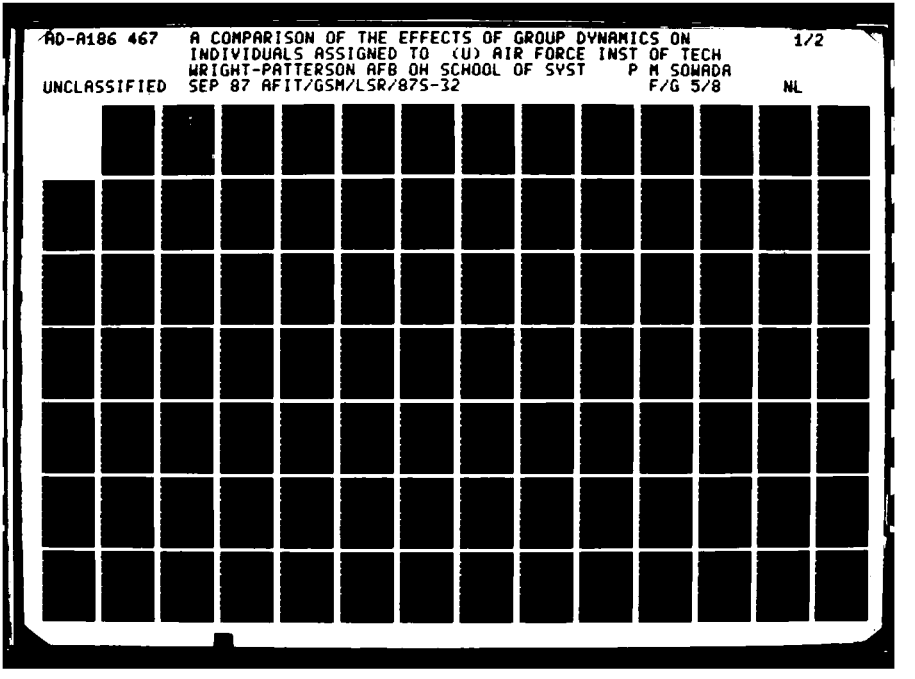
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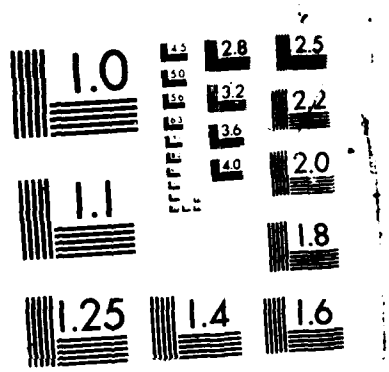

A COMPARISON OF THE EFFECTS OF GROUP DYNAMICS ON INDIVIDUALS ASSIGNED TO INTEGRAL AND NON-INTEGRAL AIRCREWS

THESIS

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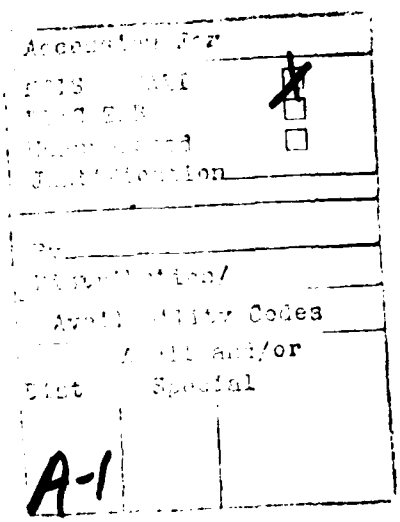

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THESIS

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

Paul M. Sowada, B.S.
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September 1987

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As I look back on this thesis effort, I realize that I have learned several important things. First, I never want to do research again. Second, my wife, Brenda, and my children, Lisa, Phillip, and Pauly, never want me to do research again. Through it all they have supported and encouraged me, especially when I was discouraged and thought it would never end. I want to thank Brenda and my kids for their love, patience, and understanding during the last fifteen months and promise them that better times are ahead.

Third, my advisor, Lieutenant Colonel James T. Lindsey Jr., knows I snould never want to do research again. But through the many drafts and redrafts I have learned about group dynamics, have improved my typing skills, and am now an expert with the Write One system.

Fourth, there is life after AFIT and if ever asked about returning for a PHD, I shall respond: "NEVERMORE," quoteth the Major, "NEVERMORE."

Finally, my personal motto has not changed since my last bout with military academia, "It's been real, it's been nice, but.....

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Abstract

The purpose of this study was to compare and contrast the effects of group dynamics using Strategic Air Command KC-135 officer aircrew members who operate under an integral crew concept and Military Airlift Command officer aircrew members who operate under a non-integral crew concept. The study compared level of group cohesiveness and intragroup communications between the two types of crew structures. This study also examined the degree of confidence crewmembers had in the people with whom they flew, attitudes regarding flying safety norms, and the type of crew structure preferred in a combat environment. Finally, tnis study sought to determine if crewmembers perceived that navigators had a greater opportunity to assume a leadership role in the crew with whom they flew if performing their duties under an integral crew structure.

A COMPARISON OF THE EFFECTS OF GROUP DYNAMICS ON INDIVIDUALS ASSIGNED TO INTEGRAL AND NON-INTEGRAL AIRCREWS

I. Introduction

Chapter Overview

This chapter contains general background information on group dynamics and the relationship of crew structuring to various effects on United States Air Force (USAF) aircrews. Particular emphasis is given to navigators on those aircrews. The specific research problem statement is introduced as well as the research objectives, questions and hypotheses. Also included in this chapter is a description of the scope of the study and pertinent definitions or assumptions.

Background

Warfighting, and the need to keep that topic on the minds of all Department of Defense (DOD) personnel, begs for answers to questions on how to improve our soldiers, sailors and airmen's performance. A review of the existing literature indicates that a study of the impact on individual crewmembers of operating under an integral crew concept has not been conducted. The review also suggests that such a study may provide useful insight into methods to improve

combat effectiveness and the warfighting skills of USAF combat aircrews.

Previous studies have shown that members of groups generate individually and collectively a set of forces within the group. These forces are generically labelled group dynamic forces. In the current study, USAF combat aircrews are the specific group of interest. It is proposed that varying the crew structure from a fixed to flexible form or vice versa, will influence various elements of group dynamics (communication, norms, cohesiveness, etc.) within a crew. Attitudes of individual aircrew members may or may not be influenced by these elements of group dynamics. However, this study will attempt to determine, in general, the impact of a fixed versus flexible crew structure on the attitudes of individual crewmembers.

Statement of Problem

The present volatile international situation presents a challenge to USAF planners and leaders charged with supporting and defending United States interests around the globe. The potential for United States involvement in regional conflicts in the Middle and Far East, Central and South America, and Africa continues to grow daily. Within the last two years, USAF combat aircrews were employed in the attack against Libya and the Grenada rescue operation.

Aircrews must be employed under a method of crew structuring that will provide the maximum combat capability

and greatest chance of success for the crews tasked to perform the required mission. Currently, two distinct crew structuring concepts are prevalent in USAF flying operations, integral and non-integral.

Current Strategic Air Command (SAC) policy requires integral composition for KC-135 aircrews while Military Airlift Command (MAC) permits non-integral composition for C-130 aircrews. This study will attempt to determine if the attitudes of officer members of aircrews are impacted by policies concerning crew structuring. For example, will they more often report their intra-crew communications as more effective (more succinct, accurate, and timely), more highly developed crew norms, or higher group confidence levels than aircrews not operating under an integral crew concept. Additionally, this study seeks to determine if the possibility for navigators to assume informal crew leadership roles is greater under an integral or non-integral crew structure.

The interaction of aircrew attitudes, skills and capabilities is proposed to have an impact on the ability to effectively perform missions in support of United States interests in areas such as Grenada and Libya. There has, however, been little research into the impact of the use of these two different crew structuring methods on combat capability and attitudes of USAF aircrews.

This study seeks to assess the impact of each type of crew structure on individual and group attitudes, skills, and capabilities in order to determine (and eventually implement) the one best suited for, and most effective in, a combat environment. This study will attempt to provide a partial answer to the question of which type of crew structure is most preferred by aircrews in combat.

Research Objectives

The primary objective of this study is to gather sufficient data from crewmembers assigned to both integral and non-integral aircrews to determine the extent to which the predicted effects of group dynamics variables occur in an integral crew structure compared to a non-integral crew structure. To accomplish this goal, the following specific research objectives will be investigated.

1. Determine if operating under an integral crew concept effects attitudes of aircrews and individual members of those aircrews.
2. Compare the attitudes of aircrew members between integral and non-integral crew composition conditions with respect to variables expected to be relevant to crew performance.
3. Determine the relationship of group membership to group level variables and individual level variables expected to be relevant to crew performance.

4. Determine if operating under an integral crew concept impacts the potential for navigators to assume an informal leadership role in individual crews.

Scope of Study

This study will examine the impact of operating under two different types of crew structures, set versus flexible, focusing on variables such as intra-group communications and levels of group cohesiveness. Groups composed of integral crews will be compared and contrasted with groups composed of non-integral crews. Only aircrew members from specific Continental United States (CONUS) KC-135 and C-130 wings will be surveyed. These types of wings were selected because KC-135 units operate under an integral crew concept while C-130 units operate under a non-integral crew concept. Additionally, the rated officer composition on KC-135 and C-130 aircrews is identical; that is, pilot, copilot and navigator.

Aircrew members from units outside the CONUS are not considered in this study. Aircrews stationed overseas are assumed to be operating in a totally different flying and social environment when compared to those aircrews assigned to CONUS units. The "we're in this together" attitude is assumed to be much stronger in both the C-130 and KC-135 units located in overseas regions. Because of the difference between CONUS and non-CONUS aircrews, data will only be collected from CONUS units. However, a comparison of C-130

and KC-135 aircrew members in overseas locations may provide a useful topic for future research on group behavior differences.

As stated above, the rated officer composition of C-130 and KC-135 aircrews is identical. Both C-130 and KC-135 aircrews also have enlisted aircrew members assigned. The KC-135 aircrew includes an enlisted air refueling specialist (boom operator). The C-130 aircrew includes an enlisted loadmaster and flight engineer.

Enlisted aircrew members will not be included in this study. There are several reasons for this decision. First, Henderson indicates a belief tnat there is a difference in the general attitudes of officer and enlisted personnel (Henderson, 1985:78). Further, specific attitudes of officer and enlisted personnel concerning the variables of interest in this study are also believed to be different. Second, aircrew duties of enlisted members are considerably different in function and scope from those of officer aircrew members. In consideration of these factors, combining data from officer and enlisted crewmembers has questionable validity. Third, the majority (75%) of aircrew members on KC-135s and C-130s are officers, and since a major focus of the research concerns group dynamics effects on navigators (officers) assigned to integral and non-integral crews, only officer aircrew members will be administered surveys.

The ultimate importance of warfighting attitudes, skills, and capabilities and a genuine concern for the combat effectiveness of USAF combat aircrews leads to a search for ways of improving both. Operating under an integral crew concept is hypotnesized to produce effects that will improve both the warfighting skills and combat effectiveness of aircrews.

Research Questions and Hypotheses

To accomplish the research objectives, data will be collected to answer and assess the following research questions and hypotheses.

Research Question #1. How do attitudes of individual crewmembers towards others on the crew differ between integral and non-integral crew structures?

Hypothesis 1.1. Members of integral crews report higher levels of confidence in the flying skills of fellow crewmembers than do members of non-integral crews.

Hypothesis 1.2. Communications between members of integral crews are viewed as more succinct, clear, and timely than the communication between members of non-integral crews.

Hypothesis 1.3. Group norms regarding flying safety are more highly developed and evident on integral crews when compared to non-integral crews.

Hypothesis 1.4. Aircrew members will indicate a preference for integral crews in the event of combat.

Research Question #2. What advantages are accrued to the flying unit, individual aircrews and aircrew members by employing an integral crew concept?

Hypothesis 2.1. Members of integral crews will indicate higher levels of group cohesiveness than members of non-integral crews.

Research Question #3. How does the leadership role of a navigator on an integral crew differ from that of a navigator on a non-integral crew?

Hypothesis 3.1. Crew members of integral crews will more frequently report the navigator as performing leadership roles than will members of non-integral crews.

Assumptions

This study assumes that the aircrew members selected to participate in the survey constitute a representative sample of the overall population (CONUS and overseas) of interest. Further, it is assumed that these individuals freely participate in this survey and will give honest answers to the questions posed.

