

AD-A242 940



NAVAL POSTGRADUATE SCHOOL
Monterey, California



THESIS

**COMPUTER FEAR AND ANXIETY
IN THE UNITED STATES ARMY**

by

Michael S. Buchner

March 1991

Thesis Advisor:

Commander Thomas Mitchell

Approved for public release; distribution is unlimited


91-17015

91 12 4 009

REPORT DOCUMENTATION PAGE			
1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b. RESTRICTIVE MARKINGS	
2a. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.	
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE			
4. PERFORMING ORGANIZATION REPORT NUMBER(S)		5. MONITORING ORGANIZATION REPORT NUMBER(S)	
6a. NAME OF PERFORMING ORGANIZATION Naval Postgraduate School	6b. OFFICE SYMBOL (If applicable) CODE 37	7a. NAME OF MONITORING ORGANIZATION Naval Postgraduate School	
6c. ADDRESS (City, State, and ZIP Code) Monterey, CA 93943-5000		7b. ADDRESS (City, State, and ZIP Code) Monterey, CA 93943-5000	
8a. NAME OF FUNDING/SPONSORING ORGANIZATION	8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State, and ZIP Code)		10. SOURCE OF FUNDING NUMBERS	
		Program Element No	Project No
		Task No	Work Unit Accession Number
11. TITLE (Include Security Classification) Computer Fear and Anxiety in the United States Army			
12. PERSONAL AUTHOR(S) Michael S. Buchner			
13a. TYPE OF REPORT Master's Thesis	13b. TIME COVERED From To	14. DATE OF REPORT (year, month, day) 1991, March	15. PAGE COUNT 145
16. SUPPLEMENTARY NOTATION The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.			
17. COSATI CODES		18. SUBJECT TERMS (continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUBGROUP	
		Computer Fear, Computer Anxiety, Computerphobia, Cyberphobia, Technostress, Computer Aversion, Computerphrenia	
19. ABSTRACT (continue on reverse if necessary and identify by block number)			
The fear of technology, particularly computers, appears to be widespread. This thesis defines computer fear and anxiety, its consequences, and provides recommendations to reduce its impact. Further, through the use of a questionnaire, it attempts to quantify the extent of computer fear and anxiety in the U.S. Army. Finding 1: As some soldiers increase their interaction with computers through training and experience their level of computer fear, anxiety, and apprehension also increases, at least for the short term. Finding 2: The extent of computer anxiety in the U.S. Army is as high as 11% for computer specialists and as high as 18% for "end-users." The extent of severe computer anxiety is approximately 4.5% for both computer specialists and "end-users." Finding 3: There is not a set of characteristics that can be used to draw a profile of a computer anxious individual. Observation/hypothesis: Computer anxiety may be understood as a cycle, termed the "Computer Anxious Cycle." The cycle involves four stages: ignorance is bliss, computer shock, rising anxiety, and relief. This hypothesis requires additional research.			
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS REPORT ☐ DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED	
22a. NAME OF RESPONSIBLE INDIVIDUAL CDR Thomas Mitchell		22b. TELEPHONE (Include Area code) (408)-646-2620	22c. OFFICE SYMBOL OR/ML

Approved for public release; distribution unlimited.

COMPUTER FEAR AND ANXIETY IN THE UNITED STATES ARMY

by

Michael S. Buchner
Captain, United States Army
B.S., University of Arizona, 1979

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN INFORMATION SYSTEMS

from the

NAVAL POSTGRADUATE SCHOOL
March 1991

Author:

Michael S. Buchner

Michael S. Buchner

Approved By:

Thomas Mitchell

Commander Thomas Mitchell, Thesis Advisor

Tung X Bui

Professor Tung Bui, Second Reader

D. E.

Professor David Whipple, Chairman,
Department of Administrative Sciences

ABSTRACT

The fear of technology, particularly computers, appears to be widespread. This thesis defines computer fear and anxiety, its consequences, and provides recommendations to reduce its impact. Further, it attempts to quantify the extent of computer fear and anxiety in the U.S. Army. Finding 1: As some soldiers increase their interaction with computers through training and experience their level of computer fear, anxiety, and apprehension also increases, at least for the short term. Finding 2: The extent of computer anxiety in the U.S. Army is as high as 11% for computer specialists and as high as 18% for "end-users." The extent of severe computer anxiety is approximately 4.5% for both computer specialists and "end-users." Finding 3: There is not a set of characteristics that can be used to draw a profile of a computer anxious individual. Observation/hypothesis: Computer anxiety may be understood as a cycle, termed the *Computer Anxious Cycle*. The cycle involves four stages: ignorance is bliss, computer shock, rising anxiety, and relief. This hypothesis requires additional research.

TABLE OF CONTENTS

I.	INTRODUCTION	1
	A. OBJECTIVE	4
	B. RESEARCH QUESTIONS	6
	C. APPROACH	6
II.	HISTORICAL BACKGROUND	8
III.	FEAR, PHOBIA, ANXIETY, AND STRESS	13
	A. FEAR	13
	B. PHOBIA	14
	C. ANXIETY	15
	D. STRESS	16
IV.	COMPUTER FEAR AND ANXIETY	18
	A. COMPUTER FEAR AND ANXIETY	18
	B. COMPUTERPHRENIA	23
	C. JOB SECURITY	26
	D. RESISTANCE TO CHANGE	30
	E. THE KEYBOARD AND TYPING	38
	F. COMPUTER LITERACY	43
	G. DEALING WITH COMPUTER ANXIETY	46
V.	METHODOLOGY	54
VI.	ANALYSIS AND RESULTS.....	58
	A. GROUP DEMOGRAPHICS	58
	1. ACTIVE DUTY SOLDIERS AND DA CIVILIANS GROUP.	58
	2. BEGINNING ENLISTED GROUP	59

3. GRADUATING ENLISTED GROUP	60
4. BEGINNING OFFICERS GROUP	61
5. GRADUATING OFFICERS GROUP	62
B. COMPUTER ATTITUDE SCORES	63
1. ANALYSIS	63
2. RESULTS	65
C. DEMOGRAPHIC/COMPUTER ATTITUDE CORRELATIONS	70
1. ANALYSIS	70
2. RESULTS	71
D. ANOTHER HYPOTHESIS	74
VII. CONCLUSIONS	76
A. FINDINGS	76
1. RESEARCH QUESTIONS	76
2. FINDINGS	76
B. DISCUSSION	77
APPENDIX A QUESTIONNAIRE	82
APPENDIX B EXPLANATION OF DATA FILES AND COLUMNS	86
APPENDIX C DESCRIPTIVE STATISTICS	91
APPENDIX D CORRELATION MATRICES	97
APPENDIX E RESPONSE PERCENTAGES	113
APPENDIX F QUESTIONNAIRE SCORES	123
LIST OF REFERENCES	133
BIBLIOGRAPHY	136
INITIAL DISTRIBUTION LIST	138

ACKNOWLEDGEMENT

I gratefully acknowledge my Lord and Savior, Jesus Christ. I thank Him not only for His gifts of love, forgiveness, and eternal life, but for His complete plan for my life. We like to think that our achievements are due to our own individual efforts. However, they are really due to the time and place of events, opportunities, and most of all the people that God places in our lives. If we accept it, His love and plan are revealed day by day. I thank Him for bringing me to this place at this time, for His constant inspiration and daily discipline necessary to achieve success in this Master's program. Most of all I thank Him for my wife, Susan, my son Clayton, and my daughter Katie. They are certainly the most precious blessing of all. I can't express enough thanks or appreciation to them. Their patience, understanding, and cooperation, while my energy was diverted away from my responsibilities as a husband and a father, were truly a blessing from God. And finally, I just have to say, "I love it when a plan comes together!"

"If any of you lacks wisdom, let him ask God, who gives to all men generously and without reproach, and it will be given to him. But let him ask in faith without any doubting, for the one who doubts is like the surf of the sea driven and tossed by the wind." [James 1:4-5]

I. INTRODUCTION

In 1804 Joseph Jacquard built a fully automated loom, programmed with punched cards, that could handle extremely complicated weaving designs. Jacquard's invention was a significant advance in automation and revolutionized the weaving industry. The weavers, however, were very angry because they feared being replaced by the machine; they burned his house and destroyed the loom he had built. This is probably the first recorded case of fear, anger, and anxiety attributed to automation.

Computers have been hailed as the most significant advancement in the history of civilization [Ref 1:p. 4]. We live in the so called "Information Age" made possible by the capabilities of computers. Computers have blended with every aspect of our lives to the point that the average American has dozens of direct and indirect contacts with them every day.

Direct contact can be experienced at a store check-out counter, an automatic teller machine, the post office, at home, or in the work place. People make indirect contact when they start their cars, stop at a traffic light, make a telephone call, or make a flight reservation.

People are hardly aware of the computers they contact indirectly. Embedded systems or systems that do not require their personal interaction are not usually thought of as

"computer systems" by the general public. These systems are not of concern in this thesis. When people hear the word "computer" they generally think of computer systems with which they have direct interaction. Most often they think of micro computers, work stations, or video display terminals.

The proliferation of micro computers in recent years has changed the way people think about computers and made it virtually impossible to avoid direct contact with them. With the development of problem-solving software that can be easily learned and used, *end-user computing*¹ is growing at the rate of 50 to 90 percent per year [Ref 2:p 672]. On the surface the widespread use of computers seems to indicate our society's complete acceptance of the assiduous machines. However, the populace may not be as comfortable with computers as our technological society pretends to be. Weinberg determined as early as 1981 that as much as 30 percent of the population has some type of fear or anxiety toward computers [Ref 3:p. 10]. It is reported that this phenomenon has a tremendous impact on our national productivity [Ref 3:p 19]. With the current extensive distribution of computers no individual or organization can escape their influence. The U.S. Government, the U.S. Army specifically, are no exceptions.

¹ End-user computing is defined as the creative use of computers by those who are not professionals in data processing.

The Information Resources Management Service (IRMS) of the General Services Administration reports that the Federal Government owns more than 1.6 million micro computers. Notice that this figure does not include other systems like special purpose, mainframe, mid-range, or mini computers. Agencies spent more than \$600 million on micros in a two year period (1987 - 1989) with the Defense Department accounting for \$343 million, or 54 percent. As for individual inventories, the IRMS said the Army has the most micros with 221,800 systems. The numbers indicate the importance of the Army's reliance on computer systems. But, does the Army's perception of computers follow suit? [Ref 4:p. 3]

In an October 1990 issue of the *Army Times* one article stated that war in the second half of the 20th century has proved that the quality of command and control does not always improve as communications increase [Ref 5:p 88]. The need was for a new relationship between communications and commanders, a bond forged and strengthened, tacticians and strategists believe, by creative use of computers. The computer -- whether tracking missiles, sorting out knotty logistical problems, or giving a lost infantryman his exact location -- will remain a key tool for success in war. [Ref 5:p. 90]

In October, 1990, the Army's Director of Information Systems for Command, Control, Communications, and Computers (DISC⁴), Lieutenant General Jerome Hilmes stated, while briefing on the Army's computing capability in Operation

Desert Shield, "The Army is an automated force. All of our combat service support activities are automated. Nowadays, when a soldier deploys, he grabs his weapon and his computer and goes." [Ref 6:p. 79]

The combination of the Army's heavy reliance on computers, and the fact that roughly one third of the population experiences computer fear and anxiety, raises questions. Namely, does computer fear and anxiety impact the Army's ability to realize the full potential of its computer systems? This thesis examines computer fear and anxiety with respect to its impact in the U.S. Army. The goal of this thesis is to define what computer fear and anxiety is, what its consequences are, and make recommendations to reduce its impact.

A. OBJECTIVE

In the last decade, the computer culture has evolved rapidly from the institutional arrangements surrounding mainframes and minicomputers to the new environment surrounding micro computers, also called personal computers (PC's) and desktop computers. In the next two decades computers will become as ubiquitous and commonplace as telephones [Ref 7:p. 57].

In line with other advanced industrial technologies, the computer is redefining social relations in the workplace. Alongside the questions of power and status that surround the new technology, we find the fears and anxieties--the future shock, technological stress, and computer phobia--of those who must come to terms with the new tools. Already, in many offices a social distance has

opened between computer users and non-users. Our fears and anxieties reflect a deeper cultural confusion about the meaning of the new technology. Does it benefit us or is it threatening? In using computers, our actions and, in turn our thoughts are subtly changed. Our conceptions of ourselves and of machines are altered. Do we think like computers? Are computers thinking machines? A new cultural synthesis will eventually emerge in the answers to these questions. In the meantime, many will experience anxiety and uncertainty about computers. [Ref 7:p. 14]

In the Army, as elsewhere, people are subjected to computers due to the necessity of organizational objectives. Many individuals anxiously choose to interact with available computer assets. Frequently however, direct contact with computers is beyond the control of the individual. The term "cyberphobia" first appeared in the early 1980's to describe the negative response to computers, more precisely, fear, distrust, and hatred of computers. Computer fear and anxiety is a real phenomenon that results in both physiological and psychological disorders that impact not only on individuals, but on organizations as well. "Technostress" is a related term which is used to identify a modern disease of adaption caused by an inability to cope with new computer technologies in a healthy manner [Ref 1:p. 16]. The fear of technology and particularly computers is widespread. The Army seems particularly vulnerable to these conditions because of the recent proliferation of computers and computerized systems coupled with the highly specialized and stressful mission environment in which managers/leaders and operators interface with advanced hardware and software. Computer fear and anxiety may be degrading the effectiveness of the individual,

the automated system, and the organization. If it is, it is essentially unrecognized and unchallenged.

The objectives of this thesis are:

1. To define computer fear and anxiety.
2. To define the impact of computer fear and anxiety on the individual and the organization.
3. To confirm or deny the existence of computer fear and anxiety in the U.S. Army.
4. To propose recommendations for dealing with the effects of computer fear and anxiety.

B. RESEARCH QUESTIONS

1. What is computer fear and anxiety? What are the pertinent aspects of the phenomenon? What are the consequences?

2. Is computer fear and anxiety as prevalent in the Army as it is in private industry? Could it have any impact in the Army and should it be recognized and dealt with?

C. APPROACH

This thesis includes the results of an extensive literature review detailing the background of computer and anxiety. The intention of the review is to determine what computer fear and anxiety is, what are the pertinent aspects of the condition, and what are the consequences. The literature review provides the necessary background information for understanding the malady in the U.S. Army. A Computer Attitude Scale (questionnaire) was developed and used to obtain information from soldiers and Department of the Army

civilians (Appendix A). The results of the questionnaire are used to draw conclusions concerning the extent of computer fear and anxiety in the U.S. Army.

Chapter II presents an historical background describing the events that led up to the present day situation. Particularly, the shift from the computer professionals as the primary users to the non-computer professionals as the primary users.

Chapter III discusses common fear, phobia, and anxiety in a universal sense.

