as described in Chapter III for career intent, but only Group 2 was subdivided by career field. This subdivision was accomplished for both the terminal and instrumental values and yielded a total of 24 subgroups (12 for each value type). These subgroups were used later in the analysis for the ranking comparisons both within and between subgroups. The subgroups were assigned abbreviated labels to facilitate reference to them in the study. The subgroups, the labels by which they will be referred to in the remainder of this study, and the number of respondents in each grouping are listed below in Table 15. These subgroups and labels apply for both the terminal and instrumental value analysis and comparisons.

The relatively small number of individuals in some of these subgroups, especially G, H, K, and L, should be noted. When the sample was constructed no consideration was given to obtaining statistically significant samples for each level of career intent within a given subgroup. As a result, some levels of career intent within subgroups ar not well represented in this study, particularly that of Unfavorable Career Intent for the 17XX subgroup of Group 2 (subgroup H). As will be seen later in the discussion, these small sample sizes raise questions about the significance of the results of some the analyses performed on the data. Because of time limitations, this problem could not be corrected for the current study.

Table 15

Survey Response Subgroups

Subgroup Name	Label	Number of Respondents
1. Group 1 Aggregate Sample	A	55
2. Group 1 Favorable Career Intent	B	19
3. Group 1 Undecided Career Intent	C	23
4. Group 1 Unfavorable Career Intent	D	13
5. Group 2 17XX Aggregate Sample	E	20
6. Group 2 17XX Favorable Career Intent	F	12
7. Group 2 17XX Undecided Career Intent	G	6
8. Group 2 17XX Unfavorable Career Intent	H	2
9. Group 2 28XX Aggregate Sample	I	24
10. Group 2 28XX Favorable Career Intent	J	10
11. Group 2 28XX Undecided Career Intent	K	7
12. Group 2 28XX Unfavorable Career Intent	L	7

Sample Demographics

The first analysis completed on the survey data was on the demographic responses. Except for the career field question for Group 2, these responses were used only for a descriptive analysis of the sample respondents. This analysis was used simply to get a feel for the mean or average characteristics of the sample groups. The following sections describe the findings of this analysis for each demographic variable.

Age. The age distributions for both Groups 1 and 2 are shown in Table 16. The respondents ranged in age from 23 years to 38 years

Table 16

Survey Group Age Distributions

	Group 1		Group 2 (17XX)		Group 2 (28XX)	
Age (Years)	Frequency	Relative Frequency	Frequency	Relative Frequency	Frequency	Relative Frequency
22	N/A	N/A	1	0.05	N/A	N/A
23	1	0.02	2	0.1	2	0.08
24	1	0.02	0	0.0	3	0.13
25	5	0.09	1	0.05	2	0.08
26	5	0.09	1	0.05	2	0.08
27	4	0.07	0	0.0	1	0.04
28	7	0.13	0	0.0	1	0.04
29	11	0.2	1	0.05	4	0.17
30	4	0.07	4	0.2	2	0.08
31	5	0.09	1	0.05	3	0.13
32	5	0.09	2	0.1	1	0.04
33	2	0.04	2	0.1	2	0.08
34	1	0.02	0	0.0	0	0.0
35	2	0.04	1	0.05	0	0.0
36	0	0.0	0	0.0	1	0.04
37	1	0.02	1	0.05	N/A	N/A
38	1	0.02	2	0.1	N/A	N/A
39	N/A	N/A	1	0.05	N/A	N/A

for Group 1, 22 to 39 for the 17XX career field in Group 2, and 23 to 36 for the 28XX career field in Group 2. The mean ages for these three groups were 29, 31, and 28 years, respectively. The standard deviation

in ages was 3.2 years for Group 1, 5 years for the 17XX career field, and 3.5 for the 28XX career field in Group 2. As can be seen, the 17XX group tended to be older with a higher variability in ages than either of the other two groups.

Sex. The predominant (modal) response in all three sample groups was male. The distributions of female and male officers in Group 1, and in the 17XX and 28XX career fields in Group 2, are shown in Table 17. The distribution of respondents was nearly equal between Group 1 and the 28XX respondents in Group 2 (approximately 1 to 6 female to male), while 25% of the 17XX group was female.

Table 17

Survey Group Sex Distributions

	Group 1		Group 2 (17XX)		Group 2 (28XX)	
Sex	Frequency	Ratio	Frequency	Ratio	Frequency	Ratio
Male	47	0.15	15	0.75	20	0.83
Female	8	0.85	5	0.25	4	0.17
	Mode: Male		Mode: Male		Mode: Male	

Rank. All company grade officer ranks (2nd lieutenant, 1st lieutenant, and captain) were represented in both Groups 1 and 2. In addition, one major responded from the 17XX career field group in Group 2. Because this particular person had only 11 years total Time-in-Service, it was assumed that he had only recently been promoted and thus was included in the sample group. The modal rank for all three groups was captain. The distribution of ranks for both of the sample groups is shown in Table 18. The distribution of ranks was

Table 18

Survey Group Rank Distributions

Rank	Group 1 Frequency	Group 1 Ratio	Group 2 (17XX) Frequency	Group 2 (17XX) Ratio	Group 2 (28XX) Frequency	Group 2 (28XX) Ratio
2lt	4	0.1	4	0.2	6	0.25
1lt	10	0.2	5	0.25	6	0.25
Capt	41	0.7	10	0.5	12	0.5
Maj	N/A	N/A	1	0.05	N/A	N/A
	Mode: Captain		Mode: Captain		Mode: Captain	

approximately equal between captain and lieutenants for the 17XX and 28XX groups (50% captains and 50% lieutenants), while 70% of the Group 1 respondents were captains.

Time-in-Service. The distribution of service times for the various survey groups is shown in Table 19 across 2 year intervals from zero to 18 years of service. No respondent indicated a time greater than 18 years of service. The mean service time for Group 1 was 6.09 years with a standard deviation of 3.31 years. The mean service time for 17XX respondents in Group 2 was 7.1 years while the mean for the 28XX respondents was 6.4 years. Standard deviation for these two groups was 4.7 and 4.1 years respectively As with age, the 17XX group averaged more time-in-service with a higher variance than the other groups.

Commissioning Source. The modal response for all three groups to the source of commission question was Officers Training School (OTS). However, a significant proportion of all three groups also indicated

Table 19

Survey Group
Time-In-Service Distributions

Service Time (Years)	Group 1 Frequency	Group 1 Relative Frequency	Group 2 (17XX) Frequency	Group 2 (17XX) Relative Frequency	Group 2 (28XX) Frequency	Group 2 (28XX) Relative Frequency
0 - 2	5	0.09	3	0.15	3	0.13
2 - 4	7	0.13	5	0.25	5	0.21
4 - 6	15	0.27	0	0.0	4	0.17
6 - 8	15	0.27	2	0.1	2	0.08
8 - 10	5	0.09	2	0.1	3	0.13
10 - 12	5	0.09	5	0.25	3	0.13
12 - 14	1	0.02	2	0.1	4	0.17
14 - 16	0	0.0	0	0.0	0	0.0
16 - 18	2	0.04	1	0.05	0	0.0

Reserve Officer Training (ROTC) as their source of commission. The distribution between these two sources was similar for the 17XX and 28XX groups, with 60% OTS and 40% ROTC for the 17XX group and 46% OTS and 50% ROTC for the 28XX group. 40% of the respondents in Group 1 indicated an OTS source, 31% a ROTC source, 18% reported the Air Force Academy as the source, and 11% indicated some other source but did not explain what that source was. No respondents in the 17XX career group indicated a service academy as their commission source, and only one respondent in the 28XX group indicated the Air Force Academy as the source of commission. The distribution of commission sources is given in Table 20.

Table 20

Survey Group
Commissioning Source Distributions

Commission Source	Group 1 Frequency	Group 1 Ratio	Group 2 (17XX) Frequency	Group 2 (17XX) Ratio	Group 2 (28XX) Frequency	Group 2 (28XX) Ratio
OTS	22	0.4	12	0.6	11	0.46
Air Force Academy	10	0.18	0	0.0	1	0.04
Other Service Academy	0	0.0	0	0.0	0	0.0
ROTC	17	0.31	8	0.4	12	0.5
Other	6	0.11	0	0.0	0	0.0
	Mode: OTS		Mode: OTS		Mode: OTS	

Highest Education Level. The modal response to the question on highest education level obtained to date was that of Bachelor's Degree for both Group 1 and the 17XX career group in Group 2. The modal response for the 28XX group was that of having completed at least some graduate degree work beyond a Bachelor's degree but not including a Master's degree. 13% of Group 1 respondents indicated that they had obtained a Master's degree while 8% of that group indicated that they had obtained a Doctorate degree. This group included 3 medical degrees and two law degrees. None of the 17XX or 28XX group respondents indicated anything beyond a Mater's degree level. The distribution of education levels for the various groups is given in Table 21.

Career Intent. When the career intent responses for Group 1 and Group 2 were categorized into the three survey response groups (SRGs) described in Chapter III (namely favorable, undecided, and unfavorable towards a career) the following results were obtained. In Group 1 the

Table 21

Survey Group
Education Level Distributions

Education Level	Group 1 Frequency	Group 1 Ratio	Group 2 (17XX) Frequency	Group 2 (17XX) Ratio	Group 2 (28XX) Frequency	Group 2 (28XX) Ratio
Bachelor's	20	0.36	12	0.6	5	0.2
Grad Work	13	0.24	5	0.3	12	0.5
Master's	13	0.24	3	0.1	7	0.3
Post Grad	1	0.02	0	0.0	0	0.0
Doctorate	8	0.15	0	0.0	0	0.0
	Mode: Bachelor's		Mode: Bachelor's		Mode: Post Bachelor	

highest proportion of respondents (42%) indicated an undecided orientation, with 35% indicating a favorable orientation and 24% an unfavorable orientation. In contrast, 60% of the 17XX group indicated a favorable intention, with 30% indicating undecided and only 10% indicating an unfavorable orientation. Only 42% of the 28XX group indicated a favorable orientation, with the rest of the respondents being evenly split between undecided and unfavorable. Table 22 gives the distribution of responses for each of the groups in terms of the three career intent categories, as well as the median and modal responses for each group.

The median responses were observed for the entire range of responses available on the survey before they were classed into the three broader SRGs. The modal responses are based on an after classification analysis of the SRGs. It was believed that the combination of these two measures would provide a better portrait of the actual tendency of the group than would either individually.

Table 22

Survey Group
Career Intent Response Distributions

SRG	Group 1 Frequency	Group 1 Ratio	Group 2 (17XX) Frequency	Group 2 (17XX) Ratio	Group 2 (28XX) Frequency	Group 2 (28XX) Ratio
Favorable	19	0.35	12	0.6	10	0.42
Undecided	23	0.42	6	0.3	7	0.29
Unfavorable	13	0.24	2	0.1	7	0.29
	Mode: Undecided		Mode: Favorable		Mode: Favorable	
	Median: Undecided		Median: Probably Will Remain		Median: Lean To Remaining	

Summary. Based on this demographic analysis, profiles for the average respondent in each sample group were constructed. These profiles are shown in Table 23. The most striking characteristic of these profiles is their marked similarity to one another. The major difference between the three profiles is the level of education which is slightly higher for engineers than it is for either Group 1 or the 17XX respondents in Group 2.

Ranking Comparisons

Rank Sums. The Kendall assessment of the agreement for the sets of value rankings within the various survey subgroups was the next analysis performed. The first step in this analysis was to sum the individual rankings for each terminal or instrumental value for all of the respondents in each of the subgroups listed in Table 15. These sums are the R_i values used in the Kendall analysis. The sums are presented in Table 24 for terminal values and Table 25 for instrumental

Table 23

Study Group
Average Demographic Profiles

Characteristic	Group 1	Group 2 (17XX)	Group 2 (28XX)
Age (years)	29	31	28
Sex	Male	Male	Male
Rank	Captain	Captain	Captain
Time-In-Service (years)	6.09	7.1	6.4
Commission Source	OTS	OTS	OTS
Education Level	Bachelor's	Bachelor's	Graduate Work
Career Intent	Undecided	Favorable	Leaning Towards

values. The value codes used in these two tables were assigned to the terminal and instrumental values in order to facilitate easy reference and manipulation of the data during the analysis. These codes and their corresponding personal values are listed in Table 26.

Ranking Test. Once the various groups of rankings had been summed, A Kendall *W* value was calculated for each subgroup using the computer spreadsheet and the procedure outlined in Chapter III. In addition, the chi-square test for significance was run on each calculated value of *W*. As an example of how these calculations were carried out using the computer, Figure 1 shows the spreadsheet printout for the test of Group 1, subgroup A for terminal values. The deviate column in Figure 1 was calculated by subtracting the *R* value from the mean *R* value. The chi-square value in this figure was calculated using Eq (3) from Chapter III.

Table 24

Survey Subgroup Rank Sums
for Terminal Value Rankings

Value Code	Sample Subgroup A	B	C	D	E	F	G	H	I	J	K	L
1A	522	189	225	108	237	148	71	18	199	74	60	65
1B	556	202	212	142	210	125	59	26	301	132	85	84
1C	395	127	173	95	141	76	47	18	161	78	27	56
1D	627	191	277	159	200	120	61	19	270	107	77	86
1E	780	252	320	208	272	174	64	34	314	134	91	89
1F	644	217	286	141	211	131	54	26	238	93	83	62
1G	304	115	139	50	104	63	32	9	121	53	28	40
1H	308	123	105	80	138	94	34	10	120	51	41	24
1I	339	138	122	79	111	77	32	2	131	60	46	25
1J	505	170	223	112	203	116	73	14	270	112	87	71
1K	544	202	239	103	195	117	52	26	251	100	76	75
1L	541	172	230	139	141	81	36	24	237	85	72	80
1M	665	236	272	157	260	168	69	23	316	130	95	91
1N	610	217	259	134	187	86	82	19	246	126	52	68
1O	350	110	156	84	152	88	54	10	134	51	42	41
1P	723	233	302	188	279	161	89	29	334	147	89	99
1Q	517	194	205	118	200	119	58	23	222	80	72	70
1R	476	161	191	124	179	108	59	12	249	97	84	68

Table 25

Survey Subgroup Rank Sums
for Instrumental Value Rankings

Value Code	Sample Subgroup A	B	C	D	E	F	G	H	I	J	K	L
2A	500	192	192	116	161	106	57	18	208	104	42	62
2B	571	195	236	140	152	97	25	30	196	84	40	72
2C	403	153	149	101	143	74	52	17	200	84	56	60
2D	786	279	320	187	279	161	86	32	381	155	114	112
2E	475	158	209	108	156	94	35	27	229	95	67	67
2F	630	200	278	152	212	132	60	20	247	113	75	59
2G	631	235	248	148	184	116	47	21	222	103	62	57
2H	210	58	102	50	95	39	42	14	72	18	27	27
2I	600	208	256	136	243	172	48	23	270	125	67	78
2J	494	175	196	123	225	146	52	27	214	107	59	48
2K	474	168	214	92	208	139	60	9	256	97	73	86
2L	518	215	192	111	229	136	82	11	225	76	78	71
2M	524	199	239	86	242	155	75	12	225	104	70	51
2N	374	112	185	77	158	75	69	14	197	69	65	63
2O	732	201	338	193	245	130	88	27	364	152	105	107
2P	693	239	284	170	227	121	86	20	277	114	78	85
2Q	278	81	114	83	86	51	24	11	123	40	43	40
2R	497	181	174	142	167	93	65	9	198	70	76	52

Table 26

Value Codes for
Terminal and Instrumental Values

Terminal Value	Value Code	Instrumental Value	Value Code
1. A Comfortable Life	1A	1. Ambitious	2A
2. An Exciting Life	1B	2. Broadminded	2B
3. A Sense Of Accomplishment	1C	3. Capable	2C
4. A World At Peace	1D	4. Clean	2D
5. A World Of Beauty	1E	5. Courageous	2E
6. Equality	1F	6. Forgiving	2F
7. Family Security	1G	7. Helpful	2G
8. Freedom	1H	8. Honest	2H
9. Health	1I	9. Imaginative	2I
10. Inner Harmony	1J	10. Independent	2J
11. Mature Love	1K	11. Intellectual	2K
12. National Security	1L	12. Logical	2L
13. Pleasure	1M	13. Loving	2M
14. Salvation	1N	14. Loyal	2N
15. Self-Respect	1O	15. Obedient	2O
16. Social Recognition	1P	16. Polite	2P
17. True Friendship	1Q	17. Responsible	2Q
18. Wisdom	1R	18. Self-Controlled	2R

VALUE	Rj:	MEAN Rj:	DEVIATE:	DEVIATE SQUARED
1A	522	522.56	-0.556	0.3086
1B	556		33.444	1118.5
1C	395		-127.6	16270
1D	627		104.44	10909
1E	780		257.44	66278
1F	644		121.44	14749
1G	304		-218.6	47767
1H	308		-214.6	46034
1I	339		-183.6	33693
1J	505		-17.56	308.2
1K	544		21.444	459.86
1L	541		18.444	340.2
1M	665		142.44	20290
1N	610		87.444	7646.5
1O	350		-172.6	29775
1P	723		200.44	40178
1Q	517		-5.556	30.864
1R	476		-46.56	2167.4

s value: 338014 W = 0.2306 CHI-SQUARE: 215.64

k = 55 k squared = 3025

N = 18 N3 - N = 5814

Figure 1. Example Kendall *W* Calculation

These tests allowed an assessment of the level of agreement within a set of terminal or instrumental rankings for each subgroup. For the example in Figure 1, it can be seen that the set of terminal value rankings in this subgroup are correlated at a level of 0.23, and that the calculated chi-square value of 215.64 far exceeds the critical value of 27.59 at the 0.05 level of significance. The interpretation of this result is that the rankings within this group are significantly correlated at a level of confidence of 95% but that the degree of correlation is somewhat weak. Table 27 gives the results for the Kendall test of terminal value rankings for all 12 subgroups.

Table 27

Kendall *W* Values for
Subgroup Terminal Value Rankings

Subgroup	k	N	Mean Rj	s	W	Chi-Square
A	55	18	522.26	338,014	0.231	215.64
B	19	18	180.5	32,701	0.187	80.39
C	23	18	218.67	65,482	0.257	100.45
D	13	18	123.39	27,152	0.332	73.29
E	20	18	190.0	45,706	0.236	80.19
F	12	18	114.0	18,764	0.269	54.87
G	6	18	57.0	4,682	0.268	27.38
H	2	18	19.0	1,156	0.596	20.28
I	24	18	228.6	83,426	0.299	122.0
J	10	18	95.0	16,162	0.334	56.71
K	7	18	67.06	8,481	0.357	42.51
L	7	18	66.5	7,767	0.327	38.93

Table 28 gives the same type of information for the tests of the instrumental value rankings. The variables *k*, *N*, *s*, and *mean Rj* are as defined for Eq (2) in Chapter III.

Discussion. For the terminal value rankings, the Kendall *W* values ranged from 0.187 to 0.596, indicating a variable level of agreement from weak to moderately strong across the various subgroups. All of the chi-square values for the terminal value subgroups were large enough to reject the null hypothesis at 95% level of confidence except for subgroup H.

Table 28

Kendall *W* Values for
Subgroup Instrumental Value Rankings

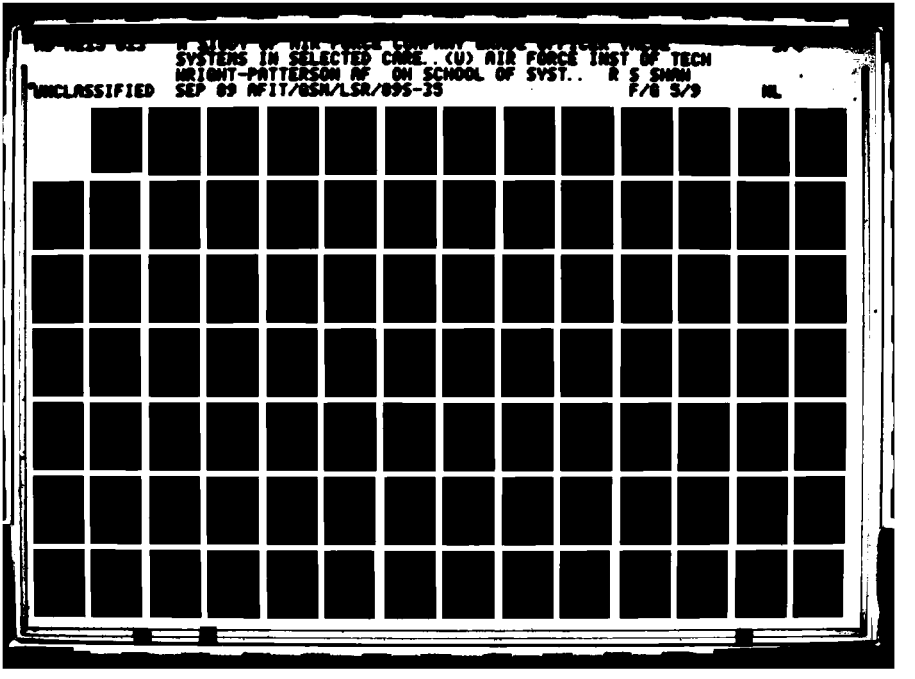
Subgroup	k	N	Mean Rj	s	W	Chi-Square
A	55	18	521.67	374,436	0.256	238.87
B	19	18	180.5	50,575	0.289	93.40
C	23	18	218.11	69,860	0.273	106.57
D	13	18	123.06	25,767	0.315	69.55
E	20	18	189.6	48,458	0.25	85.01
F	12	18	113.2	23,916	0.343	69.93
G	6	18	57.39	7,268	0.417	42.5
H	2	18	19.0	936	0.483	16.42
I	24	18	228.0	86,896	0.311	127.0
J	10	18	95.0	19,666	0.406	69.0
K	7	18	66.5	7,825	0.33	39.22
L	7	18	66.5	12,870	0.542	64.51

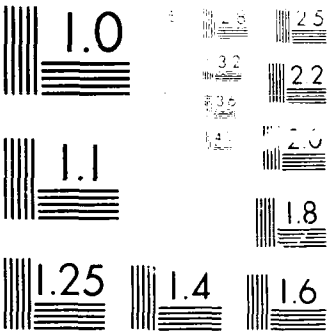
This particular *W* value was only significant to the 70% level (27:249). However, the significance of the finding for subgroup H must be questioned because of the very small (2 individuals) number of respondents in that subgroup. Noting that the chi-square value for a given subgroup (see Eq (3), Chapter III) depends in part on the number of individuals *k* in that group, a test of the sensitivity of this value to the level of *k* was performed. Leaving *N* and *W* constant for subgroup H, the *k* value was increased from 2 to 3 and the chi-square statistic recalculated. This simulation yielded a chi-square of 30.4, which is large enough to reject the null of unrelated rankings at a 95%

confidence level. If the *W* value is lowered to the average of the values across the subgroups, 0.308, to simulate a variation in its level as *k* increases, then *k* must increase to six before the chi-square becomes significant. Given this high sensitivity to the number of individuals in the subgroup, the findings for subgroup H are questionable for application outside of this study.

The results of the analysis on the instrumental rankings across the subgroups yielded results very similar to those of the terminal value analysis. The values of *W* in this case range from 0.25 to 0.542 again indicating a weak to moderately strong association between the individual rankings within subgroups. As in the previous case, subgroup H was the only subgroup whose *W* value was not significant at the 95% level by the chi-square test. However, the same argument concerning the sensitivity of the chi-square statistic to the level of *k* raised for the terminal value analysis is applicable in this case. Again, the significance of this particular finding outside of this study is questionable.

Summary. All subgroups except subgroup H were found to have a common ranking of terminal values among the individuals of that subgroup. The level of association between rankings ranged from weak ($W = 0.187$) to moderately strong ($W = 0.357$). Similarly, all subgroups except subgroup H were found to have a common ranking of instrumental values among the individuals of that subgroup. Again, the level of association ranged from weak ($W = 0.25$) to moderately strong ($W = 0.542$). Excluding group H, the average level of association across the subgroups was higher for instrumental values than it was for terminal


SYSTEMS IN SELECTED CARE.. (U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AF OH SCHOOL OF SYST.. R S SHAW
UNCLASSIFIED SEP 89 AFIT/GSA/LSR/89S-35 F/G 5/9 NL


1.0
1.1
1.25
1.4
1.6
1.8
2.2
2.5

values. The mean level for terminal values was 0.28, while the mean level for instrumental values was 0.34.