Definitions

Aircrew. A group of individual flying specialists gathered to accomplish a specified mission.

Enlisted crewmember. An aircrew member who does not hold a commission and does not hold a flying rating.

Group confidence. A feeling of trust in the perceived competence of fellow group members.

Group cohesiveness. Interpersonal trust, attraction and involvement relative to other members of a group (Bednar et al, 1974:155).

Group dynamics. Factors, variables, or forces within a group that affect the group collectively and individually.

Integral crew. An aircrew which consists of permanently assigned crew specialists. For the purpose of this study it consists of a navigator, pilot and co-pilot.

Non-integral crew. An aircrew which consists of crew members selected from specialty pools to perform a specified mission. For the purpose of this study it consists of a navigator, pilot and co-pilot.

Rated officer. Indicates an individual qualified as a navigator or pilot.

II. Literature Review

Chapter Overview

This chapter presents a discussion of relevant literature on groups. Elements of group dynamics and the six composite variables identified as most applicable to the current study are also reviewed.

Discussion

Man has been forming groups since the days when he crawled out of caves and banded together to hunt animals for food. Since then, people have joined groups for various other reasons. Cartwright and Zander propose that groups may either facilitate or inhibit the attainment of desirable social objectives (Cartwright and Zander, 1968:40). Groups have conquered nations and sailed ships around the world. People have also joined together to slaughter millions and have collaborated to put a man on the moon.

Studies of groups have led researchers to perform studies of the processes at both the individual and group level that take place within groups. Of considerable interest to military managers is how these processes affect attitudes and behavior in the workplace and on the battlefield. Warfighting skills and combat effectiveness may be improved by understanding the way a member or a group will react under combat conditions. Group dynamics is a general term used to describe these intra-group, individual and group processes.

Knowles describes group dynamics as a field of study within the social sciences which employs the use of scientific methods and analysis to determine reasons for behavior within groups (Knowles, 1959:12). Group phenomena that occur in industry, military services, and many other organizations are the primary focus of this field of study. The study of group dynamics involves setting up hypotheses and then testing them using techniques such as observation, interviews and questionnaires. Based on tne findings, a study of group dynamics and its effects on individuals facilitates the development of classification of group phenomena, theories and general principles (Knowles, 1959:13).

Many different approaches focusing on group dynamics have been developed to study groups (Knowles, 1959:23). Cartwright and Zander propose that although these many approaches at first appear to be in conflict, a more careful study reveals that the different theories and explanations do in fact compliment one anotner (Cartwright and Zander, 1953:4). Included in these approacnes are tne field theoretical approach, tne factor analysis approach, the formal organization approach, the sociometric approach, tne psychoanalytical approach, and finally the social work group approach (Knowles, 1959:24-31). A variation of the social work group approach was used in this study.

Knowles noted that the social work group approach was used by investigators; e.g. Konopka, 1946; Osborn, 1949; Coyle, 1947; to analyze narrative records of group workers and then derive generalizations concerning group interactions from series of case studies (Knowles, 1959:30-31). The social work group approach has focused primarily on an individual's personality development through group experience (Knowles, 1959:30). Additionally, the approach has been used to "ascertain the influence of the leader's behavior and other conditions on the interaction within the group and on the personality development of its members" (Strang, 1952:215).

A further review of the literature suggests several elements of group dynamics that are particularly applicable to the study of groups in the context of combat aircrews. These elements include group cohesiveness (Henderson, 1985) intra-group communications (Hellriegel and Slocum, 1974), group confidence (Nieva et al, 1985), group norms (Henderson, 1985), leadership roles (Nieva et al, 1985), and finally, crew preference in combat (Nieva et al, 1985; Henderson, 1985; Hellriegel and Slocum, 1974). The research questions and hypotheses posed earlier will allow tests to be performed that will help substantiate expected linkages between the observed strength of these composite variables in individual cases and the type of group structure under which these individuals worked.

These variables are explained and discussed in more detail in the following paragraphs. Particular attention will be given to how these elements of group dynamics may be relevant to a study of groups composed of aircrew members.

Group Cohesiveness

Group cohesiveness is a group characteristic at which much research effort has been aimed. Many researchers have developed differing views and conceptions of this elusive term. Knowles defines group cohesiveness as "the strength of the bonds that bind the individual parts together into a unified whole" (Knowles, 1959:45). Hare states that cohesiveness is analogous to morale and is indicated by the interpersonal choices made witnin the informal group structure (Hare, 1982:116). Groups are conesive if the members are attracted to the group (Hare, 1982:116). Cartwright proposes that group cohesiveness refers to "the degree to which the members of a group desire to remain in a group" (Cartwright and Zander, 1968:91).

Hare's conceptualization of cohesiveness is most applicable in the current study. Questions regarding attraction to the group are posed in the survey instrument to determine the level of cohesiveness. Hare cautions against the use of different sociometric criteria for arriving at a composite cohesiveness value because of the erroneous conclusions that may be drawn. The two major categories of cohesiveness he identifies are 'likeability'

and 'task ability' (Hare, 1982:116). In the current study, the cohesiveness composite variable examines the 'likeability' component of group cohesiveness. 'Likeability' is the desire for interaction because a person is attracted to the others in the group for personal enjoyment reasons (Hare, 1982:116). The group confidence variable discussed later in this chapter analyzes the 'task ability' component of the group cohesiveness construct. 'Task ability' is the attraction brought about by a person's perception that the group has a high degree of ability to perform a certain task (Hare, 1982:116). This distinction is important since people who have chosen each other because they work well together should be more productive than those who choose each other for more recreational reasons (Hare, 1976:10). Golembiewski reports that socially cohesive groups have been assumed to be more productive and efficient. He notes that research to investigate this assumption has produced mixed support. In other words, assuming that solving internal group problems will facilitate the solution of problems external to the group has not been empirically substantiated (Golembiewski, 1962:116).

Intra-group Communication

Intra-group communication is another element of group dynamics that is applicable to the current study. Knowles proposes that communication is "how well group members are

at understanding one another - how clearly they are communicating their ideas, values, and feelings" (Knowles, 1959:44). Nieva defines communication as "verbal interaction among group members which may vary in amount" (Nieva et al, 1985:19). In the present study, communication processes within the crew should provide an insight into the strength of the group bond. Studies generally show that the amount and intensity of communications are generally higher in high cohesive groups and lower in low cohesive groups (Golembiewski, 1962:165).

Hellriegel proposes that communication can affect both group and individual performance, and if the communication provides the individual with too much information, he may feel overloaded. Hellriegel goes on to state that inadequate or wrong information communicated can result in poor decisions and performance (Hellriegel and Slocum, 1974:266). Nieva's research showed that there is a positive relationship between communication and quality of performance by the group (Nieva et al, 1985:19).

An aircrew is a group of distinct individuals with distinct tasks to be performed by each member to solve the composite problem of accomplishing the mission. Overall, the aircrew flying environment exhibits a somewhat unstructured task framework with the individual crewmembers reacting to ever-changing requirements and priorities as individuals and as a group. Nieva and others state that

communication improved performance in unstructured task environments which they studied (Nieva et al, 1985:20). Therefore, it is proposed that better intra-group communication on aircrews should improve overall task performance.

Nieva, Hellriegel, and others concluded that communication can affect the level of performance. Therefore, this study seeks to determine if members of integral crews view their intra-crew communications as more effective when compared to the view of crewmembers of non-integral crews. The attitudes of aircrews towards perceived intra-group communication effectiveness should provide information about which method of crew structuring could be predicted to provide the higher level of crew performance.

Group Confidence

As indicated earlier in the group cohesiveness sub-section, the group confidence variable in this study is proposed to pertain to the 'task ability' portion of group cohesiveness. Hare defines 'task ability' as the attraction to group (both as a motive to join and as a desire to remain once in the group) brought about by a person's perception that the group has a high degree of ability to perform a certain task (Hare, 1982:116). This confidence is imperative in a flying environment, but most especially in a flying environment during combat, since a wrong action taken by a group member could mean death to all members of the

group. Hare states that a group will exhibit group confidence if it is well organized in a formal sense, group members are motivated to task accomplishment, and are attracted to each other, and the group is successful (Hare, 1982:171). Groups that are attracted to each other also provide more effective support when a member is subjected to anxiety-producing situations in the workplace (Golembiewski, 1962:169) as is the case in a combat environment.

In the current study, the degree of group confidence was investigated from the crewmember perspective using both peacetime and combat scenarios. Respondents are asked to indicate their preference of crew structuring in both a peacetime mission scenario and a combat flying environment. Group confidence and cohesiveness are essential during combat (Johns, 1984:2) and an understanding of this factor's impact could provide potential methods to improve warfighting skills and combat effectiveness using different crew structuring concepts.

Group Norms

Cartwright describes group norms as the finding that members of the same group exhibited relative uniformity with respect to specified opinions and modes of behavior (Cartwright and Zander, 1968:152). This definition generally carries with it the implication that some type of influence or control mechanism is at work within the group (Cartwright and Zander, 1968:152). Hare defines group norms

as, "rules of proper benavior, proper ways of acting, which have been accepted as legitimate by members of the group" (Hare,1976:19). These rules, standards, and expected behavior are derived from the goals of the group (Hare, 1976:19). Henderson asserts that "cohesion can be measured in terms of the degree to which group members conform to norms. In strongly cohesive groups members will conform even under stress" (Henderson, 1985:5).

Henderson has examined group norms in a military context and notes that a group with a normative control system that stresses personal commitment to a unit and its objectives will "emphasize the development of norms and values in such a way that members are bonded together in their commitment to each other, the group, and its purposes" (Henderson, 1985:23). Accordingly, this aspect of group dynamics is of interest in this study since aircrews that are more committed to each other, the group, and its purposes are more likely to be successful more often than those that are not as committed (Henderson, 1985:23).

The study of group norms has been operationalized in a number of different ways. One approach used by Sherif, conceptualized a norm as shared frames of reference rather than standards of behavior. Sherif's autokinetic experiment studied norms using misperception of individuals concerning movement in a stationary light (Sherif, 1935). Norms have also been conceptualized as behavioral uniformity and

operationalized by comparing the similarity of evaluations done by a housing association with evaluations done by occupants of a housing project (Golembiewski, 1962:228). In contrast, Naess conceptualized norms as social pressures. He operationalized his study of norms by examining changes in opinion regarding a topic after a discussion between two groups on that topic (Naess, 1948:26).

In the current study, the group norms concept is operationalized in a manner similar to those used by Golembiewski, that is, as behavioral uniformity. Individual and composite responses of aircrew members towards crew flying safety norms and the willingness of individuals to discuss possible infractions of flying safety norms are examined. As important as group norms are in peacetime they are considerably more important in a combat environment. Each member of the group must truly believe that the other members of the group will comply with group norms in a life or death situation. Responses to questions posed in the survey instrument should identify which crew structuring concept exhibits the higher level development of crew norms.

Leadership Roles

Anotner important aspect of group interaction, especially in the military, is that of leadership roles. Henderson proposes that, "leadership is the most important factor in achieving congruence between unit norms and

organizational objectives" (Henderson, 1985:11). A 1958 study by Gold defines a leader as "the individual with the relatively greater influence potential in a relationship," (Gold, 1958:51). A 1969 Gibb study states, "leaders are members of groups who influence others more than they are influenced by them (Gibb, 1969:206).

Ross and Hendry point out that leadership roles are most likely related to personality factors of group members, attitudes and needs of followers at a particular time, group structure, and finally, to the situation (Ross and Hendry, 1957:36). The interaction of these variables brings about a role differentiation within the group that leads to the selection of a leader without prohibiting other members from performing leadership functions at different times and in different ways during the group's life (Ross and Hendry, 1957:36).

Hare proposes that there are two kinds of leadership roles, 'idea' persons and 'best-liked' persons. The 'idea' person concentrates on the task and plays the more aggressive role, while the 'best-liked' person deals more with group social-emotional problems and plays a more passive role. These roles can be performed by a single person or each can be played by a different person (Hare, 1982:123). The current study seeks to determine if navigators assume either the 'idea' or 'best-liked' role and how often.