Chapter IV describes the different manifestations of computer fear and anxiety. The condition, effects, and remedies are defined and discussed in detail.

Chapter V describes the methodology used for assessing the extent of the problem in the U.S. Army.

Chapter VI presents the data analysis, and a detailed discussion of the results.

Chapter VII presents conclusions and offers recommendations.

II. HISTORICAL BACKGROUND

To begin understanding computer fear and anxiety it helps to know something about the historical background of computers and users. The progression of computer technology is nicely explained by the so called, "computer generations" which are detailed in Figure 1. The growth of individual and organizational relationships with computers closely parallels these computer generations. Notice too, that each generation is described in terms of hardware and software technology while the human factor goes unmentioned. As Brod explains, "the electronic workplace is a relatively new phenomenon, and as a result human casualties, until recently, have been too few to be of concern" [Ref 1:p. 27].

The first large scale computer applications, for military and scientific work, took place in the 1950's. The cumbersome machines were first used in the business world for repetitive, well-defined accounting tasks. The computer operations were centralized and carried out by small teams of computer experts. The technology did not affect the majority of employees in the companies employing the systems. The advent of transistors was responsible for the next big step in computerization. [Ref 1:p. 28]

<u>Generation</u>	<u>Year</u>	<u>Characteristics</u>
1	1950 - 1958	- vacuum tubes for CPU - machine language - bulky and unreliable
2	1959 - 1964	- transistors for memory - disk for secondary storage - processed one program at a time
3	1964 - 1970	- large scale integrated circuitry - time-sharing environment - multi-processing/multiprogramming - improved reliability and speed
4	1970 - 1980	- very large-scale integration circuitry - introduction of DBMS - decentralized computing
5	1980 - 1990	- introduction of the microcomputer - appearance of DSS and office automation - (distinguishing feature yet unrecognized for the 5th generation)

Figure 1. Computer Generations¹

¹ Awad, E., *Management Information Systems; Concepts, Structure, and Applications*, Awad and Associates, 1988.

In the 1960's transistors replaced vacuum tubes reducing the size, maintenance, and price of computers. Use of computer systems increased and expanded into more and more areas of business, although they were still used for repetitive and mundane tasks like: inventory control and payroll. Tapes and disks replaced punched cards and programming languages were simplified. Computer operations remained centralized and restricted to a core of computer technicians and specialists. [Ref 1:p. 28]

In the late 1960's and early 1970's the technology of large-scale integrated circuitry was introduced and in the late 1970's another innovation, very large-scale integrated circuitry, became widespread. These technologies increased reliability and speed and decreased the size and price of computers once again. The combination of new hardware and software introduced new computer capabilities. Private industry, and the military as well, began budgeting large amounts of their resources for information processing. Information itself was beginning to be viewed as a resource along side capital, personnel, and raw materials. New functions for computer resources sprang up: decision-making, financial planning, resource management, time-sharing, multi-processing, data base management, and computer networking to name a few. Computer operations remained centralized. Even though managers, leaders, and staff members significantly increased their dependence on data processing they still

viewed the computer from a distance. In spite of their heavy reliance on computer generated information and increased awareness of computer applications, the controls were still left in the hands of small teams of specialists. [Ref 1:p. 28]

In the late 1970's distributed processing drew in users from outside the inner circle of computer specialists. Although few in numbers, the computer was now being accessed by non-computer professionals as remote terminals were spread throughout large organizations. This was a very key stepping stone for the next major event that would affect users more profoundly than any other milestone in computing history--the introduction of the micro computer. The micro computer brought new applications to end-user computing such as: management information systems, decision support systems, and many different types of office automation applications. The micro computer placed significant computing power in the hands of the non-computer professional user. Exploring the progression of the computer generations demonstrates what a radical change this was from the past; the new end-users were not completely ready for it. The change was very rapid and the proliferation of micro computers in the 1980's forced people everywhere to confront the computing power placed at their disposal.

We are rapidly moving from an industrial-based to an information-based society [Ref 2:p. 682]. The computer revolution is leading the way to a fully cultivated

information age. The term *knowledge worker* has been coined to describe those people whose jobs involve the creation, processing, and distribution of information. More than 60 percent of the U.S. workforce is involved in the production, distribution, and use of information [Ref 8:p. 33]. The terms end-user and knowledge-worker are synonymous. It is popular to classify end-users according to their level of responsibility and authority. Whitten classifies them into four categories: Clerical and service staff, supervisory staff, middle management and professional staff, and executive management [Ref 8:p. 33]. Clerical and service workers perform the day-to-day information activities in an organization. Supervisors, are the lowest level of management and control the day-to-day operations. Middle management is concerned with relatively short-term (tactical) planning, organizing, controlling, and decision making. Executive management is responsible for the long-term (strategic) planning and control. [Ref 8:p. 34]

Clearly, computerization has permeated every organizational level. Nearly every office has one, if not several, and home use is now commonplace. The people that build computer systems do not determine their value. Computer systems serve end-users and only they can determine the system's worth [Ref 8:p. 37].

III. FEAR, PHOBIA, ANXIETY, AND STRESS

Computer fear and anxiety have many labels, such as: cyberphobia, computerphobia, fear of computers, technostress, computer anxious, computer resistance, terminal phobia, fear of technology, computer distrust, and computer aversion. Whatever the label, computer fear and anxiety are a real concern that results in both physiological and psychological disorders in individuals and diminishes the potential of organizational computer assets. In other words, computer anxiety is a negative attitude or perception toward computers and a reluctance to interact with them. To begin to understand the phenomenon a basic understanding of common fear and anxiety is beneficial.

A. FEAR

Fear is defined by the Academic American Encyclopedia as an emotional reaction characterized by unpleasant, often intense, feelings and by a desire to flee or hide. It is believed to be related to anxiety but there is no consensus about how it is related exactly. A recurring fear or irrational fear at the thought of a relatively normal situation is called a *phobia*. [Ref 9]

Fear is accompanied by physiological changes stemming from increased nervous system activity. Specifically, these include shifts in blood flow and changes in hormonal and

nervous system activity. This is typically called a "fight or flight" condition. Common symptoms of fear are pounding of the heart, rapid pulse, muscle tension, irritability, slowed digestive system, dry throat, nervous perspiration, increased adrenalin, and so called "butter flies" in the stomach. If this state of arousal is sustained for too long a period, or is too intense, then the individual may begin to break down physically and/or psychologically and become unable to function [Ref 10:p. 38].

It is widely accepted that most fear is learned. However, some things cause fear the first time they are encountered. For example, infants in certain stages show an inherent fear of strangers or loud noises. [Ref 9]

B. PHOBIA

A phobia is an intense, irrational fear of a specific circumstance, idea, or thing [Ref 9]. However, it is excessive, inappropriate, and without obvious cause. Phobias are a type of neurosis. Although a person may realize that a fear is irrational, he or she may still be terrified of the situation.

Phobias can be triggered by virtually anything. Many phobias have been named, such as: claustrophobia, the fear of being in a confined space or acrophobia, the fear of heights. Literally hundreds of different types of phobias are listed in medical literature. In the early 1980's cyberphobia and computerphobia were added to the list. These terms describe

a negative emotional response to computers, manifested as fear, distrust, and hatred of computers. Technically, the terms cyberphobia and computerphobia are restricted to the "irrational" fear of computers. However, the terms have been used in a broader sense to describe computer fear and anxiety in general. Brod coined a related term, *technostress*, to identify what he called, "a modern disease of adaption caused by an inability to cope with the new computer technologies in a healthy manner" [Ref 1:p. 16].

A survey published by the National Institute of Mental Health reported that, one in nine adults harbors some kind of phobia, making it this country's second most common mental-health problem behind alcoholism. This is more imposing considering that many alcoholics may be phobics who mask their problem with drinking. However, according to Robert L. Dupont, Director of Washington's Center of Behavioral Medicine and President of the Phobia Society of American, phobias are the most treatable of the psychiatric disorders. Once recognized, behavior therapy can extinguish mild phobias relatively quickly. [Ref 11:p. 66]

C. ANXIETY

Anxiety is described by the Academic American Encyclopedia as,

an unpleasant emotion characterized by a feeling of vague, unspecified harm. Like fear, it can cause a state of physical disturbance. Unlike fear, it is characterized by the absence of an apparent cause. That is, the circumstance that precipitates anxiety is hidden and

unknown to the person. When the cause for anxiety becomes known but the feeling of apprehension remains, it is called worry.

Anxiety has many symptoms, most of which masquerade as genuine physical ailments. Included are rapid or pounding heartbeat, difficult breathing or breathlessness, tremulousness, sweating, dry mouth, tightness in the chest, sweaty palms, dizziness, weakness, nausea, diarrhea, cramps, insomnia, fatigue, headache, loss of appetite, and sexual disturbances. In addition to the uncomfortable bodily sensations associated with fear, anxiety results in a narrowing of one's time perspective so that only the present matters; it also results in an inability to attend to more than one task at a time or to organize thoughts and plans effectively. Anxiety lowers one's ability to perform most tasks, although low levels of anxiety may temporarily increase a person's ability to do a simple task. This is due to a greater vigilance and narrowing of one's attention that are associated with anxiety. As anxiety increases, however, behavior becomes more disorganized and ineffective. [Ref 9]

A person erects defense mechanisms when he or she feels anxious. Often these serve their purpose reasonably well, and one can carry on without being overcome by anxiety. Sometimes the attempts to disregard or redirect anxiety lead to neurosis. If the defense mechanisms fail, a person develops a vague, undirected feeling of fear. In many cases an anxiety becomes a phobia.

D. STRESS

The Random House College Dictionary defines stress as physical, mental, or emotional strain or tension [Ref 12]. The Academic American Encyclopedia indicates that stress refers to certain heightened mental and body states and to the causes of such states. Individuals in demanding or dangerous situations are said to be under stress. Chronic repetition of certain emotions, such as fear, anger, anxiety, or despair, as

well as changes in work or home situations or a reaction to a traumatic experience are just a few of the ways in which stress can occur.

Some amount of stress produced from normal life situations is considered healthy. However, extended and unwanted stress can produce both mental and physical illness. Physiological effects linked with stress include ulcers, high blood pressure, and heart disease. Stress often debilitates the immune system inviting the onslaught of an array of other health problems. The same "fight or flight" reaction that accompanies fear also arises in stressful situations. [Ref 9]

Brod states that,

the primary symptom of those who are ambivalent, reluctant, or fearful of computers is anxiety. This anxiety is expressed in many ways: irritability, headaches, nightmares, resistance to learning about the computer, or outright rejection of the technology. Technoanxiety most commonly afflicts those who feel pressured--by employer, peers, or the general culture--to accept and use computers. [Ref 1:p. 16]

The intricate relationships between fear, phobia, anxiety, and stress are illustrated through the descriptions presented in this chapter. Although they can be distinguished from one another by definition, they are elaborately intertwined and overlapped in practice. The basic understanding of these maladies builds a foundation for understanding the more specific subject of computer fear and anxiety.

IV. COMPUTER FEAR AND ANXIETY

People are the most important resource in any organization and they are the most complex component to manage. Management is defined as the process of planning, organizing, leading, and controlling the work of organization members and of using all available resources to reach stated goals. Noted behavioral and management scientist Mary Parker Follet stated that management is, "the art of getting things done through people" [Ref 2:p. 3]. Today's managers and leaders, challenged by the fast pace of the information age and heavy reliance on the abilities of knowledge workers, must be concerned with and understand the human factor issues of computer systems more thoroughly than ever before. An important aspect of the human factor is computer fear and anxiety. Five related aspects emerged from the literature as being significant to understanding computer anxiety, they are: computerphrenia, job security, resistance to change, keyboard interface and typing, and computer jargon.

A. COMPUTER FEAR AND ANXIETY

The concept of computer anxiety addresses the fear of computers or tendency to be uneasy, apprehensive, or distressed toward computers in general. Computer anxiety involves an array of emotional reactions including fear. Cambre and Cook reported that,

emotional reactions described as computer anxiety can be triggered by consideration of the implications of using computers, by planning to interact with a computer, or by actually interacting with a computer. In terms of anxiety theory, computer anxiety is probably best viewed as an anxiety state (temporary) rather than an anxiety trait (permanent) and as such is susceptible to change. [Ref 13:p. 15]

Computer anxiety as a state condition rather than a trait condition is supported by the finding that exposure to computers eventually reduces computer anxiety for most individuals [Ref 13:p. 20].

The common theme has been that in spite of the potential of microcomputer-based management tools for productivity improvement, many people resist the adoption and acceptance of computer systems; and actually avoid computer use. Popular business and trade journals suggest that computer anxiety is associated with negative attitudes toward use of computers, problems in learning about them, and avoidance of computers [Ref 14:p. 229]. Attitudes toward computers are important in determining the success and implementation of computer system applications. The correlation between attitudes and system success is relatively straight forward [Ref 14:p. 231]. For example,

negative reactions to computers may partially account for the fact that the impact of the machines upon work productivity in business has been negligible. Aversive reactions to micro-computer technology may also have an impact in psychology and other mental health occupations. Opposition to computer applications by human service professionals has been cited as perhaps the single most important factor hindering appropriate use of the new technology in mental health. Simply put, the interests, knowledge and skills of mental health professionals are

typically directed more toward people than data or machines. [Ref 15:p. 176].

Meier reports that, "Computer aversion is typically not an irrational fear that debilitates individuals, but a psychological reaction that interferes with a positive adaptation to and creative use of the increasingly computerized workplace" [Ref 15:p. 176]. His notice of the increasing computerization in the workplace is noteworthy and a key factor. In 1920 only 15 percent of the American people worked in an office. In 1980 the number reached 50 percent, and in 1990 it is estimated at 75 percent [Ref 16:p. 20]. Additionally, a recent survey of 100 large American firms found that a ratio of one to two personal computer systems per employee is now commonplace [Ref 16:p. 21]. A person afraid of elevators can avoid them by taking the stairs. However, avoiding computers is nearly impossible for those people who see avoidance as a solution to their problem.

According to Meier, computer aversion is a, "negative affective (anxious) state that occurs when individuals possess low expectations about: (a) the rewards of using computers, (b) their knowledge to use computers effectively, or (c) their personal competence for behavior required to use computers effectively" [Ref 15:p. 176]. Other researchers have also reported on the connection between computer anxiety and effectiveness.

Effectiveness is an operative term associated with computer and anxiety. Maurer and Simonson reported that the

following behaviors are indicative of computer anxiety:

1. Avoidance of computers and the general areas where computers are located.
 2. Excessive caution with computers.
 3. Negative remarks about computers.
 4. Attempts to cut short the necessary use of computers.
- [Ref 17:p. 244]

Clearly these behaviors have a direct negative impact that hinder organizations from realizing the full potential (effectiveness) of available computer systems.