Composite Value Hierarchies

The next step in the analysis was to generate a composite value hierarchy for each subgroup that showed a common agreement between either terminal values, instrumental values, or both. The purpose of this step was twofold. The first objective was to be enable a visualization of the hierarchies in words rather than numbers and symbols (value codes). The second objective was to investigate the possible existence of ties in rankings among values. This is significant because as mentioned in Chapter III, the Kendall method of analysis and the interpretation of its results allows for ties for the group while the RVS does not allow ties for the individual. If ties existed it would imply that, as a group, two or more values could be equally as important to the generalized behavior of the group. Since retention and recruiting policies are generally directed towards group characteristics rather than specific, individual cases, a finding of tied values could be very significant in the evaluation and selection of future policies and programs.

Terminal Value Hierarchies. Since all of the subgroups except subgroup H were found to have common rankings for terminal values, a composite hierarchy was built for each one. These composite hierarchies are included as Tables 42 to 52 in Appendix C. As an example of these hierarchies, the composite terminal hierarchy for subgroup A (Group 1 aggregate sample) is shown in Table 29. The hierarchy was constructed by ordering the rank sums for each value in

Table 29

Example Terminal Value Composite Hierarchy

VALUE	RSI	RANK
FAMILY SECURITY	304	1
FREEDOM	308	2
HEALTH	339	3
SELF-RESPECT	350	4
A SENSE OF ACCOMPLISHMENT	395	5
WISDOM	476	6
INNER HARMONY	508	7
TRUE FRIENDSHIP	517	8
A COMFORTABLE LIFE	522	9
NATIONAL SECURITY	541	10
MATURE LOVE	544	11
AN EXCITING LIFE	556	12
SALVATION	610	13
A WORLD AT PEACE	627	14
EQUALITY	644	15
PLEASURE	665	16
SOCIAL RECOGNITION	723	17
A WORLD OF BEAUTY	751	18

that subgroup from low to high, and then assigning ranks (from one to 18) to those rank sums. Tied sums were assigned the same rank, and thus for a given subgroup the lowest ranking might be something less than 18.

The most striking and immediate characteristic of these hierarchies is the fact that five values are present in the top seven values of all of the subgroups studied. These five values are **Family Security**, **Health**, **Self-Respect**, **Freedom**, and **Sense of Accomplishment**. Table 30 displays these values, their rankings in each subgroup, and the average rank of these values across the subgroups. Although the purpose of this section was not to evaluate the differences between subgroup rankings, this result does raise certain interesting avenues for future investigation. One is that the Kruskal-Wallis analysis shows

Table 30

Top Five Terminal Values Across Subgroups

Terminal Value	Subgroup Rank											Average Rank
	A	B	C	D	E	F	G	I	J	K	L	
Family Security	1	2	3	1	1	1	1	2	2	2	3	1.58
Freedom	2	3	1	3	3	7	2	1	1	3	2	2.30
Health	3	5	2	2	2	3	1	3	3	5	1	2.50
Self-Respect	4	1	4	4	5	6	6	4	1	4	4	3.58
Sense of Accomplishment	5	4	5	5	4	2	4	5	5	1	5	3.75

that these different composite rankings are in fact different, why are the top values in each group so similar? Are the differences in rankings due to differences among rankings for values lower in the hierarchy? And finally, if all groups value the same values in the top five ranks of their hierarchies, is it possible that some of these values are much more operative than others for a given group, and is that why, at least partially, they exhibit different levels of career intent?

Several ties were also noted in the hierarchies. Because those values which are ranked first are assumed to have more impact on behavior than those which are ranked lower, ties which occur in the highest ranked values would probably have a greater impact than ties which occurred in the lower part of the hierarchy. Several subgroups had ties in the top five ranked values. **A Sense of Accomplishment** and **National Security** were tied for fourth for the 17XX career group of Group 2. **Family Security** and **Health** were tied for first while **Equality** and **Self-Respect** were tied for sixth in the 17XX undecided career

intent group. Finally, **Freedom** and **Self-Respect** were tied for first in the 28XX favorable career intent group. No pattern of ties among specific values was noted across subgroups.

Instrumental Value Hierarchies. As with the terminal value hierarchies, composite instrumental value hierarchies were developed for all subgroups except subgroup H. These composite hierarchies are included in Tables 53 through 63 of Appendix C, and are of the same form as Table 29 above for terminal values. These hierarchies are considerably more different when compared to one another than were the terminal value hierarchies. Only two instrumental values are consistently in the top five ranked values of the various subgroups. Those values were **Honest** and **Responsible**. Large differences in the rankings of the other values are apparent across the various groups though **Loyal** and **Capable** tend to be the top six or seven ranked values across the subgroups. No ties were noted in the top five value rankings, and fewer ties occurred in the instrumental rankings than occurred in the terminal rankings.

If the Kruskal-Wallis analysis demonstrates that the various subgroup instrumental rankings are indeed independent of each other, these differences in rankings might indicate a possible cause for the different career intentions of the various subgroups. It seems plausible that each subgroup could seek the same end states (represented by the terminal values), but that they value different ways of achieving them (represented by the instrumental values). This lack of similarity also suggests, as did the similarity of the terminal value rankings, a possible aim for future research. Namely, are

instrumental values more important in affecting a person's behavior than the terminal values that person holds?

Composite Value Hierarchy Comparisons

The Kruskal-Wallis test of independence for both the composite terminal and instrumental value hierarchies between the subgroups was the final portion of the analysis conducted on the data. The tests were done on the rank sums (Rj) used in the Kendall analysis. The first step in conducting this analysis was to determine what tests had to be run. To do this a test matrix was developed, which delineated all the required tests. This matrix is shown in Figure 2. A **Y** in the

Subgroup	Subgroup A	B	C	D	E	F	G	I	J	K	L
A	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
B	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
C	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y
D	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
E	N	N	N	N	N	Y	Y	Y	Y	Y	Y
F	N	N	N	N	N	N	Y	Y	Y	Y	Y
G	N	N	N	N	N	N	N	Y	Y	Y	Y
I	N	N	N	N	N	N	N	N	Y	Y	Y
J	N	N	N	N	N	N	N	N	N	Y	Y
K	N	N	N	N	N	N	N	N	N	N	Y
L	N	N	N	N	N	N	N	N	N	N	N

Figure 2. Kruskal-Wallis Test Determination Matrix For Both Terminal and Instrumental Values

matrix indicates a two-way test that would be conducted, while a N indicates a test not conducted either because it would involve testing a subgroup against itself or because it duplicated a test called out somewhere else in the matrix. Subgroup H was not included in the matrix because the Kendall analysis failed to show that it had a common ranking of values for either terminal or instrumental values. This matrix was applicable to both the terminal and instrumental value tests performed. 55 tests on various combinations of the subgroups were performed for both the terminal value rankings and the instrumental value rankings. A total of 110 tests were performed.

Results. As with the Kendall analysis, the computer was used to conduct this test also. The procedure followed consisted of the following steps. First, the value rank sums (see Tables 24 and 25) from the two subgroups being compared were jointly rank ordered from one to 36. The lowest rank sum was given a joint rank of one while the largest received a rank of 36. Ties among the Rj values received a joint rank equal to the average of the joint rank values those tied sums occupied. The joint ranks for each subgroup were then summed and the Kruskal-Wallis test statistic H was calculated using Eq (4) from Chapter III. Ties in the rank sums were accounted for in the value of H by using Eq (5) from Chapter III, and dividing H by the result to obtain H'. The critical chi-square values used in this analysis to test the significance of H at various levels of confidence are shown in Table 31.

As an example of how the analysis was run on the computer, Figure 3 shows how the analysis appeared for the terminal value hierarchy comparison of subgroup A to subgroup B. Subgroup rank sums

Table 31

Kruskal-Wallis Test Statistic
Critical Values

Critical Value	Confidence Level
10.83	99.9%
6.64	99%
3.84	95%
2.71	90%
1.64	80%

(Siegel:249)

GROUP A

Test: A/B

Rj:	A	B	t	Rj:	A	B	t
110	B	1		304	A	19	
115	B	2		308	A	20	
123	B	3		339	A	21	
127	B	4		350	A	22	
138	B	5		395	A	23	
161	B	6		476	A	24	
170	B	7		505	A	25	
172	B	8		517	A	26	
189	B	9		522	A	27	
191	B	10		541	A	28	
194	B	11		544	A	29	
202	B	12.5	2	556	A	30	
202	B	12.5		610	A	31	
217	B	14.5	2	627	A	32	
217	B	14.5		644	A	33	
233	B	16		665	A	34	
236	B	17		723	A	35	
252	B	18		780	A	36	

RA	RB	RA2D	RB2D	H	Tie Factor	H'
495	171	245025	29241	26.27	0.9997	26.277

Figure 3. Example Kruskal-Wallis Computation

are listed under the **Rj:** column, while the joint ranks assigned to the rank sums for each subgroup are listed under the **A** and **B** columns. Ties amongst the rank sums are indicated in the t column, with the number in that column indicating the number of tied values in a group of tied rank sums. This number is in fact *t* in Eq (5) from Chapter III. **Ra** and **Rb** are the sums of the joint ranks for the subgroups, while **Ra2d** and **Rb2d** are their squared values. The **tie factor** is the result of applying the denominator portion of Eq (5) to the tied rankings, and **H'** was calculated using Eq (5).

The results of this analysis for all subgroup comparisons is given in Table 32 for terminal value comparisons and Table 33 for instrumental value comparisons. These tables compare the values of the *H* and *H'*. A *n/a* in the table indicates that no ties occurred in that particular test. The actual test printouts from the analysis, which include all of the information shown in Figure 3, are attached as Appendix D. Both the printouts for terminal and instrumental hierarchy comparisons are included. These printouts include the values for *H* and *H'* as well as the rank sums for each of the two subgroups in a test, their squared values, the number of tied scores, and the tie factor value and the values of *t*.

Discussion. If a given test's *H* or *H'* value was larger than a chi-square value from Table 31 at a specific level of confidence, the result is a rejection of the null hypothesis at that level of confidence. Rejection of the null implies that the two subgroup ranking distributions are not equal. 44 of the terminal value hierarchy bi-subgroup comparisons and 43 of the instrumental comparisons had *H* values that rejected the null at a 99% or greater

Table 32

Kruskal-Wallis Results for
Terminal Value Subgroup Comparisons

Subgroup Test	H	H'	Subgroup Test	H	H'	Subgroup Test	H	H'
A vs. B	26.27	26.28	B vs. C	4.04	4.04	C vs. D	16.02	16.02
A vs. C	25.63	n/a	B vs. D	11.25	11.25	C vs. E	2.45	2.45
A vs. D	26.27	n/a	B vs. E	0.31	0.31	C vs. F	16.79	n/a
A vs. E	26.27	26.28	B vs. F	15.02	15.03	C vs. G	26.27	26.28
A vs. F	26.27	n/a	B vs. G	26.27	26.29	C vs. I	0.20	0.20
A vs. G	26.27	26.28	B vs. I	5.56	5.56	C vs. J	22.22	22.22
A vs. I	24.36	24.36	B vs. J	19.90	19.91	C vs. K	26.27	26.27
A vs. J	26.27	26.27	B vs. K	26.27	26.28	C vs. L	26.27	26.27
A vs. K	26.27	26.27	B vs. L	26.27	26.28			
A vs. L	26.27	26.27						
D vs. E	11.89	11.90	E vs. F	15.89	15.90	F vs. G	21.93	21.93
D vs. F	0.46	0.46	E vs. G	26.27	26.29	F vs. I	19.20	19.21
D vs. G	20.76	20.77	E vs. I	2.87	2.87	F vs. J	2.31	2.31
D vs. I	15.77	15.77	E vs. J	21.34	21.35	F vs. K	14.41	14.42
D vs. J	4.56	4.56	E vs. K	26.27	26.28	F vs. L	15.77	15.77
D vs. K	16.66	16.66	E vs. L	26.27	26.28			
D vs. L	17.18	17.19						
G vs. I	26.27	26.28	I vs. J	21.63	21.64	J vs. K	7.06	7.07
G vs. J	12.11	12.12	I vs. K	26.27	26.28	J vs. L	7.23	7.23
G vs. K	2.50	2.50	I vs. L	26.27	26.28			
G vs. L	2.81	2.81						
K vs. L	0.13	0.13						

level of confidence. Five more terminal and three more instrumental comparisons rejected at confidence levels between 90 and 95 percent. Three of the comparisons rejected the null at the 80% level for both instrumental and terminal values. Four tests failed to reject the null for at least the 80% level of confidence while five failed to reject for the instrumental tests. The same three bi-subgroup comparisons rejected the null at the 80% level for both the terminal and instrumental value comparison. Four of the five instrumental tests

Table 33

Kruskal-Wallis Results for
Instrumental Value Subgroup Comparisons

Subgroup Test	H	H'	Subgroup Test	H	H'	Subgroup Test	H	H'
A vs. B	26.67	n/a	B vs. C	2.76	2.76	C vs. D	15.42	n/a
A vs. C	22.37	22.38	B vs. D	11.04	11.04	C vs. E	1.85	1.85
A vs. D	26.27	n/a	B vs. E	0.24	0.24	C vs. F	18.06	18.07
A vs. E	23.43	n/a	B vs. F	13.47	13.47	C vs. G	25.22	25.23
A vs. F	26.27	n/a	B vs. G	22.22	22.23	C vs. I	0.34	0.34
A vs. G	26.27	26.28	B vs. I	5.63	5.63	C vs. J	21.78	21.79
A vs. I	21.93	n/a	B vs. J	16.15	16.15	C vs. K	25.47	25.48
A vs. J	26.27	26.28	B vs. K	21.34	21.34	C vs. L	25.63	25.64
A vs. K	26.27	26.28	B vs. L	21.05	n/a			
A vs. L	26.27	n/a						
D vs. E	12.56	12.56	E vs. F	15.02	15.02	F vs. G	16.27	16.28
D vs. F	0.40	0.40	E vs. G	22.97	22.98	F vs. I	19.06	n/a
D vs. G	20.04	20.05	E vs. I	6.73	6.74	F vs. J	2.21	2.21
D vs. I	18.65	18.66	E vs. J	18.65	18.66	F vs. K	12.67	12.67
D vs. J	4.04	4.04	E vs. K	24.99	25.00	F vs. L	12.67	12.67
D vs. K	17.98	17.99	E vs. L	24.83	24.83			
D vs. L	16.79	16.80						
G vs. I	24.67	24.68	I vs. J	19.62	19.63	J vs. K	8.29	8.30
G vs. J	12.00	12.01	I vs. K	24.05	24.06	J vs. L	7.98	7.98
G vs. K	1.26	1.26	I vs. L	25.52	25.52			
G vs. L	2.16	2.16						
K vs. L	0.04	0.04						

which failed to reject the null were identical to the bi-subgroup comparisons which failed to reject for the terminal value tests. No subgroup comparison which rejected the null for the terminal value hierarchy failed to reject the null for the instrumental comparison. Only one which rejected for the instrumental comparison failed to reject for the terminal value comparison for the same two subgroups. This similarity indicated a consistency of difference across the subgroups for both types of values. In general, the test results

supported the research hypothesis that different groups with different career intentions have different value hierarchies.

Since most of the comparisons rejected the null indicating independent value hierarchies, it seemed important to look at those that did not reject the null. Table 34 lists the subgroup comparisons that met this criteria.

Table 34

Kruskal-Wallis Comparisons
Which Failed to Reject the Null

Terminal Value Comparisons	Instrumental Value Comparisons
B vs. E	B vs. E
C vs. I	C vs. I
D vs. F	D vs. F
K vs. L	G vs. H
	K vs. L

These results have several interesting implications. Looking at those terminal value tests which failed to reject first, B vs. E implies that the aggregate 17XX group from Group 2 has the same value hierarchy as that of the officers from Group 1 with favorable career intent. This finding is consistent with the fact that 17XX officers have a high retention rate (see Chapter III). C vs. I is equally interesting, since it implies that the aggregate 28XX subgroup of survey Group 2 has the same value hierarchy as the subgroup in Group 1 which indicated an undecided level of career intention. This is consistent with the lower level of retention which characterizes the 28XX group of officers.

An odd finding is D vs. F, which implies that the 17XX group which indicated favorable career intent has the same value hierarchy as the subgroup from Group 1 which indicated an unfavorable level of intent. What this implies, in the light of the above finding concerning subgroups B and E is that while the overall group of 17XX officers has a value system which is similar to that of all company grade officers who have positive career intentions, the subgroup of 17XX officers which has a positive career intent has a value system equal to the subgroup of all company grade officers which displays an overall unfavorable level of career intention. This finding, if accurate in turn implies that the same value hierarchy can be motivating to one career group and de-motivating to another (in terms of career intent) which in turn implies that factors other than value systems are contributors to career intent. This finding is consistent with the hypothesis of this study, which does not state that value systems are the cause of a certain level of career intent, but instead that unique value systems can be correlated with specific levels of intent.

The only comparison which failed to reject the null for instrumental values but which did so for terminal values was between subgroups G and K. This finding shows that both 17XX officers and 25XX officers who are undecided about a career share a common value hierarchy. However, this subgroup comparison rejected the null at only an 80% level of confidence for terminal values. This result seems to be somewhat consistent with the finding for the instrumental value comparison of these two subgroups.

Analysis Concern. At the outset of this portion of the analysis a problem was identified which impacts the statistical significance of

some of the findings from the Kruskal-Wallis tests. The culprit is again, as it was in the Kendall analysis, the sample size k of the various subgroups. The values used in this analysis were the value rank sums for the various subgroups which were taken, as they were in the Kendall analysis, as representative of the true hierarchy of values for the subgroups. The difference between this and the Kendall tests is that in this case the distribution of sums between two groups was being compared for similarity. The sums, and their magnitudes, depend on the number of individuals in the subgroup. And it is these magnitudes that were in fact ranked in the Kruskal-Wallis tests.

The problem arose when two disproportionately sized subgroups, such as A (k = 55) and G (k = 6) were compared. When jointly ranked, the subgroup A rank sums would (because of their much larger magnitudes) receive all of the higher joint ranks. Subgroup G would receive all of the lower ranks, and the calculated H value would be large enough to automatically reject the null. Unfortunately, because of the disproportionate sample sizes, this difference in rank sum distributions was artificially induced. Thus the resulting H value and its statistical significance is in question.

The problem of disproportionate subgroup sample sizes, as mentioned at the beginning of this chapter, was realized to late in the research to rectify it for this study. Because of this, certain findings from the Kruskal-Wallis analysis which resulted from the comparison of disproportionately sized subgroups have questionable statistical significance and should not be considered as fact in future research. Table 35 lists the subgroup comparisons that should be considered in that light. A difference in subgroup size of more than

10 individuals was considered large enough to put the Kruskal-Wallis result in question and was the criteria used to generate Table 35.

Table 35

Questionable Kruskal-Wallis Results
for Both Terminal and Instrumental Comparisons

Subgroup	Tests In Question
A	All tests with this group
B	B vs. G, B vs. K, B vs. L
C	C vs. F, C vs. G, C vs. J, C vs. K, C vs. L
D	D vs. I
E	E vs. G, E vs. k, E vs. L
F	F vs. I
G	G vs. I
I	I vs. J, I vs. K, I vs. L
J	None
K	None

Summary

Despite the problems encountered because of the disproportionate subgroup sample sizes, the results that were considered significant in this study all seem to support the research hypotheses. The Kendall association analysis demonstrated that the various subgroups do have common terminal and instrumental value hierarchies. The Kruskal-Wallis test results considered significant demonstrated that groups of company grade officers in a career field who indicate different levels of career intent do have different value hierarchies. This test also

demonstrated that the value hierarchies of officers with different levels of career intent differed when compared across the various career specialties studied.

V. Conclusions and Recommendations

Conclusions

The purpose of this study was to investigate the existence of any association between an Air Force company grade officer's personal value system and his or her intentions towards remaining in the Air Force for a career. Two hypotheses were tested. The first stated that company grade officers who expressed a common level of career intent had value systems which were different from officers in that group who expressed some other level of career intent. The second stated that officers within a career specialty who expressed a common level of career intent also shared a common value hierarchy, but that these hierarchies changed from specialty to specialty. Within the limitations of the sample (subgroup sample size), this study yielded results that supported both of these hypotheses.

Common Value Systems. The Kendall Coefficient of Concordance, when calculated for different subgroups of the sample, showed that specific groups of Air Force Company grade officers do in fact share a common value system. All subgroups in the study, except for 17XX officers expressing unfavorable career intent, were shown to share common value hierarchies for both terminal and instrumental values. The significance of the 17XX unfavorable result is questionable however due to the very small sample size of that subgroup (two individuals). The conclusion to be drawn from this result is that common value hierarchies are associated with groups of company grade officers in different career fields who express specified levels of career intent.

The level of agreement within a subgroup, however, ranged from only weak to moderately strong as expressed by the Kendall Coefficient of Concordance. The implication of this result for future research is that variables other than career specialty are associated with a specific value hierarchy. It may be that factors such as job satisfaction level and demographic variables, which previous AFIT studies have shown to be significantly correlated with personal value systems, may also be significantly correlated with specific levels of career intent. Perhaps if taken in conjunction with value systems, these other factors could provide a clearer and more definable set of qualities which characterize company grade officers that exhibit certain levels of career intent.

Unique Value Systems. The Kruskal-Wallis analysis of the study data showed that for the most part different subgroups of company grade officers, when separated by job type and level of career intent, exhibit not only common but also unique value hierarchies. This was true despite the finding that all subgroups shared several terminal values and two instrumental values within the top five ranked values the terminal and instrumental value hierarchies. It was also supported by the finding that officers across career fields who express the same level of career intent do not have value systems that are independent from each other (subgroups G and K). The conclusion drawn from these results that groups of company grade officers in a career field that exhibit a specified level of career intent do in fact have a unique value system when compared to other groups both within that career field any within other career fields. Only one result seems to contradict this conclusion by indicating a common hierarchy across

career intent levels within a career group (subgroups K and L). However, due to the small sample size of these subgroups, the significance of this finding is questionable.

Validity of Findings. Several of the analysis results from this study were found to have questionable statistical significance because problems in obtaining statistically insignificant sample sizes for several of the subgroups studied. Because of these problems, and due to the fact that the study only examined two specific career fields within the overall population of company grade officers, the findings of this study should be considered as preliminary only. Further research is required to determine whether these findings are applicable to the overall population.

Recommendations

Several future studies are suggested by the results of this study:

1. Re-accomplish this study with the goal of studying significantly large samples of groups exhibiting different levels of career intent to check the results of this preliminary research.

2. Expand this research by applying it to other groups of company grade officers in other career fields with the intent of checking the results of this study against the entire population of company grade officers.

3. Develop a model of career intent which incorporates value systems with other variables such as demographic variables that could be used to predict an officer's level of career intent. Test the predictive nature of this model by measuring the variables, assigning a level of career intent to the individual based on the model, and then

polling that individual to ascertain his or her true level career intent.

4. Determine a method of investigating whether or not all values in an officer's value system are important to the behavior of choosing to make the Air Force a career. Assess whether or not these specific values are common among officers who express different levels of career intent, both within and across career fields.

5. Expand this research to look at a comparison between company grade officers versus field grade officers and non-commissioned officers, their value systems, and different levels of career intent.

Appendix A: Survey Instrument

A

USAF SCN 89-46
Expires 31 Aug 89

Air Force Company Grade Officer Career Value Survey

Prior to filling out the attached Value Survey, please answer the following questions about yourself.

1. Age: ____

2. Sex:
   a. Male: ___
   b. Female: ___

3. Rank: _____

4. Time In Service: _____

5. Primary AFSC: ____ Duty AFSC:

6. Highest education level obtained:

   a. College degree (BS, BA, or equivalent, except LL.B):
   b. Graduate work beyond bachelor's degree (no master's degree):
   c. Master's Degree:
   d. Postgraduate work beyond master's degree:
   e. Doctorate degree (includes LL.B, J.D., D.D.S., M.D., and D.V.M): ____

7. Commissioning Source:

   a. OTS: ____
   b. Air Force Academy:
   c. Other Service Academy (please specify): _____
   d. ROTC: ____
   e. Other - please specify: _____

8. What are your current intentions toward remaining in the Air Force for at least 20 years?

   a. Definitely will remain in the Air Force.
   b. Probably will remain in the Air Force.
   c. Lean toward remaining in the Air Force.
   d. Undecided. ____
   e. Lean toward not remaining in the Air Force.
   f. Probably will not remain in the Air Force.
   g. Definitely will not remain in the Air Force.