McCall indicates that assumption of a leadership role is impacted by a political process. Additionally, he points out that communicative skills and cognitive processes, whereby an individual can retain verbally transmitted information, influence assumption of leadership roles (McCall, 1977:381). Further, he feels leadership has a situational aspect and that different people will assume leadership roles based on their ability and skills to lead in a certain situation (McCall, 1977:381). Nieva summarizes her research on leadership and leadership roles and states, "there seems to be evidence that even distribution of power, as manifested by decentralization, democratic leadership, and participative climate is positively related to group performance" (Nieva et al, 1985:39).

In the current study, it is proposed that because of the nature of an integral structure (the same people interacting on a daily basis over an extended period of time) that a more decentralized, democratic, and participative climate exists and that situations occur more often which allow the navigator to exercise these political, communicative, and cognitive skills in a leadership role.

Crew Preference in Combat

Crew preference in combat is another consideration that stems from this study of groups. It is also an area of unique interest to the DOD and the USAF. Adam's study, described in a review by Lott and Lott, indicated that

members of bomber crews that were generally similar on dimensions such as age, education and role prestige tended to develop friendships with other members of the crew more readily than in situations where status congruence was low (Lott and Lott, 1965:267). However, Adam's study did not address if individual crewmembers preferred being permanently assigned to a specified crew under combat conditions. Tziner and Eden point out that, in the area of group performance, little research attention has been paid to cooperative task organization such as that of a three man tank crew (Tziner and Eden, 1985:85). There are definite similarities between tasks performed by tank crews and those performed by aircrews. For example, in a tank crew, each crewmember plays a distinct but interdependent role in a highly coordinated task environment (Tziner and Eden, 1985:85).

In a combat situation, cohesiveness, group confidence, intra-group communication, group norms and leadership roles are especially critical. Crewmembers must have confidence that their fellows will perform as expected in a stressful situation such as combat. This confidence is gained through effective crew coordination, the interaction of all crewmembers in the performance of their individual duties to accomplish the mission. A Siskel and Flexman study of aircrew skills defined coordination as the ability of crewmembers to work together, anticipate each other's needs,

to inspire confidence and mutual encouragement and to communicate effectively (Siskel and Flexman, 1962). As Henderson points out, cohesion can be measured in terms of conformity to norms and that members of cohesive groups will conform even under stress (Henderson, 1985:5). Hellriegel states that inadequate or wrong communication can result in poor decisions and performance (Hellriegel and Slocum, 1974:266). Neither poor decisions nor poor performance can be tolerated in a combat environment. Regarding leadership roles Nieva points out the decentralization of leadership and power leads to better performance (Nieva et al, 1985:39). Situations change so rapidly and decision requirements are so frequent and demanding that centralized decision making and leadership are all but impossible.

The current study attempts to focus on this aspect of military group interaction. It is expected that because of the higher degree of stress experienced at the individual and group levels in a combat environment, that communication, norms, leadership roles, cohesiveness and group confidence are especially important and therefore warrant investigation in this study. Respondents are asked to indicate their preference for flying with the same people in a peacetime and combat environment. Responses are formed into composite variables indicating one's preference for integral crews in peacetime and one's preference for integral crews in combat.

Conclusion

LaPiere's study of group dynamics indicates that groups of people who interact frequently over an extended period tend to display the predicted effects of group dynamics elements, such as cohesiveness and intra-group communication, more frequently than do those groups with less stability and interaction (LaPiere, 1954). Integral aircrews (those with permanently assigned members) are good examples of groups who interact on a regular basis over an extended period. Non-integral aircrews (those chosen from pools of crew specialists for a particular mission) are good examples of those who do not interact on a regular basis. These two crew structuring concepts are the focus of the current study.

Studies of group processes are important in the military and have particular applicability in USAF crew structuring concepts. In time of conflict, the combat effectiveness of USAF combat aircrews may be the deciding factor in whether this nation prevails over its opponent. Every member of the aircrew plays an important role toward achieving a high level of combat effectiveness. Each aircrew member must complete his assigned duties in order for the crew to achieve the overall success which ultimately produces victory.

USAF leadership is constantly searching for ways to improve aircrew combat effectiveness and overall

warfighting skills. The Air Force's "Project Warrior" program is an example of this concern for keeping concentration on warfighting activities and attitudes at a high level among aircrew members. The comparison of the strength of group dynamics variables, such as group cohesiveness and group norms, between integral and non-integral crew structuring methods may provide USAF decision makers with the required information to decide which crew structure is more appropriate in a combat environment.

III. Methodology

Chapter Overview

This chapter describes the methodology followed in this study. The chapter includes a description of the underlying population and sample from which data were collected. It also contains a description of the survey instrument used in the study and a discussion concerning survey construction and testing. The chapter concludes with a description of reliability and statistical tests used to analyze the data.

Population

The data for this study were collected from USAF KC-135 and C-130 officer aircrew members. At the time the data was gathered, the Air Force Manpower and Personnel Center (AFMPC) indicated that the total number of KC-135 and C-130 officer aircrew members was 3550 (Jogerst, 1986). The population included male and female rated officers in the ranks of second lieutenant to lieutenant colonel.

Sample

Strategic Air Command (SAC) KC-135 officer aircrew members at two representative air refueling wings were administered surveys as were Military Airlift Command (MAC) C-130 officer aircrew members from a single representative tactical airlift wing. The two SAC wings each contained approximately 96 KC-135 officer aircrew members while the MAC wing contained 192 C-130 officer aircrew members. AFMPC

Rated Officer Assignment Division assigns qualified aircrew members to CONUS wings to equally distribute overall flying experience among all units (Swickard, 1987). Therefore, this clustered sample of 384 is considered representative of KC-135 and C-130 aircrew members within the overall population.

Survey Instrument

Rather than analyzing narrative records of group workers as is usually done in the social work group approach, data to examine and support the preceding hypotheses were gathered using a survey. Using a survey allowed the gathering of current attitudinal data on aircrew members in an efficient, cost-effective and timely manner. After constructing and pretesting the survey instrument, it was administered to 192 SAC KC-135 (integral) and 192 MAC C-130 (non-integral) officer aircrew members.

As stated in the problem statement in Chapter I, little research has been done on the impact of the use of integral and non-integral crew structures on combat capability and attitudes of USAF aircrews. Therefore, developing the survey instrument required composition of original questions to gather data to assess aircrew attitudes regarding the composite variables identified and discussed in Chapter II. Grouping of responses to specific questions posed in the survey instrument allowed formation of composite variables scores. Table 1 shows those questions used to form these

composite variables along with other variables on which data was collected.

TABLE 1

COMPOSITE VARIABLE CONSTRUCTION

VARIABLES	QUESTIONS USED
CREW CONFIDENCE	21, 26, 31, 48
CREW COMMUNICATION	20, 25, 46
CREW NORMS	40, 47
INTEGRAL IN COMBAT	29, 36, 39
GROUP COHESIVENESS	22, 27, 32, 43, 44
INTEGRAL IN PEACE	17, 23, 35
JOB IMPORTANCE	19, 24, 30, 34, 45
COMMITMENT	18, 28, 33, 38
LEADERSHIP ROLES	41, 42
IDENTIFICATION	37

Survey Construction and Testing

During survey construction care was taken to preclude asking misleading, ambiguous, or leading questions. Additionally, questions were designed to allow each individual an appropriate response to each question posed. A six point Likert scale format was used to obtain data where applicable.

The survey instrument was composed of two parts. Part I contained sixteen questions concerning demographic aspects of the respondent. These demographic variables included: gender, age, marital status, rank, type of aircraft assigned, flying speciality, time in service, length of rated service, choice of base of assignment, choice of aircraft assignment, permanent crew status, and if

applicable, crew prefix and number and length of time assigned to a permanent crew.

Part II of the survey included questions to assess the effects of being, or not being, assigned to integral crews with regard to the composite variables listed in Table 1. This portion of the survey contained 29 declarative statements to which the respondent was asked to indicate his feelings based on the relationship with the members of his current assigned crew. If the respondent was not permanently assigned to a crew, then he was instructed to respond based on his relationship with the other crewmembers with whom he flew most often. Response choices were based on a Likert scale with the following response choices.

Strongly agree.

Agree.

Slightly agree.

Slightly disagree.

Disagree.

Strongly disagree.

Question 37 solicited information regarding which group of people the respondent identified with most closely. The response choices included:

Officers in the USAF.

Officers in my flying wing.

Officers in my flying squadron.

Officers on my crew.

None of these.

Questions 41 and 42 solicited information regarding assumption of leadership roles by the different members of the crew and the situations that these people assumed these leadership roles. Response choices to question 41 included:

The pilot.

The copilot.

The navigator.

Different people at different times.

An enlisted crewmember.

Response choices to question 42 included:

In a flying situation.

In a duty situation outside the flying environment.

In an off duty work situation.

In an off duty recreation situation.

In all situations.

Prior to sending the surveys to the selected units a pre-test of the survey instrument was administered to KC-135, C-141, F-4 and C-130 aircrew members currently attending the Air Force Institute of Technology School of Systems and Logistics. Following survey administration, interviews were conducted with two C-130 and two KC-135 aircrew members to improve clarity and validity of questions in the survey. As a result of the pre-test and subsequent interviews, only minor changes to survey questions were necessary.

All respondents were guaranteed anonymity in the coverletter that accompanied each survey. Despite guarantees of anonymity, responses to mail surveys are often poor (Dominowski, 1980:185). In an attempt to alleviate this situation, contact was made with the respective wing commanders of the two KC-135 wings and with the Director of Operations of the C-130 wing to request support in encouraging survey return.

Data Processing

Included with each survey was an optical character reader (OCR) answer sheet on which respondents marked their responses to the various questions. Visual quality assurance was performed to insure that returned sheets had been completed properly and to correct encoding deficiencies. Returned sheets were then numbered sequentially and optically scanned. The data were stored in a computer data file for statistical analysis and manipulation.

Statistical Tests

The Statistical Package of the Social Sciences (SPSS) was used to conduct a reliability test on the composite variables listed in Chapter II. The SAS statistical analysis package was used to assess frequency, calculate chi-square values, and compute results of t-tests.

IV. Data Analysis and Discussion

Chapter Overview

This chapter outlines and summarizes the statistical analysis of the data that were collected through the survey instrument. Reliability analyses of the composite variables are presented. Additionally, frequency data are presented and significant findings identified. The results of T-tests and chi-squared tests are also presented and discussed.

Sample Characteristics

Surveys were distributed to 384 aircrew members. A total of 138 surveys were returned. Of this total, 72 respondents were KC-135 crewmembers and 66 were C-130 crewmembers. Level of response was computed as 35.9 percent.

Reliability Tests

The results of reliability tests are presented in Table 2. Reliability coefficients can range between 0 and 1. The crew communication and preference for integral crews in peacetime reliability coefficients are at the lower end of the acceptable range for a newly designed survey (Lindsey, 1987).

The reliability analyses indicate that question 46 and question 35 do not correlate well with the other questions used to construct respectively the crew communication variable and the preference for integral crews in peacetime

variable. It appears that poor question wording may have confused respondents and caused inconsistent responses. Elimination of question 46 would have raised the reliability coefficient for the crew communication variable to .6378. In a similar way, elimination of question 35 from the preference for integral crews in peacetime variable would have raised the reliability coefficient for that variable to .6672.

TABLE 2

RELIABILITY OF MEASURES

COMPOSITE VARIABLE	RELIABILITY COEFFICIENT
CREW CONFIDENCE	.8598
CREW COMMUNICATION	.6072
CREW NORMS	.6861
INTEGRAL IN COMBAT	.6479
GROUP COHESIVENESS	.7986
INTEGRAL IN PEACE	.6027
JOB IMPORTANCE	.8699
COMMITMENT	.7783

Even though elimination of these questions would have increased the overall reliability coefficients for the respective composite variables, they were not removed. It was decided that despite this apparent flaw in question wording, the information gained by inclusion of these responses outweighed the possible negative effects.

Response Frequencies

Tables 4 through 14 in Appendix D summarize the frequency of responses to the demographic questions of the 138 (72 KC-135 and 66 C-130) crewmembers who completed surveys. Responses are broken down into KC-135 and C-130 categories to facilitate comparisons. The responses indicate that the typical KC-135 crewmember that responded to the survey is a married, male, captain between the ages of 26 and 30 years. The typical KC-135 crewmember also has zero to five years total time in service and zero to five years rated service. The demographic profile for the typical C-130 crewmember who responded is identical to that of the typical KC-135 crewmember.