There are many other specific reasons given for the computer anxiety malady. Gardner listed several primary reasons which include:

1. A threat to the established environment.
2. A loss of responsibility.
3. A feeling that computers are difficult to use.
4. Difficulty in following manuals.
5. Using computers that don't perform as advertised.
6. Not being able to trust computer results.
7. Being intimidated by the keyboard and feeling one might look silly typing.
8. Some may be afraid of breaking the computer or just afraid of the mystique which still surrounds them.
9. Health hazards such as: eye and neck strain and and video display emanations.

[Ref 18:p. 29]

Weinberg listed what he found to be the top ten reasons, they include:

1. Loss of control.
2. A bad experience with computers.
3. Intimidating computer professionals.
4. Loss of a job.
5. Fear of technology.
6. Fear of breaking the equipment.
7. Fear of being shown up by computers.
8. Fear that computers will reveal inadequacies.
9. Unfriendly computers.
10. Closet computerphobia.

[Ref 3:p. 14]

It would be a simpler matter if computer anxiety could be attributed to one of these reasons or a specific group of them. However, the matter is complicated because people can rarely verbalize definitively what it is about a computer that troubles them.

The matter is complicated further because computers are one of the few machines to which people assign anthropomorphic qualities [Ref 18:p. 30]. Primarily because it is perceived that computers have a brain and can think, read, calculate, and regurgitate information. Not only can computers talk¹ to one another but through speech synthesis they talk² (audibly) to humans. *Time* magazine selected the computer as Man of the Year for 1982 and computers have advanced in their personhood ever since [Ref 1:p 14]. Some venerate the computer's speed, efficiency, and accuracy and are left feeling powerless and fearful when confronted with a piece of machinery that is perceived to be not only *humanoid* but also intellectually superior [Ref 18:p. 30].

¹ "Talk" in this sense refers to computers communicating electronically through modems, telephone lines, and networks. Data and information passing from one computer to another is typically called data communications, tele-communications, or networking.

² "Talk" in this sense means delivering the computer output as audible synthesized speech rather than as a video display or paper printout. Computers cannot carry on a conversation with humans in the normal sense.

B. COMPUTERPHRENIA

At this point it is fitting to explain what lies at the opposite end of the scale from computer anxiety. Weinberg used the term *computerphrenia* to describe an exaggerated belief in the capabilities of computers. Individuals who are overly impressed with the value, potential, and impact of computers have computerphrenia, some to the point that they would rather spend time with computers than with people. They believe that anything that can be done by people can be done better by computers [Ref 3:p. 90]. Generally, computerphrenics, in severe cases, are introverted, have narrow interests, skip meals, abandon social relationships, and spend hours interacting with the computer. [Ref 3:p. 9]

Toris reports that the socially anxious person generalizes his or her fear of human interactions to these often anthropomorphic machines (see Figure 2). Their perception is that both man and machine demand correct responses and that computers permit even less latitude than the most insisting individuals. The features of computers that attract some socially anxious people may act to create additional social anxiety for others. In short "social anxiety" may motivate some people to gravitate toward computers and others to avoid them [Ref 19:p. 5].

Ironically the roots of computerphrenia are similar to those of computerphobia. Whereas computerphobics fear

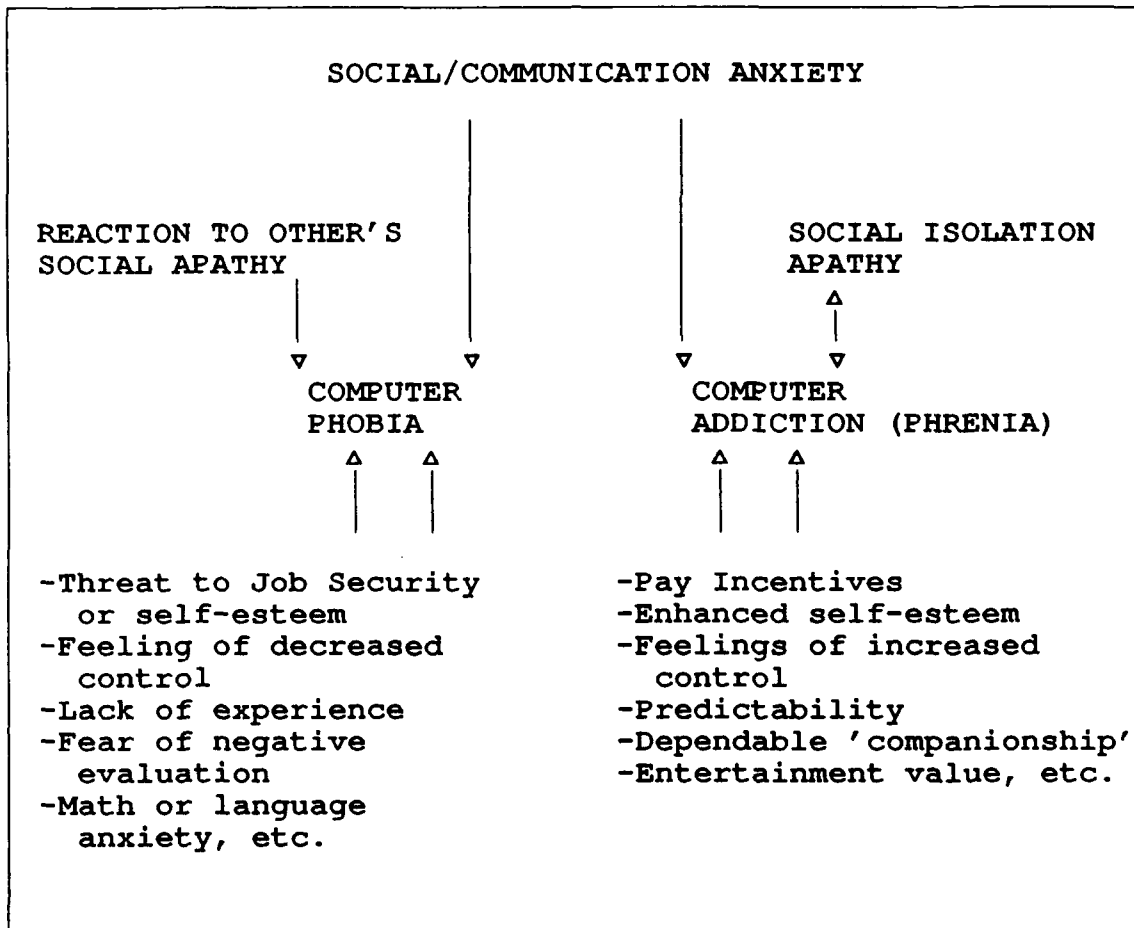


Figure 2. Some Factors Hypothesized to Affect Phobic and Addictive Behaviors Toward Computers.¹

¹ Toris, C., "Suggested Approaches to the Measurement of Computer Anxiety," Paper presented at *Computer Anxiety: Does It Really Exist?* Symposium conducted at the meeting of the Southeastern Psychological Association, New Orleans, Louisiana, 29 March 1984.

computer technology, computerphrenia relates to the fear of people. Computerphobics feel a lack of control when dealing with computers while computerphrenics feel a lack of control when dealing with people. The computerphrenic's point of view is that, unlike people, computers are compliant, predictable, cooperative, and always leave the user in control. However, computerphobics have the opposite point of view. [Ref 3:p. 86]

On the exterior it may appear that computerphrenics may serve to offset the problems created by people that experience fear and anxiety over computers. However, this is not the case. Often computerphrenics are unhappy people, superficial, compulsive, burn out rapidly, and change jobs frequently [Ref 3:p. 86]. They focus on technical feasibility and ignore the human factor in computing. As a result, they have fewer problems as system designers and programmers for embedded systems. However, they are particularly deficient with systems that are designed for end-users. In short, they are frequently misfits in an organization and require special attention from management.

Fortunately, most computerphrenics experience only "mild" characteristics of the phenomenon. Although they may have an unrealistically high expectation of computers "mild" computerphrenics are not debilitated and they cope fairly well in the workplace. Computerphrenia has significantly lesser impact on individuals and organizations than computer fear and anxiety (computerphobia).

C. JOB SECURITY

Computers are viewed as formidable competitors in the workplace because of the anthropomorphic perception, their unmatched capabilities, and enviable reputation. The example of Jacquard's automated loom (Chapter I) is perhaps the earliest example of an automated system directly replacing human workers. This is a concern that has plagued workers since the early 1800's and continues to this day. A dramatic modern day example is seen in the automobile industry where 90 percent of the factory equipment is now computer-controlled [Ref 1:p. 56]. Gardner and her associates uncovered an interesting contrast that applies to both computerphobics and noncomputerphobics. According to their study,

the respondents generally did not believe that their own jobs were threatened by computers (see Figure 3). However, the opposite response was found when the question was rephrased to ask about their co-worker's jobs. About 65 percent of all phobics felt the computer might replace their colleagues; only 38 percent of noncomputer phobics felt that way. Fearing the effects of computerization on the lives of others yet denying any possible change to the structure of one's own life is consistent with being cyberphobic. [Ref 18:p. 31]

Automation and robotics on the automobile assembly line is not the only kind of computerization that workers fear. Professional workers and knowledge workers are also at risk.

Beliefs About Job Changes

"The computer may someday replace me."

	<u>Non- Cyberphobics</u>	<u>Computer Anxious</u>	<u>Cyberphobics</u>
Strongly agree/agree	7	2	9
Neutral	11	12	0
Strongly disagree/ disagree	81	85	91

"The computer may someday displace some of my co-workers."

	<u>Non- Cyberphobics</u>	<u>Computer Anxious</u>	<u>Cyberphobics</u>
Strongly agree/agree	38	41	64
Neutral	15	17	27
Strongly disagree/ disagree	48	43	9

Figure 3. Beliefs About Job Changes¹

¹ Gardner, E., and others, "Human-Oriented Implementation Cures Cyberphobia," *Data Management*, p. 31, November 1985.

One manager described the following situation:

you employ two engineers and fifteen draftsmen in a precision metalworking foundry. Their job is to design the complicated parts from which molds will be taken. If you buy a computer with a plotter to do the designing, you will be able to employ a single person, an engineer, instead of seventeen. [Ref 1:p. 55]

The fear of being automated out of a job is a more abstract problem that troubles many workers and intensifies the stress they are under [Ref 1:p. 54].

Workers, below management levels, are undoubtedly the most threatened group of the work force affected by job loss because of automation and computerization. However, managers also fear unemployment. Patrick writes, "A manager who is a member of the pre-electronic generation who refuses to use a computer will sooner or later be squashed out of a job by the predicted flattened organization" [Ref 20:p. 82]. "Flattened organization" refers to the current trend toward the thinning of organizational management structures whereby the number of management levels, particularly in middle management, are declining. This trend is generally attributed to information management technology. Managers must face up to the fervor of management information systems (MIS), decision support systems (DSS), and expert systems (ES). These applications increasingly capture and perform traditional management functions.

However, managers are probably not as threatened by being directly replaced by a computer as they are threatened by other managers who embrace computer technology. Patrick also

reports that, "The competition within and between companies for jobs, salary, and careers will soon depend on information technology skills as well as on communication and functional expertise" [Ref 20:p. 83]. Booz, Allen & Hamilton found that, "One factor that contributes to cyberphobia seems to be middle managers' fears that they don't actually manage anything--that in fact they are not really decision-makers, but merely 'information conduits,' who could easily be replaced by the very computers that they are learning to use" [Ref 21:p. 79]

The distress over job security and anxiety induced by the possibility of being replaced by a computer is applicable to the Army as well. In the mid 1980's the concept of the *light* division, a division that can be moved in a minimum number of aircraft sorties, was having an impact on how automated support would be provided. The Army had to meet it's global threat missions without exceeding personnel ceilings mandated by Congress. To help create the positions required to man the new light divisions, the Army "personnel community" alone gave up more than 2500 personnel positions. Similar shifts in other combat service support communities, such as logistics and finance, also took place. However, the mission of the personnel community did not shrink along with it's diminished personnel base required to do the job. In fact the support missions of the personnel community, and others, increased due to the increased number of divisions and associated divisional personnel positions. The Army replaced the combat service

support soldiers with the Tactical Army Combat Service Support Computer System (TACCS). The TACCS is a ruggedized microcomputer that provides units with their own computing power. Unit personnel clerks were forced to use a computer to perform the tasks that previously required several clerks to do manually. Many of the displaced soldiers were given options to reclassify and retrain into a narrow set of other job classifications; primarily combat (infantry) type classifications needed in the new light divisions. Soldiers who did not reclassify were prohibited from reenlistment and forced out of the Army. Additionally, the remaining positions in the personnel community were regraded, renamed, and reorganized. The Army personnel community is still adjusting to the effects of this shakeup.

D. RESISTANCE TO CHANGE

Another issue that surrounds the aura of computer anxiety is the problem of *resistance to change*. Guarnieri wrote that,

in the face of precipitous change, many capable and intelligent workers are resisting easy-to-use systems. The resisters range from clerks who must trade typewriters for word processors and ledger cards for computerized accounting systems, to executive vice-presidents who need extensive up-to-the-minute information. As a result, information managers are faced with frustrations, problems and challenges different from generally accepted management principles. [Ref 22:p. 12]

It was mentioned earlier that computer anxiety is associated with negative attitudes toward the use of computer, problems in learning about them, and avoidance of computers [Ref 14:p. 229]. Attitudes toward computer systems are

important in determining their success and implementation. The correlation between attitudes and system success is relatively straight forward [Ref 14:p. 231]. Generally, a prevailing negative attitude may cause otherwise good systems to fail. On the other hand, widespread positive attitudes are key to a successful system implementation. It must be recognized however, that the element of change is responsible for a great deal of the pessimistic attitude toward new systems. The problem of resistance to change is at least as old as management theory, and almost assuredly even older than that. Again, the story of Jacquard's automated loom in 1804 provides an early example of resistance to change due to automation. The difference between resistance to change and resistance to technology (computers) is a fine line.

Introducing computers into any organization represents change. However, resistance to change involving computers is a more complex problem than change due to, procedural innovations, management policy, or organizational restructuring. This is probably because of the anthropomorphic qualities associated with computers. Additionally, implementation of computer systems frequently force other changes in the organization such as those mentioned above which the individual experiences through changes in job content and working conditions.

Guarnieri, an industrial psychologist, coined the term *Psycho-Computer Syndrome* [Ref 22:p. 12]. This syndrome appears to be a merger of computer anxiety and resistance to change. He stated that,

the *Psycho-Computer Syndrome* is a recognizable motivational pattern with eight stages.... As your staff learns how to use a system for the first time they evolve from traditional office workers to members of a computerized office. Before they can emotionally and intellectually accept the computer as a useful, satisfying tool, they must pass through an eight stage process....

Eight Stages

1. General feelings of emotional and intellectual insecurity.
2. Ego-status disintegration.
3. Hostility/challenge.
4. Search for equilibrium: first sign that training can begin.
5. Formation of support group.
6. Significant learning success: first breakthrough.
7. Ego-status integration.
8. Equilibrium: a new office routine.