VALUE SURVEY INSTRUCTIONS

On the next page are 18 values listed in alphabetical order. Your task is to arrange them in order of their importance to YOU, as guiding principles in YOUR life.

Study the list carefully and pick out the one value which is most important for you. Write the number one (1) in the space to the left of that value.

Then pick out the value which is second most important for you. Write the number two (2) in the space to the left of that value. Do the same for each of the remaining values. The value which is least important will receive the number eighteen (18).

Work slowly and think carefully. If you change your mind, feel free to change your answers. The end result should show how you really feel.

____ A COMFORTABLE LIFE
(a prosperous life)

____ AN EXCITING LIFE
(a stimulating, active life)

____ A SENSE OF ACCOMPLISHMENT
(lasting contribution)

____ A WORLD AT PEACE
(free of war and conflict)

____ A WORLD OF BEAUTY
(beauty of nature and the arts)

____ EQUALITY
(brotherhood, equal opportunity for all)

____ FAMILY SECURITY
(taking care of loved ones)

____ FREEDOM
(independence, free choice)

____ HEALTH
(physical and mental well-being)

____ INNER HARMONY
(freedom from inner conflict)

____ MATURE LOVE
(sexual and spiritual intimacy)

____ NATIONAL SECURITY
(protection from attack)

____ PLEASURE
(an enjoyable, leisurely life)

____ SALVATION
(saved, eternal life)

____ SELF-RESPECT
(self-esteem)

____ SOCIAL RECOGNITION
(respect, admiration)

____ TRUE FRIENDSHIP
(close companionship)

____ WISDOM
(a mature understanding of life)

WHEN YOU HAVE FINISHED, GO ON TO THE NEXT PAGE

Below is another list of 18 values. Arrange them in order of importance, the same as before.

____ AMBITIOUS
(hard working, aspiring)

____ BROADMINDED
(open-minded)

____ CAPABLE
(competent, effective)

____ CLEAN
(neat, tidy)

____ COURAGEOUS
(standing up for your beliefs)

____ FORGIVING
(willing to pardon others)

____ HELPFUL
(working for the welfare of others)

____ HONEST
(sincere, truthful)

____ IMAGINATIVE
(daring, creative)

____ INDEPENDENT
(self-reliant, self-sufficient)

____ INTELLECTUAL
(intelligent, reflective)

____ LOGICAL
(consistent, rational)

____ LOVING
(affectionate, tender)

____ LOYAL
(faithful to one's friends, group)

____ OBEDIENT
(dutiful, respectful)

____ POLITE
(courteous, well-mannered)

____ RESPONSIBLE
(dependable, reliable)

____ SELF-CONTROLLED
(restrained, self-disciplined)

Appendix B: Raw Survey Response Data

The following tables list the raw data taken directly from the surveys used in the analysis portion of this study. Tables 36 and 37 contain the demographic information for Groups 1 and 2 respectively. Tables 38 and 39 contain, respectively, the Group 1 and Group 2 responses to the Terminal value portion of the Rokeach Value Survey (RVS). Tables 40 and 41 contain the Group 1 and Group 2 responses to the Instrumental value portion of the RVS. The following paragraphs explain the meaning of the legends in the various Table columns.

Demographic Data Table Legends. The column headings in Tables 36 and 37 correspond to the questions on the demographic portion of the Career Value Survey. The entries in those columns are the responses to those questions. Column 1 of both Tables, labeled No., refers to the control number placed on the individual survey after receipt of the response by the researcher. This number is used to reference that particular survey respondents answers throughout all of the raw data tables and the ensuing analysis. The Time-In-Service column is in years. The intent column refers to the career intent of the respondent. The entries under Education Level, Commission Source and Intent correspond to the lettered answers ((a) through (e), (a) through (e), and (a) through (g) respectively) indicated by the individual in response to those questions on the survey.

Value Response Raw Data Table Legends. Tables 38 through 41 contain the raw response data to the RVS portion of the career value survey. The column labeled No. in each table refers to the individual

survey control number mentioned above for the demographic data. This number identifies a unique survey common to all the data tables. For instance, survey number 34 for Group 1 is the same respondent for the demographic, terminal, and instrumental tables for that group. The value codes in Tables 38 through 41 correspond to the codes delineated for terminal and instrumental values in Table 25. For instance, instrumental value code 2F is equivalent to the instrumental value **Forgiving**. The entries in these tables correspond to the ranks assigned to each value by the respondent.

Table 36

Group 1 Demographic Data

No.	Age (Yrs)	Sex	Rank	Time In Service	Education Level	Commission Source	Intell
1	29	Male	Captain	8.0	e	e	[illegible]
2	29	Male	Captain	6.0	b	a	a
3	27	Male	1st Lt	3.0	a	a	[illegible]
4	26	Female	Captain	1.0	e	e	[illegible]
5	26	Female	Captain	5.0	a	a	[illegible]
6	29	Male	Captain	7.0	e	e	[illegible]
7	32	Male	Captain	9.0	b	a	[illegible]
8	30	Female	Captain	5.0	e	d	[illegible]
9	34	Female	Captain	16.0	c	b	e
10	27	Male	Captain	5.0	a	b	e
11	35	Female	Captain	11.0	c	a	b
12	32	Male	Captain	6.5	c	a	e
13	31	Male	Captain	5.0	e	e	[illegible]
14	23	Male	2nd Lt	0.4	b	d	[illegible]
15	24	Male	2nd Lt	1.4	a	a	[illegible]
16	26	Male	Captain	4.0	a	b	b
17	28	Male	Captain	6.0	a	a	[illegible]
18	31	Male	Captain	6.5	c	d	b
19	29	Male	Captain	0.8	e	e	b
20	32	Male	Captain	7.0	b	a	d
21	28	Female	1st Lt	10.0	c	a	c
22	29	Male	1st Lt	4.0	a	a	d
23	26	Male	Captain	5.0	b	b	[illegible]
24	25	Male	2nd Lt	1.7	a	d	b
25	25	Male	1st Lt	3.0	b	d	e

Table 36 (Continued)

Group 1 Demographic Data

No.	Age (Yrs)	Sex	Rank	Time In Service	Education Level	Commission Source	Intent
26	29	Male	Captain	6.0	c	d	c
27	27	Male	Captain	5.0	a	d	f
28	31	Male	Captain	6.8	a	a	c
29	32	Male	Captain	5.0	e	e	f
30	29	Female	2nd Lt	7.8	a	a	a
31	29	Male	Captain	6.0	a	b	d
32	25	Male	1st Lt	3.0	a	b	c
33	29	Male	Captain	7.5	a	a	b
34	33	Male	Captain	10.0	c	a	b
35	33	Male	Captain	16.0	d	a	a
36	37	Male	Captain	13.0	c	a	b
37	27	Male	Captain	5.0	a	b	e
38	25	Male	1st Lt	3.0	b	b	b
39	28	Male	Captain	5.0	c	a	e
40	38	Male	Captain	8.0	a	a	f
41	30	Male	1st Lt	10.0	b	a	b
42	29	Male	Captain	5.5	b	a	b
43	28	Male	Captain	5.5	c	a	[illegible]
44	35	Male	Captain	10.0	b	a	a
45	29	Male	Captain	6.0	b	d	f
46	32	Male	Captain	9.0	c	d	b
47	31	Male	Captain	9.1	c	b	f
48	28	Male	Captain	6.0	c	d	a
49	30	Male	1st Lt	3.0	a	a	a
50	28	Male	Captain	6.0	b	b	c
51	31	Male	Captain	6.0	b	a	d
52	30	Male	Captain	9.0	e	d	b
53	28	Male	1st Lt	4.0	a	a	d
54	26	Male	Captain	4.0	a	d	b
55	25	Female	1st Lt	2.6	a	d	c

Table 37

Group 2 Demographic Data

No.	Age (yrs)	Sex	Rank	Time In Service	Education Level	AFSC	Comm Source	Intent
1	31	Female	Captain	11.0	b	28	a	a
2	33	Male	Major	11.0	b	17	d	a

Table 37 (Continued)

Group 2 Demographic Data

No.	Age (yrs)	Sex	Rank	Time In Service	Education Level	AFSC	Comm Source	Intent
3	33	Male	2nd Lt	9.0	b	28	a	b
4	36	Female	Captain	13.0	b	28	a	b
5	38	Female	Captain	10.0	b	17	a	b
6	22	Male	2nd Lt	0.2	a	17	d	e
7	26	Male	1st Lt	2.0	a	17	d	a
8	29	Male	Captain	4.0	c	28	a	c
9	30	Male	Captain	8.0	a	17	d	a
10	29	Male	Captain	4.5	c	28	a	g
11	32	Male	Captain	8.5	b	17	a	b
12	27	Male	2nd Lt	8.6	a	28	a	f
13	31	Male	1st Lt	12.0	b	28	a	b
14	23	Female	2nd Lt	0.9	a	17	d	c
15	30	Male	Captain	8.8	c	28	d	e
16	37	Male	Captain	13.0	a	17	a	g
17	30	Male	2nd Lt	3.0	c	17	a	b
18	25	Male	1st Lt	3.0	b	17	a	b
19	29	Male	Captain	6.0	c	28	d	b
20	28	Male	Captain	5.5	a	28	d	a
21	24	Male	1st Lt	3.0	b	28	d	b
22	30	Male	1st Lt	3.7	a	17	a	g
23	23	Male	2nd Lt	0.5	a	17	d	c
24	24	Female	1st Lt	2.5	b	28	d	c
25	30	Male	Captain	11.0	b	28	a	f
26	29	Female	1st Lt	3.0	a	17	a	d
27	31	Male	1st Lt	7.5	a	17	a	a
28	30	Female	Captain	7.0	a	17	d	e
29	26	Male	2nd Lt	2.0	a	28	d	g
30	24	Male	1st Lt	1.5	b	28	d	c
31	32	Male	Captain	10.0	c	28	b	b
32	23	Male	2nd Lt	1.3	b	28	d	f
33	33	Female	Captain	11.0	c	17	a	c
34	33	Male	Captain	12.0	c	28	a	c
35	39	Male	Captain	10.0	c	17	a	a
36	25	Male	1st Lt	2.8	b	28	d	f
37	29	Male	Captain	6.0	b	28	a	i
38	31	Male	1st Lt	13.0	b	28	a	b
39	32	Male	Captain	10.0	b	17	d	a
40	38	Male	Captain	17.0	a	17	a	a
41	35	Male	Captain	13.0	a	17	a	a
42	25	Male	2nd Lt	2.0	a	28	d	b
43	23	Male	2nd Lt	0.4	a	28	d	e
44	26	Female	Captain	5.0	c	28	d	f

Table 38

Group 1 Survey Responses:
Terminal Value Raw Data

	Value Code																
No.	1A	1B	1C	1D	1E	1F	1G	1H	1I	1J	1K	1L	1M	1N	1O	1P	1Q	1R
1	14	17	1	5	18	3	13	9	8	11	6	10	12	16	2	15	4	7
2	11	3	4	18	16	17	8	2	1	7	12	5	13	15	6	14	9	10
3	12	10	11	16	14	13	1	3	4	8	9	6	15	5	2	18	17	7
4	8	17	12	16	18	15	10	2	7	3	5	14	9	1	4	13	6	11
5	12	16	11	10	9	6	5	8	7	2	3	14	15	18	1	13	4	17
6	13	18	8	12	14	11	3	7	6	4	2	15	17	1	5	16	9	10
7	6	12	2	11	13	16	5	7	8	9	18	10	17	1	4	14	15	3
8	8	6	16	17	7	15	10	9	2	11	3	13	1	18	4	14	5	12
9	12	11	9	8	15	10	1	3	2	16	4	5	17	13	6	18	14	7
10	8	3	2	13	4	12	11	5	10	17	15	14	16	18	6	9	7	1
11	2	18	8	14	15	13	1	6	3	10	17	9	4	5	7	16	11	12
12	5	8	1	9	14	15	4	2	3	16	18	11	13	17	6	12	7	10
13	5	9	4	14	13	8	3	1	7	12	11	17	10	18	2	16	13	6
14	6	16	10	11	18	17	1	3	8	9	13	12	15	2	5	14	7	4
15	11	10	12	17	18	9	3	16	8	7	6	15	13	1	2	5	4	14
16	6	5	4	12	17	16	1	2	8	15	13	7	14	18	3	9	10	11
17	11	13	6	16	15	7	5	2	4	10	12	3	14	18	1	17	9	8
18	11	12	13	8	18	10	2	5	3	4	16	9	14	17	6	15	7	1
19	11	13	7	12	8	9	2	5	14	4	15	10	18	1	6	17	16	3
20	14	18	13	4	12	5	1	2	3	9	10	6	16	8	7	17	11	15
21	17	1	5	9	18	8	3	2	6	7	11	10	16	4	12	15	13	14
22	13	9	10	6	15	4	5	2	3	8	12	7	14	16	11	18	1	17
23	6	1	12	14	18	10	11	5	3	2	13	9	17	16	7	15	4	8
24	17	16	14	4	12	5	9	10	6	2	8	7	15	1	13	18	11	3
25	1	9	5	13	17	16	6	12	7	11	10	14	2	18	3	4	15	8
26	8	9	10	18	15	17	2	6	3	13	16	5	14	1	11	12	9	4
27	6	5	7	12	18	14	8	3	2	13	4	10	9	15	11	17	1	16
28	4	15	14	17	18	8	1	5	2	3	6	16	9	13	11	12	10	7
29	14	13	3	10	15	8	4	6	7	1	5	9	16	18	2	17	11	12
30	16	15	3	10	14	13	12	9	7	11	4	6	18	1	8	17	2	5
31	1	5	4	6	17	18	2	3	15	16	7	10	9	14	8	12	11	13
32	13	7	8	12	11	18	16	3	6	4	14	15	10	5	10	1	17	2
33	18	17	4	3	14	10	7	9	1	6	11	15	16	5	2	13	8	12
34	17	10	1	2	9	16	7	3	11	4	5	15	18	6	8	12	14	13
35	6	1	2	13	18	14	4	10	9	15	8	16	3	17	5	11	12	7
36	8	2	3	16	14	15	13	5	4	17	10	11	6	18	1	7	9	12
37	2	5	3	13	14	18	17	12	1	10	11	15	4	16	6	7	9	8
38	14	17	11	9	13	6	3	2	8	7	10	5	16	1	4	18	12	15
39	14	15	1	8	17	7	2	4	6	12	13	9	16	11	3	18	10	5
40	3	4	5	7	18	15	2	16	1	11	10	6	9	8	12	14	13	17
41	2	6	13	16	17	18	14	12	3	10	4	15	5	1	7	8	9	11
42	6	12	10	7	13	11	1	2	3	14	17	4	8	16	18	15	9	5
43	10	11	5	17	18	16	3	1	9	8	12	15	2	14	4	13	6	7
44	7	3	2	9	17	8	16	4	15	1	5	6	14	18	10	13	12	11
45	3	4	10	17	16	15	5	1	6	8	7	11	2	18	12	13	9	14

Table 38 (Continued)

Group 1 Survey Responses:
Terminal Value Raw Data

	Value Code																
No.	1A	1B	1C	1D	1E	1F	1G	1H	1I	1J	1K	1L	1M	1N	1O	1P	1Q	1R
46	3	4	6	17	7	14	2	12	5	15	16	1	11	18	8	10	9	13
47	11	9	8	10	15	4	1	3	12	16	6	2	13	18	14	17	5	7
48	11	5	1	13	12	16	14	7	9	17	10	2	15	18	3	4	8	6
49	15	9	2	7	17	4	8	3	11	14	16	1	10	18	5	13	12	6
50	17	9	6	10	5	11	4	1	3	2	15	18	12	13	7	16	14	8
51	15	13	11	12	16	6	1	3	2	5	10	14	17	4	8	18	9	7
52	10	18	3	16	8	11	1	14	12	6	9	15	17	5	2	7	13	4
53	14	13	9	15	17	12	3	6	11	10	2	7	18	1	4	16	5	8
54	13	18	12	3	14	15	5	4	6	7	9	10	17	16	1	11	8	2
55	1	11	18	13	7	16	2	9	8	15	10	5	4	17	14	6	12	3

Table 39

Group 2 Survey Responses:
Terminal Value Raw Data

	Value Code																
No.	1A	1B	1C	1D	1E	1F	1G	1H	1I	1J	1K	1L	1M	1N	1O	1P	1Q	1R
1	14	13	8	10	17	4	1	2	7	12	6	3	15	18	5	16	9	11
2	18	13	11	14	12	15	4	10	5	8	9	2	16	1	6	17	7	3
3	3	4	11	5	17	12	2	1	16	13	6	8	7	18	9	15	14	10
4	6	17	2	14	10	1	5	4	9	15	11	13	16	18	3	8	7	12
5	18	15	8	4	11	10	1	12	6	3	2	5	17	14	13	16	9	7
6	18	10	11	1	4	5	6	3	14	7	8	2	15	16	12	17	13	9
7	11	12	9	5	17	18	2	3	13	16	7	4	14	1	6	15	8	10
8	7	6	3	8	11	18	13	4	9	10	16	5	17	2	1	15	14	12
9	18	1	2	15	16	3	13	14	12	11	10	17	7	9	5	4	8	6
10	12	18	9	3	6	4	8	5	2	7	11	10	13	1	14	17	16	15
11	14	16	3	17	18	15	2	13	7	5	4	11	10	1	6	12	8	9
12	13	14	12	17	15	10	3	7	4	5	2	9	18	1	6	16	11	8
13	7	15	10	8	5	16	2	1	4	17	13	6	18	9	3	14	11	12
14	9	13	10	4	14	2	7	1	6	17	15	5	12	18	3	16	8	11
15	6	18	5	17	12	16	1	11	10	8	3	15	14	9	2	13	4	7
16	9	14	5	3	17	11	2	4	1	10	18	6	12	16	8	15	13	7
17	11	6	8	13	14	15	3	4	1	16	9	5	12	2	7	18	10	17
18	17	14	5	9	16	3	15	4	10	6	7	8	18	1	11	13	12	2
19	3	13	17	4	16	5	2	12	1	11	14	7	9	6	15	18	8	10
20	10	15	13	11	12	2	1	3	7	16	6	4	9	17	5	18	8	14
21	8	13	7	15	12	16	14	10	2	9	6	17	11	1	3	18	4	5
22	9	12	13	16	17	15	7	6	1	4	8	18	11	3	2	14	10	5
23	9	5	2	18	6	16	7	15	4	14	3	10	13	11	17	12	8	1

Table 39 (Continued)

Group 2 Survey Responses:
Terminal Value Raw Data

	Value Code																	
No.	1A	1B	1C	1D	1E	1F	1G	1H	1I	1J	1K	1L	1M	1N	1O	1P	1Q	1R
24	12	17	3	14	5	11	1	8	9	17	10	6	16	2	15	4	13	18
25	2	11	3	10	12	17	1	5	7	15	16	8	9	18	6	13	14	4
26	14	3	1	13	10	12	9	8	4	16	6	7	11	17	5	18	2	15
27	17	12	8	5	16	7	2	9	6	10	11	3	18	1	4	15	13	14
28	8	12	13	7	18	14	2	3	1	11	9	6	4	5	15	17	10	16
29	9	10	7	15	16	14	4	1	2	3	17	18	11	12	5	8	6	13
30	11	6	3	17	16	10	5	2	1	12	14	15	13	18	4	9	8	7
31	3	13	6	17	18	16	9	1	7	8	12	2	11	15	4	14	10	5
32	12	8	13	11	15	6	7	5	2	17	9	14	16	10	1	18	4	3
33	13	16	10	18	12	5	1	4	3	8	11	6	14	15	2	9	17	7
34	13	18	3	10	12	9	1	11	2	8	5	6	14	4	7	15	17	16
35	1	4	8	15	17	16	13	6	2	3	14	11	5	18	7	9	12	10
36	8	5	1	18	9	4	16	2	6	7	15	17	14	13	3	12	11	10
37	3	10	1	6	18	15	5	2	4	14	13	11	8	16	7	17	9	12
38	5	12	2	9	15	8	13	7	6	3	10	14	16	18	1	17	4	11
39	9	11	7	10	18	6	1	5	2	16	15	4	17	8	3	14	12	13
40	7	8	5	1	4	9	6	3	10	14	13	2	17	12	16	18	15	11
41	7	13	2	12	15	14	1	11	3	8	16	9	17	18	4	10	5	6
42	15	17	2	14	12	13	4	10	1	8	16	11	18	6	3	9	5	7
43	8	10	9	5	17	4	2	3	11	18	15	14	13	1	6	16	7	12
44	9	18	11	12	16	7	1	3	2	17	5	4	10	13	6	14	8	15

Table 40

Group 1 Survey Responses:
Instrumental Value Raw Data

	Value Code																	
No.	2A	2B	2C	2D	2E	2F	2G	2H	2I	2J	2K	2L	2M	2N	2O	2P	2Q	2R
1	12	18	11	16	10	14	4	1	9	5	6	8	7	3	15	17	2	13
2	1	11	7	16	2	17	12	4	6	13	3	8	18	14	9	15	5	10
3	16	13	9	12	3	15	14	1	6	8	4	11	5	2	18	17	10	7
4	11	10	2	18	15	12	13	1	14	4	7	9	3	8	16	17	5	6
5	17	10	12	11	4	9	8	1	13	5	15	14	6	2	16	7	3	18
6	11	17	5	18	6	7	14	1	16	9	10	13	3	8	15	12	2	4
7	2	18	6	15	16	7	17	8	9	1	5	10	12	11	13	14	4	3
8	15	2	1	3	14	16	13	4	17	6	5	7	12	11	18	8	9	10
9	18	10	11	12	13	14	2	1	3	4	5	6	7	17	16	15	8	9
10	2	5	8	18	3	14	12	1	4	7	11	15	13	10	16	17	9	6
11	10	11	4	12	13	5	15	6	14	7	3	17	8	1	18	9	2	16
12	3	8	2	17	4	16	13	7	9	12	11	5	14	15	18	6	10	1

Table 40 (Continued)

Group 1 Survey Responses:
Instrumental Value Raw Data

	Value Code																	
Nc.	2A	2B	2C	2D	2E	2F	2G	2H	2I	2J	2K	2L	2M	2N	2O	2P	2Q	2R
13	11	5	6	15	16	14	3	10	2	4	1	9	8	13	18	12	7	17
14	10	8	7	18	11	12	16	2	9	15	4	3	5	6	13	17	1	14
15	3	15	4	5	6	17	16	7	18	13	8	9	1	2	10	11	12	14
16	5	11	1	18	4	17	12	2	6	13	3	14	15	8	6	16	7	10
17	10	11	8	18	13	17	12	1	2	9	16	3	15	6	7	14	5	4
18	14	1	9	18	4	11	12	2	3	6	15	13	10	7	17	16	5	8
19	17	12	5	18	16	1	6	7	11	13	8	15	2	14	3	9	4	10
20	18	8	3	17	6	9	4	1	16	10	11	7	15	14	12	13	2	5
21	1	18	2	10	14	16	8	9	15	4	6	7	17	12	13	11	3	5
22	12	10	7	14	2	15	5	3	16	1	18	9	6	4	13	17	8	11
23	2	9	3	18	10	11	12	13	1	7	8	4	14	15	17	16	5	6
24	7	14	6	18	5	3	15	1	9	17	12	13	11	8	10	16	4	2
25	9	8	7	14	15	12	16	2	13	17	5	6	3	1	18	11	4	10
26	8	11	9	18	5	13	6	1	12	14	3	10	16	4	15	17	2	7
27	4	7	6	18	5	12	8	1	9	10	13	14	11	2	17	16	3	15
28	18	8	17	13	15	2	3	6	14	11	10	12	1	4	7	5	16	9
29	8	7	1	14	4	17	13	3	9	10	5	6	12	16	15	18	2	11
30	14	15	11	8	10	4	9	6	16	18	13	12	1	2	17	3	5	7
31	2	13	1	12	7	8	14	6	18	15	9	4	10	3	17	16	4	5
32	9	13	6	18	7	15	14	8	2	1	10	5	16	4	17	12	3	11
33	12	5	13	18	6	7	15	3	16	4	17	14	9	1	11	8	2	10
34	17	1	7	18	8	16	12	5	9	10	2	4	11	3	13	14	6	15
35	8	10	6	18	2	13	12	5	1	3	4	11	14	7	17	15	9	16
36	6	10	7	9	8	11	16	1	15	12	18	13	17	2	5	14	3	4
37	10	18	5	4	17	12	11	16	14	1	13	2	7	15	8	6	9	3
38	5	15	9	8	12	1	10	2	17	18	7	14	3	4	11	13	6	16
39	12	4	1	18	8	17	6	5	13	2	7	10	11	9	15	16	3	14
40	9	6	15	16	2	5	13	1	12	14	7	8	4	3	18	9	11	10
41	13	9	14	8	16	7	18	1	17	6	5	10	2	3	15	12	4	11
42	12	17	4	11	9	15	16	1	13	10	8	6	18	7	3	14	2	5
43	1	2	13	18	7	14	10	6	8	9	11	12	15	3	17	16	5	4
44	14	8	13	15	7	16	6	5	3	4	2	11	17	12	10	18	1	9
45	1	10	2	9	11	16	12	8	13	14	15	3	4	5	17	6	7	18
46	13	10	11	15	12	17	14	1	2	9	8	3	18	4	5	6	7	16
47	11	8	12	18	3	14	15	1	10	9	4	5	13	2	17	16	6	7
48	6	15	7	17	3	18	11	8	16	14	5	10	12	2	4	16	1	9
49	9	13	10	15	8	17	14	1	7	6	12	11	16	2	4	18	3	5
50	11	14	9	8	13	10	12	1	15	3	4	18	6	5	17	7	2	16
51	6	9	10	11	8	7	17	1	12	15	14	13	4	3	16	18	2	5
52	4	10	13	14	9	12	6	1	15	7	17	16	2	11	18	8	3	5
53	13	12	15	14	6	4	10	2	16	18	17	9	3	1	8	11	5	7
54	3	13	2	18	12	4	17	5	16	11	7	6	8	14	15	10	9	1
55	4	15	8	16	10	5	17	3	14	6	7	11	13	9	18	2	1	12