Table 15 summarizes responses to question 37 in the survey instrument. This question sought to determine the group with whom officer aircrew members most closely identified. Responses indicate that both KC-135 and C-130 crewmembers identify most closely with the other officers in their flying squadron. Identification with other officers in their flying wing ranked second with both KC-135 and C-130 groups.

Questions 41 and 42 sought to determine which persons assumed a leadership role in the aircrew and in what situations. Responses to questions 41 and 42, presented in Tables 16 and 17, indicate that the pilot assumed the leadership role for both KC-135 and C-130 flyings group most

often with different people at different times having the second largest response.

KC-135 crewmembers indicated that the person who assumed the leadership role most often did so in all situations followed closely by flying situations. The C-130 respondent group indicated that these top two response categories were reversed with flying first and all situations second.

The values for the crew confidence variable generally were in the 10-24 point range. However, seven values were noted in the 7 to 8 point range which is more than two standard deviations from the mean for the KC-135 group. Only three C-130 values were more than two standard deviations from the mean. Disregarding these values would raise the mean composite response from 19.19 to 20.43 for KC-135 crewmembers and from 17.71 to 18.03 for C-130 crewmembers. Regardless of these outlier values, the mean KC-135 response was higher than the mean C-130 response.

In the crew communication variable, KC-135 response totals once again exhibited a considerably higher number of lower range values when compared to C-130 responses. Nine KC-135 as opposed to three C-130 crewmembers reported communication values of 9 or less, which is more than two standard deviations below the respective means for the two groups. These extreme values could have affected the overall group mean enough to affect the results of t-tests

and caused acceptance of a null hypothesis that should have been rejected or vice versa.

The crew norms variable also had a higher number of individual KC-135 crewmember response totals in the lower range, that is, outside two standard deviations. Eight KC-135 crewmembers as opposed to three C-130 crewmembers had norms totals of less than 6. Values more than two standard deviations below the mean were also observed through analysis of the job importance and commitment variables. All composite variables are examined more closely and are explained more fully in the t-test section which follows.

t-Tests

T-tests were performed to determine if there was a significant difference between the means of the responses for the KC-135 crewmembers and the C-130 crewmembers with regard to crew confidence, crew communication, crew norms, preference for integral crew composition in peacetime, preference for integral crews in combat, cohesiveness, job importance, and commitment.

Results of the t-tests are fully presented in Appendix E. Table 3 is a summary of these findings. At the .05 confidence level, six of the eight tests showed that a significant difference did exist between the two groups of crewmembers with only crew norms and crew communication showing no significant difference in the means of the two

TABLE 3

t-TEST SUMMARIES

VARIABLE	MEAN	STANDARD DEVIATION	t STATISTIC
CREW CONFIDENCE			2.2441**
KC-135	19.19	4.74	
C-130	17.71	2.81	
CREW COMMUNICATION			0.6789
KC-135	14.07	1.88	
C-130	13.86	1.66	
CREW NORMS			-0.9563
KC-135	9.29	2.21	
C-130	9.60	1.54	
PREFERENCE FOR INTEGRAL CREWS IN PEACETIME			6.6556****
KC-135	11.14	1.98	
C-130	9.09	1.57	
PREFERENCE FOR INTEGRAL CREWS IN COMBAT			0.0433**
KC-135	13.14	3.20	
C-130	12.21	1.99	
GROUP COHESIVENESS			-2.1325**
KC-135	19.46	5.42	
C-130	21.07	3.20	
JOB IMPORTANCE			-3.3467***
KC-135	22.33	6.41	
C-130	25.43	4.29	
COMMITMENT			-4.7618****
KC-135	15.97	4.95	
C-130	19.33	3.17	

LEGEND: *: P <= .10
**: P <= .05
***: P <= .01
****: P <= .001

groups. Furtner analysis of t-test results will be covered in the Tests of Hypotheses section in the next chapter.

Chi-Square Tests

Chi-square tests were performed to determine if there was a significant difference in the distribution of responses from both groups that indicated which persons on the crew filled leadership roles in the flying group. Because of the overwhelming number of responses that indicated that the pilot assumed the leadership role in both KC-135 and C-130 aircrews in all situations, cni-square tests results were of questionable validity. Further analysis of tne results of the chi-square results will be presented in the Tests of Hypotheses section in the next chapter. The chi-square tests results are reported in Appendix F.

Conclusion

Responses from the questionnaires indicated that both groups were very similar with respect to demographic variables. Responses to questions concerning identification with different groups, the person who assumed the flying group leadership role, and in what situations that person assumed the leadership role indicated similar homogeneity. Because of the amount of similarity concerning these factors, the differences noted in the majority of the t-test results should provide some insight into which crew

structuring concept elicits the most favorable attitudes regarding the composite variables used in this study.

V. Results and Conclusions

Chapter Overview

In this chapter, the research questions and hypotheses proposed in Chapter 1 are examined and tne results of the data analyses and statistical tests are discussed. Areas for future research are also outlined. Finally, implications for results of this study are presented.

Examination of Research Questions and Hypotheses

Research Question #1. How do attitudes of individual crewmembers towards others on the crew differ between integral and non-integral crew structures?

Hypothesis 1.1. Members of integral crews report higher levels of confidence in the flying skills of fellow crewmembers than do members of non-integral crews.

Results. The null hypothesis that the mean value of the confidence composite variable are equal is rejected at the .05 confidence level. The mean value for KC-135 crewmembers was 19.19, but for C-130 non-integral crewmembers was 17.71. The t-value of 2.2441 indicates that the difference between respondents from KC-135 and C-130 aircrews is statistically significant. The above hypothesis is accepted.

Hypotnesis 1.2. Communications between members of integral crews are viewed as more succinct, clear, and timely than the communication between members of non-integral crews.

Results. The null hypothesis cannot be rejected in this instance at the .05 confidence level. Because the difference between the two means for integral and non-integral crewmembers is so small, .021, the t-value of .6789 indicates that the two means are effectively equal. Therefore, there appears to be no statistically significant difference in the overall communications of integral and non-integral crewmembers.

Hypothesis 1.3. Group norms regarding flying safety are more highly developed and evident on integral crews when compared to non-integral crews.

Results. The test results indicate that the means of the composite crew norms values is the same for the two groups. Thus, at the .05 confidence level the null hypothesis is accepted and the above hypothesis is rejected. The mean values of 9.29 for KC-135 and 9.60 for C-130 crewmembers are considered to be essentially equal.

Hypothesis 1.4. Aircrew members will indicate a preference for integral crews in the event of combat.

Results. A crewmember is assumed to indicate a preference for integral crews in combat if the reported value is higher than 9. A preference for non-integral crews is indicated if the reported score is less than or equal to 9. Table 22 shows that values greater than 9 were reported by 94.3 percent of the KC-135 crewmembers and by 100 percent of the C-130 crewmembers. Therefore, the

hypothesis above is accepted and it is concluded that both groups of aircrew members indicate a preference for integral crews in combat.

Table 3 shows that at the .05 confidence level there is a statistically significant difference in the mean values of the preference for integral crews in combat between KC-135 and C-130 crewmembers. Thus, on the average, KC-135 crewmembers reported a higher level of preference for integral crews in combat when compared with C-130 crewmembers.

Research Question #2. What advantages are accrued to the flying unit, individual aircrews and aircrew members by employing an integral crew concept?

Hypothesis 2.1. Members of integral crews will indicate higher levels of group cohesiveness than members of non-integral crews.

Results. The mean value of 19.46 for integral crewmembers and 21.07 for non-integral crewmembers allows rejection of the null hypothesis at the .05 confidence level. Moreover, the t-value of -2.0950 indicates that the level of group cohesiveness is significantly higher for the C-130 crewmembers. This result indicates that non-integral crewmembers reported higher levels of group cohesiveness than did integral crews. This finding is directly counter to the above hypothesis and may result from C-130 crewmember responses which considered the squadron as the referent

group. This result will be covered in more detail in the next section.

Research Question #3. How does the leadership role of a navigator on an integral crew differ from that of a navigator on a non-integral crew?

Hypothesis 3.1. Crewmembers of integral crews will more frequently report the navigator as performing leadership roles than will members of non-integral crews.

Results. The chi-square test results for this hypothesis have limited validity because of the overwhelming number of responses that indicated the pilot assumed the leadership role in all situations. Only one C-130 crewmember and zero KC-135 crewmembers indicated that the navigator assumed a leadership role. Therefore, the above hypothesis is rejected at the .05 confidence level. Because only 1 of 138 responses in this sample indicated that the navigator assumed a leadership role it is concluded that navigators had a very low probability of assuming a leadership role regardless of the type of crew structure.

Summary and Conclusions

The results of statistical tests indicate that members of integral crews report equal or higher levels of all the relevant composite variables except group cohesiveness, job importance and commitment. The results of the crew cohesiveness hypothesis may at first seem surprising considering that a review of the literature suggested that

integral crews should exhibit more cohesiveness than non-integral crews. A closer examination is warranted.

The mean cohesiveness value was significantly higher for the C-130 flying group when compared to KC-135 flying group. A total of 52 KC-135 crewmembers indicated that they identified most closely with other officers in either their flying squadron or wing. The number of C-130 crewmembers who responded this way was 53. However, crewmembers were asked to respond based on present crew assignment (KC-135) and if not assigned to a crew to respond based on the people with whom they flew most often (C-130). Reported frequencies for identification with other officers on the crew was 6 and 1 respectively for KC-135 and C-130 crewmembers. Thus KC-135 crewmembers may have answered the questions related to cohesiveness while considering other officers on their crew, that is, people with whom they did not closely identify. On the other hand, C-130 crewmembers may have answered considering other officers in their flying squadron and wing, that is, those with whom they most closely identified.

It may be possible that despite efforts to encourage C-130 crewmembers to respond to the cohesiveness questions based on the experience of flying with a limited number of fellow crewmembers, their responses were instead given considering the entire group of officers in their flying squadron. If C-130 crewmembers responded considering the

squadron as the referent group, it could possibly account for the somewhat surprising results in the cohesiveness area. Additionally, the significantly higher number of values below two standard deviations from the mean for KC-135 crewmembers may have biased the t-test results in favor of C-130 respondents with respect to the cohesiveness variable, the job importance variable, and the commitment variable.

The opportunity for navigators to assume leadership roles in both flying groups is reported to be quite low but perhaps rewording the leadership questions would provide greater insight to navigator leadership possibilities. This could be done by specifically asking if the navigator ever assumed a leadership role rather than asking generally which member assumed the leadership role most often. Furthermore, additional questions regarding this aspect of group interactions on aircrews should be posed in any follow-on research effort to the current study.

Aircrew members from both groups indicated a strong preference for integral crews in combat. An integral crew structure may cause problems in scheduling flying requirements, ancillary training requirements, and personal scheduling flexibility, but the results of this study tend to support it as the preferred crew structuring method in combat for these respondents. Additionally, KC-135 crewmembers indicated a preference for integral crews in

peacetime when compared to C-130 crewmembers who reported no preference either way. This result is not surprising since individuals comfortable in their present situation generally resist change to a different situation (Donnelly et al, 1971: 459-460).

The relatively low response rate (138 returned out of 384 sent out) may have caused some response bias that adversely effected test results. Crewmembers who are dissatisfied with their current situation or who are planning to leave the Air Force may not have responded to the survey. The lack of their viewpoint regarding elements of group dynamics effects could have skewed the data in favor of the crew concept under which they were operating and had experienced dissatisfaction.

Because most of the present crew force lack combat experience further study and analysis should be conducted with different groups of crewmembers. Participants of the Grenada or Libya operations, or former crewmembers who served in combat in the Vietnam conflict are likely candidates for furtner research. Regardless of tne type of crew structure that these individuals operated, their combat experience would provide an additional viewpoint from which to study preference for different crew structuring concepts in a combat environment.

One objective of this study was to provide information about crew structuring. Obtaining the best possible combat

crew performance is the ultimate motivation for seeking to accomplish that objective. This study has provided some insight into group effects on combat aircrews but further research is required to make the best possible decision regarding crew structuring concepts.

Areas for Future Research

Analysis of demographic data indicates that the majority of the respondents in this study are very junior in rank and are not likely to have actually experienced combat. Because of the vital importance of aircrew performance in a combat environment, an examination of attitudes of aircrew members who have participated in combat operations such as the recent raid on Libya and the Grenada rescue mission could provide useful insight into which type of crew structuring method is preferred after having experience in a combat environment.