Stages 1 through 4 can be considered personal reactions, and 5 through 8 social reactions. [Ref 22:p. 12]

Guarnieri also points out that although organizational members are learning the same new system, they may enter the *Psycho-Computer Syndrome* at different stages and progress through at a different pace. The entry stage depends on the individual's motivational needs. The pace depends on the individual's personality structure and sensitivity along with the quality of training received and the reliability and complexity of the new system. [Ref 22:p. 12]

The wide range of system techniques being implemented in many different applications makes it is difficult to place types of change into neat , self-contained categories. However, London grouped the most common types of change into five categories:

1. Revised procedures/and work content.
2. New equipment.
3. New documentation.
4. Revised work direction.
5. Staffing and organization changes.

Figure 4 provides examples of the types of changes that will evoke a variety of reactions from the system users in the organization. Although not usually articulated as questions, the reactions can be expressed as a series of questions.

1. Will it affect my earnings?
2. Will it block my promotion prospects?
3. Will it limit my freedom of action?
4. Will it mean I lose my job?
5. Will it take the fun out of the job?
6. Will it mean more supervision?
7. Will it cut the number of my staff?
8. Will I just become a 'new boy'?
9. Will it erode my authority?
10. Will it increase my work-load?
11. Will I be able to cope with everything?
12. Is this just the first step, what will it lead to next?

Both actual and perceived answers to these questions determines how individuals behave during systems development, implementation, and beyond. [Ref 23:p. 86]

Guarnieri and London not only provide insight for the managers faced with implementing change but also demonstrate the additional complexity of change when computing is an added dimension. It is not clear whether resistance to change,

1. Revised Procedures/Work Content:
 - a. Lack of immediate visual records.
 - b. Different, tighter work schedules.
 - c. Work fragmentation among staff and more functions.
 - d. Different, tighter procedures, with more formalized, rigorous, standards.
 - e. Reduction in immediate personal control.
2. New Equipment:
 - a. Visual display unit or keyboard printers introduced in the office.
 - b. Data collection terminals (e.g. badge readers) introduced in plant.
 - c. Microfilm/microfiche readers introduced for use with COM output.
 - d. New office equipment to deal with filing, etc., of computer input and output.
3. New Documentation:
 - a. Introduction of machine-readable documents (OCR, mark reading, mark sense cards, MICR, etc.).
 - b. Change in forms to make them suitable for transcription type data preparation.
 - c. New/changed output reports --different content, format, timing, and accuracy.
 - d. Use of modified coding and numbering systems on documents.
4. Revised Work Direction:

Computer-produced information is used to monitor or direct work done: e.g. computer directed: production scheduling and control, sales call schedules, transport loading, routing scheduling, and account chase lists.
5. Staffing/Organization Changes:
 - a. Elimination of some jobs or combining jobs.
 - b. Introduction of more staff or a different type of staff.
 - c. Change in organizational hierarchy.
 - d. Holding staffing levels but expecting greater throughput.

Figure 4. Typical System Changes¹

¹ London, K., *The People Side of Systems*, McGraw Hill, 1973.

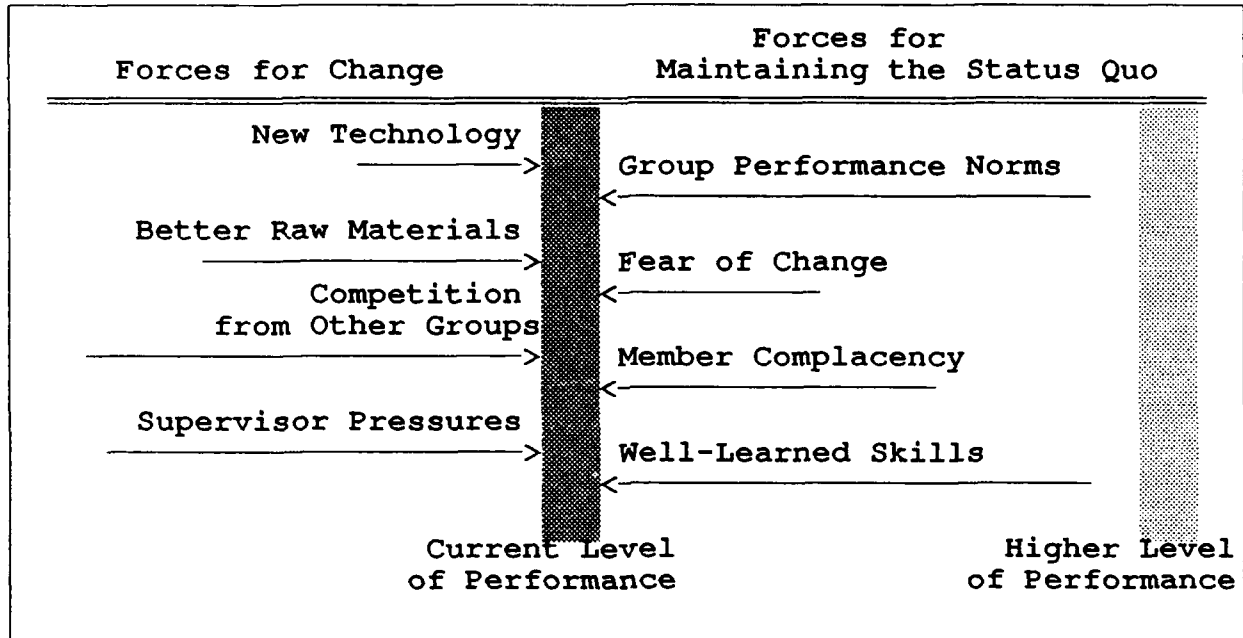
involving computers, causes computer anxiety or whether computer anxiety causes resistance to change. Indeed, there may not even be a cause and effect relationship. Certainly computer anxiety and resistance to change are braided together but precisely how they relate is a complex matter. The important thing is, as First stated, "Change in the workplace can be a frightening phenomenon for workers... technological change... hits employees particularly hard." [Ref 23:p. 47]. First summed it up very well when she wrote,

in addition to symbolizing the disturbing nature of change itself, new hardware and software can trigger special anxieties, especially during a period of corporate transition. Some workers fear their jobs will be taken away by the new technology, while others worry that it will require them to take on even more work--work that they may not be able to handle. People like to feel that they're the best at what they do. Change threatens that confidence. They're concerned they might not be able to do their old jobs as well the new way.... Resistance to change shows up in increased absenteeism, a drop in productivity, and plummeting morale. Resistance can manifest itself as breaking the rules and attempting to get attention. The individual may go into states of depression and childlike behavior. Such regression can take the form of uncooperativeness or even vengeful and destructive actions.... Although resistance to change is, to a certain extent, inevitable, there is much a manager can do to avoid fanning the fires. [Ref 23:p. 48]

One popular theory addressing the subject of change in the workplace is Lewin's theory of the "force field." His theory has been widely accepted in management theory and practice. Lewin asserts that any behavior is the result of an equilibrium between driving and restraining forces. The driving forces press one way and the restraining forces push back. The performance level that develops is a compromise of

the two sets of forces. The forces can be of many different types, and the behavior or performance can be that of an individual, group, or organization (Figure 5). Figure 5 shows "new technology" as a force for change and "fear of change" as a force for maintaining the status quo. More often than not the new technology includes computer technology in which case fear of technology and computer fear and anxiety should be viewed as restraining forces. As mentioned earlier, implementation of computer systems frequently force other changes in the organization such as: procedural innovations, management policy, and organizational restructuring which are forces for change in themselves. Programs of planned change are directed toward removing or weakening the restraining forces and toward creating or strengthening the driving forces that exist in organizations. [Ref 2:p. 367]

Lewin also addressed the process of bringing about effective change. He noted that individuals experience two major obstacles to change. First they are unwilling, or unable, to modify long-established attitudes and behavior. Second, changes frequently only last for a short period of time. After a brief period of trying to do things differently, individuals often return to their previous pattern of behavior. To overcome these obstacles Lewin



Note: Length of arrow is equal to amount of force.

Figure 5. Lewin's Force-Field Diagram¹

¹ Stoner, J. A., Freeman, R., *Management*, 4th ed., pp. 367, Prentice Hall, 1989.

developed a three-step change model. Schein and others have elaborated the model which entails unfreezing, change, and refreezing.

1. **Unfreezing** involves making the need for change so obvious that the individual, group, or organization can readily see and accept it.

2. **Changing** requires a trained change agent to foster new values, attitudes, and behavior through the processes of identification and internalization. Organization members identify with the change agent's values, attitudes, and behavior, internalizing them once they perceive their effectiveness in performance.

3. **Refreezing** means locking the behavior pattern into place by means of supporting or reinforcing mechanisms, so that it becomes the new norm.

[Ref 2:p. 368]

Organizations are made up of three interdependent elements under the influence of common forces: structure, technology, and people. A change in one element is likely to affect another. An effective change program is likely to be one that acknowledges the interaction of these three elements and attempts to change all three of them as appropriate.

[Ref 2:p. 371]

E. THE KEYBOARD AND TYPING

The primary interface with computers is through the electronic keyboard. For various reasons this creates a problem for many people. Recently, when asked what he thought the next ten years holds for computing, the managing director of Word Perfect Corporation, Peter Ferguson, stated that, "We'll lose the need for tactile input, keyboards. That's the

greatest hang-up for most people in computing..." [Ref 25:p. 11]. For the most part, the problem is due to the lack of typing skills. Not everyone knows how to type, while some individuals are troubled over the stigma associated with typing.

The management consulting firm of Booz, Allen, and Hamilton reported that a critical factor in determining reactions to computers was one's typing ability and that typing was essential in adapting to computers [Ref 21:p. 79]. Gardner's study listed "being intimidated by the keyboard and feeling one might look silly typing," as one of the specific reasons for computer fear and anxiety [Ref 18:p. 29]. Individuals that are intimidated by a keyboard generally avoid computers because they don't believe they can manipulate the system.

It is important to realize that keyboard intimidation does not always result from the lack of typing skills. Many people without formal training and polished typing skills have developed their own typing style and skill, usually referred to as the "hunt-and-peck" method. Many people using this method have adapted to computers very well. Although they may not be as proficient as a trained typist, they are just as comfortable prodding along at their own comfortable pace. This observation leads one to believe that the intimidation induced by keyboards has a great deal to do with one's attitude.

Brod related this example which demonstrates how attitudes toward typing can hinder adaption to computers.

An accounts executive at an insurance company has been informed that her company has purchased a computer system to handle account information. Also, that a terminal will be placed near her desk to give her access to all information on accounts. She feels inexplicably frustrated by the news. She hates the typing that will be required to use the terminal: having spent years moving away from secretarial duties, she views it as a step backwards. She also fears that she won't be able to master the artificial language necessary to use the new equipment. Lately she has been delegating work on accounts to those below her.
[Ref 26:p. 753]

In a *Time* magazine article Taylor writes that,

tools like the personal computer will be most useful at lower levels. I think those who will really use the personal computer could be considered the doer, and the executive will be, as he always has been, the reviewer.
[Ref 27:p. 82]

Taylor also wrote,

most executives are intimidated by a keyboard. While computer firms insist that even the most ham-handed executive can be taught to operate a computer in a matter of hours, executive resistance remains high.... To have an executive fumbling around with the keyboard to find the right key is just embarrassing for him. We have found that if they can go some place private, a little knowledge and interest will conquer their fears.
[Ref 27:p. 82]

These examples support the view of many executive that typing is a low status skill [Ref 28:p. 176]. This accounts, at least in part, for the contemptuous attitude toward any keyboard interaction by individuals who view typing as a vocation beneath their professional station. The senior vice president of Zayre Corp., Mervyn Weich, says sitting in front of a terminal and trying to extract information is

unacceptably difficult and time consuming. He said, "If I could talk to the computer as easily as I talk to my administrative assistant, yes, I'd use it, but it's a lot of work to punch in questions... my assistant is easier to work with" [Ref 27:p. 82].

The ability to converse with computers has been one of the most widely accepted goals within the cumulative unconscious of computer users and programmers [Ref 29:p. 102]. In a recent experiment, Ogozalek and Praag concluded that their participants expressed an intense dislike for typing and saw the listening typewriter as a fun and convenient alternative [Ref 30:p. 210]. In the experiment, the *listening typewriter* appeared to the participant to be a computer with a speech recognition input capability that could be manipulated solely by speech input. Computers that can recognize unconstrained human speech have not yet been fully developed. The computer was actually a simulation created by a typist in a separate room that typed whatever the participant wanted. The text appeared on the participants screen exactly as desired. The strongest statistical finding was that participants preferred the listening typewriter to keyboard input. [Ref 30:p. 210]

Voice recognition and synthesis have a primary roll in natural language interfaces and artificial intelligence. The ability of the computer to understand an idiomatic, human-language sentence, phrased by a non-expert, and return the desired response will influence computer progress and

acceptance more than any other development to date [Ref 29:p. 102]. The demand for this capability is overwhelming [Ref 29:p. 102]. However, a computer system that approaches the capabilities simulated by the listening typewriter remains to be seen. In the mean time users will have to continue coping with the many tactile devices that are currently available.

The primary input device is the keyboard. However, the quest for alternatives continues in the computer industry. An advertisement in the December 1990 issue of *Popular Science* read,

CLIPBOARD COMPUTER

Computers without keyboards may be the electronic-age savior of reluctant typists. GRiD Systems had the first. Its computer software recognizes your strokes as if you had typed them in. You can also use the electronic pen to draw pictures that can be stored, displayed, or printed; \$2,370.00.

[Ref 31:p. 66]

The device is not a complete computer system, it is an input device only. The price seems prohibitive, but it indicates how much the computer industry believes a user might be willing to pay in order to dodge a keyboard.

Some other popular input devices include the: mouse, joystick, track ball, light pen, touch screen, and tablet. The existence of these devices attests to the continuing search for alternatives to the keyboard. The increasing sophistication of computer software continues to impose on the keyboard's monopoly as an input device. The actual preference for an input device depends on the activity the user desires

to carry out. While the keyboard is preferred for text input a mouse may be preferred for picking and positioning operations, see Figure 6. Although these devices may limit dependence on the keyboard it is unlikely that the keyboard will ever be replaced completely by any of them.

F. COMPUTER LITERACY

Gardner and her associates reported that,

by the late 1980's, virtually all managers and professionals will be expected to be computer literate and capable of actually using a computer. In such an environment, a manager (or any person) suffering from a fear of computers will be seriously affected: Promotions and advancements are at risk, and new job possibilities are limited. [Ref 18:p. 29]

In a recent article, Patrick, makes several suggestions for proactive management and leading an organization into new markets. One of the suggestions he makes is to hire computer-literate employees. So what is so important about computer literacy or "jargon" as it is sometimes called?