Table 41

Group 2 Survey Responses:
Instrumental Value Raw Data

	Value Code																	
No.	2A	2B	2C	2D	2E	2F	2G	2H	2I	2J	2K	2L	2M	2N	2O	2P	2Q	2R
1	4	6	8	18	12	11	5	1	13	17	3	7	10	16	15	9	2	14
2	15	8	6	14	2	9	18	1	16	10	17	7	11	5	13	12	3	4
3	9	10	11	8	7	15	16	1	6	13	12	2	14	3	17	18	5	4
4	13	3	5	18	4	9	7	1	16	10	17	15	12	11	14	2	6	8
5	18	14	6	7	5	8	1	4	9	13	15	16	2	3	17	12	10	11
6	1	8	2	17	7	9	10	12	11	16	5	15	13	14	6	18	4	3
7	2	8	6	18	7	17	3	4	16	8	10	15	13	11	14	12	1	5
8	4	6	7	14	12	16	9	1	11	5	17	10	18	13	15	8	3	2
9	4	5	7	6	8	10	9	3	11	18	17	12	14	13	15	2	1	16
10	10	12	17	18	7	8	2	1	11	3	13	14	9	5	16	15	4	6
11	12	13	2	18	4	11	5	14	17	10	16	15	6	7	9	8	1	3
12	14	18	8	13	4	2	7	3	17	9	15	16	1	11	12	10	6	5
13	5	12	10	18	4	16	11	1	13	6	8	7	17	2	15	14	3	9
14	2	1	16	17	3	10	9	8	4	5	7	14	13	12	18	11	6	15
15	12	2	11	17	18	16	15	4	6	14	5	7	8	1	13	9	10	3
16	7	16	1	15	14	12	6	13	18	17	5	4	10	11	9	8	2	3
17	5	9	8	17	6	7	13	1	18	16	15	14	12	11	10	3	2	4
18	11	2	10	16	3	9	8	1	12	4	13	14	15	4	5	17	6	7
19	18	4	5	17	11	12	10	1	9	13	6	3	16	7	14	15	2	8
20	17	9	10	18	15	7	8	6	13	16	11	14	1	3	12	5	4	2
21	14	16	13	17	8	7	15	1	12	9	5	3	6	10	18	11	4	2
22	11	14	16	17	13	8	15	1	5	10	4	7	2	3	18	12	9	6
23	17	1	10	16	4	3	2	9	8	13	14	15	7	6	18	12	5	11
24	5	3	4	18	2	6	13	10	9	1	11	14	8	12	16	17	7	15
25	3	6	15	17	16	7	18	14	1	2	5	8	10	13	12	11	9	4
26	13	5	6	15	3	7	8	2	4	10	17	11	12	9	14	16	1	18
27	7	8	6	17	16	9	10	1	15	18	14	12	13	5	4	11	2	3
28	3	4	2	8	10	13	9	1	14	5	12	16	15	11	18	17	6	7
29	3	4	8	17	13	12	2	1	14	15	9	6	5	16	18	11	7	10
30	4	12	13	14	7	11	8	5	10	3	2	15	6	17	18	9	1	16
31	4	5	6	17	7	18	13	1	12	2	8	3	11	9	15	16	10	14
32	18	11	8	17	5	10	6	1	12	7	13	9	3	4	16	15	2	14
33	1	6	16	13	8	18	9	10	7	3	5	11	15	17	14	12	2	11
34	14	7	11	18	13	5	6	1	15	16	12	4	17	2	8	9	3	10
35	8	7	2	16	17	10	6	5	18	1	3	9	15	11	12	14	4	13
36	2	10	3	12	17	11	14	4	6	5	15	16	13	1	18	9	8	7
37	1	3	2	18	4	12	8	5	6	7	10	11	9	15	17	14	13	16
38	16	3	6	15	9	7	13	4	14	8	12	10	11	5	18	17	2	1
39	9	10	11	12	13	14	15	1	16	17	2	8	18	3	4	5	6	7
40	3	8	4	7	6	17	13	2	14	15	9	5	18	1	10	11	12	16
41	12	5	6	13	7	11	15	2	10	16	8	9	18	1	17	14	3	4
42	4	16	10	9	18	11	5	1	17	13	15	12	6	3	14	7	2	8
43	2	7	8	15	11	9	3	1	10	13	16	17	4	5	18	12	6	14
44	12	11	1	18	5	9	8	3	17	7	16	2	10	13	15	14	4	6

Appendix C: Composite Value Hierarchy Tables

Table 42
Subgroup A Terminal Value Hierarchy

Value	Rj:	Rank
FAMILY SECURITY	304	1
FREEDOM	308	2
HEALTH	339	3
SELF-RESPECT	350	4
A SENSE OF ACCOMPLISHMENT	395	5
WISDOM	476	6
INNER HARMONY	505	7
TRUE FRIENDSHIP	517	8
A COMFORTABLE LIFE	522	9
NATIONAL SECURITY	541	10
MATURE LOVE	544	11
AN EXCITING LIFE	556	12
SALVATION	610	13
A WORLD AT PEACE	627	14
EQUALITY	644	15
PLEASURE	665	16
SOCIAL RECOGNITION	723	17
A WORLD OF BEAUTY	780	18

Table 43
Subgroup B Terminal Value Hierarchy

Value	Rj:	Rank
SELF-RESPECT	110	1
FAMILY SECURITY	115	2
FREEDOM	123	3
A SENSE OF ACCOMPLISHMENT	127	4
HEALTH	138	5
WISDOM	161	6
INNER HARMONY	170	7
NATIONAL SECURITY	172	8
A COMFORTABLE LIFE	189	9
A WORLD AT PEACE	191	10
TRUE FRIENDSHIP	194	11
AN EXCITING LIFE	202	12
MATURE LOVE	202	12
EQUALITY	217	13
SALVATION	217	13
SOCIAL RECOGNITION	233	14
PLEASURE	236	15
A WORLD OF BEAUTY	252	16

Table 44
Subgroup C Terminal Value Hierarchy

Value	Rj:	Rank
FREEDOM	105	1
HEALTH	122	2
FAMILY SECURITY	139	3
SELF-RESPECT	156	4
A SENSE OF ACCOMPLISHMENT	173	5
WISDOM	191	6
TRUE FRIENDSHIP	205	7
AN EXCITING LIFE	212	8
INNER HARMONY	223	9
A COMFORTABLE LIFE	225	10
NATIONAL SECURITY	230	11
MATURE LOVE	239	12
SALVATION	259	13
PLEASURE	272	14
A WORLD AT PEACE	277	15
EQUALITY	286	16
SOCIAL RECOGNITION	302	17
A WORLD OF BEAUTY	320	18

Table 45
Subgroup D Terminal Value Hierarchy

Value	Rj:	Rank
FAMILY SECURITY	50	1
HEALTH	79	2
FREEDOM	80	3
SELF-RESPECT	84	4
A SENSE OF ACCOMPLISHMENT	95	5
MATURE LOVE	103	6
A COMFORTABLE LIFE	108	7
INNER HARMONY	112	8
TRUE FRIENDSHIP	118	9
WISDOM	124	10
SALVATION	134	11
NATIONAL SECURITY	139	12
EQUALITY	141	13
AN EXCITING LIFE	142	14
PLEASURE	157	15
A WORLD AT PEACE	159	16
SOCIAL RECOGNITION	188	17
A WORLD OF BEAUTY	208	18

Table 46
Subgroup E Terminal Value Hierarchy

Value	Rj:	Rank
FAMILY SECURITY	104	1
HEALTH	111	2
FREEDOM	138	3
A SENSE OF ACCOMPLISHMENT	141	4
NATIONAL SECURITY	141	4
SELF-RESPECT	152	5
WISDOM	179	6
SALVATION	187	7
MATURE LOVE	195	8
A WORLD AT PEACE	200	9
TRUE FRIENDSHIP	200	9
INNER HARMONY	203	10
AN EXCITING LIFE	210	11
EQUALITY	211	12
A COMFORTABLE LIFE	237	13
PLEASURE	260	14
A WORLD OF BEAUTY	272	15
SOCIAL RECOGNITION	279	16

Table 47
Subgroup F Terminal Value Hierarchy

Value	Rj:	Rank
FAMILY SECURITY	63	1
A SENSE OF ACCOMPLISHMENT	76	2
HEALTH	77	3
NATIONAL SECURITY	81	4
SALVATION	86	5
SELF-RESPECT	88	6
FREEDOM	94	7
WISDOM	108	8
INNER HARMONY	116	9
MATURE LOVE	117	10
TRUE FRIENDSHIP	119	11
A WORLD AT PEACE	120	12
AN EXCITING LIFE	125	13
EQUALITY	131	14
A COMFORTABLE LIFE	148	15
SOCIAL RECOGNITION	161	16
PLEASURE	168	17
A WORLD OF BEAUTY	174	18

Table 48
Subgroup G Terminal Value Hierarchy

Value	Rj:	Rank
FAMILY SECURITY	32	1
HEALTH	32	1
FREEDOM	34	2
NATIONAL SECURITY	36	3
A SENSE OF ACCOMPLISHMENT	47	4
MATURE LOVE	52	5
EQUALITY	54	6
SELF-RESPECT	54	6
TRUE FRIENDSHIP	58	7
AN EXCITING LIFE	59	8
WISDOM	59	8
A WORLD AT PEACE	61	9
A WORLD OF BEAUTY	64	10
PLEASURE	69	11
A COMFORTABLE LIFE	71	12
INNER HARMONY	73	13
SALVATION	82	14
SOCIAL RECOGNITION	89	15

Table 49
Subgroup I Terminal Value Hierarchy

Value	Rj:	Rank
FREEDOM	120	1
FAMILY SECURITY	121	2
HEALTH	131	3
SELF-RESPECT	134	4
A SENSE OF ACCOMPLISHMENT	161	5
A COMFORTABLE LIFE	199	6
TRUE FRIENDSHIP	222	7
NATIONAL SECURITY	237	8
EQUALITY	238	9
SALVATION	246	10
WISDOM	249	11
MATURE LOVE	251	12
A WORLD AT PEACE	270	13
INNER HARMONY	270	13
AN EXCITING LIFE	301	14
A WORLD OF BEAUTY	314	15
PLEASURE	316	16
SOCIAL RECOGNITION	334	17

Table 50
Subgroup J Terminal Value Hierarchy

Value	Rj:	Rank
FREEDOM	51	1
SELF-RESPECT	51	1
FAMILY SECURITY	53	2
HEALTH	60	3
A COMFORTABLE LIFE	74	4
A SENSE OF ACCOMPLISHMENT	78	5
TRUE FRIENDSHIP	80	6
NATIONAL SECURITY	85	7
EQUALITY	93	8
WISDOM	97	9
MATURE LOVE	100	10
A WORLD AT PEACE	107	11
INNER HARMONY	112	12
SALVATION	126	14
PLEASURE	130	14
AN EXCITING LIFE	132	15
A WORLD OF BEAUTY	134	16
SOCIAL RECOGNITION	147	17

Table 51
Subgroup K Terminal Value Hierarchy

Value	Rj:	Rank
A SENSE OF ACCOMPLISHMENT	27	1
FAMILY SECURITY	28	2
FREEDOM	41	3
SELF-RESPECT	42	4
HEALTH	46	5
SALVATION	52	6
A COMFORTABLE LIFE	60	7
NATIONAL SECURITY	72	8
TRUE FRIENDSHIP	72	8
MATURE LOVE	76	9
A WORLD AT PEACE	77	10
EQUALITY	83	11
WISDOM	84	12
AN EXCITING LIFE	85	13
INNER HARMONY	87	14
SOCIAL RECOGNITION	89	15
A WORLD OF BEAUTY	91	16
PLEASURE	95	17

Table 52
Subgroup L Terminal Value Hierarchy

Value	Rj:	Rank
HEALTH	25	1
FREEDOM	28	2
FAMILY SECURITY	40	3
SELF-RESPECT	41	4
A SENSE OF ACCOMPLISHMENT	56	5
EQUALITY	62	6
A COMFORTABLE LIFE	65	7
SALVATION	68	8
WISDOM	68	8
TRUE FRIENDSHIP	70	9
INNER HARMONY	71	10
MATURE LOVE	75	11
NATIONAL SECURITY	80	12
AN EXCITING LIFE	84	13
A WORLD AT PEACE	86	14
A WORLD OF BEAUTY	89	15
PLEASURE	91	16
SOCIAL RECOGNITION	98	17

Table 53
Subgroup A Instrumental Value Hierarchy

Value	Rj:	Rank
HONEST	210	1
RESPONSIBLE	278	2
LOYAL	374	3
CAPABLE	403	4
INTELLECTUAL	474	5
COURAGEOUS	475	6
INDEPENDENT	494	7
SELF-CONTROLLED	497	8
AMBITIOUS	500	9
LOGICAL	518	10
LOVING	524	11
BROADMINDED	571	12
IMAGINATIVE	600	13
FORGIVING	630	14
HELPFUL	631	15
POLITE	693	16
OBEDIENT	732	17
CLEAN	786	18

Table 54
Subgroup B Instrumental Value Hierarchy

Value	Rj:	Rank
HONEST	58	1
RESPONSIBLE	81	2
LOYAL	112	3
CAPABLE	153	4
COURAGEOUS	158	5
INTELLECTUAL	168	6
INDEPENDENT	175	7
SELF-CONTROLLED	181	8
AMBITIOUS	192	9
BROADMINDED	195	10
LOVING	199	11
FORGIVING	200	12
OBEDIENT	201	13
IMAGINATIVE	208	14
LOGICAL	215	15
HELPFUL	235	16
POLITE	239	17
CLEAN	279	18

Table 55
Subgroup C Instrumental Value Hierarchy

Value	Rj:	Rank
HONEST	102	1
RESPONSIBLE	114	2
CAPABLE	149	3
SELF-CONTROLLED	174	4
LOYAL	185	5
AMBITIOUS	192	6
LOGICAL	192	6
INDEPENDENT	196	7
COURAGEOUS	209	8
INTELLECTUAL	214	9
BROADMINDED	236	10
LOVING	239	11
HELPFUL	248	12
IMAGINATIVE	256	13
FORGIVING	278	14
POLITE	284	15
CLEAN	320	16
OBEDIENT	338	17

Table 56
Subgroup D Instrumental Value Hierarchy

Value	Rj:	Rank
HONEST	50	1
LOYAL	77	2
RESPONSIBLE	83	3
LOVING	86	4
INTELLECTUAL	92	5
CAPABLE	101	6
COURAGEOUS	108	7
LOGICAL	111	8
AMBITIOUS	116	9
INDEPENDENT	123	10
IMAGINATIVE	136	11
BROADMINDED	140	12
SELF-CONTROLLED	142	13
HELPFUL	148	14
FORGIVING	152	15
POLITE	170	16
CLEAN	187	17
OBEDIENT	193	18

Table 57
Subgroup E Instrumental Value Hierarchy

Value	Rj:	Rank
RESPONSIBLE	85	1
HONEST	95	2
CAPABLE	143	3
BROADMINDED	152	4
COURAGEOUS	156	5
LOYAL	158	6
AMBITIOUS	161	7
SELF-CONTROLLED	167	8
HELPFUL	184	9
INTELLECTUAL	208	10
FORGIVING	212	11
INDEPENDENT	225	12
POLITE	227	13
LOGICAL	229	14
LOVING	242	15
IMAGINATIVE	243	16
OBEDIENT	245	17
CLEAN	279	18

Table 58
Subgroup F Instrumental Value Hierarchy

Value	Rj:	Rank
HONEST	39	1
RESPONSIBLE	51	2
CAPABLE	74	3
LOYAL	75	4
SELF-CONTROLLED	93	5
COURAGEOUS	94	6
BROADMINDED	97	7
AMBITIOUS	106	8
HELPFUL	116	9
POLITE	121	10
OBEDIENT	130	11
FORGIVING	132	12
LOGICAL	136	13
INTELLECTUAL	139	14
INDEPENDENT	146	15
LOVING	155	16
CLEAN	161	17
IMAGINATIVE	172	18

Table 59
Subgroup G Instrumental Value Hierarchy

Value	Rj:	Rank
RESPONSIBLE	24	1
BROADMINDED	25	2
COURAGEOUS	35	3
AMBITIOUS	37	4
HONEST	42	5
HELPFUL	47	6
IMAGINATIVE	48	7
CAPABLE	52	8
INDEPENDENT	52	8
FORGIVING	60	9
INTELLECTUAL	60	9
SELF-CONTROLLED	65	10
LOYAL	69	11
LOVING	75	12
LOGICAL	82	13
CLEAN	86	14
POLITE	86	14
OBEDIENT	88	15

Table 60
Subgroup I Instrumental Value Hierarchy

Value	Rj:	Rank
HONEST	72	1
RESPONSIBLE	123	2
BROADMINDED	196	3
LOYAL	197	4
SELF-CONTROLLED	198	5
CAPABLE	200	6
AMBITIOUS	208	7
INDEPENDENT	214	8
HELPFUL	222	9
LOGICAL	225	10
LOVING	225	10
COURAGEOUS	229	11
FORGIVING	247	12
INTELLECTUAL	256	13
IMAGINATIVE	270	14
POLITE	277	15
OBEDIENT	364	16
CLEAN	381	17

Table 61
Subgroup J Instrumental Value Hierarchy

Value	Rj:	Rank
HONEST	18	1
RESPONSIBLE	40	2
LOYAL	69	3
SELF-CONTROLLED	70	4
LOGICAL	76	5
BROADMINDED	84	6
CAPABLE	84	6
COURAGEOUS	95	7
INTELLECTUAL	97	8
HELPFUL	103	9
AMBITIOUS	104	10
LOVING	104	10
INDEPENDENT	107	11
FORGIVING	113	12
POLITE	114	13
IMAGINATIVE	125	14
OBEDIENT	152	15
CLEAN	155	16

Table 62
Subgroup K Instrumental Value Hierarchy

Value	Rj:	Rank
HONEST	27	1
BROADMINDED	40	2
AMBITIOUS	42	3
RESPONSIBLE	43	4
CAPABLE	56	5
INDEPENDENT	59	6
HELPFUL	62	7
LOYAL	65	8
COURAGEOUS	67	9
IMAGINATIVE	67	9
LOVING	70	10
INTELLECTUAL	73	11
FORGIVING	75	12
SELF-CONTROLLED	76	13
LOGICAL	78	14
POLITE	78	14
OBEDIENT	105	15
CLEAN	114	16

Table 63
Subgroup L Instrumental Value Hierarchy

Value	Rj:	Rank
HONEST	27	1
RESPONSIBLE	40	2
INDEPENDENT	48	3
LOVING	51	4
SELF-CONTROLLED	52	5
HELPFUL	57	6
FORGIVING	59	7
CAPABLE	60	8
AMBITIOUS	62	9
LOYAL	63	10
COURAGEOUS	67	11
LOGICAL	71	12
BROADMINDED	72	13
IMAGINATIVE	78	14
POLITE	85	15
INTELLECTUAL	86	16
OBEDIENT	107	17
CLEAN	112	18

Appendix D: Kruskal-Wallis Computer Printouts

On the following pages are the computer printouts of the Kruskal-Wallis tests for independence of both terminal and instrumental value hierarchies across the various subgroups. The tests are arranged in alphabetical order by subgroup (A, B, C, . . .) for each type of value hierarchy analyzed. Terminal value hierarchy tests are listed first followed by the instrumental value hierarchy tests. Each test is headed by two capital letters separated by a back-slash, which indicate the subgroups being compared (e.g. A/B would be subgroup A vs. subgroup B). Each set of subgroup comparisons (e.g. subgroup A to all others) begins on a new page, and two tests are displayed per page. If a set of subgroup comparisons contains an odd number of tests, the last test is shown by itself prior to a new group starting on the following page. When more than one test is shown on a page, the tests are displayed side-by-side.

Included in each listing are the jointly ranked subgroup rank sum values and their corresponding joint rankings (first three columns), the tied values (under column t), and the calculated values of the test itself. The capital letters next to the rank sum values in the first column of the test listing indicate which subgroup that particular value belonged to prior to its being jointly ranked with the other rank sum values. All test values are identical in nature to those explained in Chapter IV for Figure 3.