A comparison of aircrew members operating under different crew structuring concepts in overseas locations could also provide useful insight into group behavior differences. The growing tension in overseas areas and the potential for an encounter with hostile air elements on a daily basis makes an overseas flying environment different from a CONUS environment. The aircrews flying in an overseas environment may develop a different perspective regarding group interactions and preference for a particular crew structuring method than those who have only flown in a CONUS peacetime environment.

Finally, a study of two man fighter aircraft combat crews could provide still another useful perspective on the group bonding and interpersonal reactions that take place in a combat environment. F-4G Wild Weasel or F-15 Strike Eagle flying squadrons could be used as potential survey groups in this type of study.

Implications of Findings for the Air Force

The review of relevant literature in conducting this study indicates that certain group dynamics effects can impact the performance of group members. Air Force leaders are continually striving to improve the performance of combat aircrews. The results of this study indicate that the majority of both groups of aircrew members report a preference for integral crews in combat. An old military adage proclaims that an army should train as it will fight. If this is true, and many senior leaders indicate they believe it is, then the Air Force leadership must decide which crew structuring concept provides the most effective performance in a combat environment and develop training programs which compliment that concept. Only in this way can the maximum level of combat crew performance be attained.

Appendix A

Survey Instrument

FROM: AFIT/LSG (Major Sowada)

SUBJECT: Request for Survey Participation

TO: USAF Aircrew Member

1. The attached survey will be used in a graduate level research effort currently underway at the Air Force Institute of Technology (AFIT). Participation is entirely voluntary but your assistance will be greatly appreciated. The research relates to group interaction between members of combat aircrews. All respondents are guaranteed anonymity.

2. Please honestly respond to eacn question and mark your answer on the enclosed answer sheet. When you have finished answering all questions and marking your answers, place both the questionnare and the answer sheet in the pre-addressed envelope provided. Place the envelope in your base distribution system.

3. If there are any questions regarding this survey, please contact Major Paul Sowada at AUTOVON 785-6569/5435. Thank you for your cooperation.

JAMES T. LINDSEY, Lt Col, USAF
Head, Department of Communication
and Organizational Sciences
School of Systems and Logistics

3 Atch
1. Questionnaire
2. Answer Sheet
3. Pre-addressed Envelope

THIS SURVEY IS IN TWO SECTIONS. FIRST IS A SHORT SERIES OF DEMOGRAPHIC QUESTIONS FOLLOWED BY A SECTION CONTAINING OPINION/ATTITUDE QUESTIONS. MARK YOUR ANSWER TO EACH QUESTION ON BOTH THIS QUESTIONNAIRE AND THE OPTICAL SCAN SHEET. DARKEN THE SPACES ON THE ENCLOSED OPTICAL SCAN SHEET USING A NUMBER 2 PENCIL. AFTER COMPLETING THE SURVEY AND THE ANSWER SHEET, PLEASE MAIL **BOTH** THE SURVEY AND THE ANSWER SHEET BACK IN THE PRE-ADDRESSED ENVELOPE PROVIDED.

MARK THE ONE ANSWER TO EACH QUESTION THAT BEST DESCRIBES YOU. USE THE FOLLOWING RESPONSES TO ANSWER QUESTIONS 1-12.

RESPONSE CHOICES

		A	B	C	D	E	F
1.	PRESENT GRADE	O-1	O-2	O-3	O-4	O-5	O-6
2.	PRESENT AGE	< 25	26-30	31-35	36-40	41-45	> 45
3.	SEX	M	F				
4.	MARITAL STATUS	MARRIED	SINGLE	DIVOR	SEPAR	WIDOW	
5.	TOTAL TIME IN SERVICE (YRS)	0-5	6-10	11-15	16-20	> 20	
6.	TOTAL RATED SERVICE (YRS)	0-5	6-10	11-15	16-20	> 20	
7.	FLYING SPECIALTY	IP	P	IN	N	IC^{P}	CP
8.	CURRENT AIRCRAFT YOU ARE ASSIGNED TO FLY	KC-135	C-141	C-5	C-130	KC-10	OTHER
9.	THIS AIRCRAFT WAS YOUR (_) CHOICE OF ASSIGNMENT.	FIRST	SECOND	THIRD	NOT MY CHOICE		
10.	YOUR CURRENT BASE WAS YOUR (_) CHOICE OF ASSIGNMENT.	FIRST	SECOND	THIRD	NOT MY CHOICE		
11.	ARE YOU PERMANENTLY ASSIGNED A SPECIFICALLY NUMBERED CREW?	YES	NO				

IF YES, PLEASE ANSWER QUESTIONS 12 THROUGH 16.
IF NO, GO TO QUESTION 17 ON THE NEXT PAGE.

12. PERIOD OF TIME YOU HAVE BEEN ASSIGNED TO A SPECIFIC CREW (MONTHS) 1-6 7-12 13-18 19-24 > 24

USE THE FOLLOWING RESPONSES TO ANSWER QUESTIONS 13-15.

RESPONSE CHOICES

	A	B	C	D	E	F	G	H	I	J
13. CREW NUMBER PREFIX	S	E	R	N	(NOT APPLICABLE)					
14. FIRST DIGIT OF CREW NUM.	1	2	3	4	5	6	7	8	9	0
15. SECOND DIGIT OF CREW NUM.	1	2	3	4	5	6	7	8	9	0
16. THIRD DIGIT OF CREW NUM.	1	2	3	4	5	6	7	8	9	0

THE FOLLOWING QUESTIONS REFER TO YOUR RELATIONSHIP WITH OTHER **OFFICER** CREWMEMBERS. ANSWER THESE QUESTIONS BASED ON YOUR PRESENT CREW ASSIGNMENT. **IF YOU ARE NOT ASSIGNED TO A SPECIFIC CREW, THEN ANSWER BASED ON THE OFFICER CREWMEMBERS WITH WHOM YOU FLY MOST OFTEN.**

17. ON A PEACETIME MISSION, I WOULD PREFER TO FLY WITH THE SAME PEOPLE ALL THE TIME.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

18. WORKING IN MY PRESENT AIRCRAFT AND FLYING SPECIALTY IS **NOT** VERY ENJOYABLE.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

19. I DO **NOT** FEEL MY JOB IN THIS FLYING SPECIALTY AND AIRCRAFT IS VERY IMPORTANT.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

20. ON A CONUS TRAINING SORTIE, THE CREW COORDINATION BETWEEN MEMBERS OF MY CREW IS CLEAR, SUCCINT AND ACCURATE.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

21. I AM VERY CONFIDENT IN THE FLYING SKILLS OF EVERYONE ON MY CREW.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

22. MORE THAN ANY OTHER GROUP, I WOULD RATHER SPEND MY OFF DUTY TIME WITH THE PEOPLE ON MY CREW.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

23. ON A PEACETIME MISSION, I DO **NOT** FEEL THE FLYING SORTIE GOES ANY MORE SMOOTHLY WHEN I FLY WITH THE SAME PEOPLE ALL THE TIME.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

24. I FEEL I HAVE A LOT OF RESPONSIBILITY IN MY PRESENT AIRCRAFT AND FLYING SPECIALTY.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

25. DURING DEBRIEFING, THE DISCUSSION BETWEEN MEMBERS OF MY CREW PROVIDES HELPFUL CRITIQUE OF INDIVIDUAL CREWMEMBER INFLIGHT PERFORMANCE.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

26. GIVEN A CHOICE, I WOULD PREFER TO CONTINUE TO FLY WITH THE MEMBERS OF MY CREW.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

27. EVEN AFTER BEING ON TDY OR ALERT, I WOULD RATHER BE WITH THE PEOPLE ON MY CREW MORE THAN ANYBODY ELSE.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

28. I AM TOTALLY DEDICATED TO ACHIEVING THE FORMAL GOALS OR OBJECTIVES OF THE SQUADRON TO WHICH I AM ASSIGNED.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

29. ON A COMBAT MISSION, THERE ARE MORE ADVANTAGES THAN DISADVANTAGES TO FLYING WITH THE SAME PEOPLE EVERY TIME.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

30. IN MY OPINION, THE PEOPLE ON MY CREW DO **NOT** VIEW MY JOB AS VERY IMPORTANT TO MISSION ACCOMPLISHMENT.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

31. I FEEL TOTALLY SAFE FLYING WITH THE PEOPLE ON MY CREW.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

32. WHEN I AM IN A DIFFICULT SITUATION AND NEED HELP, I KNOW I CAN **NEVER** RELY ON THE MEMBERS OF MY CREW.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

33. I AM TOTALLY DEDICATED TO ACHIEVING THE FORMAL GOALS OR OBJECTIVES OF THE WING TO WHICH I AM ASSIGNED.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

34. THE ROLE OF MY FLYING SPECIALTY IS VERY IMPORTANT FOR ACCOMPLISHING THE OVERALL FLYING MISSION OF THIS WING.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

35. FLYING WITH DIFFERENT PEOPLE IN PEACETIME DOES **NOT** BROADEN FLYING KNOWLEDGE AND INDIVIDUAL SKILLS.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

36. FLYING WITH DIFFERENT PEOPLE ON A COMBAT MISSION BROADENS FLYING KNOWLEDGE AND INDIVIDUAL SKILLS.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

37. I MOST CLOSELY IDENTIFY WITH (_____)

A. OFFICERS IN THE USAF.
B. OFFICERS IN MY FLYING WING.
C. OFFICERS IN MY FLYING SQUADRON.
D. OFFICERS ON MY CREW.
E. NONE OF THESE.

38. ASSUMING ALL MY FINANCIAL NEEDS ARE SATISFIED, I WOULD MOST LIKELY **NOT** CONTINUE IN THE USAF FOR A CAREER.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

39. GIVEN A COMBAT SITUATION AND A DEFINITE CHANCE FOR HOSTILE ENGAGEMENT, I WOULD RATHER BE FLYING WITH THE PEOPLE ON MY CREW.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

40. MY CREW IS NOT AFRAID TO REPORT OR DISCUSS FLYING SAFETY INFRACTIONS.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

41. THE PERSON WHO USUALLY ASSUMES THE LEADERSHIP ROLE FOR MY CREW IS

A. THE PILOT.
B. THE COPILOT.
C. THE NAVIGATOR.
D. DIFERENT PEOPLE AT DIFFERENT TIMES.
E. AN ENLISTED CREWMEMBER.

42. THE PERSON WHO USUALLY ASSUMES THE LEADERSHIP ROLE FOR MY CREW MOST OFTEN DOES SO

A. IN A FLYING SITUATION.
B. IN A DUTY SITUATION OUTSIDE THE FLYING ENVIRONMENT.
C. IN AN OFF DUTY WORK SITUATION.
D. IN AN OFF DUTY RECREATION SITUATION.
E. IN ALL SITUATIONS.

43. I **NEVER** SOCIALIZE WITH MY CREW WHEN WE ARE OFF-DUTY.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

44. I AM TOTALLY WILLING TO HELP THE MEMBERS OF MY CREW WITH THEIR PERSONAL OR FAMILY PROBLEMS.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

45. IT WOULD BE DIFFICULT FOR MY CREW TO ACCOMPLISH THE FLYING MISSION EFFECTIVELY WITHOUT MY PARTICIPATION.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

46. MY CREW OFTEN HAS DIFFICULTY TALKING ABOUT THINGS OUTSIDE OF FLYING THAT ADVERSELY AFFECT CREW PERFORMANCE.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

47. MY CREW HAS SET DEFINITE STANDARDS ABOUT FLYING SAFETY.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

48. I WOULD ALWAYS PREFER TO BE FLYING WITH MY CREW IN AN EMERGENCY SITUATION.

A. STRONGLY AGREE.
B. AGREE.
C. SLIGHTLY AGREE.
D. SLIGHTLY DISAGREE.
E. DISAGREE.
F. STRONGLY DISAGREE.

THIS CONCLUDES THE QUESTIONS. PLEASE PLACE THIS SURVEY AND THE COMPLETED RESPONSE SHEET IN THE PRE-ADDRESSED ENVELOPE AND PLACE IN YOUR BASE DISTRIBUTION SYSTEM. THANK YOU FOR PARTICIPATING IN THIS SURVEY..