Many professionals are bound to a unique vocabulary within their field that must be understood in order to communicate precisely and operate effectively. Accounting, law, and medical professions are cases in point. Without a working knowledge of the terminology, or jargon, used in these professions one cannot fully grasp the concepts that make them tick. Computing is no exception, it also has a unique jargon that must be understood to some degree. Without an understanding of computer jargon a users ability to understand computers is also limited. Unlike accounting, law, or medical

Preferred Input Devices

Preferred input devices for different input techniques. Highest preferences are to the left and lowest to the right, with equal preferences separated by a slash (/).

Picking:	mouse, joystick/track ball, light pen/ touch screen/soft keys, function keys.
Positioning:	mouse, joystick/track ball, light pen/ touch screen, cursor keys.
Numeric input:	numeric key pad, alphanumeric key pad, tablet.
Text input:	alphanumeric key pad, tablet (limited input only).
Drawing:	tablet, mouse, light pen.
Digitizing:	tablet.

Figure 6. Preferred Input Devices.¹

¹ Monk, A., *Fundamentals of Human-Computer Interaction*, Academic Press, 1984.

jargon, however, computer jargon abounds wherever computers are found and used. This means that professional boundaries don't exist where computing jargon is concerned. Whether people choose to use a computer or are forced to use one they must come to terms with computer jargon.

Computer terminology presents a formidable barrier to understanding computers. Ironically, the technical nature of the vocabulary that is intended to spur precise communication often has the opposite effect. Computer professionals adapt to computer jargon through specialized training, extended experience, and constant use. The jargon is necessary and it becomes a second language. To the noncomputer professionals the jargon is too technical, foreign, and clumsy. Instead of being a useful tool like it is to the computer professional it is often a barrier to the nonprofessional.

A unique characteristic of computer jargon is its negative, violent, and fatal tone. For example: Disk crash, system crash, virus, contaminated files, illegal address, fatal protection violation, or program bombed. Typical error messages illustrate this explicitly. For example: illegal input, fatal error, job killed, illegal password, or access denied. Language like this is discouraging to the computer anxious novice. The tone of such language serves to perpetuate a negative attitude and stimulates the anxiety of a struggling user.

In choosing words for a technical vocabulary, there are two approaches: either the words are coined specifically for use within the vocabulary, or they are taken over from the general vocabulary and assigned a restricted or special meaning. In general, coined words don't cause communication problems. Words taken over from the general vocabulary or other fields are more of a problem. These terms frustrate understanding because they are confused with their common meanings. However, the difference is critical. Some examples are: compile, function, word, buffer, file, and index. [Ref 32:p. 43]

Shore's conclusion about computer jargon sums it up nicely,

computer jargon is pervasive and annoying. When people complain about it, they are reacting to the use of technical terms not generally understood, to the impenetrable style in which much documentation about computer systems is written, and to the widespread use of computer slang.

Computer jargon makes computers harder to approach, and it contributes to the frustrations and anxieties of novice users. It is, however, unavoidable. Whether you want to use computer comfortably or just to discuss them intelligently, coming to terms with some jargon is a necessary step. [Ref 32:p. 39]

G. DEALING WITH COMPUTER ANXIETY

The first step in any problem solving technique is recognition of the problem. The preceding sections in this chapter provide sufficient information for accomplishing this first step. But, what can be done to deal with the problem of computer anxiety. Weinberg wrote,

since computer phobia has its roots in frustration, confusing jargon, and a distrust of machines, it's not difficult to develop activities to help overcome it. Of course, some of the hardcore computerphobics, whose fear is simply a manifestation of other neuroses, may require professional psychological help. But the vast majority of computerphobics simply need to learn more about computers, have more experience with computers, and be more honest with themselves. [Ref 3:p 26]

Indeed training and experience are the tools of choice. These are not only the preferred choices stressed in current literature but, fortunately, they are the primary tools available to managers, teachers, and others charged with handling the problem.

Jordan and Stroup reported a ten percent decrease in the number of college students expressing fear about the use of computers after the completion of an introductory data analysis course [Ref 33:p 130]. Similarly, Powers noted a comparable decrease in anxiety as a function of continued exposure to computer use [Ref 33:p 130]. At this stage in the information age many computer training and work experience programs prove effective in reducing computer anxiety to some extent, although it is an incidental outcome. However, education programs become more effective in reducing computer anxiety when that anxiety is recognized as one of the specific objectives of the program.

An important tenet for reducing computer anxiety is the method by which the new user is introduced to computers and how they are taught to interact with computer systems. An initial bad experience or impression that computers are

impossible to learn about implants an arduous barrier to overcome before any real understanding can be achieved. Banks and Havice add that, students must be reminded that early repeated failure is part of the normal process; and that instructors must take certain steps to minimize early failures and assure initial success, to immunize learners from acquiring a "learned helplessness" [Ref 34:p 22].

Banks and Havice suggest a program structure based on learning in progression from the simple to the complex [Ref 34:p 22]. In agreement with this approach, Howard and his associates concluded, "...Training which begins with the use of simple systems and tools, rather than with in-depth computer concepts, is more likely to overcome resistance" [Ref 35:p. 15]. Fortunately, this is the common sense approach taken by most program directors even without having considered the objective of reducing computer anxiety. This logical technique accounts for the general effectiveness of training programs in reducing computer anxiety. However, the concept needs to be continually emphasized in order to keep training and work experience programs at an appropriately elementary level while computer technology continues to escalate in complexity.

Introductory computer training must be carefully designed with the target audience in mind. A successful high school introductory course is most likely inappropriate for engineering freshmen. Likewise, a continuing education course

designed for mid-career professionals is not appropriate for full-time MBA students. Another level of segregation is needed within each of these sub-groups, a level segregating high and low computer anxious students. Different approaches are required for these two diverse levels. Students who enter an introductory course with little knowledge about how computers work and with minimum experience in their use are more likely to suffer from high computer anxiety. This creates a dilemma because the students who need the training the most may be those with the greatest computer anxiety-induced barriers to learning. Howard and his associates point out that,

segregation of students based on computer anxiety appears to be preferable to segregation based on other more obvious factors such as demographics or academic major.... Segregation based on other than computer anxiety is a poor tactic because it fails to account for the computer anxious individuals scattered among all of the subgroups.... Approximately one-third of the students in this study were successfully identified...as seriously computer anxious. Since computer anxiety decreased significantly in connection with the (introductory) course, even when no particular conscious effort was made to design the course to combat computer anxiety, it ought to be possible to realize even greater anxiety reduction in sections of a course explicitly designed for computer anxious students.... The segregation would also benefit the students who have more computer knowledge and experience and low computer anxiety. These students could be given more advanced and accelerated material, escaping the boredom and discouragement of a course that is directed at the computer illiterate beginner.... The present study addresses the need for a differentiated approach to training computer anxious students but essentially begs the question of how to do so. Research is needed to determine which kinds of approaches are most effective in reducing computer anxiety. [Ref 35:p. 20]

Lewis compiled a list of helpful tactics that serve to minimize anxiety and counter negative attitudes towards computers. She suggested that trainers consider using the following strategies:

1. Demistify the computer. Take the computer apart so that users can see that is simply a machine with working parts.
2. Attempt to ascertain learners worst fears. Then demonstrate how such fears are usually not realized. For example, show how hitting the wrong key does not blow the computer's circuits or damage the machine.
3. Avoid using emotionally charged sentences when giving instructions to learners. For example, avoid statements like, "Under no circumstances should you ever...."
4. Start with the basics. All too often those familiar with computers forget that beginning learners do not even know the location of the on/off switch or how to handle a disk correctly.
5. Recount your own personal experiences as a beginning computer user. For those who are anxious, there is nothing more intimidating than to view the teacher as a specialist who was proficient from day one.
6. Avoid jargon or buzz words. Introduce new terminology slowly. Computereze can be confusing and disorienting. When using technical terms, be certain to provide definitions and handouts that can serve as supplemental references and guides.
7. Take things slowly. Before moving on to new content or adding more complex commands, be sure that everyone is ready to do so.
8. Don't give students too much information and overload them with details and irrelevances. Try to empower individuals to learn on their own so that they will later be able to use their newly acquired knowledge independently.
9. Remind learners that they do not have to memorize everything.

10. Avoid stimulus overload by minimizing the simultaneous use of lecture, video screens, overhead projectors, and computer monitors. Trying to listen, watch, type, and write at the same time requires a degree of proprioceptive skill that can easily befuddle a first-time computer user.

11. Provide numerous and frequent opportunities for hands-on practice. Hands-on time should be a low-pressure, uninterrupted period during which specific, limited assignments can be undertaken.

12. Promote learning partnerships. Assist individuals in identifying another person with whom they can work and experiment.

13. Utilize learners as peer tutors to assist others who are striving to gain mastery. Learners are exposed to additional teaching strategies and new ways for viewing the process. It may well be that the instructor's explanation is too complex, but that a co-learner has a more easily understood method.

14. Encouraging group work. Computers need not be isolating devices.

15. Encourage learners to share their successes as well as their problems. The celebration of little victories goes a long way toward encouraging persistence and progress.

16. Reserve time during each class period for open discussion. Talking it through helps individuals to realize that they are not alone or unique in their concerns.

17. Reassure users that it is all right to make mistakes. To be a successful problem solver, one needs to play with the problem.

[Ref 36:p. 7]

In addition to training and experience there is at least one other method which will assist in reducing computer anxiety. It is through interface and software design. Holmes writes,

the nervous user community is the target group for which it is the hardest to design software.... As a software designer, a manager, or a training manager, it is your

responsibility to assess your users' needs, attitudes and prior experience. If your users are unfamiliar with computer technology, you must address their fears throughout the entire software design and implementation process: during the design of the user interface, during user training, and during ongoing user support. [Ref 37:p. 18].

The term "user-friendly" is used to capture the idea that a well designed system will reduce human error and make the system easier to learn, more appealing, and more productive to the users. Text books abound with certain guidelines that apply to the design of any user interface. However, there are a few rules that are of particular interest when the recipients are novice users. Holmes presents some of these rules, which combine elements of psychology, graphic design, and systems development:

1. Give the user a feeling of control. A well designed system ensures that the user feels confident and in control of the interaction between human and machine. This reduces fear and leads to higher satisfaction with finished tasks.
2. Make your user interface attractive, simple and inviting. You can reduce a user's reluctance to use the system by creating attractive, uncluttered screens which are pleasing to the eye and easy to read. Use consistent, plain language which is free from jargon.
3. Provide meaningful feedback for every user action. This reassures users that the computer is acknowledging and performing the actions they have requested, and that everything is running smoothly.
4. Provide a way out for the user at all times. In your software, allow the user to cancel or reverse any action. This adds to the user's sense of control and security.
5. Be consistent in your wording. If one action requires the user to press <enter>, then make all other actions consistent.

6. Provide shortcuts for more experienced users. A well designed system should be able to accommodate users of various levels of expertise. For example, design the system with the option of using either a menu system or command language.

7. Use constructive, positive wording in all error messages. Avoid cryptic or generic error messages. Explain the problem and suggest a solution. Adopt a positive tone which does not blame the user for the error.
[Ref 37:p. 18]

It is also important to inform new users that if something is confusing, the problem may not be their inability to understand or learn the software, but a problem of the software design [Ref 37:p. 18].

At first glance it may not appear as though managers, teachers, and users in general have any influence on interface and software design issues. To the contrary, they have a great deal to do with it. The user community is the first echelon in defining system requirements. Their inability to adequately define exactly what they want results in "user-unfriendly" systems that users struggle with from the moment it is delivered. A little education and homework on the part of the user community in regard to requirements analysis could recast poorly designed systems into the type of system defined by Holmes' seven points above. Not only would this result in a better interface and software design but the early appreciation gained by users long before they see the actual system would serve enormously in reducing their anxiety about the impending system.

V. METHODOLOGY

A questionnaire was developed and used to assess computer fear and anxiety in the United States Army. The questionnaire captures 44 data points (Appendix A). There are 14 demographic data points and 30 questions which capture responses on a five point Likert scale. Where 1 = strongly agree, 2 = agree to some extent, 3 = uncertain, 4 = disagree to some extent, and 5 = strongly disagree. Questions 1-20 on the questionnaire are adapted from the computer attitude scale (CATT) first developed by Dambrot in 1986 [Ref 38:p. 182]. Questions 21-30 on the questionnaire are adapted from a scale developed by Raub in 1981 [Ref 14:p. 231]. The 30 questions are composed of 12 positive and 18 negative statements reflecting anxiety, apprehension, confusion, aversion, and general attitude in using computers in general. The participants were asked to respond to the statements on a five point Likert scale ranging from *strongly agree* (1) to *strongly disagree* (5). The last item on the questionnaire is a remarks section which was included for two reasons. First, to appease those participants who may have felt limited by the narrow scope of the questionnaire but had need to express something of concern. Second, to capture any pertinent ideas that were not captured entirely by responses to the 30 statements in the questionnaire.

Three general groups were chosen as subjects for this study:

1. Army applicants at a Military Entrance Processing Station (MEPS).
2. Soldiers on active duty and Department of the Army (DA) civilians.
3. Soldiers in training at the Army Computer Science School, Fort Gordon, Georgia.

Studying Army applicants at a MEPS would have provided an assessment of the computer anxiety levels and general attitudes toward computers of individuals who were about to become soldiers but had not yet been influenced by Army training and indoctrination. However, the questionnaires from this group were lost in the mail and never recovered.

Soldiers currently on active duty and DA civilians were randomly selected from organizations that are heavily dependent on computers as a primary tool for mission accomplishment. The organizations canvassed included an Army division finance and accounting office, a personnel service company, and a hospital administration directorate. Computers are commonplace in these organizations and assigned personnel are representative of active duty soldiers and civilians that have both the opportunity and the need to interact with computers in the workplace. Army organizations generally not dependent on automation, such as: infantry, artillery, and armor units were purposely avoided. Subjects from these types of organizations would skew the findings and provide no useful

insight into the malady of computer fear, aversion, and anxiety in the U.S. Army.

The soldiers at the U.S. Army Computer Science School were subdivided into four categories:

1. Enlisted soldiers just beginning a course.
2. Enlisted soldiers just finishing a course.
3. Officers just beginning a course.
4. Officers just finishing a course.

Enlisted subjects were in attendance at either the *Software Analyst Course* (MOS 74F10) or the *Information Systems Operator Course* (MOS 74D10). Officers were in attendance at the *Systems Automation Course*. These groups provide a good cross section of soldiers specifically trained to accomplish the U.S. Army automation missions in the Army's information mission area. Additionally, studying the differences between beginning students and graduating students provides insight into the effect of computer training courses on computer fear, aversion, and anxiety.