KRUSKAL-WALLIS TESTS: TERMINAL VALUES

SUBGROUP A

A/B

Rj:	A	B	t
110 B		1	
115 B		2	
123 B		3	
127 B		4	
138 B		5	
161 B		6	
170 B		7	
172 B		8	
189 B		9	
191 B		10	
194 B		11	
202 B		12.5	2
202 B		12.5	
217 B		14.5	2
217 B		14.5	
233 B		16	
236 B		17	
252 B		18	
304 A	19		
308 A	20		
339 A	21		
350 A	22		
395 A	23		
476 A	24		
505 A	25		
517 A	26		
522 A	27		
541 A	28		
544 A	29		
556 A	30		
610 A	31		
627 A	32		
644 A	33		
665 A	34		
723 A	35		
780 A	36		

RA	RB	RA2D	RB2D
495	171	245025	29241

H = 26.27
TIE FACTOR = 0.9997
H' = 26.277

A/C

Rj:	A	C	t
105 C		1	
122 C		2	
139 C		3	
156 C		4	
173 C		5	
191 C		6	
205 C		7	
212 C		8	
223 C		9	
225 C		10	
230 C		11	
239 C		12	
259 C		13	
272 C		14	
277 C		15	
286 C		16	
302 C		17	
304 A	18		
308 A	19		
320 C		20	
339 A	21		
350 A	22		
395 A	23		
476 A	24		
505 A	25		
517 A	26		
522 A	27		
541 A	28		
544 A	29		
556 A	30		
610 A	31		
627 A	32		
644 A	33		
665 A	34		
723 A	35		
780 A	36		

RA	RC	RA2D	RC2D
493	173	243049	29929

H = 25.625
TIE FACTOR = 1
H' = 25.625

A/D

Rj:	A	D	t
50	D	1	
79	D	2	
80	D	3	
84	D	4	
95	D	5	
103	D	6	
108	D	7	
112	D	8	
118	D	9	
124	D	10	
134	D	11	
139	D	12	
141	D	13	
142	D	14	
157	D	15	
159	D	16	
188	D	17	
208	D	18	
304	A	19	
308	A	20	
339	A	21	
350	A	22	
395	A	23	
476	A	24	
505	A	25	
517	A	26	
522	A	27	
541	A	28	
544	A	29	
556	A	30	
610	A	31	
627	A	32	
644	A	33	
665	A	34	
723	A	35	
780	A	36	

RA	RD	RA2D	RD2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 1

H' = 26.27

A/E

Rj:	A	E	t
104	E	1	
111	E	2	
138	E	3	
141	E	4.5	2
141	E	4.5	
152	E	6	
179	E	7	
187	E	8	
195	E	9	
200	E	10.5	2
200	E	10.5	
203	E	12	
210	E	13	
211	E	14	
237	E	15	
260	E	16	
272	E	17	
279	E	18	
304	A	19	
308	A	20	
339	A	21	
350	A	22	
395	A	23	
476	A	24	
505	A	25	
517	A	26	
522	A	27	
541	A	28	
544	A	29	
556	A	30	
610	A	31	
627	A	32	
644	A	33	
665	A	34	
723	A	35	
780	A	36	

RA	RE	RA2D	RE2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9997

H' = 26.277

A/F

Rj:		A	F	t
63	F		1	
76	F		2	
77	F		3	
81	F		4	
86	F		5	
88	F		6	
94	F		7	
108	F		8	
116	F		9	
117	F		10	
119	F		11	
120	F		12	
125	F		13	
131	F		14	
148	F		15	
161	F		16	
168	F		17	
174	F		18	
304	A	19		
308	A	20		
339	A	21		
350	A	22		
395	A	23		
476	A	24		
505	A	25		
517	A	26		
522	A	27		
541	A	28		
544	A	29		
556	A	30		
610	A	31		
627	A	32		
644	A	33		
665	A	34		
723	A	35		
780	A	36		

RA	RF	RA2D	RF2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 1

H' = 26.27

A/G

Rj:		A	G	t
32	G		1.5	2
32	G		1.5	
34	G		3	
36	G		4	
47	G		5	
52	G		6	
54	G		7.5	2
54	G		7.5	
58	G		9	
59	G		10.5	2
59	G		10.5	
61	G		12	
64	G		13	
69	G		14	
71	G		15	
73	G		16	
82	G		17	
89	G		18	
304	A	19		
308	A	20		
339	A	21		
350	A	22		
395	A	23		
476	A	24		
505	A	25		
517	A	26		
522	A	27		
541	A	28		
544	A	29		
556	A	30		
610	A	31		
627	A	32		
644	A	33		
665	A	34		
723	A	35		
780	A	36		

RA	RG	RA2D	RG2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9996

H' = 26.28

A/I

Rj:	A	I	t
120 I		1	
121 I		2	
131 I		3	
134 I		4	
161 I		5	
199 I		6	
222 I		7	
237 I		8	
238 I		9	
246 I		10	
249 I		11	
251 I		12	
270 I		13.5	2
270 I		13.5	
301 I		15	
304 A	16		
308 A	17		
314 I		18	
316 I		19	
334 I		20	
339 A	21		
350 A	22		
395 A	23		
476 A	24		
505 A	25		
517 A	26		
522 A	27		
541 A	28		
544 A	29		
556 A	30		
610 A	31		
627 A	32		
644 A	33		
665 A	34		
723 A	35		
780 A	36		

RA	RI	RA2D	RI2D
489	177	239121	31329

H = 24.36

TIE FACTOR = 0.9999

H' = 24.363

A/J

Rj:	A	J	t
51 J		1.5	2
51 J		1.5	
53 J		3	
60 J		4	
74 J		5	
78 J		6	
80 J		7	
85 J		8	
93 J		9	
97 J		10	
100 J		11	
107 J		12	
112 J		13	
126 J		14	
130 J		15	
132 J		16	
134 J		17	
147 J		18	
304 A	19		
308 A	20		
339 A	21		
350 A	22		
395 A	23		
476 A	24		
505 A	25		
517 A	26		
522 A	27		
541 A	28		
544 A	29		
556 A	30		
610 A	31		
627 A	32		
644 A	33		
665 A	34		
723 A	35		
780 A	36		

RA	RJ	RA2D	RJ2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9999

H' = 26.274

A/K

Rj:	A	K	t
27	K	1	
28	K	2	
41	K	3	
42	K	4	
46	K	5	
52	K	6	
60	K	7	
72	K	8.5	2
72	K	8.5	
76	K	10	
77	K	11	
83	K	12	
84	K	13	
85	K	14	
87	K	15	
89	K	16	
91	K	17	
95	K	18	
304	A	19	
308	A	20	
339	A	21	
350	A	22	
395	A	23	
476	A	24	
505	A	25	
517	A	26	
522	A	27	
541	A	28	
544	A	29	
556	A	30	
610	A	31	
627	A	32	
644	A	33	
665	A	34	
723	A	35	
780	A	36	

RA	RK	RA2D	RK2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9999

H' = 26.274

A/L

Rj:	A	L	t
25	L	1	
28	L	2	
40	L	3	
41	L	4	
56	L	5	
62	L	6	
65	L	7	
68	L	8.5	2
68	L	8.5	
70	L	10	
71	L	11	
75	L	12	
80	L	13	
84	L	14	
86	L	15	
89	L	16	
91	L	17	
98	L	18	
304	A	19	
308	A	20	
339	A	21	
350	A	22	
395	A	23	
476	A	24	
505	A	25	
517	A	26	
522	A	27	
541	A	28	
544	A	29	
556	A	30	
610	A	31	
627	A	32	
644	A	33	
665	A	34	
723	A	35	
780	A	36	

RA	RL	RA2D	RL2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9999

H' = 26.274

SUBGROUP B

B/C

Rj:	B	C	t
105 C		1	
110 B	2		
115 B	3		
122 C		4	
123 B	5		
127 B	6		
138 B	7		
139 C		8	
156 C		9	
161 B	10		
170 B	11		
172 B	12		
173 C		13	
189 B	14		
191 B	15.5		2
191 C		15.5	
194 B	17		
202 B	18.5		2
202 B	18.5		
205 C		20	
212 C		21	
217 B	22.5		2
217 B	22.5		
223 C		24	
225 C		25	
230 C		26	
233 B	27		
236 B	28		
239 C		29	
252 B	30		
259 C		31	
272 C		32	
277 C		33	
286 C		34	
302 C		35	
320 C		36	

RB	RC	RB2D	RC2D
269.5	396.5	72630	157212

H = 4.0362

TIE FACTOR = 0.9996

H' = 4.0377

B/D

Rj:	B	D	t
50 D		1	
79 D		2	
80 D		3	
84 D		4	
95 D		5	
103 D		6	
108 D		7	
110 B	8		
112 D		9	
115 B	10		
118 D		11	
123 B	12		
124 D		13	
127 B	14		
134 D		15	
138 B	16		
139 D		17	
141 D		18	
142 D		19	
157 D		20	
159 D		21	
161 B	22		
170 B	23		
172 B	24		
188 D		25	
189 B	26		
191 B	27		
194 B	28		
202 B	29.5		2
202 B	29.5		
208 D		31	
217 B	32.5		2
217 B	32.5		
233 B	34		
236 B	35		
252 B	36		

RB	RD	RB2D	RD2D
439	227	192721	51529

H = 11.247

TIE FACTOR = 0.9997

H' = 11.25

B/E

Rj:		B	E	t
104	E		1	
110	B	2		
111	E		3	
115	B	4		
123	B	5		
127	B	6		
138	B	7.5		2
138	E		7.5	
141	E		9.5	2
141	E		9.5	
152	E		11	
161	B	12		
170	B	13		
172	B	14		
179	E		15	
187	E		16	
189	B	17		
191	B	18		
194	B	19		
195	E		20	
200	E		21.5	2
200	E		21.5	
202	B	23.5		2
202	B	23.5		
203	E		25	
210	E		26	
211	E		27	
217	B	28.5		2
217	B	28.5		
233	B	30		
236	B	31		
237	E		32	
252	B	33		
260	E		34	
272	E		35	
279	E		36	

RB	RE	RB2D	RE2D
315.5	350.5	99540	122850

H = 0.3064

TIE FACTOR = 0.9994

H' = 0.3066

B/F

Rj:		B	F	t
63	F		1	
76	F		2	
77	F		3	
81	F		4	
86	F		5	
88	F		6	
94	F		7	
108	F		8	
110	B	9		
115	B	10		
116	F		11	
117	F		12	
119	F		13	
120	F		14	
123	B	15		
125	F		16	
127	B	17		
131	F		18	
138	B	19		
148	F		20	
161	B	21.5		2
161	F		21.5	
168	F		23	
170	B	24		
172	B	25		
174	F		26	
189	B	27		
191	B	28		
194	B	29		
202	B	30.5		2
202	B	30.5		
217	B	32.5		2
217	B	32.5		
233	B	34		
236	B	35		
252	B	36		

RB	RF	RB2D	RF2D
455.5	210.5	207480	44310

H = 15.021

TIE FACTOR = 0.9996

H' = 15.027

B/G

Rj:	B	G	t
32 G		1.5	2
32 G		1.5	
34 G		3	
36 G		4	
47 G		5	
52 G		6	
54 G		7.5	2
54 G		7.5	
58 G		9	
59 G		10.5	2
59 G		10.5	
61 G		12	
64 G		13	
69 G		14	
71 G		15	
73 G		16	
82 G		17	
89 G		18	
110 B	19		
115 B	20		
123 B	21		
127 B	22		
138 B	23		
161 B	24		
170 B	25		
172 B	26		
189 B	27		
191 B	28		
194 B	29		
202 B	30.5		2
202 B	30.5		
217 B	32.5		2
217 B	32.5		
233 B	34		
236 B	35		
252 B	36		

RB	RG	RB2D	RG2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9994

H' = 26.287

B/I

Rj:	B	I	t
110 B	1		
115 B	2		
120 I		3	
121 I		4	
123 B	5		
127 B	6		
131 I		7	
134 I		8	
138 B	9		
161 B	10.5		2
161 I		10.5	
170 B	12		
172 B	13		
189 B	14		
191 B	15		
194 B	16		
199 I		17	
202 B	18.5		2
202 B	18.5		
217 B	20.5		2
217 B	20.5		
222 I		22	
233 B	23		
236 B	24		
237 I		25	
238 I		26	
246 I		27	
249 I		28	
251 I		29	
252 B	30		
270 I		31.5	2
270 I		31.5	
301 I		33	
314 I		34	
316 I		35	
334 I		36	

RB	RI	RB2D	RI2D
258.5	407.5	66822	166056

H = 5.5557

TIE FACTOR = 0.9995

H' = 5.5586

B/J

Rj:	B	J	t
51 J		1.5	2
51 J		1.5	
53 J		3	
60 J		4	
74 J		5	
78 J		6	
80 J		7	
85 J		8	
93 J		9	
97 J		10	
100 J		11	
107 J		12	
110 B	13		
112 J		14	
115 B	15		
123 B	16		
126 J		17	
127 B	18		
130 J		19	
132 J		20	
134 J		21	
138 B	22		
147 J		23	
161 B	24		
170 B	25		
172 B	26		
189 B	27		
191 B	28		
194 B	29		
202 B	30.5		2
202 B	30.5		
217 B	32.5		2
217 B	32.5		
233 B	34		
236 B	35		
252 B	36		

RB	RJ	RB2D	RJ2D
474	192	224676	36864

H = 19.901

TIE FACTOR = 0.9996

H' = 19.908

B/K

Rj:	B	K	t
27 K		1	
28 K		2	
41 K		3	
42 K		4	
46 K		5	
52 K		6	
60 K		7	
72 K		8.5	2
72 K		8.5	
76 K		10	
77 K		11	
83 K		12	
84 K		13	
85 K		14	
87 K		15	
89 K		16	
91 K		17	
95 K		18	
110 B	19		
115 B	20		
123 B	21		
127 B	22		
138 B	23		
161 B	24		
170 B	25		
172 B	26		
189 B	27		
191 B	28		
194 B	29		
202 B	30.5		2
202 B	30.5		
217 B	32.5		2
217 B	32.5		
233 B	34		
236 B	35		
252 B	36		

RB	RK	RB2D	RK2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9996

H' = 26.28

B/L

Rj:		B	L	t
25	L		1	
28	L		2	
40	L		3	
41	L		4	
56	L		5	
62	L		6	
65	L		7	
68	L		8.5	2
68	L		8.5	
70	L		10	
71	L		11	
75	L		12	
80	L		13	
84	L		14	
86	L		15	
89	L		16	
91	L		17	
98	L		18	
110	B	19		
115	B	20		
123	B	21		
127	B	22		
138	B	23		
161	B	24		
170	B	25		
172	B	26		
189	B	27		
191	B	28		
194	B	29		
202	B	30.5		2
202	B	30.5		
217	B	32.5		2
217	B	32.5		
233	B	34		
236	B	35		
252	B	36		

RB	RL	RB2D	RL2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9996

H' = 26.28

SUBGROUP C

C/D

Rj:	C	D	t
50 D		1	
79 D		2	
80 D		3	
84 D		4	
95 D		5	
103 D		6	
105 C	7		
108 D		8	
112 D		9	
118 D		10	
122 C	11		
124 D		12	
134 D		13	
139 C	14.5		2
139 D		14.5	
141 D		16	
142 D		17	
156 C	18		
157 D		19	
159 D		20	
173 C	21		
188 D		22	
191 C	23		
205 C	24		
208 D		25	
212 C	26		
223 C	27		
225 C	28		
230 C	29		
239 C	30		
259 C	31		
272 C	32		
277 C	33		
286 C	34		
302 C	35		
320 C	36		

RC	RD	RC2D	RD2D
459.5	206.5	211140	42642

H = 16.018

TIE FACTOR = 0.9999

H' = 16.02

C/E

Rj:	C	E	t
104 E		1	
105 C	2		
111 E		3	
122 C	4		
138 E		5	
139 C	6		
141 E		7.5	2
141 E		7.5	
152 E		9	
156 C	10		
173 C	11		
179 E		12	
187 E		13	
191 C	14		
195 E		15	
200 E		16.5	2
200 E		16.5	
203 E		18	
205 C	19		
210 E		20	
211 E		21	
212 C	22		
223 C	23		
225 C	24		
230 C	25		
237 E		26	
239 C	27		
259 C	28		
260 E		29	
272 C	30.5		2
272 E		30.5	
277 C	32		
279 E		33	
286 C	34		
302 C	35		
320 C	36		

RC	RE	RC2D	RE2D
382.5	283.5	146306	80372

H = 2.4526

TIE FACTOR = 0.9996

H' = 2.4535

C/F

Rj:	C	F	t
63	F	1	
76	F	2	
77	F	3	
81	F	4	
86	F	5	
88	F	6	
94	F	7	
105	C	8	
108	F	9	
116	F	10	
117	F	11	
119	F	12	
120	F	13	
122	C	14	
125	F	15	
131	F	16	
139	C	17	
148	F	18	
156	C	19	
161	F	20	
168	F	21	
173	C	22	
174	F	23	
191	C	24	
205	C	25	
212	C	26	
223	C	27	
225	C	28	
230	C	29	
239	C	30	
259	C	31	
272	C	32	
277	C	33	
286	C	34	
302	C	35	
320	C	36	

RC	RF	RC2D	RF2D
470	196	220900	38416

H = 18.788

TIE FACTOR = 1

H' = 18.788

C/G

Rj:	C	G	t
32	G	1.5	2
32	G	1.5	
34	G	3	
36	G	4	
47	G	5	
52	G	6	
54	G	7.5	2
54	G	7.5	
58	G	9	
59	G	10.5	2
59	G	10.5	
61	G	12	
64	G	13	
69	G	14	
71	G	15	
73	G	16	
82	G	17	
89	G	18	
105	C	19	
122	C	20	
139	C	21	
156	C	22	
173	C	23	
191	C	24	
205	C	25	
212	C	26	
223	C	27	
225	C	28	
230	C	29	
239	C	30	
259	C	31	
272	C	32	
277	C	33	
286	C	34	
302	C	35	
320	C	36	

RC	RG	RC2D	RG2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9996

H' = 26.28

C/I

Rj:	C	I	t
105 C	1		
120 I		2	
121 I		3	
122 C	4		
131 I		5	
134 I		6	
139 C	7		
156 C	8		
161 I		9	
173 C	10		
191 C	11		
199 I		12	
205 C	13		
212 C	14		
222 I		15	
223 C	16		
225 C	17		
230 C	18		
237 I		19	
238 I		20	
239 C	21		
246 I		22	
249 I		23	
251 I		24	
259 C	25		
270 I		26.5	2
270 I		26.5	
272 C	28		
277 C	29		
286 C	30		
301 I		31	
302 C	32		
314 I		33	
316 I		34	
320 C	35		
334 I		36	

RC	RI	RC2D	RI2D
319	347	101761	120409

H = 0.1961

TIE FACTOR = 0.9999

H' = 0.1961

C/J

Rj:	C	J	t
51 J		1	2
51 J		2	
53 J		3	
60 J		4	
74 J		5	
78 J		6	
80 J		7	
85 J		8	
93 J		9	
97 J		10	
100 J		11	
105 C	12		
107 J		13	
112 J		14	
122 C	15		
126 J		16	
130 J		17	
132 J		18	
134 J		19	
139 C	20		
147 J		21	
156 C	22		
173 C	23		
191 C	24		
205 C	25		
212 C	26		
223 C	27		
225 C	28		
230 C	29		
239 C	30		
259 C	31		
272 C	32		
277 C	33		
286 C	34		
302 C	35		
320 C	36		

RC	RJ	RC2D	RJ2D
482	184	232324	33856

H = 22.223

TIE FACTOR = 0.9999

H' = 22.226

C/K

Rj:	C	K	t
27	K	1	
28	K	2	
41	K	3	
42	K	4	
46	K	5	
52	K	6	
60	K	7	
72	K	8.5	2
72	K	8.5	
76	K	10	
77	K	11	
83	K	12	
84	K	13	
85	K	14	
87	K	15	
89	K	16	
91	K	17	
95	K	18	
105	C	19	
122	C	20	
139	C	21	
156	C	22	
173	C	23	
191	C	24	
205	C	25	
212	C	26	
223	C	27	
225	C	28	
230	C	29	
239	C	30	
259	C	31	
272	C	32	
277	C	33	
286	C	34	
302	C	35	
320	C	36	

RC	RK	RC2D	RK2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9999

H' = 26.274

C/L

Rj:	C	L	t
25	L	1	
28	L	2	
40	L	3	
41	L	4	
56	L	5	
62	L	6	
65	L	7	
68	L	8.5	2
68	L	8.5	
70	L	10	
71	L	11	
75	L	12	
80	L	13	
84	L	14	
86	L	15	
89	L	16	
91	L	17	
98	L	18	
105	C	19	
122	C	20	
139	C	21	
156	C	22	
173	C	23	
191	C	24	
205	C	25	
212	C	26	
223	C	27	
225	C	28	
230	C	29	
239	C	30	
259	C	31	
272	C	32	
277	C	33	
286	C	34	
302	C	35	
320	C	36	

RC	RL	RC2D	RL2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9999

H' = 26.274

SUBGROUP D

D/E

Rj:	D	E	t
50 D	1		
79 D	2		
80 D	3		
84 D	4		
95 D	5		
103 D	6		
104 E		7	
108 D	8		
111 E		9	
112 D	10		
118 D	11		
124 D	12		
134 D	13		
138 E		14	
139 D	15		
141 D	17		3
141 E		17	
141 E		17	
142 D	19		
152 E		20	
157 D	21		
159 D	22		
179 E		23	
187 E		24	
188 D	25		
195 E		26	
200 E		27.5	2
200 E		27.5	
203 E		29	
208 D	30		
210 E		31	
211 E		32	
237 E		33	
260 E		34	
272 E		35	
279 E		36	

RD	RE	RD2D	RE2D
224	442	50176	195364

H = 11.893

TIE FACTOR = 0.9994

H' = 11.9

D/F

Rj:	D	F	t
50 D	1		
63 F		2	
76 F		3	
77 F		4	
79 D	5		
80 D	6		
81 F		7	
84 D	8		
86 F		9	
88 F		10	
94 F		11	
95 D	12		
103 D	13		
108 D	14.5		2
108 F		14.5	
112 D	16		
116 F		17	
117 F		18	
118 D	19		
119 F		20	
120 F		21	
124 D	22		
125 F		23	
131 F		24	
134 D	25		
139 D	26		
141 D	27		
142 D	28		
148 F		29	
157 D	30		
159 D	31		
161 F		32	
168 F		33	
174 F		34	
188 D	35		
208 D	36		

RD	RF	RD2D	RF2D
354.5	311.5	125670	97032

H = 0.4626

TIE FACTOR = 0.9999

H' = 0.4627

D/G

Rj:		D	G	t
32	G		1.5	2
32	G		1.5	
34	G		3	
36	G		4	
47	G		5	
50	D	6		
52	G		7	
54	G		8.5	2
54	G		8.5	
58	G		10	
59	G		11.5	2
59	G		11.5	
61	G		13	
64	G		14	
69	G		15	
71	G		16	
73	G		17	
79	D	18		
80	D	19		
82	G		20	
84	D	21		
89	G		22	
95	D	23		
103	D	24		
108	D	25		
112	D	26		
118	D	27		
124	D	28		
134	D	29		
139	D	30		
141	D	31		
142	D	32		
157	D	33		
159	D	34		
188	D	35		
208	D	36		

RD	RG	RD2D	RG2D
477	189	227529	35721

H = 20.757

TIE FACTOR = 0.9996

H' = 20.765

D/I

Rj:		D	I	t
50	D	1		
79	D	2		
80	D	3		
84	D	4		
95	D	5		
103	D	6		
108	D	7		
112	D	8		
118	D	9		
120	I		10	
121	I		11	
124	D	12		
131	I		13	
134	D	14.5		2
134	I		14.5	
139	D	16		
141	D	17		
142	D	18		
157	D	19		
159	D	20		
161	I		21	
188	D	22		
199	I		23	
208	D	24		
222	I		25	
237	I		26	
238	I		27	
246	I		28	
249	I		29	
251	I		30	
270	I		31.5	2
270	I		31.5	
301	I		33	
314	I		34	
316	I		35	
334	I		36	

RD	RI	RD2D	RI2D
207.5	458.5	43056	210222

H = 15.766

TIE FACTOR = 0.9997

H' = 15.77

D/J

Rj:	D	J	t
50 D	1.5		
51 J		1.5	2
51 J		3	
53 J		4	
60 J		5	
74 J		6	
78 J		7	
79 D	8		
80 J		9.5	2
80 D	9.5		
84 D	11		
85 J		12	
93 J		13	
95 D	14		
97 J		15	
100 J		16	
103 D	17		
107 J		18	
108 D	19		
112 D	20		
112 J		21	
118 D	22		
124 D	23		
126 J		24	
130 J		25	
132 J		26	
134 D	27.5		2
134 J		27.5	
139 D	29		
141 D	30		
142 D	31		
147 J		32	
157 D	33		
159 D	34		
188 D	35		
208 D	36		

RD	RJ	RD2D	RJ2D
400.5	265.5	160400	70490

H = 4.5607

TIE FACTOR = 0.9996

H' = 4.5625

D/K

Rj:	D	K	t
27 K		1	
28 K		2	
41 K		3	
42 K		4	
46 K		5	
50 D	6		
52 K		7	
60 K		8	
72 K		9.5	2
72 K		9.5	
76 K		11	
77 K		12	
79 D	13		
80 D	14		
83 K		15	
84 D	16.5		2
84 K		16.5	
85 K		18	
87 K		19	
89 K		20	
91 K		21	
95 D	22.5		2
95 K		22.5	
103 D	24		
108 D	25		
112 D	26		
118 D	27		
124 D	28		
134 D	29		
139 D	30		
141 D	31		
142 D	32		
157 D	33		
159 D	34		
188 D	35		
208 D	36		

RD	RK	RD2D	RK2D
462	204	213444	41616

H = 16.658

TIE FACTOR = 0.9996

H' = 16.664

D/L

Rj:		D	L	t
25	L		1	
28	L		2	
40	L		3	
41	L		4	
50	D	5		
56	L		6	
62	L		7	
65	L		8	
68	L		9.5	2
68	L		9.5	
70	L		11	
71	L		12	
75	L		13	
79	D	14		
80	D	15.5		2
80	L		15.5	
84	D	17.5		2
84	L		17.5	
86	L		19	
89	L		20	
91	L		21	
95	D	22		
98	L		23	
103	D	24		
108	D	25		
112	D	26		
118	D	27		
124	D	28		
134	D	29		
139	D	30		
141	D	31		
142	D	32		
157	D	33		
159	D	34		
188	D	35		
208	D	36		