Appendix B

SPSS Reliability Program

```
FILE HANDLE RESULT/NAME='RESULT'
DATA LIST FILE=RESULT FIXED RECORDS=1/
          QU1 TO QU48 (48F1.0)
RECODE  QU23 QU36 QU32 QU43 QU19 QU30 QU18 QU38 QU46
          (1=6)(2=5)(3=4)(4=3)(5=2)(6=1)
COMPUTE         CONFID=QU21+QU26+QU31+QU48
COMPUTE         COMMUN=QU20+QU25+QU46
COMPUTE         CNORMS=QU40+QU47
COMPUTE         INTPEA=QU17+QU23+QU35
COMPUTE         INTCOM=QU29+QU36+QU39
COMPUTE         COHESI=QU22+QU27+QU32+QU43+QU44
COMPUTE         JOBIMP=QU19+QU24+QU30+QU34+QU45
COMPUTE         COMMIT=QU18+QU28+QU33+QU38
RELIABILITY     VARIABLES=QU17 TO QU48/
  SCALE         (CONFID)=QU21,QU26,QU31,QU48/
STATISTICS      1 3 4 5 11 12 9
RELIABILITY     VARIABLES=QU17 TO QU48/
  SCALE         (COMMUN)=QU20,QU25,QU46/
STATISTICS      1 3 4 5 11 12 9
RELIABILITY     VARIABLES=QU17 TO QU48/
  SCALE         (CNORMS)=QU40,QU47/
STATISTICS      1 3 4 5 11 12 9
RELIABILITY     VARIABLES=QU17 TO QU48/
  SCALE         (INTPEA)=QU17,QU23,QU35/
STATISTICS      1 3 4 5 11 12 9
RELIABILITY     VARIABLES=QU17 TO QU48/
  SCALE         (INTCOM)=QU29,QU36,QU39/
STATISTICS      1 3 4 5 11 12 9
RELIABILITY     VARIABLES=QU17 TO QU48/
  SCALE         (COHESI)=QU22,QU27,QU32,QU43,QU44/
STATISTICS      1 3 4 5 11 12 9
RELIABILITY     VARIABLES=QU17 TO QU48/
  SCALE         (JOBIMP)=QU19,QU24,QU30,QU34,QU45/
STATISTICS      1 3 4 5 11 12 9
RELIABILITY     VARIABLES=QU17 TO QU48/
  SCALE         (COMMIT)=QU18,QU28,QU33,QU38/
STATISTICS      1 3 4 5 11 12 9
FINISH
```

Appendix C

SAS Data Reduction Program

```
OPTIONS LINESIZE=78;
DATA INIT;
INFILE RESULT;
INPUT QU1 1 QU2 2 QU3 3 QU4 4 QU5 5 QU6 6 QU7 7 QU8 8 QU9 9
QU10 10 QU11 11 QU12 12 QU13 13 QU14 14-16 QU17 17 QU18 18
QU19 19 QU20 20 QU21 21 QU22 22 QU23 23 QU24 24 QU25 25
QU26 26 QU27 27 QU28 28 QU29 29 QU30 30 QU31 31 QU32 32
QU33 33 QU34 34 QU35 35 QU36 36 QU37 37 QU38 38 QU39 39
QU40 40 QU41 41 QU42 42 QU43 43 QU44 44 QU45 45 QU46 46
QU47 47 QU48 48;

PROC FORMAT;
   VALUE GRADE     1='2ND LIEUTENANT'
                   2='1ST LIEUTENANT'
                   3='CAPTAIN'
                   4='MAJOR'
                   5='LT COLONEL'
                   6='COLONEL';
   VALUE AGE       1='YOUNGER THAN 25'
                   2='26 TO 30'
                   3='31 TO 35'
                   4='36 TO 40'
                   5='41 TO 45'
                   6='OLDER THAN 45';
   VALUE SEX       1='MALE'
                   2='FEMALE';
   VALUE MARITAL   1='MARRIED'
                   2='SINGLE'
                   3='DIVORCED'
                   4='SEPARATED'
                   5='WIDOWED';
   VALUE SERVICE   1='0 TO 5'
                   2='6 TO 10'
                   3='11 TO 15'
                   4='16 TO 20'
                   5='MORE THAN 20';
   VALUE RATED     1='0 TO 5'
                   2='6 TO 10'
                   3='11 TO 15'
                   4='16 TO 20'
                   5='MORE THAN 20';
   VALUE SPECIALT  1='INST PILOT'
                   2='PILOT'
                   3='INST NAV'
                   4='NAVIGATOR'
                   5='INST CO'
                   6='COPILOT';
```

```
VALUE AIRCRAFT 1='KC-135'
               2='C-141'
               3='C-5'
               4='C-130'
               5='KC-10'
               6='OTHER';
VALUE AIRCHOIC 1='FIRST'
               2='SECOND'
               3='THIRD'
               4='NOT MY CHOICE';
VALUE BASECHOI 1='FIRST'
               2='SECOND'
               3='THIRD'
               4='NOT MY CHOICE';
VALUE ASSGCREW 1='YES'
               2='NO';
VALUE CREWTIME 1='1 TO 6'
               2='7 TO 12'
               3='13 TO 18'
               4='19 TO 24'
               5='MORE THAN 24'
               .='NOT APPLICABLE';
VALUE PREFIX   1='S'
               2='E'
               3='R'
               4='N'
               .,5='NOT APPLICABLE';
VALUE CREWNUM  .='NOT APPLICABLE';
VALUE COMBATA  1='STRONGLY AGREE'
               2='AGREE'
               3='SLIGHTLY AGREE'
               4='SLIGHTLY DISAGREE'
               5='DISAGREE'
               6='STRONGLY DISAGREE'
               .='DID NOT RESPOND';
 VALUE COMMITA 1='STRONGLY AGREE'
               2='AGREE'
               3='SLIGHTLY AGREE'
               4='SLIGHTLY DISAGREE'
               5='DISAGREE'
               6='STRONGLY DISAGREE'
               .='DID NOT RESPOND';
 VALUE JOBIMPA 1='STRONGLY AGREE'
               2='AGREE'
               3='SLIGHTLY AGREE'
               4='SLIGHTLY DISAGREE'
               5='DISAGREE'
               6='STRONGLY DISAGREE'
               .='DID NOT RESPOND';
```

```
VALUE COMMUNA 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE CONFIDA 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COHESIA 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COMBATB 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE JOBIMPB 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COMMUNB 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE CONFIDB 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
```

```
VALUE COHESIB 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COMMITB 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COMBATC 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE JOBIMPC 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE CONFIDC 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COHESIC 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COMMITC 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
```

```
VALUE JOBIMPD 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COMBATD 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COMBATE 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COHESID 1='IN THE USAF'
              2='IN MY WING'
              3='IN MY SQUADRON'
              4='ON MY CREW'
              5='NONE OF THESE'
              .='DID NOT RESPOND';
VALUE COMMITD 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COMBATF 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE CNORMSA 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
```

```
VALUE LROLESA 1='PILOT'
              2='COPILOT'
              3='NAVIGATOR'
              4='DIFF PEOPLE'
              5='ENLISTED MEM'
              .='DID NOT RESPOND';
VALUE LROLESB 1='FLYING SITUATION'
              2='DUTY OUTSIDE FLY'
              3='OFF DUTY WORK'
              4='OFF DUTY RECREAT'
              5='ALL SITUATIONS'
              .='DID NOT RESPOND';
VALUE COHESIE 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COMMITE 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY AGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE JOBIMPE 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE COMMUNC 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
VALUE CNORMSB 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';
```

```
VALUE CONFIDD 1='STRONGLY AGREE'
              2='AGREE'
              3='SLIGHTLY AGREE'
              4='SLIGHTLY DISAGREE'
              5='DISAGREE'
              6='STRONGLY DISAGREE'
              .='DID NOT RESPOND';

LABEL QU1='PRESENT GRADE'
      QU2='PRESENT AGE'
      QU3='SEX'
      QU4='MARITAL STATUS'
      QU5='TOTAL TIME IN SERVICE (YEARS)'
      QU6='TOTAL RATED SERVICE (YEARS)'
      QU7='FLYING SPECIALTY'
      QU8='CURRENT AIRCRAFT YOU ARE ASSIGNED TO FLY'
      QU9='CHOICE OF AIRCRAFT ASSIGNMENT'
     QU10='CHOICE OF BASE ASSIGNMENT'
     QU11='PERMANENTLY ASSIGNED TO NUMBERED CREW'
     QU12='PERIOD ASSIGNED TO NUMBERED CREW'
     QU13='CREW NUMBER PREFIX'
     QU14='CREW NUMBER'
     QU17='PREFER SAME PEOPLE ON PEACETIME MISSION'
     QU18='AIRCRAFT/FLYING SPECIALTY NOT ENJOYABLE'
     QU19='AIRCRAFT/FLYING SPECIALTY NOT IMPORTANT'
     QU20='CREW COORDINATION CLEAR/SUCCINT/ACCURATE'
     QU21='VERY CONFIDENT IN CREW FLYING SKILLS'
     QU22='SPEND OFF DUTY TIME WITH PEOPLE ON CREW'
     QU23='PTIME MISS NO MORE SMOOTH WITH SAME PEO'
     QU24='RESPONSIBILITY IN AIRCRAFT/SPECIALTY'
     QU25='HELPFUL DISCUSSION/CRITIQUE IN DEBRIEF'
     QU26='PREFER TO CONTINUE FLYING WITH SAME CREW'
     QU27='SPEND TIME WITH CREW AFTER TDY OR ALERT'
     QU28='DEDICATED TO SQUADRON GOALS/OBJECTIVES'
     QU29='MORL ADVAN FLY WITH SAME PEOPL IN COMBAT'
     QU30='CREW VIEWS MY JOB AS NOT IMPORTANT'
     QU31='FEEL TOTALLY SAFE FLYING WITH CREW'
     QU32='NEVER RELY ON CREW FOR HELP WHEN NEEDED'
     QU33='DEDICATED TO WING GOALS/OBJECTIVES'
     QU34='FLYING SPECIALTY ROLE IMPORTANT TO WING'
     QU35='DIFF PEO IN PTIME NOT BROADEN FLY SKILLS'
     QU36='FLY WITH DIFFERENT PEOPLE IN COMBAT'
     QU37='MOST CLOSELY INDENTIFY WITH OFFICERS'
     QU38='CONTINUE USAF CAREER IF SUDDENLY WEALTHY'
     QU39='RATHER FLY WITH CREW IN COMBAT SITUATION'
     QU40='CREW NOT AFRAID TO DISCUSS FLYING SAFETY'
     QU41='PERSON WHO ASSUMES CREW LEADERSHIP ROLE'
     QU42='ASSUMES LEADERSHIP ROLE MOST OFTEN'
     QU43='NEVER SOCIALIZE WITH CREW WHEN OFF DUTY'
     QU44='WILLING TO HELP CREW WITH PERS PROBLEMS'
     QU45='MISSION DIFFICULT WITHOUT ME INVOLVED'
     QU46='CREW HAS DIFFICULTY TALKING OUT PROBLEMS'
```

```
      QU47='DEFINITE CREW FLYING SAFETY STANDARDS'
      QU48='PREFER TO FLY WITH CREW IN EMERGENCY'
      CONFID='COMPOSITE CREW CONFIDENCE VALUES'
      COMMUN='COMPOSITE CREW COMMUNICATION VALUES'
      CNORMS='COMPOSITE CREW NORMS VALUES'
      INTPEA='PREFERENCE FOR INTEGRAL IN PEACETIME'
      INTCOM='PREFERENCE FOR INTEGRAL IN COMBAT'
      COHESI='COMPOSITE COHESIVENESS VALUES'
      JOBIMP='COMPOSITE JOB IMPORTANCE VALUES'
      COMMIT='COMPOSITE COMMITMENT VALUES';

FORMAT QU1 GRADE. QU2 AGE. QU3 SEX. QU4 MARITAL. QU5
SERVICE. QU6 RATED. QU7 SPECIALT. QU8 AIRCRAFT. QU9
AIRCHOIC. QU10 BASECHOI. QU11 ASSGCREW. QU12 CREWTIME.
QU13 PREFIX. QU14 CREWNUM. QU17 COMBATA. QU18 COMMITA.
QU19 JOBIMPA. QU20 COMMUNA. QU21 CONFIDA. QU22 COHESIA.
QU23 COMBATB. QU24 JOBIMPB. QU25 COMMUNB. QU26 CONFIDB.
QU27 COHESIB. QU28 COMMITB. QU29 COMBATC. QU30 JOBIMPC.
QU31 CONFIDC. QU32 COHESIC. QU33 COMMITC. QU34 JOBIMPD.
QU35 COMBATD. QU36 COMBATE. QU37 COHESID. QU38 COMMITD.
QU39 COMBATF. QU40 CNORMSA. QU41 LROLESA. QU42 LROLESB.
QU43 COHESIE. QU44 COMMITE. QU45 JOBIMPE. QU46 COMMUNC.
QU47 CNORMSB. QU48 CONFIDD.;

CONFID=28-(QU21+QU26+QU31+QU48);
COMMUN=21-(QU20+QU25+(7-QU46));
CNORMS=14-(QU40+QU47);
INTPEA=21-(QU17+(7-QU23)+(7-QU35));
INTCOM=21-(QU29+QU36+QU39);
COHESI=35-(QU22+QU27+(7-QU32)+(7-QU43)+QU44);
JOBIMP=35-((7-QU19)+QU24+(7-QU30)+QU34+QU45);
COMMIT=28-((7-QU18)+QU28+QU33+(7-QU38));

PROC SORT;
  BY QU8;
PROC FREQ;
  BY QU8;
   TABLES QU1 -- QU7 QU9 -- QU14 QU37 QU41 QU42 CONFID --
COMMIT;
PROC FREQ;
   TABLES QU8*QU41/CHISQ;
PROC FREQ;
   TABLES QU8*QU42/CHISQ;
PROC FREQ;
   TABLES QU8*QU37/CHISQ;
PROC TTEST;
  CLASS QU8;
   VAR CONFID -- COMMIT;
```