Questionnaires were distributed and returned as described below:

<u>Sample Group</u>	<u># Distributed</u>	<u># Returned</u>
1. Enlisted Beginning	50	47
2. Enlisted Graduating	50	46
3. Officer Beginning	50	16
4. Officer Graduating	50	50
5. Active Duty	<u>120</u>	<u>91</u>
Totals:	320	250
Percent Returned:		78%

The return rate for the beginning officers is low because only one course was in session at the time of the survey, a graduating class. The 16 beginning officers were those that had reported early and were inprocessing for the next Systems Automation Course. In spite of these circumstances the sample sizes, overall, are adequate for statistical analysis and the purposes of this thesis.

The data was analyzed using a computer based, general purpose, data analysis system for organizing, analyzing, and reporting statistical data. The system was useful in producing a number of different presentations of the data that are constructive in the assessment of computer anxiety in the U.S. Army. These presentations are contained in Appendices C through F. The Appendices are as follows:

- A. Questionnaire.
- B. Explanation of Data Files and Columns.
- C. Descriptive Statistics.
- D. Correlation Matrices.
- E. Response Percentages.
- F. Questionnaire Scores Analysis.

VI. ANALYSIS AND RESULTS

A. GROUP DEMOGRAPHICS

Before a discussion of the findings concerning computer anxiety it is necessary to become acquainted with the general characteristics of the different sample groups. This is done by analyzing the demographic items, (C1-C14) in Appendix E, for each group. For an explanation of each area considered (C1-C14) see Appendix B. Again, the sample groups are: active duty soldiers and DA civilians (Active Duty), enlisted soldiers just beginning computer training (Beginning Enlisted), enlisted soldiers just graduating from computer training (Graduating Enlisted), commissioned officers just beginning computer training (Beginning Officers), commissioned officers just graduating from computer training (Graduating Officers).

1. Active Duty Soldiers and DA Civilians Group

The active duty sample (N=91) is nearly half male (55%) and half female (45%). This group is fairly well educated with 37% having a high school diploma or equivalent and another 42% with one to three years of college. Stemming from this, they have a fair amount of civilian computer training; 44% have had one or two courses and another 30% have had three or four courses. It is noteworthy that 61% of these civilian courses were received within the last two years.

This group reported that most of their military computer training was received through advanced individual training (41%) which may also account for the surprising number of soldiers that considered themselves to be in computer related profession (53%). This is surprising because this sample was drawn from a division finance office, a personnel service company, and a hospital administration directorate where the density of computer related professions is very low. Possibly, they misunderstood the question concerning ones "profession." Their military computer training was very recent, 76% within the last two years and 47% within the last year alone. This group has accumulated an impressive amount of work experience with computers; 33% reported two to five years experience and 23% had five years or more under their belt. As with all the sample groups, slightly better than 50% received typing training through high school typing courses. Only 29% of this group owned a personal computer and a striking 73% of them have owned them for less than one year.

2. Beginning Enlisted Group

Recall that both the beginning and graduating enlisted groups were attending computer related courses, the *Software Analyst Course* and the *Information Systems Operators Course*. The enlisted group (N=47) just beginning computer training was nearly three-fourths male (72%) and one-fourth female (28%). This group is relatively young 62% were less than 20 years old and 26% were 21 to 25 years old. Not surprisingly, this

sample group consisted primarily of junior enlisted grades, 91% of which were E4 or below. Accordingly, this groups education level is relatively low, although 72% had a high school diploma or equivalent only 21 percent had taken any college courses. They reported having very little work experience with computers, 40% with no experience and another 32% reporting less than one year of experience. About 34% of this group owned a personal computer.

3. Graduating Enlisted Sample

As with the previous group, this graduating enlisted group (N=46) was nearly three-fourths male (72%) and one-fourth female (28%). Also similar to the previous group, they are relatively young; 28% were 20 years or less and 46% were between 21 and 25 years old. This sample group also consisted primarily of junior enlisted grades, 83% of which were E4 or below. They reported very little civilian computer training; 55% reported none and only 24% reported one or two courses. More than 75% of their civilian computer training was within the last year. The extent of their military computer training consisted primarily of the course they just graduated from. These enlisted graduates had very little work experience with computers; 35% reported having none and another 39% reported less than one year. About 39% owned a personal computer.

4. Beginning Officers Group

Officers just beginning the systems automation course formed the smallest sample size of all the groups ($N = 16$). The sample size tends to limit the legitimacy of conclusions about this sample group. However, the characteristics of this group exhibit a striking resemblance to the graduating officer sample group. In some instances this thesis treats the sample as if it were representative of officers just beginning the course.

This group consisted of 81% males and 19% females. This group is older than previous groups with 60% falling between 31 and 40 years of age. As the name implies, this group consisted of commissioned officers; company grade officers (56%) and field grade officers (44%). This is an educated group with 69% having a bachelors degree and 31% holding a masters degree. Even so, they are no better off where civilian computer training is concerned. Similar to the other groups, 44% reported participation in one or two courses and another 25% report having had three or four courses. One important difference is that their civilian training was not as recent as other groups but rather evenly spread out over the last 10 years. This group has had relatively little military computer training, 77% report having no military computer training at all. What little military computer training that had been received by this group was very recent, 77% was received within the last year. They have had a fair

amount of computer work experience, 20% have had one to two years experience, 13% have had three to four years, and another 27% have had five years or more. Although typing training was primarily through high school courses (50%), as was the case with other groups, this group reported a relatively higher number of "self taught" instances (25%). About 85% of these officers consider themselves to be in a non-computer related profession. Approximately 69% of this group owned a personal computer (PC). In contrast to PC owners in other groups, this group has owned their PC's for a longer period. They've owned PC's for the last five years instead of the one year generally reported by the other groups. PC ownership seems to be tied to affordability rather than desire, lack of desire, or any other variable. The group with the higher income (officers) own more PC's than the groups with lower incomes. This, coupled with relatively the same generally positive response to statement number 16 (C30) on the questionnaire (If I had the money, I'd buy a computer.) support this finding.

5. Graduating Officer Group

The characteristics of graduating officers and beginning officers are very similar. However, in addition to the sample size (N=50), there are a few differences worth noting. Although, the systems automation course is designed for managers at the commissioned officer level, a small number (6%) of this group were senior non-commissioned officers (E5

to E9). While 55% reported having some civilian computer training, another 31% reported having none at all. Although 46% reported receiving this training within the last year, the remaining 54% was spread out fairly evenly over the last 10 years. Of course, as a graduating class this group had the full benefit of 17 weeks of concentrated computer training and experience. The amount of computer work experience in this group was diverse, 34% reported having none at all while 40% reported having more than two years, and the rest fell somewhere in the middle. As was the case with other groups, high school typing training prevailed (51%). However, they also attributed typing skills largely to being "self-taught" (31%). PC ownership was nearly split, 52% owned a PC. About half of the owners had their PC's less than one year and the other half had owned their PC from one to ten years.

B. COMPUTER ATTITUDE SCORES

1. Analysis

A scoring mechanism was used to obtain a score for each questionnaire. This allows for comparisons, on a large scale, between the sample groups and also provides a standard with which individuals can compare their individual scores. Since the questionnaire contains both positive and negative statements it cannot be scored simply by adding up the original values given to each statement. A person with a positive attitude toward computers could conceivably score the same value as a person with a negative attitude. That is: a

person that generally agrees (value = 1) with the positive statements about computers will generally disagree (value = 5) with the negative statements. On a questionnaire with one positive statement and one negative statement, for example, such an individual might score a six ($1 + 5 = 6$). On the other hand, an individual that generally disagrees (value = 5) with positive statements about computers will generally agree (value = 1) with the negative statements. On the same questionnaire with only one positive statement and one negative statement this individual might also score a six ($5 + 1 = 6$).

What is needed is a score that indicates a positive or negative trend by it's magnitude alone. In other words, a relatively high score may indicate either a positive trend or a negative trend but not both. Likewise, a relatively low score would indicate the opposite trend of the higher score. This is accomplished by reversing the scored values for all the negative statements on the questionnaire. For negative statements this means that "strongly agree" receives a value of five (instead of one), "agree to some extent" receives a value of four (instead of two), "uncertain" continues to receive a value of three, "disagree to some extent" receives a value of two (instead of four), and "strongly disagree" receives a value of one (instead of five). Once the values are reversed in this way, a total score can be obtained by

adding up the values for each of the 30 statements (C15-C44) on the questionnaire. [Ref 39:p. 65]

The result of this scoring procedure is detailed in Appendix F. A higher score indicates a more negative attitude toward computers and a tendency toward computer fear and anxiety. An extremely high score indicates a more severe computer anxiety (computerphobia). A relatively low score indicates a more positive attitude toward computers and an extremely low score indicates a tendency toward computerphrenia. Table 1 is a brief synopsis of the mean score, standard deviation, and normal range for each sample group. The groups are listed by ascending order of their mean value. The normal range defines the scores that fall within one standard deviation (+ or -) of the mean:

	<u>MEAN</u>	<u>STDEV</u>	<u>NORMAL RANGE</u>
1. Beginning Enlisted	51.57	11.55	40.02 - 63.12
2. Graduating Enlisted	54.63	13.54	41.09 - 68.17
3. Beginning Officers	55.06	15.52	39.54 - 70.58
4. Graduating Officers	58.58	13.16	45.42 - 71.74
5. Active Duty	59.25	14.64	44.61 - 73.89

Table 1. Score Synopsis

2. Results

As some soldiers increase their interaction with computers through training and experience their level of computer fear, anxiety, and apprehension also increases, at least for the short term. Notice that the mean score of the beginning enlisted sample is lower than the graduating enlisted sample. The mean score of officers just beginning

their computer training is lower than the graduating officer group. The group with the most training and experience, active duty soldiers, has the highest mean score overall. However, keep in mind that the active duty sample group members are not professionals in a computer related field, but they are rather an "end-user" group. This may explain the reason for the higher mean score. The next question is, to what extent does computer fear and anxiety permeate through each of the sample groups.

Appendix F also shows a tally of scores for each sample group. The tally includes the score (C45), the count for each score, the cumulative count, the percent for each score, and the cumulative percent. By imposing the normal range of scores, from Table 1, over the full range of scores found in each group it is possible to determine the proportion of scores that lie above and below the normal range of scores for each group. Scores lying above the normal range indicate the portion of the group with a meaningful amount of computer fear and anxiety. Scores lying below the normal range indicate the portion of the group with excessively positive attitudes concerning computer technology. Table 2 provides a synopsis of this analysis.

	<u>MIN</u>	<u>BELOW</u>	<u>NORMAL RANGE</u>	<u>ABOVE</u>	<u>MAX</u>
	<u>SCORE</u>	<u>RANGE</u>		<u>RANGE</u>	<u>SCORE</u>
1. Beg Enlisted	28	15%	40.02 - 63.12	11%	92
2. Grad Enlisted	38	9%	41.09 - 68.17	11%	103
3. Beg Officers	39	13%	39.54 - 70.58	13%	92
4. Grad Officers	37	18%	45.42 - 71.74	14%	88
5. Active Duty	32	15%	44.61 - 73.89	18%	85

Table 2. Score Range Analysis

Notice that the proportion of scores above the normal range increases from 11% for the beginning enlisted group to 18% for the most trained and experienced group, active duty. In other words, the proportion of scores exhibiting computer fear and anxiety increased from 11% to 18% as training and experience increased. Also note that the proportion of scores falling below the normal range decreased from 15% for the beginning enlisted group to 9% for the graduating enlisted group and that the proportion above the normal range remained at 11%. That is, the proportion of soldiers having a definitive positive attitude decreased and the proportion with a determined negative attitude remained unchanged as training and experience increased. Additionally, the proportion of scores falling below the normal range for beginning enlisted, is equal (15%) to that of the active duty sample group. This is also unexpected since the beginning enlisted group is the least trained and experienced and the active duty group has significantly more training and experience.

This analysis provides further evidence in support of the first major finding: as soldiers increase their interaction

with computers, through training and experience, their level of computer fear, anxiety, and apprehension also increases.

It is noteworthy that the beginning enlisted and graduating enlisted groups are computer professionals training in computer courses designed specifically to teach hard-core computer skills. Whereas the officer groups and the active duty group are not computer professionals and receive training designed specifically for "end-users." This may explain, at least in part, the obvious differences between the enlisted groups and the other groups in this study. As might be expected, the end-user groups exhibit slightly higher computer anxiety than the computer system professionals.

Table 2 also provides evidence as to the extent of computer fear and anxiety in the U.S. Army. As indicated, 11 to 18 (average 13.4%) percent of the scores lie more than one standard deviation above the mean. This is not strong enough evidence to classify this portion of the sample as "extremely" computer anxious, referred to as "computerphobic" in some literature. However, it is certainly safe enough to classify this portion of the sample as exhibiting computer fear, anxiety, and apprehension, referred to as *computer anxious*. This is a significantly lower proportion than the 30 percent reported by Weinberg in 1982 [Ref 3:p. 10] and again by Howard in 1987 [Ref 35:p. 12]. However, it matches very closely with the 11 percent reported as computer anxious by Gardner in 1985 [Ref 18:p. 30] and even more closely with the 13 percent

reported by Lewis in 1988 [Ref 36:p. 5]. These studies included only end-users and none of them indicated that computer system professionals were included, as is the case in this thesis. It is not certain, but it may be that the inclusion of computer system professionals tends to drive down the prevalence and detection of computer anxiety.

As previously explained "computerphobia" is a term used to describe the more severe case of computer fear and anxiety. However, to avoid the clinical implications of the term "phobia" the preferred terminology is "extremely computer anxious." The extent of extreme computer anxiety in the sample groups can be determined by using the same methods used to examine the extent of computer fear and anxiety. However, instead of determining the proportion of scores lying only one standard deviation above the mean score it is necessary to determine the proportion of scores lying above two standard deviations. This procedure yields the data presented in Table 3.

<u>% ABOVE TWO STDEV</u>	
1. Beginning Enlisted	4%
2. Graduating Enlisted	6.5%
3. Beginning Officers	6%
4. Graduating Officers	2%
5. Active Duty	4%

Table 3. Scores Above Two Standard Deviations

The proportion of scores that lie above two standard deviations of the mean, range from two percent to six and one

half percent (average 4.5%). This finding is quite similar to findings of other researchers. Weinberg reported the proportion of "computerphobics" at five percent in 1982 [Ref 3:p. 10], Gardner reported three percent in 1985 [Ref 18:p. 30], and Lewis reported three percent in 1988 [Ref 36:p. 5].

C. DEMOGRAPHIC/COMPUTER ATTITUDE CORRELATIONS

1. Analysis

Correlation coefficients measure the association or correlation between two variables. Correlation coefficients range from -1.0 to 1.0. Coefficients close to zero indicate a weak relationship and values close to -1.0 or 1.0 indicate a strong relationship. Normally, correlation coefficients with an order of magnitude in the range of 0.60 to 0.90 are considered significant [Ref 40:p. 525]. Examining the correlations between demographic variables and scores and also between demographic variables and individual statements provides insight as to the profile of individuals most likely to exhibit computer fear and anxiety. However, with data on individual's feelings or attitudes, values close to -1.0 or 1.0 are rare [Ref 41:p. 259]. Typically, coefficients on data describing individuals is rarely higher than 0.30 which reveals very little about relationships between variables [Ref 41:p. 259]. In short, it is extremely difficult to analyze data reflecting psychological or attitudinal

considerations. Correlation matrices are provided in Appendix D and also Appendix F (for scores).