RD	RL	RD2D	RL2D
464	202	215296	40804

H = 17.178

TIE FACTOR = 0.9996

H' = 17.185

SUBGROUP E

E/F

Rj:		E	F	t
63	F		1	
76	F		2	
77	F		3	
81	F		4	
86	F		5	
88	F		6	
94	F		7	
104	E	8		
108	F		9	
111	E	10		
116	F		11	
117	F		12	
119	F		13	
120	F		14	
125	F		15	
131	F		16	
138	E	17		
141	E	18.5		2
141	E	18.5		
148	F		20	
152	E	21		
161	F		22	
168	F		23	
174	F		24	
179	E	25		
187	E	26		
195	E	27		
200	E	28.5		2
200	E	28.5		
203	E	30		
210	E	31		
211	E	32		
237	E	33		
260	E	34		
272	E	35		
279	E	36		

RE	RF	RE2D	RF2D
459	207	210681	42849

H = 15.892

TIE FACTOR = 0.9997

H' = 15.896

E/G

Rj:		E	G	t
32	G		1.5	2
32	G		1.5	
34	G		3	
36	G		4	
47	G		5	
52	G		6	
54	G		7.5	2
54	G		7.5	
58	G		9	
59	G		10.5	2
59	G		10.5	
61	G		12	
64	G		13	
69	G		14	
71	G		15	
73	G		16	
82	G		17	
89	G		18	
104	E	19		
111	E	20		
138	E	21		
141	E	22.5		2
141	E	22.5		
152	E	24		
179	E	25		
187	E	26		
195	E	27		
200	E	28.5		2
200	E	28.5		
203	E	30		
210	E	31		
211	E	32		
237	E	33		
260	E	34		
272	E	35		
279	E	36		

RE	RG	RE2D	RG2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9994

H' = 26.287

E/I

Rj:		E	I	t
104	E	1		
111	E	2		
120	I		3	
121	I		4	
131	I		5	
134	I		6	
138	E	7		
141	E	8.5		2
141	E	8.5		
152	E	10		
161	I		11	
179	E	12		
187	E	13		
195	E	14		
199	I		15	
200	E	16.5		2
200	E	16.5		
203	E	18		
210	E	19		
211	E	20		
222	I		21	
237	E	22.5		2
237	I		22.5	
238	I		24	
246	I		25	
249	I		26	
251	I		27	
260	E	28		
270	I		29.5	2
270	I		29.5	
272	E	31		
279	E	32		
301	I		33	
314	I		34	
316	I		35	
334	I		36	

RE	RI	RE2D	RI2D
279.5	386.5	78120	149382

H = 2.865

TIE FACTOR = 0.9995

H' = 2.8665

E/J

Rj:		E	J	t
51	J		1.5	2
51	J		1.5	
53	J		3	
60	J		4	
74	J		5	
78	J		6	
80	J		7	
85	J		8	
93	J		9	
97	J		10	
100	J		11	
104	E	12		
107	J		13	
111	E	14		
112	J		15	
126	J		16	
130	J		17	
132	J		18	
134	J		19	
138	E	20		
141	E	21.5		2
141	E	21.5		
147	J		23	
152	E	24		
179	E	25		
187	E	26		
195	E	27		
200	E	28.5		2
200	E	28.5		
203	E	30		
210	E	31		
211	E	32		
237	E	33		
260	E	34		
272	E	35		
279	E	36		

RE	RJ	RE2D	RJ2D
479	187	229441	34969

H = 21.337

TIE FACTOR = 0.9996

H' = 21.345

E/K

Rj:	E	K	t
27	K	1	
28	K	2	
41	K	3	
42	K	4	
46	K	5	
52	K	6	
60	K	7	
72	K	8.5	2
72	K	8.5	
76	K	10	
77	K	11	
83	K	12	
84	K	13	
85	K	14	
87	K	15	
89	K	16	
91	K	17	
95	K	18	
104	E	19	
111	E	20	
138	E	21	
141	E	22.5	2
141	E	22.5	
152	E	24	
179	E	25	
187	E	26	
195	E	27	
200	E	28.5	2
200	E	28.5	
203	E	30	
210	E	31	
211	E	32	
237	E	33	
260	E	34	
272	E	35	
279	E	36	

RE	RK	RE2D	RK2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9996

H' = 26.28

E/L

Rj:	E	L	t
25	L	1	
28	L	2	
40	L	3	
41	L	4	
56	L	5	
62	L	6	
65	L	7	
68	L	8.5	2
68	L	8.5	
70	L	10	
71	L	11	
75	L	12	
80	L	13	
84	L	14	
86	L	15	
89	L	16	
91	L	17	
98	L	18	
104	E	19	
111	E	20	
138	E	21	
141	E	22.5	2
141	E	22.5	
152	E	24	
179	E	25	
187	E	26	
195	E	27	
200	E	28.5	2
200	E	28.5	
203	E	30	
210	E	31	
211	E	32	
237	E	33	
260	E	34	
272	E	35	
279	E	36	

RE	RL	RE2D	RL2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9996

H' = 26.28

SUBGROUP F

F/G

Rj:		F	G	t
32	G		1.5	2
32	G		1.5	
34	G		3	
36	G		4	
47	G		5	
52	G		6	
54	G		7.5	2
54	G		7.5	
58	G		9	
59	G		10.5	2
59	G		10.5	
61	G		12	
63	F	13		
64	G		14	
69	G		15	
71	G		16	
73	G		17	
76	F	18		
77	F	19		
81	F	20		
82	G		21	
86	F	22		
88	F	23		
89	G		24	
94	F	25		
108	F	26		
116	F	27		
117	F	28		
119	F	29		
120	F	30		
125	F	31		
131	F	32		
148	F	33		
161	F	34		
168	F	35		
174	F	36		

RF	RG	RF2D	RG2D
481	185	231361	34225

H = 21.926

TIE FACTOR = 0.9996

H' = 21.934

F/I

Rj:		F	I	t
63	F	1		
76	F	2		
77	F	3		
81	F	4		
86	F	5		
88	F	6		
94	F	7		
108	F	8		
116	F	9		
117	F	10		
119	F	11		
120	F	12.5		2
120	I		12.5	
121	I		14	
125	F	15		
131	F	16.5		2
131	I		16.5	
134	I		18	
148	F	19		
161	F	20.5		2
161	I		20.5	
168	F	22		
174	F	23		
199	I		24	
222	I		25	
237	I		26	
238	I		27	
246	I		28	
249	I		29	
251	I		30	
270	I		31.5	2
270	I		31.5	
301	I		33	
314	I		34	
316	I		35	
334	I		36	

RF	RI	RF2D	RI2D
194.5	471.5	37830	222312

H = 19.201

TIE FACTOR = 0.9995

H' = 19.211

F/J

Rj:	F	J	t
51 J		1.5	2
51 J		1.5	
53 J		3	
60 J		4	
63 F	5		
74 J		6	
76 F	7		
77 F	8		
78 J		9	
80 J		10	
81 F	11		
85 J		12	
86 F	13		
88 F	14		
93 J		15	
94 F	16		
97 J		17	
100 J		18	
107 J		19	
108 F	20		
112 J		21	
116 F	22		
117 F	23		
119 F	24		
120 F	25		
125 F	26		
126 J		27	
130 J		28	
131 F	29		
132 J		30	
134 J		31	
147 J		32	
148 F	33		
161 F	34		
168 F	35		
174 F	36		

RF	RJ	RF2D	RJ2D
381	285	145161	81225

H = 2.3062

TIE FACTOR = 0.9999

H' = 2.3065

F/K

Rj:	F	K	t
27 K		1	
28 K		2	
41 K		3	
42 K		4	
46 K		5	
52 K		6	
60 K		7	
63 F	8		
72 K		9.5	2
72 K		9.5	
76 F	11.5		2
76 K		11.5	
77 F	13.5		2
77 K		13.5	
81 F	15		
83 K		16	
84 K		17	
85 K		18	
86 F	19		
87 K		20	
88 F	21		
89 K		22	
91 K		23	
94 F	24		
95 K		25	
108 F	26		
116 F	27		
117 F	28		
119 F	29		
120 F	30		
125 F	31		
131 F	32		
148 F	33		
161 F	34		
168 F	35		
174 F	36		

RF	RK	RF2D	RK2D
453	213	205209	45369

H = 14.414

TIE FACTOR = 0.9995

H' = 14.42

F/L

Rj:		F	L	t
25	L		1	
28	L		2	
40	L		3	
41	L		4	
56	L		5	
62	L		6	
63	F	7		
65	L		8	
68	L		9.5	2
68	L		9.5	
70	L		11	
71	L		12	
75	L		13	
76	F	14		
77	F	15		
80	L		16	
81	F	17		
84	L		18	
86	F	19.5		2
86	L		19.5	
88	F	21		
89	L		22	
91	L		23	
94	F	24		
98	L		25	
108	F	26		
116	F	27		
117	F	28		
119	F	29		
120	F	30		
125	F	31		
131	F	32		
148	F	33		
161	F	34		
168	F	35		
174	F	36		

RF	RL	RF2D	RL2D
458.5	207.5	210222	43056

H = 15.766

TIE FACTOR = 0.9997

H' = 15.77

SUBGROUP G

G/I

Rj:		G	I	t
32	G	1.5		2
32	G	1.5		
34	G	3		
36	G	4		
47	G	5		
52	G	6		
54	G	7.5		2
54	G	7.5		
58	G	9		
59	G	10.5		2
59	G	10.5		
61	G	12		
64	G	13		
69	G	14		
71	G	15		
73	G	16		
82	G	17		
89	G	18		
120	I		19	
121	I		20	
131	I		21	
134	I		22	
161	I		23	
199	I		24	
222	I		25	
237	I		26	
238	I		27	
246	I		28	
249	I		29	
251	I		30	
270	I		31.5	
270	I		31.5	
301	I		33	
314	I		34	
316	I		35	
334	I		36	

RG	RI	RG2D	RI2D
171	495	29241	245025

H = 26.27

TIE FACTOR = 0.9996

H' = 26.28

G/J

Rj:		G	J	t
32	G	1.5		2
32	G	1.5		
34	G	3		
36	G	4		
47	G	5		
51	J		6.5	2
51	J		6.5	
52	G	8		
53	J		9	
54	G	10.5		2
54	G	10.5		
58	G	12		
59	G	13.5		2
59	G	13.5		
60	J		15	
61	G	16		
64	G	17		
69	G	18		
71	G	19		
73	G	20		
74	J		21	
78	J		22	
80	J		23	
82	G	24		
85	J		25	
89	G	26		
93	J		27	
97	J		28	
100	J		29	
107	J		30	
112	J		31	
126	J		32	
130	J		33	
132	J		34	
134	J		35	
147	J		36	

RG	RJ	RG2D	RJ2D
223	443	49729	196249

H = 12.112

TIE FACTOR = 0.9995

H' = 12.118

G/K

Rj:	G	K	t
27 K		1	
28 K		2	
32 G	3.5		2
32 G	3.5		
34 G	5		
36 G	6		
41 K		7	
42 K		8	
46 K		9	
47 G	10		
52 G	11.5		2
52 K		11.5	
54 G	13.5		2
54 G	13.5		
58 G	15		
59 G	16.5		2
59 G	16.5		
60 K		18	
61 G	19		
64 G	20		
69 G	21		
71 G	22		
72 K		23.5	2
72 K		23.5	
73 G	25		
76 K		26	
77 K		27	
82 G	28		
83 K		29	
84 K		30	
85 K		31	
87 K		32	
89 G	33.5		2
89 K		33.5	
91 K		35	
95 K		36	

RG	RK	RG2D	RK2D
283	383	80089	146689

H = 2.5024

TIE FACTOR = 0.9992

H' = 2.5034

G/L

Rj:	G	L	t
25 L		1	
28 L		2	
32 G	3.5		2
32 G	3.5		
34 G	5		
36 G	6		
40 L		7	
41 L		8	
47 G	9		
52 G	10		
54 G	11.5		2
54 G	11.5		
56 L		13	
58 G	14		
59 G	15.5		2
59 G	15.5		
61 G	17		
62 L		18	
64 G	19		
65 L		20	
68 L		21.5	2
68 L		21.5	
69 G	23		
70 L		24	
71 G	25.5		2
71 L		25.5	
73 G	27		
75 L		28	
80 L		29	
82 G	30		
84 L		31	
86 L		32	
89 G	33.5		2
89 L		33.5	
91 L		35	
98 L		36	

RG	RL	RG2D	RL2D
280	386	78400	148996

H = 2.8117

TIE FACTOR = 0.9992

H' = 2.8129

SUBGROUP I

I/J

Rj:	I	J	t
51 J		1.5	2
51 J		1.5	
53 J		3	
60 J		4	
74 J		5	
78 J		6	
80 J		7	
85 J		8	
93 J		9	
97 J		10	
100 J		11	
107 J		12	
112 J		13	
120 I	14		
121 I	15		
126 J		16	
130 J		17	
131 I	18		
132 J		19	
134 I	20		
134 J		21	
147 J		22	
161 I	23		
199 I	24		
222 I	25		
237 I	26		
238 I	27		
246 I	28		
249 I	29		
251 I	30		
270 I	31.5		2
270 I	31.5		
301 I	33		
314 I	34		
316 I	35		
334 I	36		

RI	RJ	RI2D	RJ2D
480	186	230400	34596

H = 21.63

TIE FACTOR = 0.9997

H' = 21.636

I/K

Rj:	I	K	t
27 K		1	
28 K		2	
41 K		3	
42 K		4	
46 K		5	
52 K		6	
60 K		7	
72 K		8.5	2
72 K		8.5	
76 K		10	
77 K		11	
83 K		12	
84 K		13	
85 K		14	
87 K		15	
89 K		16	
91 K		17	
95 K		18	
120 I	19		
121 I	20		
131 I	21		
134 I	22		
161 I	23		
199 I	24		
222 I	25		
237 I	26		
238 I	27		
246 I	28		
249 I	29		
251 I	30		
270 I	31.5		2
270 I	31.5		
301 I	33		
314 I	34		
316 I	35		
334 I	36		

RI	RK	RI2D	RK2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9997

H' = 26.277

I/L

Rj:	I	L	t
25	L	1	
28	L	2	
40	L	3	
41	L	4	
56	L	5	
62	L	6	
65	L	7	
68	L	8.5	2
68	L	8.5	
70	L	10	
71	L	11	
75	L	12	
80	L	13	
84	L	14	
86	L	15	
89	L	16	
91	L	17	
98	L	18	
120	I	19	
121	I	20	
131	I	21	
134	I	22	
161	I	23	
199	I	24	
222	I	25	
237	I	26	
238	I	27	
246	I	28	
249	I	29	
251	I	30	
270	I	31.5	2
270	I	31.5	
301	I	33	
314	I	34	
316	I	35	
334	I	36	

RI	RL	RI2D	RL2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9997

H' = 26.277

SUBGROUP J

J/K

Rj:	J	K	t
27 K		1	
28 K		2	
41 K		3	
42 K		4	
46 K		5	
51 J	6.5		2
51 J	6.5		
52 K		8	
53 J	9		
60 J	10.5		2
60 K		10.5	
72 K		12.5	2
72 K		12.5	
74 J	14		
76 K		15	
77 K		16	
78 J	17		
80 J	18		
83 K		19	
84 K		20	
85 J	21.5		2
85 K		21.5	
87 K		23	
89 K		24	
91 K		25	
93 J	26		
95 K		27	
97 J	28		
100 J	29		
107 J	30		
112 J	31		
126 J	32		
130 J	33		
132 J	34		
134 J	35		
147 J	36		

RJ	RK	RJ2D	RK2D
417	249	173889	62001

H = 7.0629

TIE FACTOR = 0.9995

H' = 7.0648

J/L

Rj:	J	L	t
25 L		1	
28 L		2	
40 L		3	
41 L		4	
51 J	5.5		2
51 J	5.5		
53 J	7		
56 L		8	
60 J	9		
62 L		10	
65 L		11	
68 L		12.5	2
68 L		12.5	
70 L		14	
71 L		15	
74 J	16		
75 L		17	
78 J	18		
80 J	19.5		2
80 L		19.5	
84 L		21	
85 J	22		
86 L		23	
89 L		24	
91 L		25	
93 J	26		
97 J	27		
98 L		28	
100 J	29		
107 J	30		
112 J	31		
126 J	32		
130 J	33		
132 J	35		
134 J	35		
147 J	36		

RJ	RL	RJ2D	RL2D
416.5	250.5	173472	62750

H = 7.2294

TIE FACTOR = 0.9996

H' = 7.2312

SUBGROUP K

K/L

Rj:		K	L	t
25	L		1	
27	K	2		
28	K	3.5		2
28	L		3.5	
40	L		5	
41	K	6.5		2
41	L		6.5	
42	K	8		
46	K	9		
52	K	10		
56	L		11	
60	K	12		
62	L		13	
65	L		14	
68	L		15.5	2
68	L		15.5	
70	L		17	
71	L		18	
72	K	19.5		2
72	K	19.5		
75	L		21	
76	K	22		
77	K	23		
80	L		24	
83	K	25		
84	K	26.5		2
84	L		26.5	
85	K	28		
86	L		29	
87	K	30		
89	K	31.5		2
89	L		31.5	
91	K	33.		2
91	L		33.5	
95	K	35		
98	L		36	

RK	RL	RK2D	RJ2D
344.5	321.5	118680	103362

H = 0.1323

TIE FACTOR = 0.9991

H' = 0.1324

KRUSKAL-WALLIS TEST: INSTRUMENTAL VALUES

SUBGROUP A

A/B

Rj:	A	B	t
58 B		1	
81 B		2	
112 B		3	
153 B		4	
158 B		5	
168 B		6	
175 B		7	
181 B		8	
192 B		9	
195 B		10	
199 B		11	
200 B		12	
201 B		13	
208 B		14	
210 A	15		
215 B		16	
235 B		17	
239 B		18	
278 A	19		
279 B		20	
374 A	21		
403 A	22		
474 A	23		
475 A	24		
494 A	25		
497 A	26		
500 A	27		
518 A	28		
524 A	29		
571 A	30		
600 A	31		
630 A	32		
631 A	33		
693 A	34		
732 A	35		
786 A	36		

RA	RB	RA2D	RB2D
490	176	240100	30976

H = 24.674

TIE FACTOR = 1

H' = 24.674

A/C

Rj:	A	C	t
102 C		1	
114 C		2	
149 C		3	
174 C		4	
185 C		5	
192 C		6.5	2
192 C		6.5	
196 C		8	
209 C		9	
210 A	10		
214 C		11	
236 C		12	
239 C		13	
248 C		14	
256 C		15	
278 A	16.5		2
278 C		16.5	
284 C		18	
320 C		19	
338 C		20	
374 A	21		
403 A	22		
474 A	23		
475 A	24		
494 A	25		
497 A	26		
500 A	27		
518 A	28		
524 A	29		
571 A	30		
600 A	31		
630 A	32		
631 A	33		
693 A	34		
732 A	35		
786 A	36		

RA	RC	RA2D	RC2D
482.5	183.5	232806	33672

H = 22.372

TIE FACTOR = 0.9997

H' = 22.379

A/D

Rj:	A	D	t
50	D		1
77	D		2
83	D		3
86	D		4
92	D		5
101	D		6
108	D		7
111	D		8
116	D		9
123	D		10
136	D		11
140	D		12
142	D		13
148	D		14
152	D		15
170	D		16
187	D		17
193	D		18
210	A	19	
278	A	20	
374	A	21	
403	A	22	
474	A	23	
475	A	24	
494	A	25	
497	A	26	
500	A	27	
518	A	28	
524	A	29	
571	A	30	
600	A	31	
630	A	32	
631	A	33	
693	A	34	
732	A	35	
786	A	36	

RA	RD	RA2D	RD2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 1

H' = 26.27

A/E

Rj:	A	E	t
86	E		1
95	E		2
143	E		3
152	E		4
156	E		5
158	E		6
161	E		7
167	E		8
184	E		9
208	E		10
210	A	11	
212	E		12
225	E		13
227	E		14
229	E		15
242	E		16
243	E		17
245	E		18
278	A	19	
279	E		20
374	A	21	
403	A	22	
474	A	23	
475	A	24	
494	A	25	
497	A	26	
500	A	27	
518	A	28	
524	A	29	
571	A	30	
600	A	31	
630	A	32	
631	A	33	
693	A	34	
732	A	35	
786	A	36	

RA	RE	RA2D	RE2D
486	180	236196	32400

H = 23.432

TIE FACTOR = 1

H' = 23.432

A/F

Rj:	A	F	t
39	F	1	
51	F	2	
74	F	3	
75	F	4	
93	F	5	
94	F	6	
97	F	7	
106	F	8	
116	F	9	
121	F	10	
130	F	11	
132	F	12	
136	F	13	
139	F	14	
146	F	15	
155	F	16	
161	F	17	
172	F	18	
210	A	19	
278	A	20	
374	A	21	
403	A	22	
474	A	23	
475	A	24	
494	A	25	
497	A	26	
500	A	27	
518	A	28	
524	A	29	
571	A	30	
600	A	31	
630	A	32	
631	A	33	
693	A	34	
732	A	35	
786	A	36	

RA	RF	RA2D	RF2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 1

H' = 26.27

A/G

Rj:	A	G	t
24	G	1	
25	G	2	
35	G	3	
37	G	4	
42	G	5	
47	G	6	
48	G	7	
52	G	8.5	2
52	G	8.5	
60	G	10.5	2
60	G	10.5	
65	G	12	
69	G	13	
75	G	14	
82	G	15	
86	G	16.5	2
86	G	16.5	
88	G	18	
210	A	19	
278	A	20	
374	A	21	
403	A	22	
474	A	23	
475	A	24	
494	A	25	
497	A	26	
500	A	27	
518	A	28	
524	A	29	
571	A	30	
600	A	31	
630	A	32	
631	A	33	
693	A	34	
732	A	35	
786	A	36	

RA	RG	RA2D	RG2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9996

H' = 26.28

A/I

Rj:	A	I	t
72 I		1	
123 I		2	
196 I		3	
197 I		4	
198 I		5	
200 I		6	
208 I		7	
210 A	8		
214 I		9	
222 I		10	
225 I		11.5	2
225 I		11.5	
229 I		13	
247 I		14	
256 I		15	
270 I		16	
277 I		17	
278 A	18		
364 I		19	
374 A	20		
381 I		21	
403 A	22		
474 A	23		
475 A	24		
494 A	25		
497 A	26		
500 A	27		
518 A	28		
524 A	29		
571 A	30		
600 A	31		
630 A	32		
631 A	33		
693 A	34		
732 A	35		
786 A	36		

RA	RI	RA2D	RI2D
481	185	231361	34225

H = 21.926

TIE FACTOR = 1

H' = 21.926

A/J

Rj:	A	J	t
18 J		1	
40 J		2	
69 J		3	
70 J		4	
76 J		5	
84 J		6.5	2
84 J		6.5	
95 J		8	
97 J		9	
103 J		10	
104 J		11.5	2
104 J		11.5	
107 J		13	
113 J		14	
114 J		15	
125 J		16	
152 J		17	
155 J		18	
210 A	19		
278 A	20		
374 A	21		
403 A	22		
474 A	23		
475 A	24		
494 A	25		
497 A	26		
500 A	27		
518 A	28		
524 A	29		
571 A	30		
600 A	31		
630 A	32		
631 A	33		
693 A	34		
732 A	35		
786 A	36		

RA	RJ	RA2D	RJ2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9997

H' = 26.277

A/K

Rj:	A	K	t
27	K	1	
40	K	2	
42	K	3	
43	K	4	
56	K	5	
59	K	6	
62	K	7	
65	K	8	
67	K	9.5	2
67	K	9.5	
70	K	11	
73	K	12	
75	K	13	
76	K	14	
78	K	15.5	2
78	K	15.5	
105	K	17	
114	K	18	
210	A	19	
278	A	20	
374	A	21	
403	A	22	
474	A	23	
475	A	24	
494	A	25	
497	A	26	
500	A	27	
518	A	28	
524	A	29	
571	A	30	
600	A	31	
630	A	32	
631	A	33	
693	A	34	
732	A	35	
786	A	36	

RA	RK	RA2D	RK2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 0.9997

H' = 26.277

A/L

Rj:	A	L	t
27	L	1	
40	L	2	
48	L	3	
51	L	4	
52	L	5	
57	L	6	
59	L	7	
60	L	8	
62	L	9	
63	L	10	
67	L	11	
71	L	12	
72	L	13	
78	L	14	
85	L	15	
86	L	16	
107	L	17	
112	L	18	
210	A	19	
278	A	20	
374	A	21	
403	A	22	
474	A	23	
475	A	24	
494	A	25	
497	A	26	
500	A	27	
518	A	28	
524	A	29	
571	A	30	
600	A	31	
630	A	32	
631	A	33	
693	A	34	
732	A	35	
786	A	36	