Appendix D

Response Frequencies Tables

TABLE 4

PRESENT GRADE

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
2ND LIEUTENANT	2	2.8	2	2.8
1ST LIEUTENANT	20	27.8	22	30.6
CAPTAIN	32	44.4	54	75.0
MAJOR	11	15.3	65	90.3
LT COLONEL	6	8.3	71	98.6
COLONEL	1	1.4	72	100.0
C-130				
2ND LIEUTENANT	7	10.6	7	10.6
1ST LIEUTENANT	26	39.4	33	50.0
CAPTAIN	24	36.4	57	86.4
MAJOR	2	3.0	59	89.4
LT COLONEL	7	10.6	66	100.0

TABLE 5

PRESENT AGE

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
YOUNGER THAN 25	11	15.3	11	15.3
26 TO 30	34	47.2	45	62.5
31 TO 35	10	13.9	55	76.4
36 TO 40	10	13.9	65	90.3
41 TO 45	5	6.9	70	97.2
OLDER THAN 45	2	2.8	72	100.0
C-130				
YOUNGER THAN 25	12	18.2	12	18.2
26 TO 30	41	62.1	53	80.3
31 TO 35	3	4.5	56	84.8
36 TO 40	7	10.6	63	95.5
41 TO 45	3	4.5	66	100.0

TABLE 6

SEX

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
MALE	71	98.6	71	98.6
FEMALE	1	1.4	72	100.0
C-130				
MALE	65	98.5	65	98.5
FEMALE	1	1.5	66	100.0

TABLE 7

MARITAL STATUS

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
MARRIED	54	75.0	54	75.0
SINGLE	15	20.8	69	95.8
DIVORCED	1	1.4	70	97.2
SEPARATED	2	2.8	72	100.0
C-130				
MARRIED	51	77.3	51	77.3
SINGLE	12	18.2	63	95.5
DIVORCED	2	3.0	65	98.5
SEPARATED	1	1.5	66	100.0

TABLE 8

TOTAL TIME IN SERVICE (YEARS)

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
0 TO 5	34	47.2	34	47.2
6 TO 10	18	25.0	52	72.2
11 TO 15	9	12.5	61	84.7
16 TO 20	8	11.1	69	95.8
MORE THAN 20	3	4.2	72	100.0
C-130				
0 TO 5	43	65.2	43	65.2
6 TO 10	12	18.2	55	83.3
11 TO 15	3	4.5	58	87.9
16 TO 20	8	12.1	66	100.0

TABLE 9

TOTAL RATED SERVICE (YEARS)

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
0 TO 5	40	55.6	40	55.6
6 TO 10	12	16.7	52	72.2
11 TO 15	9	12.5	61	84.7
16 TO 20	7	9.7	68	94.4
MORE THAN 20	4	5.6	72	100.0
C-130				
0 TO 5	46	69.7	46	69.7
6 TO 10	8	12.1	54	81.8
11 TO 15	5	7.6	59	89.4
16 TO 20	7	10.6	66	100.0

TABLE 10

FLYING SPECIALTY

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
INST PILOT	21	29.2	21	29.2
PILOT	13	18.1	34	47.2
INST NAV	10	13.9	44	61.1
NAVIGATOR	7	9.7	51	70.8
INST CO	1	1.4	52	72.2
COPILOT	20	27.8	72	100.0
C-130				
INST PILOT	16	24.2	16	24.2
PILOT	12	18.2	28	42.4
INST NAV	7	10.6	35	53.0
NAVIGATOR	17	25.8	52	78.8
COPILOT	14	21.2	66	100.0

TABLE 11

CHOICE OF AIRCRAFT ASSIGNMENT

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
FIRST	18	25.0	18	25.0
SECOND	12	16.7	30	41.7
THIRD	9	12.5	39	54.2
NOT MY CHOICE	33	45.8	72	100.0
C-130				
FIRST	37	56.1	37	56.1
SECOND	13	19.7	50	75.8
THIRD	8	12.1	58	87.9
NOT MY CHOICE	8	12.1	66	100.0

TABLE 12

CHOICE OF BASE ASSIGNMENT

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
FIRST	22	30.6	22	30.6
SECOND	8	11.1	30	41.7
THIRD	5	6.9	35	48.6
NOT MY CHOICE	37	51.4	72	100.0
C-130				
FIRST	17	25.8	17	25.8
SECOND	11	16.7	28	42.4
THIRD	6	9.1	34	51.5
NOT MY CHOICE	32	48.5	66	100.0

TABLE 13

PERMANENTLY ASSIGNED TO CREW

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
YES	58	81.7	58	81.7
NO	13	18.3	71	100.0
C-130				
NO	66	100.0	66	100.0

TABLE 14

PERIOD ASSIGNED TO CREW

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
1 TO 6	19	32.2	19	32.2
7 TO 12	15	25.4	34	57.6
13 TO 18	11	18.6	45	76.3
19 TO 24	10	16.9	55	93.2
MORE THAN 24	4	6.8	59	100.0
C-130				
NOT APPLICABLE	66	100.0	66	100.0

TABLE 15

MOST CLOSELY INDENTIFY WITH OFFICERS

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
IN THE USAF	3	4.2	3	4.2
IN MY WING	18	25.4	21	29.6
IN MY SQUADRON	34	47.9	55	77.5
ON MY CREW	6	8.5	61	85.9
NONE OF THESE	10	14.1	71	100.0
C-130				
IN THE USAF	7	10.6	7	10.6
IN MY WING	18	27.3	25	37.9
IN MY SQUADRON	35	53.0	60	90.9
ON MY CREW	1	1.5	61	92.4
NONE OF THESE	5	7.6	66	100.0

TABLE 16

PERSON WHO ASSUMES LEADERSHIP ROLE

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
PILOT	53	74.6	53	74.6
DIFFERENT PEOPLE	11	15.5	64	90.1
ENLISTED MEMBER	7	9.9	71	100.0
C-130				
PILOT	54	81.8	54	81.8
COPILOT	1	1.5	55	83.3
NAVIGATOR	1	1.5	56	84.8
DIFFERENT PEOPLE	10	15.2	66	100.0

TABLE 17

ASSUMES LEADERSHIP ROLE MOST OFTEN

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
FLYING SITUATION	34	47.9	34	47.9
DUTY OUTSIDE FLY	2	2.8	36	50.7
ALL SITUATIONS	35	49.3	71	100.0
C-130				
FLYING SITUATION	41	62.1	41	62.1
OFF DUTY RECREAT	1	1.5	42	63.6
ALL SITUATIONS	24	36.4	66	100.0

TABLE 18

CREW CONFIDENCE VALUES

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
7	1	1.4	1	1.4
6	6	8.5	7	9.9
10	2	2.8	9	12.7
14	1	1.4	10	14.1
16	3	4.2	13	18.3
17	1	1.4	14	19.7
18	5	7.0	19	26.8
19	11	15.5	30	42.3
20	6	8.5	36	50.7
21	6	8.5	42	59.2
22	11	15.5	53	74.6
23	10	14.1	63	88.7
24	8	11.3	71	100.0
C-130				
11	3	4.5	3	4.5
13	3	4.5	6	9.1
14	3	4.5	9	13.6
15	2	3.0	11	16.7
16	7	10.6	18	27.3
17	13	19.7	31	47.0
18	9	13.6	40	60.6
19	8	12.1	48	72.7
20	9	13.6	57	86.4
21	2	3.0	59	89.4
22	5	7.6	64	97.0
23	2	3.0	66	100.0

TABLE 19

CREW COMMUNICATION VALUES

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
7	2	2.8	2	2.8
8	6	8.5	8	11.3
9	1	1.4	9	12.7
10	2	2.8	11	15.5
11	4	5.6	15	21.1
12	6	8.5	21	29.6
13	12	16.9	33	46.5
14	8	11.3	41	57.7
15	15	21.1	56	78.9
16	12	16.9	68	95.8
17	2	2.8	70	98.6
18	1	1.4	71	100.0
C-130				
7	1	1.5	1	1.5
9	2	3.0	3	4.5
11	5	7.6	8	12.1
12	16	24.2	24	36.4
13	11	16.7	35	53.0
14	13	19.7	48	72.7
15	10	15.2	58	87.9
16	4	6.1	62	93.9
17	4	6.1	66	100.0

TABLE 20

CREW NORMS VALUES

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
4	6	8.5	6	8.5
5	1	1.4	7	9.9
6	1	1.4	8	11.3
7	5	7.0	13	18.3
8	7	9.9	20	28.2
9	7	9.9	27	38.0
10	18	25.4	45	63.4
11	21	29.6	66	93.0
12	5	7.0	71	100.0
C-130				
5	1	1.5	1	1.5
6	2	3.0	3	4.5
7	4	6.1	7	10.6
8	7	10.6	14	21.2
9	8	12.1	22	33.3
10	31	47.0	53	80.3
11	5	7.6	58	87.9
12	8	12.1	66	100.0

TABLE 21

PREFERENCE FOR INTEGRAL IN PEACETIME

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
6	1	1.4	1	1.4
9	7	9.9	8	11.3
10	3	4.2	11	15.5
11	1	1.4	12	16.9
12	5	7.0	17	23.9
13	16	22.5	33	46.5
14	16	22.5	49	69.0
15	9	12.7	58	81.7
16	7	9.9	65	91.5
17	2	2.8	67	94.4
18	4	5.6	71	100.0
C-130				
7	1	1.5	1	1.5
8	1	1.5	2	3.0
9	11	16.7	13	19.7
10	10	15.2	23	34.8
11	12	18.2	35	53.0
12	17	25.8	52	78.8
13	5	7.6	57	86.4
14	6	9.1	63	95.5
15	1	1.5	64	97.0
16	1	1.5	65	98.5
17	1	1.5	66	100.0

TABLE 22

PREFERENCE FOR INTEGRAL IN COMBAT

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
8	1	1.4	1	1.4
9	4	5.7	5	7.1
10	2	2.9	7	10.0
11	4	5.7	11	15.7
12	6	8.6	17	24.3
13	13	18.6	30	42.9
14	15	21.4	45	64.3
15	13	18.6	58	82.9
16	10	14.3	68	97.1
17	2	2.9	70	100.0
C-130				
11	2	3.0	2	3.0
12	5	7.6	7	10.6
13	14	21.2	21	31.8
14	11	16.7	32	48.5
15	16	24.2	48	72.7
16	10	15.2	58	87.9
17	4	6.1	62	93.9
18	4	6.1	66	100.0