2. Results

The correlation analysis did not reveal any significant relationships between the demographic variables (C1-C14) and questionnaire scores or individual statements. This analysis demonstrates the third major finding, that: there is no set of characteristics that can be used to draw a profile of a computer anxious individual.

The highest correlation coefficients were observed in the *beginning officer* sample. This is due to the small sample size ($N = 16$) explained earlier and should be discounted accordingly. In the correlation matrix for this group the highest correlation (-0.607) is between *work experience with computers* (C9) and *questionnaire scores* (C45). This was a common relationship found throughout all the sample groups. The negative value of the coefficient indicates that as one of the variables increases the other variable decreases. In other words, as the number of years of work experience increases, computer fear, anxiety, and apprehension decreases.

All possible relationships are reflected in the correlation matrices and can be examined according to the particular interests of the reader. A few of the more highly correlated and interesting relationships are discussed below. Another reminder, however, that while they may be interesting,

the values of the correlation coefficients are too low to be used as conclusive evidence.

In the *graduating officer* sample the correlation coefficient between C13 (home computer) and C45 (questionnaire score) was 0.394. This suggests that officers that owned a personal computer (PC) are less likely to experience computer fear and anxiety. This was also the case with the *beginning officer* sample. Bound to this relationship is the length of time the PC was owned (C14). The longer the PC was owned the lower the score, indicating less likelihood of computer fear and anxiety.

Without going into a detailed discussion about additional correlations, Table 4 provides the most highly correlated demographic items for each of the sample groups. The demographic items are in order according to the strength of their relationships with the individual statements, from highest to lowest. The statements (C15-C44) are also in order from highest to lowest according to the value of the correlation coefficient. Appendix B provides the definition of each column/item (C#).

(From Appendix D)		
	<u>Demographic Item</u>	<u>Correlated With (Statements)</u>
1. Beginning Enlisted	C9	C43, C42, C15
2. Graduating Enlisted	C7	C28, C44, C29, C16
	C9	C42
	C12	C18
3. Beginning Officers	Not Evaluated (N = 16)	
4. Graduating Officers	C9	C23, C40, C22
	C14	C23, C40
	C10	C23
5. Active Duty	C12	C40
	C14	C18

Table 4. Significant Correlations

While Table 4 depicts the highest correlations that occurred in each group the highest correlations, overall, occurred in the graduating officer sample. The coefficients, however insignificant, in that group were:

C9 to C23, 0.533	C14 to C23, 0.406	C10 TO C23, 0.447
C9 to C40, 0.482	C14 TO C40, -0.352	C10 = Civilian
C9 to C22, 0.444	C14 = Years owned	typing
C9 = Years of work	a PC.	training.
experience		
with computers.		

This means that the respondents with more years of work experience with computers (C9) tended to disagree with statements C23, C40, and C22.

C23: Even though computers are valuable and necessary, I still have a fear of them.

C40: I have avoided computers because they are unfamiliar to me.

C22: Computers intimidate and threaten me.

This seems to refute the first major finding. However, consider the correlations with C14. The longer the respondent owned the PC (C14) the more he tended to disagree with

statement C23 and agree (negative correlation) with statement C40 (see statement explanations above). This is a contradiction in itself and is pointed out to caution against placing too much emphasis on the correlations coefficients calculated in this analysis. While they are interesting they lack validity.

D. ANOTHER HYPOTHESIS

The correlations discussed above, though weak, along with the other evidence suggests an interesting hypothesis. It would appear that computer anxiety may be tied to a cycle somewhat dependent on the level of knowledge, training, and experience obtained by an individual or group. The cycle may be something like this:

Computer Anxious Cycle

1. Ignorance is bliss. When soldiers have viewed computers from a distance and are incognizant of computer systems, due to their lack of real knowledge and first hand experience, they generally feel comfortable about computers and computer systems. Computer anxiety is low.
2. Computer shock. The initial exposure to computers alerts the soldier to the unfamiliar and seemingly complex and highly technical domain of end-user computing. Computer anxiety gets roots and begins to rise.
3. Rising anxiety. Learning new concepts, terminology, and skills in any discipline involves the so called "learning curve." This is a sort of growth cycle where one is intellectually immature in the discipline and grows to maturity with time. This growth is probably unique in end-user computing because of the "computer shock" experienced at the beginning. During this growth period the level of computer anxiety continues rising.
4. Relief. As the soldier approaches intellectual maturity in end-user computing he begins to realize that

the impression experienced in the "computer shock" stage was invalid and false. Computer anxiety begins to subside.

The evidence introduced by this analysis is not conclusive enough to claim the *Computer Anxious Cycle* as a major finding in this thesis. However, it is strong enough to mention as a significant observation and introduce the hypothesis. Additionally, it is particularly consistent with the literature extensively reviewed and presented in Chapter IV. This observation (hypothesis) merits further investigation.

VII. CONCLUSION

A. FINDINGS

1. Research Questions

The research questions were stated in Section B of Chapter I. They are repeated in this section for clarity and emphasis with respect to the findings, observations, and discussion:

Research Questions

1. What is computer fear and anxiety? What are the pertinent aspects of the phenomenon? What are the consequences?
2. Is computer fear and anxiety as prevalent in the Army as it is in private industry? Could it have any impact in the Army and should it be recognized and dealt with?

2. Findings

A summary of the major findings and observations are provided below:

1. Finding 1: As some soldiers increase their interaction with computers through training and experience their level of computer fear, anxiety, and apprehension also increases, at least for the short term.
2. Finding 2: The extent of computer anxiety in the U.S. Army is as high as 11% for computer specialists and as high as 18% for "end-users." The extent of severe computer anxiety is approximately 4.5% for both computer specialists and "end-users."
3. Finding 3: There is not a set of characteristics that can be used to draw a profile of a computer anxious individual.

4. Observation: Computer anxiety may be understood as a cycle, termed the *Computer Anxious Cycle* in Section D, Chapter VI. The cycle involves four stages: ignorance is bliss, computer shock, rising anxiety, and relief. This hypothesis requires additional research.

B. DISCUSSION

The first set of research questions were answered explicitly in Chapter IV. No further discussion is necessary or provided here regarding these questions. The second set of research questions are answered plainly in Chapter VI and directly by the findings listed above. Further discussion is provided to place the findings in proper perspective.

An important aspect of the military sample groups in this thesis is the very fact that they are soldiers. Soldiers are trained and indoctrinated, from basic training and beyond, that they can accomplish any assigned missions. The "can-do" spirit is an important part of training and indoctrination that makes the soldier a unique individual in our society. Typically, they have a high degree of self confidence and a willingness to accept additional responsibility and to charge forward in the performance of their duties. In this regard they are atypical in their overall attitude and capacity toward fear and anxiety in general.

Although the first major finding is incidental to the research questions, it is pertinent. On the surface the first major finding is surprising and unexpected. One might expect that training and experience would reduce computer fear and anxiety. Indeed, training and experience is the most

recommended method for overcoming the debilitating effects of computer fear and anxiety. However, the difference may lie in the type of training considered.

Predominantly, the computer training courses provided in the Army are technically oriented and designed to produce technical proficiency and "know-how." Army training is remarkably successful in accomplishing that task. United States Army soldiers are among the most highly specialized and proficient professionals in our society, and the world for that matter. This is a different orientation than the type of training discussed in Section G, Chapter IV.

If the hypothesized *computer anxious cycle* is actually credible it could account for the seemingly peculiar finding. While the entire cycle is relevant to the malady of computer anxiety, the "rising anxiety" stage may be particularly germane to training. The orientation of technical training is fuel for the rising anxiety stage of the cycle. This is probably because, even though the preponderance of computer system concepts are grasped entirely by trainees, many concepts are not understood completely. Even without this particular consideration, computer anxiety rises in the third stage of the cycle.

Notice that the finding is qualified with the phrase, "at least in the short term." The reason for this is that computer anxiety does not continue to rise indefinitely. At some point computer anxiety begins to subside. Recall from

Section A, Chapter IV, that computer anxiety is best viewed as an anxiety state (temporary) rather than an anxiety trait (permanent) and as such it is susceptible to change. The point of change is a case by case matter and is unpredictable. Honeyman and White reported,

while it is true that the consequences of high state anxiety are complex, they are usually negative and debilitating. However, they are also susceptible to change over time. As this study indicates, the lowering of an individuals state anxiety level does occur over time, and the timing of such change differs with the level of previous experience of the participant. Beginners require enough time working with a computer to allow their relatively high anxiety states to lower. It can be postulated that without adequate time in contact with the computer these states of anxiety will not become lower, and the beginner's fear of using the computer will continue. [Ref 33:p. 136]

The second research question is answered directly by the second major finding and discussed sufficiently in Subsection 3, Section B, Chapter VI. The first step in any problem solving methodology is recognition of the problem. This thesis accomplishes this first stage in the process. The question unanswered is weather this level of computer anxiety warrants attention. The answer to this question requires an independent study. From a purely economical point of view it comes down to the trade-off between the cost benefit of recapturing lost productivity and the resources required to reduce computer anxiety. From a leadership and management point of view it comes down to caring about the health, morale and, welfare of our soldiers and DA civilians. People are our

most valuable resource and they deserve consideration and priority in the human-computer interactive environment.

A panel of human-computer interaction experts said, much of the work in the field of computer human interaction consists of finding out what is wrong with existing interfaces or which of several existing alternatives is better. Over the next few decades, the possibilities for computer-human interaction will explode. This will be due to: 1. continued decrease in the costs of processing and memory, 2. new technologies being invented and existing technologies (e.g., handwriting recognition, speech synthesis) being extended, 3. new applications and, 4. new ideas about how people can interact with computers.

While changes along these lines are bound to occur, we need not take the view that investigators in human-computer interaction are to be passive observers of some uncontrolled and uncontrollable evolution. Indeed, we can help steer this process by visions of what the future of human-computer interaction could and should be like. [Ref 42:p. 253]

Additionally, Brod stated, as computers are designed for more complex tasks, success will depend on how effectively users can operate the machines. Effective operation will be evidenced by the intensity, accuracy, and quality of system use. These factors ultimately depend on employees who feel comfortable using computer technology. [Ref 26:p. 753]

Left unchallenged, the phenomenon of computer anxiety will most likely increase in both extent and severity rather than decrease. Developing proactive initiatives in the area of human-computer interaction, that include the substance of this thesis, is plainly in the best interest of the U.S. Army.

Certainly the Army cannot take decisive action based solely on the findings in this thesis. However, the findings should be recognized and introduced into appropriate Army publications and literature. Acknowledgement and awareness

alone, of computer anxiety in the Army, can play a meaningful part in reversing the effects of computer fear and anxiety. Particularly, recognizing and integrating the information, insight, and counsel presented in Chapter IV.

APPENDIX A

QUESTIONNAIRE

Questionnaire
Computer Attitude Scale (CATT)

Instructions: The purpose of this questionnaire is to obtain information regarding attitudes toward computers in the Army. Your identity will remain completely anonymous. DO NOT write your name, SSN, or unit on this questionnaire. Return your completed questionnaire to the proctor, or to: Naval Postgraduate School, SMC: 2926, Monterey, CA 93943-5000.

I. Demographic Information: For each item circle the corresponding number that applies or write in the information requested.

1. Gender:

1 - Male;

2 - Female

2. **Age:**

1 - 20 years or less;

2 - 21 to 25 years;

3 - 26 to 30 years;

4 - 31 to 35 years;

5 - 36 to 40 years;

6 - 41 to 45 years;

7 - 46 to 50 years;

8 - 51 years or greater;

3. **Grade/Rank:**

Military:

1 - E/1 to E/4;

2 - E/5 to E/6;

3 - E/7 to E/9;

4 - W/1 to W/4;

5 - 0/1 to 0/3;

6 - 0/4 or greater;

Civilian: (Grade)

- 4. Education:**

1 - 11 years or less;

2 - High Schl diploma/equivalent;

3 - 1 to 3 years college;

4 - B.S degree;

5 - M.S. degree;

6 - Ph.D. degree;

- ## 5. Computer Training:

Civilian Training:

1 - None;

2 - 1 or 2 courses;

3 - 3 to 4 courses;

4 - 2 to 3 years;

5 - B.S. degree in computer related field:

6 - M.S. degree or higher in computer related field;

How many years ago? (circle one): 0 1 2 3 4 5 6 7 8 9

Military Training: (List course titles if applicable):

- 1 - None; 2 - Advanced Individual Tng (AIT);
3 - Systems Automation Course; 4 - _____;

How many years ago? (circle one): 0 1 2 3 4 5 6 7 8 9

6. **Work Experience With Computers:**

- 1 - None; 2 - Less than 6 months;
3 - 6 months to 1 year; 4 - 1 to 2 years;
5 - 2 to 5 years; 6 - 5 years or greater;

7. **Typing Training:** (List other source of tng if applicable):

Civilian Training:

- 1 - None/I can't type; 2 - None/I "hunt-and-peck;"
3 - Self taught; 4 - High School Typing Classes;
5 - College Courses; 6 - _____;

Military Training: (List course titles if applicable):

- 1 - None; 2 - Advanced Individual Tng (AIT);
3 - OJT; 4 - _____;

8. **Profession:**

- 1 - Computer related profession (operator, programmer,
analyst, etc.).

2 - Noncomputer related profession.

9. **Home Computer:** Do you have a computer at home? Yes No

If yes, how many years? 0 1 2 3 4 5 6 7 8 9

II. Questions:

Please indicate your agreement or disagreement with each of the following items by circling the number to the right of each statement which corresponds most closely to your desired response.

- 1 = Strongly agree.
2 = Agree to some extent.
3 = Uncertain.
4 = Disagree to some extent.
5 = Strongly disagree.