RA	RL	RA2D	RL2D
495	171	245025	29241

H = 26.27

TIE FACTOR = 1

H' = 26.27

SUBGROUP B

B/C

Rj:		B	C	t
58	B	1		
81	B	2		
102	C		3	
112	B	4		
114	C		5	
149	C		6	
153	B	7		
158	B	8		
168	B	9		
174	C		10	
175	B	11		
181	B	12		
185	C		13	
192	C		15	3
192	B	15		
192	C		15	
195	B	17		
196	C		18	
199	B	19		
200	B	20		
201	B	21		
208	B	22		
209	C		23	
214	C		24	
215	B	25		
235	B	26		
236	C		27	
239	C		28.5	2
239	B	28.5		
248	C		30	
256	C		31	
278	C		32	
279	B	33		
284	C		34	
320	C		35	
338	C		36	

RB	RC	RB2D	RC2D
280.5	385.5	78680	148610

H = 2.7589

TIE FACTOR = 0.9994

H' = 2.7607

B/D

Rj:		B	D	t
50	D		1	
58	B	2		
77	D		3	
81	B	4		
83	D		5	
86	D		6	
92	D		7	
101	D		8	
108	D		9	
111	D		10	
112	B	11		
116	D		12	
123	D		13	
136	D		14	
140	D		15	
142	D		16	
148	D		17	
152	D		18	
153	B	19		
158	B	20		
168	B	21		
170	D		22	
175	B	23		
181	B	24		
187	D		25	
192	B	26		
193	D		27	
195	B	28		
199	B	29		
200	B	30		
201	B	31		
208	B	32		
215	B	33		
235	B	34		
239	B	35		
279	B	36		

RB	RD	RB2D	RD2D
438	228	191844	51984

H = 11.036

TIE FACTOR = 1

H' = 11.036

B/E

Rj:	B	E	t
58 B	1		
81 B	2		
86 E		3	
95 E		4	
112 B	5		
143 E		6	
152 E		7	
153 B	8		
156 E		9	
158 B	10.5		2
158 E		10.5	
161 E		12	
167 E		13	
168 B	14		
175 B	15		
181 B	16		
184 E		17	
192 B	18		
195 B	19		
199 B	20		
200 B	21		
201 B	22		
208 B	23.5		2
208 E		23.5	
212 E		25	
215 B	26		
225 E		27	
227 E		28	
229 E		29	
235 B	30		
239 B	31		
242 E		32	
243 E		33	
245 E		34	
279 E		35.5	2
279 B	35.5		

RB	RE	RB2D	RE2D
317.5	348.5	100806	121452

H = 0.2404

TIE FACTOR = 0.9996

H' = 0.2405

B/F

Rj:	B	F	t
39 F		1	
51 F		2	
58 B	3		
74 F		4	
75 F		5	
81 B	6		
93 F		7	
94 F		8	
97 F		9	
106 F		10	
112 B	11		
116 F		12	
121 F		13	
130 F		14	
132 F		15	
136 F		16	
139 F		17	
146 F		18	
153 B	19		
155 F		20	
158 B	21		
161 F		22	
168 B	23		
172 F		24	
175 B	25		
181 B	26		
192 B	27		
195 B	28		
199 B	29		
200 B	30		
201 B	31		
208 B	32		
215 B	33		
235 B	34		
239 B	35		
279 B	36		

RB	RF	RB2D	RF2D
449	217	201601	47089

H = 13.469

TIE FACTOR = 1

H' = 13.469

B/G

Rj:		B	G	t
24	G		1	
25	G		2	
35	G		3	
37	G		4	
42	G		5	
47	G		6	
48	G		7	
52	G		8.5	2
52	G		8.5	
58	B	10		
60	G		11	2
60	G		12	
65	G		13	
69	G		14	
75	G		15	
81	B	16		
82	G		17	
86	G		18.5	2
86	G		18.5	
88	G		20	
112	B	21		
153	B	22		
158	B	23		
168	B	24		
175	B	25		
181	B	26		
192	B	27		
195	B	28		
199	B	29		
200	B	30		
201	B	31		
208	B	32		
215	B	33		
235	B	34		
239	B	35		
279	B	36		

RB	RG	RB2D	RG2D
482	184	232324	33856

H = 22.223

TIE FACTOR = 0.9996

H' = 22.232

B/I

Rj:		B	I	t
58	B	1		
72	I		2	
81	B	3		
112	B	4		
123	I		5	
153	B	6		
158	B	7		
168	B	8		
175	B	9		
181	B	10		
192	B	11		
195	B	12		
196	I		13	
197	I		14	
198	I		15	
199	B	16		
200	B	17.5		2
200	I		17.5	
201	B	19		
208	I		20.5	2
208	B	20.5		
214	I		22	
215	B	23		
222	I		24	
225	I		25.5	2
229	I		25.5	
229	I		27	
235	B	28		
239	B	29		
247	I		30	
256	I		31	
270	I		32	
277	I		33	
279	B	34		
364	I		35	
381	I		36	

RB	RI	RB2D	RI2D
258	408	66564	166464

H = 5.6305

TIE FACTOR = 0.9995

H' = 5.6327

B/J

Rj:	B	J	t
18 J		1	
40 J		2	
58 B	3		
69 J		4	
70 J		5	
76 J		6	
81 B	7		
84 J		8.5	2
84 J		8.5	
95 J		10	
97 J		11	
103 J		12	
104 J		13.5	2
104 J		13.5	
107 J		15	
112 B	16		
113 J		17	
114 J		18	
125 J		19	
152 J		20	
153 B	21		
155 J		22	
158 B	23		
168 B	24		
175 B	25		
181 B	26		
192 B	27		
195 B	28		
199 B	29		
200 B	30		
201 B	31		
208 B	32		
215 B	33		
235 B	34		
239 B	35		
279 B	36		

RB	RJ	RB2D	RJ2D
460	206	211600	42436

H = 16.145

TIE FACTOR = 0.9997

H' = 16.149

B/K

Rj:	B	K	t
27 K		1	
40 K		2	
42 K		3	
43 K		4	
56 K		5	
58 B	6		
59 K		7	
62 K		8	
65 K		9	
67 K		10.5	2
67 K		10.5	
70 K		12	
73 K		13	
75 K		14	
76 K		15	
78 K		16.5	2
78 K		16.5	
81 B	18		
105 K		19	
112 B	20		
114 K		21	
153 B	22		
158 B	23		
168 B	24		
175 B	25		
181 B	26		
192 B	27		
195 B	28		
199 B	29		
200 B	30		
201 B	31		
208 B	32		
215 B	33		
235 B	34		
239 B	35		
279 B	36		

RB	RK	RB2D	RK2D
479	187	229441	34969

H = 21.337

TIE FACTOR = 0.9997

H' = 21.342

B/L

Rj:	B	L	t
27 L		1	
40 L		2	
46 L		3	
51 L		4	
52 L		5	
57 L		6	
58 B	7		
59 L		8	
60 L		9	
62 L		10	
63 L		11	
67 L		12	
71 L		13	
72 L		14	
78 L		15	
81 B	16		
85 L		17	
86 L		18	
107 L		19	
112 B	20		
112 L		21	
153 B	22		
158 B	23		
168 B	24		
175 B	25		
181 B	26		
192 B	27		
195 B	28		
199 B	29		
200 B	30		
201 B	31		
208 B	32		
215 B	33		
235 B	34		
239 B	35		
279 B	36		

RB	RL	RB2D	RL2D
478	188	228484	35344

H = 21.046

TIE FACTOR = 1

H' = 21.046

SUBGROUP C

C/D

Rj:	C	D	t
50	D		1
77	D		2
83	D		3
86	D		4
92	D		5
101	D		6
102	C	7	
108	D		8
111	D		9
114	C	10	
116	D		11
123	D		12
136	D		13
140	D		14
142	D		15
148	D		16
149	C	17	
152	D		18
170	D		19
174	C	20	
185	C	21	
187	D		22
192	C	23.5	
192	C	23.5	
193	D		25
196	C	26	
209	C	27	
214	C	28	
236	C	29	
239	C	30	
248	C	31	
256	C	32	
278	C	33	
284	C	34	
320	C	35	
338	C	36	

RC	RD	RC2D	RD2D
463	203	214369	41209

H = 16.917

TIE FACTOR = 1

H' = 16.917

C/E

Rj:	C	E	t
86	E		1
95	E		2
102	C	3	
114	C	4	
143	E		5
149	C	6	
152	E		7
156	E		8
158	E		9
161	E		10
167	E		11
174	C	12	
184	E		13
185	C	14	
192	C	15.5	
192	C	15.5	
196	C	17	
208	E		18
209	C	19	
212	E		20
214	C	21	
225	E		22
227	E		23
229	E		24
236	C	25	
239	C	26	
242	E		27
243	E		28
245	E		29
248	C	30	
256	C	31	
278	C	32	
279	E		33
284	C	34	
320	C	35	
338	C	36	

RC	RE	RC2D	RE2D
376	290	141376	84100

H = 1.8507

TIE FACTOR = 0.9994

H' 1.851

C/F

Rj:		C	F	t
39	F		1	
51	F		2	
74	F		3	
75	F		4	
93	F		5	
94	F		6	
97	F		7	
102	C	8		
106	F		9	
114	C	10		
116	F		11	
121	F		12	
130	F		13	
132	F		14	
136	F		15	
139	F		16	
146	F		17	
149	C	18		
155	F		19	
161	F		20	
172	F		21	
174	C	22		
185	C	23		
192	C	24.5		2
192	C	24.5		
196	C	25		
209	C	27		
214	C	28		
236	C	29		
239	C	30		
248	C	31		
256	C	32		
278	C	33		
284	C	34		
320	C	35		
338	C	36		

RC	RF	RC2D	RF2D
471	195	221841	38025

H = 19.063

TIE FACTOR = 0.9999

H' = 19.065

C/G

Rj:		C	G	t
24	G		1	
25	G		2	
35	G		3	
37	G		4	
42	G		5	
47	G		6	
48	G		7	
52	G		8.5	2
52	G		8.5	
60	G		10.5	2
60	G		10.5	
65	G		12	
69	G		13	
75	G		14	
82	G		15	
86	G		16	
86	G		17.5	2
88	G		17.5	
102	C	19		
114	C	20		
149	C	21		
174	C	22		
185	C	23		
192	C	24.5		2
192	C	24.5		
196	C	26		
209	C	27		
214	C	28		
236	C	29		
239	C	30		
248	C	31		
256	C	32		
278	C	33		
284	C	34		
320	C	35		
338	C	36		

RC	RG	RC2D	[illegible]
495	170.7	245025	[illegible]

H = 26.210

TIE FACTOR = 0.9995

H' = 26.232

C/I

Rj:	C	I	t
72 I		1	
102 C	2		
114 C	3		
123 I		4	
149 C	5		
174 C	6		
185 C	7		
192 C	8.5		2
192 C	8.5		
196 I		10.5	2
196 C	10.5		
197 I		12	
198 I		13	
200 I		14	
208 I		15	
209 C	16		
214 I		17.5	2
214 C	17.5		
222 I		19	
225 I		20.5	2
225 I		20.5	
229 I		22	
236 C	23		
239 C	24		
247 I		25	
248 C	26		
256 I		27.5	2
256 C	27.5		
270 I		29	
277 I		30	
278 C	31		
284 C	32		
320 C	33		
338 C	34		
364 I		35	
381 I		36	

RC	RI	RC2D	RI2D
314.5	351.5	98910	123552

H = 0.3425

TIE FACTOR = 0.9994

H' = 0.3427

C/J

Rj:	C	J	t
18 J		1	
40 J		2	
69 J		3	
70 J		4	
76 J		5	
84 J		6.5	2
84 J		6.5	
95 J		8	
97 J		9	
102 C	10		
103 J		11	
104 J		12.5	2
104 J		12.5	
107 J		14	
113 J		15	
114 C	16.5		2
114 J		16.5	
125 J		18	
149 C	19		
152 J		20	
155 J		21	
174 C	22		
185 C	23		
192 C	24.5		2
192 C	24.5		
196 C	26		
209 C	27		
214 C	28		
236 C	29		
239 C	30		
248 C	31		
256 C	32		
278 C	33		
284 C	34		
320 C	35		
338 C	36		

RC	RJ	RC2D	RJ2D
480.5	185.5	230880	34410

H = 21.778

TIE FACTOR = 0.9995

H' = 21.789

C/K

Rj:	C	K	t
27 K		1	
40 K		2	
42 K		3	
43 K		4	
56 K		5	
59 K		6	
62 K		7	
65 K		8	
67 K		9.5	2
67 K		9.5	
70 K		11	
73 K		12	
75 K		13	
76 K		14	
78 K		15.5	2
78 K		15.5	
102 C	17		
105 K		18	
114 C	19.5		2
114 K		19.5	
149 C	21		
174 C	22		
185 C	23		
192 C	24		2
192 C	25		
196 C	26		
209 C	27		
214 C	28		
236 C	29		
239 C	30		
248 C	31		
256 C	32		
278 C	33		
284 C	34		
320 C	35		
338 C	36		

RC	RK	RC2D	RK2D
492.5	173.5	242556	30102

H = 25.466

TIE FACTOR = 0.9995

H' = 25.479

C/L

Rj:	C	L	t
27 L		1	
40 L		2	
48 L		3	
51 L		4	
52 L		5	
57 L		6	
59 L		7	
60 L		8	
62 L		9	
63 L		10	
67 L		11	
71 L		12	
72 L		13	
78 L		14	
85 L		15	
86 L		16	
102 C	17		
107 L		18	
112 L		19	
114 C	20		
149 C	21		
174 C	22		
185 C	23		
192 C	24		2
192 C	25		
196 C	26		
209 C	27		
214 C	28		
236 C	29		
239 C	30		
248 C	31		
256 C	32		
278 C	33		
284 C	34		
320 C	35		
338 C	36		

RC	RL	RC2D	RL2D
493	173	243049	29929

H = 25.625

TIE FACTOR = 0.9994

H' = 25.629

SUBGROUP D

D/E

Rj:		D	E	t
50	D	1		
77	D	2		
83	D	3		
86	E		4.5	2
86	D	4.5		
92	D	6		
95	E		7	
101	D	8		
108	D	9		
111	D	10		
116	D	11		
123	D	12		
136	D	13		
140	D	14		
142	D	15		
143	E		16	
148	D	17		
152	D	18.5		2
152	E		18.5	
156	E		20	
158	E		21	
161	E		22	
167	E		23	
170	D	24		
184	E		25	
187	D	26		
193	D	27		
208	E		28	
212	E		29	
225	E		30	
227	E		31	
229	E		32	
242	E		33	
243	E		34	
245	E		35	
279	E		36	

RD	RE	RD2D	RE2D
221	445	48841	198025

H = 12.556

TIE FACTOR = 0.9997

H' = 12.56

D/F

Rj:		D	F	t
39	F		1	
50	D	2		
51	F		3	
74	F		4	
75	F		5	
77	D	6		
83	D	7		
86	D	8		
92	D	9		
93	F		10	
94	F		11	
97	F		12	
101	D	13		
106	F		14	
108	D	15		
111	D	16		
116	D	17.5		2
116	F		17.5	
121	F		19	
123	D	20		
130	F		21	
132	F		22	
136	D	23.5		2
136	F		23.5	
139	F		25	
140	D	26		
142	D	27		
146	F		28	
148	D	29		
152	D	30		
155	F		31	
161	F		32	
170	D	33		
172	F		34	
187	D	35		
193	D	36		

RD	RF	RD2D	RF2D
353	313	124609	97969

H = 0.4003

TIE FACTOR = 0.9997

H' = 0.4004

D/G

Rj:		D	G	t
24	G		1	
25	G		2	
35	G		3	
37	G		4	
42	G		5	
47	G		6	
48	G		7	
50	D	8		
52	G		9.5	2
52	G		9.5	
60	G		11.5	2
60	G		11.5	
65	G		13	
69	G		14	
75	G		15	
77	D	16		
82	G		17	
83	D	18		
86	D	19.5		2
86	G		19.5	
86	G		21	
88	G		22	
92	D	23		
101	D	24		
108	D	25		
111	D	26		
116	D	27		
123	D	28		
136	D	29		
140	D	30		
142	D	31		
148	D	32		
152	D	33		
170	D	34		
187	D	35		
193	D	36		

RD	RG	RD2D	RG2D
474.5	191.5	225150	36672

H = 20.042

TIE FACTOR = 0.9996

H' = 20.05

D/I

Rj:		D	I	t
50	D	1		
72	I		2	
77	D	3		
83	D	4		
86	D	5		
92	D	6		
101	D	7		
108	D	8		
111	D	9		
116	D	10		
123	I		11.5	2
123	D	11.5		
136	D	13		
140	D	14		
142	D	15		
148	D	16		
152	D	17		
170	D	18		
187	D	19		
193	D	20		
196	I		21	
197	I		22	
198	I		23	
200	I		24	
208	I		25	
214	I		26	
222	I		27	
225	I		28.5	2
225	I		28.5	
229	I		30	
247	I		31	
256	I		32	
270	I		33	
277	I		34	
364	I		35	
381	I		36	

RD	RI	RD2D	RI2D
196.5	469.5	38612	220430

H = 18.651

TIE FACTOR = 0.9996

H' = 18.658

D/J

Rj:	D	J	t
18 J		1	
40 J		2	
50 D	3		
69 J		4	
70 J		5	
76 J		6	
77 D	7		
83 D	8		
84 J		9.5	2
84 J		9.5	
86 D	11		
92 D	12		
95 J		13	
97 J		14	
101 D	15		
103 J		16	
104 J		17	2
104 J		18	
107 J		19	
108 D	20		
111 D	21		
113 J		22	
114 J		23	
116 D	24		
123 D	25		
125 J		26	
136 D	27		
140 D	28		
142 D	29		
148 D	30		
152 D	31.5		2
152 J		31.5	
155 J		33	
170 D	34		
187 D	35		
193 D	36		

RD	RJ	RD2D	RJ2D
396.5	269.5	157212	72630

H = 4.0362

TIE FACTOR = 0.9996

H' = 4.0377

D/K

Rj:	D	K	t
27 K		1	
40 K		2	
42 K		3	
43 K		4	
50 D	5		
56 K		6	
59 K		7	
62 K		8	
65 K		9	
67 K		10.5	2
67 K		10.5	
70 K		12	
73 K		13	
75 K		14	
76 K		15	
77 D	16		
78 K		17.5	2
78 K		17.5	
83 D	19		
86 D	20		
92 D	21		
101 D	22		
105 K		23	
108 D	24		
111 D	25		
114 K		26	
116 D	27		
123 D	28		
136 D	29		
140 D	30		
142 D	31		
148 D	32		
152 D	33		
170 D	34		
187 D	35		
193 D	36		

RD	RK	RD2D	RK2D
467	199	218089	39601

H = 17.974

TIE FACTOR = 0.9997

H' = 17.978

D/L

Rj:		D	L	t
27	L		1	
40	L		2	
48	L		3	
50	D	4		
51	L		5	
52	L		6	
57	L		7	
59	L		8	
60	L		9	
62	L		10	
63	L		11	
67	L		12	
71	L		13	
72	L		14	
77	D	15		
78	L		16	
83	D	17		
85	L		18	
86	D	19.5		2
86	L		19.5	
92	D	21		
101	D	22		
107	L		23	
108	D	24		
111	D	25		
112	L		26	
116	D	27		
123	D	28		
136	D	29		
140	D	30		
142	D	31		
148	D	32		
152	D	33		
170	D	34		
187	D	35		
193	D	36		

RD	RL	RD2D	RL2D
462.5	203.5	213906	41412

H = 16.787

TIE FACTOR = 0.9999

H' = 16.798

SUBGROUP E

E/F

Rj:	E	F	t
39 F		1	
51 F		2	
74 F		3	
75 F		4	
86 E	5		
93 F		6	
94 F		7	
95 E	8		
97 F		9	
106 F		10	
116 F		11	
121 F		12	
130 F		13	
132 F		14	
136 F		15	
139 F		16	
143 E	17		
146 F		18	
152 E	19		
155 F		20	
156 E	21		
158 E	22		
161 F		23.5	2
161 E	23.5		
167 E	25		
172 F		26	
184 E	27		
208 E	28		
212 E	29		
225 E	30		
227 E	31		
229 E	32		
242 E	33		
243 E	34		
245 E	35		
279 E	36		

RE	RF	RE2D	RF2D
455.5	210.5	207480	44310

H = 15.021

TIE FACTOR = 0.9999

H' = 15.023

E/G

Rj:	E	G	t
24 G		1	
25 G		2	
35 G		3	
37 G		4	
42 G		4	
47 G		5	
48 G		6	
52 G		7.5	2
52 G		7.5	
60 G		9.5	2
60 G		9.5	
65 G		11	
69 G		12	
75 G		13	
82 G		14	
86 E	16		3
86 G		16	
86 G		16	
88 G		18	
95 E	20		
143 E	21		
152 E	22		
156 E	23		
158 E	24		
161 E	25		
167 E	26		
184 E	27		
208 E	28		
212 E	29		
225 E	30		
227 E	31		
229 E	32		
242 E	33		
243 E	34		
245 E	35		
279 E	36		

RE	RG	RE2D	RG2D
492	160	242064	25600

H = 22.966

TIE FACTOR = 0.9993

H' = 22.981

E/I

Rj:	E	I	t
72	I	1	
86	E 2		
95	E 3		
123	I	4	
143	E 5		
152	E 6		
156	E 7		
158	E 8		
161	E 9		
167	E 10		
184	E 11		
196	I	12	
197	I	13	
198	I	14	
200	I	15	
208	I	16.5	2
208	E 16.5		
212	E 18		
214	I	19	
222	I	20	
225	E 22		3
225	I	22	
225	I	22	
227	E 24		
229	E 25.5		2
229	I	25.5	
242	E 27		
243	E 28		
245	E 29		
247	I	30	
256	I	31	
270	I	32	
277	I	33	
279	E	34	
364	I	35	
391	I	36	

RE	RI	RE2D	RI2D
251	415	63001	172225

H = 6.7306

TIE FACTOR = 0.9992

H' = 6.7358

E/J

Rj:	E	J	t
18	J	1	
40	J	2	
69	J	3	
70	J	4	
76	J	5	
84	J	6.5	2
84	J	6.5	
86	E 8		
95	J	9.5	2
95	E 9.5		
97	J	11	
103	J	12	
104	J	13.5	2
104	J	13.5	
107	J	15	
113	J	16	
114	J	17	
125	J	18	
143	E 19		
152	E 20		
152	J	21	
155	J	22	
156	E 23		
158	E 24		
161	E 25		
167	E 26		
184	E 27		
208	E 28		
212	E 29		
225	E 30		
227	E 31		
229	E 32		
242	E 33		
243	E 34		
245	E 35		
279	E 36		

RE	RJ	RE2D	RJ2D
469.5	196.5	220430	38612

H = 18.651

TIE FACTOR = 0.9996

H' = 18.658

E/K

Rj:		E	K	t
27	K		1	
40	K		2	
42	K		3	
43	K		4	
56	K		5	
59	K		6	
62	K		7	
65	K		8	
67	K		9.5	2
67	K		9.5	
70	K		11	
73	K		12	
75	K		13	
76	K		14	
78	K		15.5	2
78	K		15.5	
86	E	17		
95	E	18		
105	K		19	
114	K		20	
143	E	21		
152	E	22		
156	E	23		
158	E	24		
161	E	25		
167	E	26		
184	E	27		
208	E	28		
212	E	29		
225	E	30		
227	E	31		
229	E	32		
242	E	33		
243	E	34		
245	E	35		
279	E	36		

RE	RK	RE2D	RK2D
491	175	241081	30625

H = 24.989

TIE FACTOR = 0.9997

H' = 24.995

E/L

Rj:		E	L	t
27	L		1	
40	L		2	
48	L		3	
51	L		4	
52	L		5	
57	L		6	
59	L		7	
60	L		8	
62	L		9	
63	L		10	
67	L		11	
71	L		12	
72	L		13	
78	L		14	
85	L		15	
86	E	16.5		2
86	L		16.5	
95	E	18		
107	L		19	
112	L		20	
143	E	21		
152	E	22		
156	E	23		
158	E	24		
161	E	25		
167	E	26		
184	E	27		
208	E	28		
212	E	29		
225	E	30		
227	E	31		
229	E	32		
242	E	33		
243	E	34		
245	E	35		
279	E	36		