TABLE 23

COHESIVENESS VALUES

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
6	6	8.5	6	8.5
8	1	1.4	7	9.9
11	1	1.4	8	11.3
13	1	1.4	9	12.7
14	1	1.4	10	14.1
15	1	1.4	11	15.5
16	2	2.8	13	18.3
17	1	1.4	14	19.7
18	9	12.7	23	32.4
19	6	8.5	29	40.8
20	3	4.2	32	45.1
21	8	11.3	40	56.3
22	9	12.7	49	69.0
23	9	12.7	58	81.7
24	4	5.6	62	87.3
25	6	8.5	68	95.8
26	1	1.4	69	97.2
27	1	1.4	70	98.6
28	1	1.4	71	100.0
C-130				
13	1	1.5	1	1.5
14	1	1.5	2	3.0
15	1	1.5	3	4.5
16	3	4.5	6	9.1
17	2	3.0	8	12.1
18	4	6.1	12	18.2
19	6	9.1	18	27.3
20	12	18.2	30	45.5
21	7	10.6	37	56.1
22	8	12.1	45	68.2
23	4	6.1	49	74.2
24	8	12.1	57	86.4
25	4	6.1	61	92.4
26	4	6.1	65	98.5
30	1	1.5	66	100.0

TABLE 24

JOB IMPORTANCE VALUES

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
6	6	8.5	6	8.5
8	1	1.4	7	9.9
11	1	1.4	8	11.3
15	1	1.4	9	12.7
16	1	1.4	10	14.1
18	1	1.4	11	15.5
19	2	2.8	13	18.3
20	5	7.0	18	25.4
21	3	4.2	21	29.6
22	4	5.6	25	35.2
23	6	8.5	31	43.7
24	4	5.6	35	49.3
25	12	16.9	47	66.2
26	10	14.1	57	80.3
27	2	2.8	59	83.1
28	5	7.0	64	90.1
29	5	7.0	69	97.2
30	2	2.8	71	100.0
C-130				
10	1	1.5	1	1.5
14	1	1.5	2	3.0
15	1	1.5	3	4.5
16	1	1.5	4	6.1
18	1	1.5	5	7.6
20	2	3.0	7	10.6
21	1	1.5	8	12.1
22	5	7.6	13	19.7
23	5	7.6	18	27.3
24	4	6.1	22	33.3
25	10	15.2	32	48.5
26	2	3.0	34	51.5
27	4	6.1	38	57.6
28	8	12.1	46	69.7
29	10	15.2	56	84.8
30	10	15.2	66	100.0

TABLE 25

COMMITMENT VALUES

	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
KC-135				
6	8	11.3	8	11.3
10	2	2.8	10	14.1
11	2	2.8	12	16.9
12	4	5.6	16	22.5
13	5	7.0	21	29.6
14	5	7.0	26	36.6
15	2	2.8	28	39.4
16	4	5.6	32	45.1
17	6	8.5	38	53.5
18	6	8.5	44	62.0
19	8	11.3	52	73.2
20	6	8.5	58	81.7
21	5	7.0	63	88.7
22	4	5.6	67	94.4
23	4	5.6	71	100.0
C-130				
12	2	3.0	2	3.0
13	2	3.0	4	6.1
14	2	3.0	6	9.1
15	5	7.6	11	16.7
17	6	9.1	17	25.8
18	9	13.6	26	39.4
19	4	6.1	30	45.5
20	7	10.6	37	56.1
21	9	13.6	46	69.7
22	11	16.7	57	86.4
23	4	6.1	61	92.4
24	5	7.6	66	100.0

Appendix E

t-Test Tables

TABLE 26

VARIABLE: CREW CONFIDENCE

	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
KC-135	71	19.19	4.74	0.5636	7.0	24.0
C-130	66	17.71	2.81	0.3466	11.0	23.0

VARIANCES	T	DF	PROB > |T|	PROB > F
UNEQUAL	2.2441	115.2	0.0267	0.2909
EQUAL	2.2049	135.0	0.0292	

TABLE 27

VARIABLE: CREW COMMUNICATION

	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
KC-135	71	14.07	1.88	0.2236	10.0	18.0
C-130	66	13.86	1.66	0.2047	10.0	17.0

VARIANCES	T	DF	PROB > |T|	PROB > F
UNEQUAL	0.6820	134.6	0.4964	0.8743
EQUAL	0.6789	135.0	0.4984	

TABLE 28

VARIABLE: CREW NORMS

	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
KC-135	71	9.29	2.21	0.2626	4.0	12.0
C-130	66	9.60	1.54	0.1905	5.0	12.0

VARIANCES	T	DF	PROB > ¶T¶	PROB > F
UNEQUAL	-0.9563	125.6	0.3408	0.6728
EQUAL	-0.9443	135.0	0.3467	

TABLE 29

VARIABLE: PREFERENCE FOR INTEGRAL CREWS IN PEACETIME

	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
KC-135	71	11.14	1.98	0.2359	7.0	17.0
C-130	66	9.09	1.57	0.1939	7.0	14.0

VARIANCES	T	DF	PROB > ¶T¶	PROB > F
UNEQUAL	6.7116	131.8	0.0001	0.1278
EQUAL	6.6556	135.0	0.0001	

TABLE 30

VARIABLE: PREFERENCE FOR INTEGRAL CREWS IN COMBAT

	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
KC-135	70	13.14	3.20	0.3835	5.0	18.0
C-130	66	12.21	1.99	0.2457	7.0	18.0

VARIANCES	T	DF	PROB > ¶T¶	PROB > F
UNEQUAL	2.0432	116.4	0.0433	0.1661
EQUAL	2.0167	134.0	0.0457	

TABLE 31

VARIABLE: GROUP COHESIVENESS

	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
KC-135	71	19.46	5.42	0.6440	6.0	28.0
C-130	66	21.07	3.20	0.3947	13.0	30.0

VARIANCES	T	DF	PROB > ¶T¶	PROB > F
UNEQUAL	-2.1325	115.0	0.0351	0.4665
EQUAL	-2.0950	135.0	0.0380	

TABLE 32

VARIABLE: JOB IMPORTANCE

	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
KC-135	71	22.33	6.41	0.7612	6.0	30.0
C-130	66	25.43	4.29	0.5285	10.0	30.0

VARIANCES	T	DF	PROB > ¶T¶	PROB > F
UNEQUAL	-3.3467	123.0	0.0011	0.2617
EQUAL	-3.3001	135.0	0.0012	

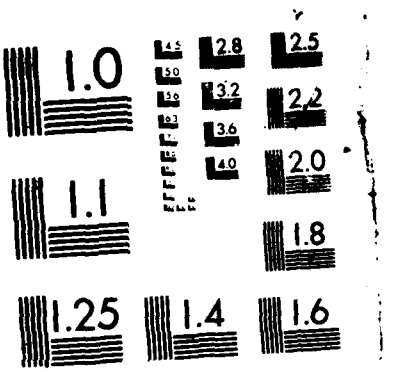
TABLE 33

VARIABLE: COMMITMENT

	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
KC-135	71	15.97	4.95	0.5875	6.0	23.0
C-130	66	19.33	3.17	0.3912	12.0	24.0

VARIANCES	T	DF	PROB > ¶T¶	PROB > F
UNEQUAL	-4.7618	120.4	0.0001	0.0465
EQUAL	-4.6895	135.0	0.0001	

AD-A186 467 A COMPARISON OF THE EFFECTS OF GROUP DYNAMICS ON 2/2
INDIVIDUALS ASSIGNED TO (U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AFB OH SCHOOL OF SYST P M SOWADA
UNCLASSIFIED SEP 87 AFIT/GSM/LSR/87S-32 F/G 5/8 NL



Appendix F

Chi-Square Test Tables

TABLE 34

AIRCRAFT ASSIGNMEMT BY ASSUMES LEADERSHIP ROLE

KC-135	PILOT	COPILOT	NAVIGATO	DIFFEREN	ENLISTED	TOTAL
FREQ	53	0	0	11	7	71
PCT	38.69	0.00	0.00	8.03	5.11	51.82
ROW PCT	74.65	0.00	0.00	15.49	9.86	
COL PCT	49.53	0.00	0.00	52.38	100.00	
C-130						
FREQ	54	1	1	10	0	66
PCT	39.42	0.73	0.73	7.30	0.00	48.18
ROW PCT	81.82	1.52	1.52	15.15	0.00	
COL PCT	50.47	100.00	100.00	47.62	0.00	
TOTAL	107	1	1	21	7	137
	78.10	0.73	0.73	15.33	5.11	100.00

STATISTICS

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	8.886	0.064
LIKELIHOOD RATIO CHI-SQUARE	4	12.351	0.015
MANTEL-HAENSZEL CHI-SQUARE	1	2.485	0.115

EFFECTIVE SAMPLE SIZE = 137

WARNING: 60% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5. CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE 35

AIRCRAFT ASSIGNMENT BY SITUATION WHERE ASSUME LEADERS ROLE

KC-135	FLYING	NON FLY	RECREATE	ALL	TOTAL
FREQUENCY	34	2	0	35	71
PERCENT	24.82	1.46	0.00	25.55	51.82
ROW PCT	47.89	2.82	0.00	49.30	
COL PCT	45.33	100.00	0.00	59.32	
C-130					
FREQUENCY	41	0	1	24	66
PERCENT	29.93	0.00	0.73	17.52	48.18
ROW PCT	62.12	0.00	1.52	36.36	
COL PCT	54.67	0.00	100.00	40.68	
TOTAL	75	2	1	59	137
	54.74	1.46	0.73	43.07	100.00

STATISTICS

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	5.529	0.137
LIKELIHOOD RATIO CHI-SQUARE	3	6.694	0.082
MANTEL-HAENSZEL CHI-SQUARE	1	2.190	0.139

EFFECTIVE SAMPLE SIZE = 137

WARNING: 50% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5. CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE 36

AIRCRAFT ASSIGNMENT BY GROUP MOST CLOSELY IDENTIFIED WITH

KC-135	USAF	WING	SQUADRON	CREW	NONE	TOTAL
FREQ	3	18	34	6	10	71
PERCENT	2.19	13.14	24.82	4.38	7.30	51.82
ROW PCT	4.23	25.35	47.89	8.45	14.08	
COL PCT	30.00	50.00	49.28	85.71	66.67	
C-130						
FREQ	7	18	35	1	5	66
PERCENT	5.11	13.14	25.55	0.73	3.65	48.18
ROW PCT	10.61	27.27	53.03	1.52	7.58	
COL PCT	70.00	50.00	50.72	14.29	33.33	
TOTAL	10	36	69	7	15	137
	7.30	26.28	50.36	5.11	10.95	100.00

STATISTICS

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	6.679	0.154
LIKELIHOOD RATIO CHI-SQUARE	4	7.139	0.129
MANTEL-HAENSZEL CHI-SQUARE	1	3.976	0.046

EFFECTIVE SAMPLE SIZE = 137

WARNING: 30% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5. CHI-SQUARE MAY NOT BE A VALID TEST.

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VITA

Major Paul M. Sowada was born 16 December 1952 in Corpus Christi Texas. He graduated from Corpus Christi Academy in May 1971 and from the United States Air Force Academy Preparatory School in May 1972. In July 1972 he entered the United States Air Force Academy and graduated in June 1976 with a Bachelor of Science degree in General Management. After completing Undergraduate Navigator Training at Mather AFB California in March 1977 and Strategic Air Command Combat Crew Training School at Castle AFB California in August 1977, he was assigned to the 11th Air Refueling Squadron and 340th Air Refueling Group at Altus AFB Oklahoma. While there he served as a line crew navigator, instructor navigator, tanker scheduling officer, and finally as Chief, Tanker Scheduling Branch. In November 1982 he was transferred to Headquarters Eighth Air Force at Barksdale AFB Louisiana. He first served as the Deputy Chief, Operations Systems Management Division followed by jobs as the Chief, Tanker Plans and Tactics, Bombing and Navigation Division; Executive Officer to the Vice-Commander; and finally as Aide to the Commander Eighth Air Force. He entered the School of Systems and Logistics, Air Force Institute of Technology, in May 1986.

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The purpose of this study was to compare and contrast the effects of group dynamics using Strategic Air Command KC-135 officer aircrew members who operate under an integral crew concept and Military Airlift Command officer aircrew members who operate under a non-integral crew concept. The study compared level of group cohesiveness and intragroup communications between the two types of crew structures. This study also examined the degree of confidence crewmembers had in the people with whom they flew, attitudes regarding flying safety norms, and the type of crew structure preferred in a combat environment. Finally, this study sought to determine if crewmembers perceived that navigators had a greater opportunity to assume a leadership role in the crew with whom they flew if performing their duties under an integral crew structure.

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