RE	RL	RE2D	RL2D
490.5	175.5	240590	30800

H = 24.831

TIE FACTOR = 0.9999

H' = 24.834

SUBGROUP F

F/G

Rj:		F	G	t
24	G		1	
25	G		2	
35	G		3	
37	G		4	
39	F	5		
42	G		6	
47	G		7	
48	G		8	
51	F	9		
52	G		10.5	2
52	G		10.5	
60	G		12.5	2
60	G		12.5	
65	G		14	
69	G		15	
74	F	16		
75	F	17.5		2
75	G		17.5	
82	G		19	
86	G		20	
86	G		21	
88	G		22	
93	F	23		
94	F	24		
97	F	25		
106	F	26		
116	F	27		
121	F	28		
130	F	29		
132	F	30		
136	F	31		
139	F	32		
146	F	33		
155	F	34		
161	F	35		
172	F	36		

RF	RG	RF2D	RG2D
460.5	205.5	212060	42230

H = 16.272

TIE FACTOR = 0.9996

h' = 16.279

F/I

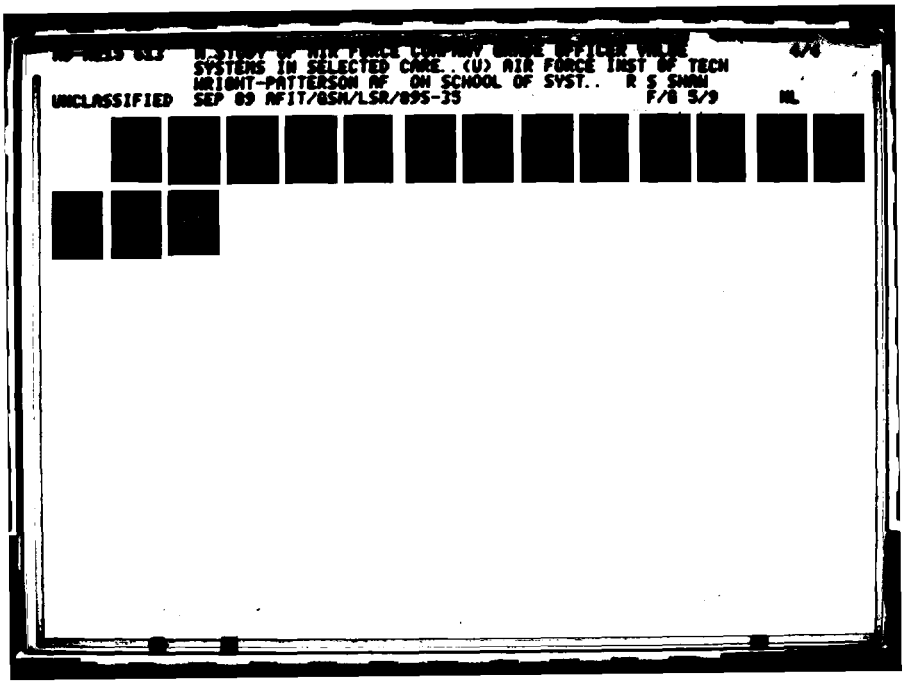
Rj:		F	I	t
39	F	1		
51	F	2		
72	I		3	
74	F	4		
75	F	5		
93	F	6		
94	F	7		
97	F	8		
106	F	9		
116	F	10		
121	F	11		
123	I		12	
130	F	13		
132	F	14		
136	F	15		
139	F	16		
146	F	17		
155	F	18		
161	F	19		
172	F	20		
196	I		21	
197	I		22	
198	I		23	
200	I		24	
208	I		25	
214	I		26	
222	I		27	
225	I		28	
225	I		29	
229	I		30	
247	I		31	
258	I		32	
270	I		33	
277	I		34	
364	I		35	
381	I		36	

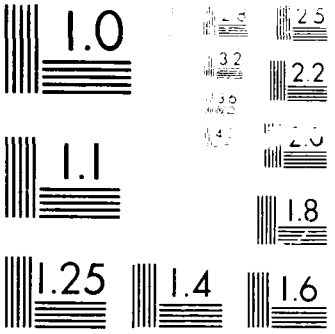
RF	RI	RF2D	RI2D
195	471	38025	221841

H = 19.063

TIE FACTOR = 1

H' = 19.063


SYSTEMS IN SELECTED CARE..(U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AF OH SCHOOL OF SYST.. R S SHAW
UNCLASSIFIED SEP 89 AFIT/GSM/LSR/89S-35 F/G 5/9 NL


1.0
1.1
1.25
1.4
1.6
1.8
2.2

F/J

Rj:		F	J	t
18	J		1	
39	F	2		
40	J		3	
51	F	4		
69	J		5	
70	J		6	
74	F	7		
75	F	8		
76	J		9	
84	J		10.5	2
84	J		10.5	
93	F	12		
94	F	13		
95	J		14	
97	F	15.5		2
97	J		15.5	
103	J		17	
104	J		18.5	2
104	J		18.5	
106	F	20		
107	J		21	
113	J		22	
114	J		23	
116	F	24		
121	F	25		
125	J		26	
130	F	27		
132	F	28		
136	F	29		
139	F	30		
146	F	31		
152	J		32	
155	F	33.5		2
155	J		33.5	
161	F	35		
172	F	36		

RF	RJ	RF2D	RJ2D
380	286	144400	81796

H = 2.2111

TIE FACTOR = 0.9996

H' = 2.212

F/K

Rj:		F	K	t
27	K		1	
39	F	2		
40	K		3	
42	K		4	
43	K		5	
51	F	6		
56	K		7	
59	K		8	
62	K		9	
65	K		10	
67	K		11.5	2
67	K		11.5	
70	K		13	
73	K		14	
74	F	15		
75	F	16.5		2
75	K		16.5	
76	K		18	
78	K		19.5	2
78	K		19.5	
93	F	21		
94	F	22		
97	F	23		
105	K		24	
106	F	25		
114	K		25	
116	F	27		
121	F	28		
130	F	29		
132	F	30		
136	F	31		
139	F	32		
146	F	33		
155	F	34		
161	F	35		
172	F	36		

RF	RK	RF2D	RK2D
445.5	220.5	198470	48620

H = 12.669

TIE FACTOR = 0.9997

H' = 12.672

F/L

Rj:		F	L	t
27	L		1	
39	F	2		
40	L		3	
48	L		4	
51	F	5.5		2
51	L		5.5	
52	L		7	
57	L		8	
59	L		9	
60	L		10	
62	L		11	
63	L		12	
67	L		13	
71	L		14	
72	L		15	
74	F	16		
75	F	17		
78	L		18	
85	L		19	
86	L		20	
93	F	21		
94	F	22		
97	F	23		
106	F	24		
107	L		25	
112	L		26	
116	F	27		
121	F	28		
130	F	29		
132	F	30		
136	F	31		
139	F	32		
146	F	33		
155	F	34		
161	F	35		
172	F	36		

RF	RL	RF2D	RL2D
445.5	220.5	198470	48620

H = 12.669

TIE FACTOR = 0.9999

H' = 12.67

SUBGROUP G

G/I

Rj:	G	I	t
24 G	1		
25 G	2		
35 G	3		
37 G	4		
42 G	5		
47 G	6		
48 C	7		
52 G	8.5		2
52 G	8.5		
60 G	10.5		2
60 G	10.5		
65 G	12		
69 G	13		
72 I		14	
75 G	15		
82 G	16		
86 G	17.5		2
86 G	17.5		
88 G	19		
123 I		20	
196 I		21	
197 I		22	
198 I		23	
200 I		24	
208 I		25	
214 I		26	
222 I		27	
225 I		28.5	2
225 I		28.5	
229 I		30	
247 I		31	
256 I		32	
270 I		33	
277 I		34	
364 I		35	
381 I		36	

RG	RI	RG2D	RI2D
176	490	30976	240100

H = 24.674

TIE FACTOR = 0.9997

H' = 24.68

G/J

Rj:	G	J	t
18 J		1	
24 G	2		
25 G	3		
35 G	4		
37 G	5		
40 J		6	
42 G	7		
47 G	8		
48 G	9		
52 G	10.5		2
52 G	10.5		
60 G	12.5		2
60 G	12.5		
65 G	14		
69 G	15.5		2
69 J		15.5	
70 J		17	
75 G	18		
76 J		19	
82 G	20		
84 J		21.5	2
84 J		21.5	
86 G	23.5		2
86 G	23.5		
88 G	25		
95 J		26	
97 J		27	
103 J		28	
104 J		29.5	2
104 J		29.5	
107 J		31	
113 J		32	
114 J		33	
125 J		34	
152 J		35	
155 J		36	

RG	RJ	RG2D	RJ2D
223.5	442.5	49952	195806

H = 12.002

TIE FACTOR = 0.9992

H' = 12.011

G/K

Rj:		G	K	t
24	G	1		
25	G	2		
27	K		3	
35	G	4		
37	G	5		
40	K		6	
42	G	7.5		2
42	K		7.5	
43	K		9	
47	G	10		
48	G	11		
52	G	12.5		2
52	G	12.5		
56	K		14	
59	K		15	
60	G	16.5		2
60	G	16.5		
62	K		18	
65	K		19.5	2
65	G	19.5		
67	K		21.5	2
67	K		21.5	
69	G	23		
70	K		24	
73	K		25	
75	G	26.5		2
75	K		26.5	
76	K		28	
78	K		29.5	2
78	K		29.5	
82	G	31		
86	G	32.5		2
86	G	32.5		
88	G	34		
105	K		35	
114	K		36	

RG	RK	RG2D	RK2D
297.5	368.5	88506	135792

H = 1.2614

TIE FACTOR = 0.999

H' = 1.2627

G/L

Rj:		G	L	t
24	G	1		
25	G	2		
27	L		3	
35	G	4		
37	G	5		
40	L		6	
42	G	7		
47	G	8		
48	L		9.5	2
48	G	9.5		
51	L		11	
52	L		13	2
52	G	13		
52	G	13		
57	L		15	
59	L		16	
60	G	18		3
60	G	18		
60	L		19	
62	L		20	
63	L		21	
65	G	22		
67	L		23	
69	G	24		
71	L		25	
72	L		26	
75	G	27		
78	L		28	
82	G	29		
85	L		30	
86	G	33		3
86	G	33		
86	L		33	
88	G	34		
107	L		35	
112	L		36	

RG	RL	RG2D	RL2D
300.5	368.5	90300	135792

H = 2.1593

TIE FACTOR = 0.9983

H' = 2.1629

SUBGROUP I

I/J

Rj:	I	J	t
18 J		1	
40 J		2	
69 J		3	
70 J		4	
72 I		5	
76 J		6	
84 J		7.5	2
84 J		7.5	
95 J		9	
97 J		10	
103 J		11	
104 J		12.5	2
104 J		12.5	
107 J		14	
113 J		15	
114 J		16	
123 I	17		
125 J		18	
152 J		19	
155 J		20	
196 I	21		
197 I	22		
198 I	23		
200 I	24		
208 I	25		
214 I	26		
222 I	27		
225 I	28.5		2
225 I	28.5		
229 I	30		
247 I	31		
256 I	32		
270 I	33		
277 I	34		
364 I	35		
381 I	36		

RI	RJ	RI2D	RJ2D
473	193	223729	37249

H = 19.619

TIE FACTOR = 0.9996

H' = 19.627

I/K

Rj:	I	J	t
27 K		1	
40 K		2	
42 K		3	
43 K		4	
56 K		5	
59 K		6	
62 K		7	
65 K		8	
67 K		9.5	2
67 K		9.5	
70 K		11	
72 I	12		
73 K		13	
75 K		14	
76 K		15	
78 K		16.5	2
78 K		16.5	
105 K		18	
114 K		19	
123 I	20		
196 I	21		
197 I	22		
198 I	23		
200 I	24		
208 I	25		
214 I	26		
222 I	27		
225 I	28.5		2
225 I	28.5		
229 I	30		
247 I	31		
256 I	32		
270 I	33		
277 I	34		
364 I	35		
381 I	36		

RI	RK	RI2D	RK2D
488	178	238144	31684

H = 24.049

TIE FACTOR = 0.9996

H' = 24.058

I/L

Rj:	I	L	t
27	L	1	
40	L	2	
48	L	3	
51	L	4	
52	L	5	
57	L	6	
59	L	7	
60	L	8	
62	L	9	
63	L	10	
67	L	11	
71	L	12	
72	I 13.5		2
72	L	13.5	
78	L	15	
85	L	16	
86	L	17	
107	L	18	
112	L	19	
123	I 20		
196	I 21		
197	I 22		
198	I 23		
200	I 24		
208	I 25		
214	I 26		
222	I 27		
225	I 28.5		2
225	I 28.5		
229	I 30		
247	I 31		
256	I 32		
270	I 33		
277	I 34		
364	I 35		
381	I 36		

RI	RL	RI2D	RL2D
489.5	176.5	239610	31152

H = 24.517

TIE FACTOR = 0.9997

H' = 24.523

SUBGROUP J

J/K

Rj:	J	K	t
18 J	1		
27 K		2	
40 K		3.5	2
40 J	3.5		
42 K		5	
43 K		6	
56 K		7	
59 K		8	
62 K		9	
65 K		10.	
67 K		11.5	2
67 K		11.5	
69 J	13		
70 J	14.5		2
70 K		14.5	
73 K		16	
75 K		17	
76 K		18.5	2
76 J	18.5		
78 K		20	
78 K		21	
84 J	22.5		2
84 J	22.5		
95 J	24		
97 J	25		
103 J	26		
104 J	27.5		2
104 J	27.5		
105 K		29	
107 J	30		
113 J	31		
114 J	32.5		2
114 K		32.5	
125 J	34		
152 J	35		
155 J	36		

RJ	RK	RJ2D	RK2D
424	242	179776	58564

H = 8.2892

TIE FACTOR = 0.9991

H' = 8.2966

J/L

Rj:	J	K	t
18 J	1		
27 L		2	
40 L		3.5	2
40 J	3.5		
42 L		5	
43 L		6	
56 L		7	
57 L		8	
59 L		9	
60 L		10	
62 L		11	
63 L		12	
67 L		13	
69 J	14		
70 J	15		
71 L		16	
7 L		17	
76 J	18		
78 L		19	
84 J	20		
84 J	21		
85 L		22	
86 L		23	
95 J	24		
97 J	25		
103 J	26		
104 J	27.5		2
104 J	27.56		
107 L		29.5	2
107 J	29.5		
112 L		31	
113 J	32		
114 J	33		
125 J	34		
152 J	35		
155 J	36		

RJ	RL	RJ2D	RL2D
422.1	244	178135	59536

H = 7.9542

TIE FACTOR = 0.9996

H' = 7.9572

SUBGROUP K

K/L

Rj:		K	L	t
27	L		1.5	2
27	K	1.5		
40	K	3.5		2
40	L		3.5	
42	K	5		
43	K	6		
48	L		7	
51	L		8	
52	L		9	
56	K	10		
57	L		11	
59	K	12.5		2
59	L		12.5	
60	L		14	
62	K	15.5		2
62	L		15.5	
63	L		17	
65	K	18		
67	K	20		3
67	K	20		
67	L		20	
70	K	22		
71	L		23	
72	L		24	
73	K	25		
75	K	26		
76	K	27		
78	L		29	3
79	K	29		
78	K	29		
85	L		31	
86	L		32	
105	K	33		
107	L		34	
112	L		35	
114	K	36		

RK	RL	RK2D	RL2D
339	327	114921	106929

H = 0.0359

TIE FACTOR = 0.9985

H' = 0.036

Bibliography

1. Air Force Human Resources Laboratory. Career Indications Among Junior Officers. Report No. AFHRL-TR-69-33. Air Force Systems Command: Brooks AFB TX, September 1969 (AD-703728).

2. Air Force Human Resources Laboratory. Changes in Career Intent During Initial Tour of Active Duty. Report No. AFHRL-TR-[illegible]. Air Force Systems Command: Brooks AFB TX, December 1[illegible] (AD-722408).

3. Air Force Human Resources Laboratory. Predictability of Expressed Career Intent. Report No. AFHRL-TR-72-25. Air Force Systems Command: Brooks AFB TX, March 1972 (AD-74[illegible]).

4. Bagley, Capt Larry C. A Study of the Personal Value Systems and Operative Goals of Minuteman Missile Operational Career Fields. MS thesis AFIT/GSM/SM/73-2. School of Engineering, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, December 1973 (AD-773797).

5. Bartholomew, Lt Col Charles W. Personal Value Systems and Career Objectives of Men Vis A Vis Women Air Force Officers. MS thesis AFIT/GSM/SM 73-3. School of Engineering, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, December 1973 (AD-769932).

6. Cohen, Jacob. "Rokeach Value Survey." The Eighth Mental Measurements Yearbook, Volume I, edited by Oscar [illegible]. Highland Park NJ: Gryphon Press, 1978.

7. [illegible]rell, John [illegible]. "An Air Force for the Lean Years," Air Force Magazine, 71: 56-64 (June 1988).

8. Dalbey, Capt Stephen B. A Pilot Study of the Personal Value Systems of United States Air Force Officers. MS thesis AFIT/GSM/SM/72-4. Air Force Institute of Technology (AU), Wright-Patterson AFB OH, December 1972 (AD-754168).

9. Davis, Capt Carl L. Class handout distributed in [illegible] 630 Research Methods. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, November 1988.

10. Dethloff, Capt Frank R. and Capt Dennis E. Doucet. A Study of Pilots' Value Systems and Their Effect on Career Intentions. MS thesis, AFIT/LSSR/29-78B. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1978 (AD-A061342).

11. Emory, William C. Business Research Methods [illegible] Edition. Homewood IL: Irwin, 1985.

12. England, George W. and others. The Manager and the Man: A Cross-Cultural Study of Personal Values. Kent State University: Kent State University Center for Business and Economic Research, [illegible].

13. -----. Personal Values and Military Administration. Contract No. N14-[illegible]-A-0141-0003. University of Minnesota Industrial Relations Center, September [illegible] (AD-[illegible]).

14. Ginovsky, John. "Airline-Hiring Boom [illegible] Group Predicts," Air Force Times: [illegible] November [illegible].

15. -----. "Airlines Cites Quality [illegible]," Air Force Times: 4+ November 14 [illegible].

16. Hopkins, Capt Leonard E. and Captain James A. [illegible] Profile of the Air Force Contracting [illegible] AFIT/SLSR [illegible]. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB [illegible] 1976 (AD-A0324[illegible]).

17. [illegible] Rokeach Value Survey [illegible] Measurements [illegible] Volume [illegible] Park NJ: Gryphon Press, [illegible].

18. Lussier, Capt Donald. [illegible] unstructured telephone interviews. [illegible] February [illegible].

19. Madia, Capt John A. A Study of the Personal [illegible] Satisfactions of United States Air Force Officers. [illegible] AFIT/GSM/SM/74D-7. School of Engineering, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, [illegible] (AD-A0036021).

20. Markiselli, Capt Dennis F. Analysis of Personal [illegible] Operative Goals of SAC Minuteman Missile Maintenance [illegible] thesis, AFIT/GSM/SM/73-19. School of Engineering, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, [illegible] 1973 (AD-769931).

21. Marumoto, Capt Glen S. The Study of Personal Values of Selected Senior U.S. Army and U.S. Air Force Officers. MS thesis, AFIT/GLM/LSR/88S-44. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1988 (AD-A201580).

22. McCosh, Capt Carol E. The Value Hierarchies of Selected Air Force Officers. MS thesis, AFIT/GLM/LSH/86S-45. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1986 (AD-A174[illegible]).

23. Mueller, Daniel [illegible]. Ph. D. Rokeach Value Survey [illegible] Volume I, edited by Daniel [illegible]. Keyser and Richard [illegible]. Kansas City: Test Corporation of America, 1984.

24. Ott, Lyman. An Introduction To Statistical Methods and Data Analysis (Third Edition). [illegible]

25. Rokeach, Milton. The Nature of Human Values. New York: The Free Press, [illegible].

26. Schlatter, Maj John [illegible]. and Capt James [illegible]. Value Systems of USAF [illegible] thesis, AFIT SLSR [illegible]. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 19[illegible] (AD-A[illegible]).

27. Siegel, Sidney. Nonparametric Statistics for the Behavioral Sciences. New York: McGraw-Hill Book Company, [illegible].

28. Sikula, Andrew F. "The Values and Value Systems of [illegible] Personnel Managers," Public Personnel Management, [illegible] (July 197[illegible]).

29. [illegible] Mayer N. [illegible] William [illegible] Commitments [illegible] The New Military [illegible] of Organization, edited by [illegible]. New York: [illegible] Sage Foundation, [illegible].

Vita

Captain Robert S. Shaw II was born on 14 January [illegible] in [illegible], Washington. He graduated from high school in Vancouver, Washington, in 19[illegible] and attended Washington State University, where he received the degree of Bachelor of Science in Mechanical Engineering in 1964. Upon graduation he received a commission in the United States Air Force through the ROTC program. He entered active duty in [illegible] 1964 and served as a program manager serving the Aeronautical Systems Program Office, Aeronautical Systems Division, Air Force Systems Command, at Wright-Patterson Air Force Base in Dayton, Ohio. He managed several diverse programs including the Standard Central Air Data Computer (SCADC) and the Communicate, Navigate and Identify (CNI) Integration Program until entering the School of Systems and Logistics, Air Force Institute of Technology, in June 1985.

Permanent Address: [illegible]

Benton City, WA [illegible]

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) AFIT/GSM/LSR/89S-35	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION School of Systems and Logistics 6b. OFFICE SYMBOL (If applicable) AFIT/LSY	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code) Air Force Institute of Technology Wright-Patterson AFB OH 45433-6583	7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
A STUDY OF AIR FORCE COMPANY GRADE OFFICER VALUE SYSTEMS IN SELECTED CAREER FIELDS AND THEIR CORRELATION WITH CAREER INTENTIONS

12. PERSONAL AUTHOR(S)
Robert S. Shaw II, B.S., Captain, USAF

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
MS Thesis	FROM _____ TO _____	1989 September	301

16. SUPPLEMENTARY NOTATION

17. COSATI CODES		
FIELD	GROUP	SUB-GROUP
05	08	

18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
Military Personnel
Air Force Personnel
Officer Personnel
Behavior

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

Thesis Advisor: John A. Muller
Professor of Technical Communication
Department of Communication
and Organizational Sciences

Approved for public release: IAW AFR 190-1.

Larry W. Emmelhainz

LARRY W. EMMELHAINZ, Lt Col, USAF 14 Oct 89
Director of Research and Consultation
Air Force Institute of Technology (AU)
Wright-Patterson AFB OH 45433-6583

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	UNCLASSIFIED

22a. NAME OF RESPONSIBLE INDIVIDUAL	22b. TELEPHONE (Include Area Code)	22c. OFFICE SYMBOL
John A. Muller, Professor	(513) 255-2254	LSR

DD Form 1473, JUN 86 *Previous editions are obsolete.*

SECURITY CLASSIFICATION OF THIS PAGE
UNCLASSIFIED

The purpose of this study was to investigate the correlation between the personal values of Air Force company grade officers and their decision of whether or not to remain in the Air Force for a career. The study objectives were to determine whether officer value systems are correlated with different levels of career intent, to determine if these value systems are unique, and to synopsize the past research into Air Force officer values conducted at AFIT. The study is based on the findings of this past research which showed that officers in different career fields and as a group do possess unique and measurable value systems.

The study focused on company grade officers in six career fields, chosen to represent the range of possible career intentions from positive to negative. Using a written survey officers were asked to rank two sets of 18 terms used to represent personal values in terms of importance. Non-parametric analysis was used to assess the level of agreement in these rankings for subgroups of officers in each career field expressing different levels of career intent (favorable, undecided, and unfavorable), as well as the independence of these rankings across career fields.

The study found that officers who expressed a common level of career intent also shared a common set of values, and these sets of values differed from those shared by officers expressing a different level of career intent. The study also found that different subgroups of officers, when separated by job type and level of career intent, exhibit not only common but also unique value hierarchies. These findings should be considered preliminary because of the limited sample of career fields and the insignificant sample sizes of several of the subgroups studied.

END

FILMED

1-90

DTIC