- | | |
|--|-------------------|
| 1. I think computers are fascinating. | 1 2 3 4 5 |
| 2. If I used a computer, I could save time and work. | 1 2 3 4 5 |
| 3. I feel very negative about computers in general. | 1 2 3 4 5 |

1 = Strongly agree. 2 = Agree to some extent. 3 = Uncertain. 4 = Disagree to some extent. 5 = Strongly disagree.
--

- | | | | | | |
|---|---|---|---|---|---|
| 4. Only computer specialists can use computers. | 1 | 2 | 3 | 4 | 5 |
| 5. Computers control too much of our world today. | 1 | 2 | 3 | 4 | 5 |
| 6. Computers are having a bad effect on my work and my life. | 1 | 2 | 3 | 4 | 5 |
| 7. A computer could make learning more fun for me. | 1 | 2 | 3 | 4 | 5 |
| 8. Computer's intimidate and threaten me. | 1 | 2 | 3 | 4 | 5 |
| 9. Even though computers are valuable and necessary, I still have a fear of them. | 1 | 2 | 3 | 4 | 5 |
| 10. All computer people talk in a strange and technical language. | 1 | 2 | 3 | 4 | 5 |
| 11. Given a little time and training, anybody could learn to use computers. | 1 | 2 | 3 | 4 | 5 |
| 12. Government regulations should be established to control computers. | 1 | 2 | 3 | 4 | 5 |
| 13. Computers make mistakes. | 1 | 2 | 3 | 4 | 5 |
| 14. Using a computer could be enjoyable. | 1 | 2 | 3 | 4 | 5 |
| 15. I look forward to computers taking over certain routine tasks of my home or job. | 1 | 2 | 3 | 4 | 5 |
| 16. If I had the money, I'd buy a home computer. | 1 | 2 | 3 | 4 | 5 |
| 17. I would rather have a computer present my instruction than a teacher. | 1 | 2 | 3 | 4 | 5 |
| 18. Computers are so complicated, I would rather do my work manually. | 1 | 2 | 3 | 4 | 5 |
| 19. Computers are being forced on us; we are having our decision process replaced by them, making us lose control of our lives. | 1 | 2 | 3 | 4 | 5 |
| 20. Computers are superior to humans in processing information. | 1 | 2 | 3 | 4 | 5 |

1 = Strongly agree. 2 = Agree to some extent. 3 = Uncertain. 4 = Disagree to some extent. 5 = Strongly disagree.
--

- | | | | | | |
|--|---|---|---|---|---|
| 21. I am confident that I could learn computer skills. | 1 | 2 | 3 | 4 | 5 |
| 22. I am sure of my ability to learn a computer programming language. | 1 | 2 | 3 | 4 | 5 |
| 23. I will be able to keep up with important technological advances in computers. | 1 | 2 | 3 | 4 | 5 |
| 24. I feel apprehensive about using a computer terminal. | 1 | 2 | 3 | 4 | 5 |
| 25. If given the opportunity to use a computer, I'm afraid that I might damage it in some way. | 1 | 2 | 3 | 4 | 5 |
| 26. I have avoided computers because they are unfamiliar to me. | 1 | 2 | 3 | 4 | 5 |
| 27. I hesitate to use a computer for fear of making mistakes that I cannot correct. | 1 | 2 | 3 | 4 | 5 |
| 28. I am sure of my ability to interpret a computer printout. | 1 | 2 | 3 | 4 | 5 |
| 29. I have difficulty understanding most technical matters. | 1 | 2 | 3 | 4 | 5 |
| 30. Computer terminology sounds like confusing jargon to me. | 1 | 2 | 3 | 4 | 5 |

Remarks: (Make any appropriate remarks below):

THANK YOU, for your cooperation and participation!

APPENDIX B EXPLANATION OF DATA FILES AND COLUMNS

A. EXPLANATION OF DATA FILES

The data collected by the questionnaire (Appendix A) was entered into a matrix with 44 columns. Each column in the matrix represents an item from the questionnaire and each line represents one questionnaire.

Active Duty Sample

- Notes:
1. 44 columns total.
 2. Columns 1-14 are demographic data.
 3. Columns 15- 44 are responses to questions 1-30.
 4. Each line represents data from one questionnaire.
 5. Asterics (*) represent missing data.

1	2	3	4
12345678901234567890123456789012345678901234			

Data File Example:

```

14332910532212115555155515511135541115555155
21343310541212224424444433424452222244422144
14542410321210115555125214212155511135555232
27642510531220231344224322433253253233342434
25132210641115115545251213513451431121555254
1533102*531215111555155515511135521115555121
163310***43***235513255323222233321221313333
11121021342220324521255513*3224253112345424*
  
```

B. EXPLANATIONS OF DATA COLUMNS

The columns are sometimes referred to as C#, such as: C1 for column number 1. Each column in the matrix represents an item from the questionnaire and each line represents one questionnaire. The explanation of the 44 data items (columns) are as follows:

I. Demographic Information:

<u>Col #</u>	<u>Item:</u>
--------------	--------------

C1. Gender:

1 - Male;

2 - Female

Col #

Item:

C2. Age:

- | | |
|-----------------------|--------------------------|
| 1 - 20 years or less; | 2 - 21 to 25 years; |
| 3 - 26 to 30 years; | 4 - 31 to 35 years; |
| 5 - 36 to 40 years; | 6 - 41 to 45 years; |
| 7 - 46 to 50 years; | 8 - 51 years or greater; |

C3. Military Grade/Rank:

- | | |
|-----------------|---------------------|
| 1 - E/1 to E/4; | 2 - E/5 to E/6; |
| 3 - E/7 to E/9; | 4 - W/1 to W/4; |
| 5 - O/1 to O/3; | 6 - O/4 or greater; |
| 7 - Civilian | |

C4. Education:

- | | |
|---------------------------|--------------------------------------|
| 1 - 11 years or less; | 2 - High Schl
diploma/equivalent; |
| 3 - 1 to 3 years college; | 4 - B.S degree; |
| 5 - M.S. degree; | 6 - Ph.D. degree; |

C5. Civilian Computer Training:

- | | |
|--|---------------------|
| 1 - None; | 2 - 1 or 2 courses; |
| 3 - 3 to 4 courses; | 4 - 2 to 3 years; |
| 5 - B.S. degree in computer related field; | |
| 6 - M.S. degree or higher in computer related field; | |

C6. Civilian Computer Training: How many years ago:

0 1 2 3 4 5 6 7 8 9

C7. Military Computer Training:

- | | |
|--------------------------------|---------------------------------------|
| 1 - None; | 2 - Advanced Individual
Tng (AIT); |
| 3 - Systems Automation Course; | 4 - Other; |

C8. Military Computer Training: How many years ago:

0 1 2 3 4 5 6 7 8 9

C9. Work Experience With Computers:

- | | |
|-------------------------|-------------------------|
| 1 - None; | 2 - Less than 6 months; |
| 3 - 6 months to 1 year; | 4 - 1 to 2 years; |
| 5 - 2 to 5 years; | 6 - 5 years or greater; |

C10. Civilian Typing Training:

- | | |
|------------------------|---------------------------------|
| 1 - None/I can't type; | 2 - None/I "hunt-and-peck;" |
| 3 - Self taught; | 4 - High School Typing Classes; |
| 5 - College Courses; | 6 - Other; |

Col #

Item:

C11. Military Typing Training:

- | | |
|-----------|---------------------------------------|
| 1 - None; | 2 - Advanced Individual Tng
(AIT); |
| 3 - OJT; | 4 - Other; |

C12. Profession:

- 1 - Computer related profession (operator, programmer, analyst, etc.).
- 2 - Noncomputer related profession.

C13. Home Computer: (Own a personal computer).

- 1 - Yes 2 - No

C14. Owned A Personal Computer: (Years):

0 1 2 3 4 5 6 7 8 9

II. Questions:

- 1 = Strongly agree.
2 = Agree to some extent.
3 = Uncertain.
4 = Disagree to some extent.
5 = Strongly disagree.

Col #

Questions

- | | |
|------|--|
| C15. | 1. I think computers are fascinating. |
| C16. | 2. If I used a computer, I could save time and work. |
| C17. | 3. I feel very negative about computers in general. |
| C18. | 4. Only computer specialists can use computers. |
| C19. | 5. Computers control too much of our world today. |
| C20 | 6. Computers are having a bad effect on my work and my life. |
| C21 | 7. A computer could make learning more fun for me. |
| C22 | 8. Computer's intimidate and threaten me. |

- C23. 9. Even though computers are valuable and necessary, I still have a fear of them.
- C24. 10. All computer people talk in a strange and technical language.
- C25. 11. Given a little time and training, anybody could learn to use computers.
- C26. 12. Government regulations should be established to control computers.
- C27. 13. Computers make mistakes.
- C28. 14. Using a computer could be enjoyable.
- C29. 15. I look forward to computers taking over certain routine tasks of my home or job.
- C30. 16. If I had the money, I'd buy a home computer.
- C31. 17. I would rather have a computer present my instruction than a teacher.
- C32. 18. Computers are so complicated, I would rather do my work manually.
- C33. 19. Computers are being forced on us; we are having our decision process replaced by them, making us lose control of our lives.
- C34. 20. Computers are superior to humans in processing information.
- C35. 21. I am confident that I could learn computer skills.
- C36. 22. I am sure of my ability to learn a computer programming language.
- C37. 23. I will be able to keep up with important technological advances in computers.
- C38. 24. I feel apprehensive about using a computer terminal.
- C39. 25. If given the opportunity to use a computer, I'm afraid that I might damage it in some way.
- C40. 26. I have avoided computers because they are unfamiliar to me.

- C41. 27. I hesitate to use a computer for fear of making mistakes that I cannot correct.
- C42. 28. I am sure of my ability to interpret a computer printout.
- C43. 29. I have difficulty understanding most technical matters.
- C44. 30. Computer terminology sounds like confusing jargon to me.
- C45. Column C45 contains the questionnaire scores. It is not part of the data file, it is generated by the statistical analysis software.

APPENDIX C
DESCRIPTIVE STATISTICS

A. ACTIVE DUTY SAMPLE

Descriptive Statistics

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C1	91	0	1.4505	1.0000	1.4444	0.5003	0.0524
C2	91	0	3.659	3.000	3.580	1.973	0.207
C3	89	2	2.865	2.000	2.753	2.356	0.250
C4	91	0	2.8022	3.0000	2.7531	0.9216	0.0966
C5	90	1	2.1556	2.0000	2.1250	0.8334	0.0879
C6	90	1	2.511	2.000	2.275	2.464	0.260
C7	78	13	2.205	2.000	2.171	1.085	0.123
C8	74	17	1.595	1.000	1.288	2.245	0.261
C9	89	2	4.180	5.000	4.247	1.599	0.170
C10	89	2	3.865	4.000	3.914	0.968	0.103
C11	68	23	2.000	2.000	1.952	0.977	0.119
C12	78	13	1.4744	1.0000	1.4714	0.5026	0.0569
C13	90	1	1.7111	2.0000	1.7375	0.4558	0.0480
C14	90	1	0.778	0.000	0.475	1.688	0.178
C15	91	0	1.6484	1.0000	1.5185	0.8866	0.0929
C16	91	0	1.681	1.000	1.543	0.999	0.105
C17	90	1	4.444	5.000	4.612	1.018	0.107
C18	89	2	4.539	5.000	4.691	0.954	0.101
C19	91	0	3.429	4.000	3.481	1.415	0.148
C20	91	0	4.396	5.000	4.543	1.042	0.109
C21	88	3	1.818	2.000	1.725	1.001	0.107
C22	90	1	4.4000	5.0000	4.5250	0.9338	0.0984
C23	90	1	4.322	5.000	4.450	1.069	0.113
C24	91	0	3.319	4.000	3.358	1.397	0.146
C25	91	0	1.5934	1.0000	1.4815	0.8162	0.0856
C26	91	0	2.703	3.000	2.667	1.225	0.128
C27	89	2	3.348	4.000	3.383	1.399	0.148
C28	91	0	1.5824	1.0000	1.4815	0.8037	0.0842
C29	91	0	2.231	2.000	2.136	1.165	0.122
C30	87	4	1.805	1.000	1.684	1.199	0.129
C31	91	0	3.736	4.000	3.815	1.200	0.126
C32	91	0	3.857	4.000	3.963	1.270	0.133
C33	91	0	3.923	4.000	4.012	1.249	0.131
C34	91	0	3.088	3.000	3.099	1.435	0.150
C35	89	2	1.2472	1.0000	1.1728	0.5283	0.0560
C36	89	2	1.5730	1.0000	1.5062	0.8103	0.0859
C37	89	2	1.9101	2.0000	1.8395	0.9249	0.0980
C38	89	2	3.674	4.000	3.741	1.380	0.146

C39	87	4	4.402	5.000	4.506	0.958	0.103
C40	89	2	4.371	5.000	4.469	1.049	0.111
C41	89	2	4.247	5.000	4.346	1.151	0.122
C42	88	3	2.216	2.000	2.150	1.119	0.119
C43	89	2	3.742	4.000	3.765	1.133	0.120
C44	88	3	3.500	4.000	3.550	1.232	0.131

B. BEGINNING ENLISTED SAMPLE

Descriptive Statistics

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C1	47	0	1.2766	1.0000	1.2558	0.4522	0.0660
C2	47	0	1.574	1.000	1.465	0.903	0.132
C3	47	0	1.0851	1.0000	1.0465	0.2821	0.0411
C4	47	0	2.2766	2.0000	2.2326	0.5787	0.0844
C5	47	0	2.000	2.000	1.953	0.978	0.143
C6	47	0	1.468	1.000	1.349	1.640	0.239
C7	43	4	1.395	1.000	1.282	0.728	0.111
C8	42	5	0.452	0.000	0.263	1.152	0.178
C9	47	0	2.574	2.000	2.488	1.691	0.247
C10	46	1	3.826	4.000	3.833	0.739	0.109
C11	43	4	1.302	1.000	1.205	0.674	0.103
C12	43	4	1.6512	2.0000	1.6667	0.4822	0.0735
C13	47	0	1.6596	2.0000	1.6744	0.4790	0.0699
C14	47	0	1.489	0.000	1.233	2.527	0.369
C15	47	0	1.3617	1.0000	1.3023	0.6052	0.0883
C16	47	0	1.574	1.000	1.512	0.773	0.113
C17	47	0	4.8298	5.0000	4.8837	0.4333	0.0632
C18	47	0	4.8298	5.0000	4.9070	0.4809	0.0701
C19	47	0	3.830	4.000	3.907	1.274	0.186
C20	47	0	4.8936	5.0000	4.9302	0.3117	0.0455
C21	47	0	1.3404	1.0000	1.2791	0.5625	0.0820
C22	47	0	4.489	5.000	4.628	1.101	0.161
C23	47	0	4.660	5.000	4.791	0.891	0.130
C24	47	0	3.596	4.000	3.651	1.313	0.192
C25	47	0	1.489	1.000	1.395	0.804	0.117
C26	47	0	3.532	4.000	3.581	1.349	0.197
C27	47	0	3.426	4.000	3.465	1.529	0.223
C28	47	0	1.2340	1.0000	1.1860	0.4761	0.0694
C29	47	0	2.298	2.000	2.256	1.082	0.158
C30	47	0	1.340	1.000	1.209	0.815	0.119
C31	47	0	4.149	4.000	4.209	0.955	0.139
C32	47	0	4.340	5.000	4.442	0.984	0.144
C33	47	0	4.383	5.000	4.488	1.114	0.163
C34	47	0	3.234	3.000	3.256	1.507	0.220
C35	46	1	1.1087	1.0000	1.0714	0.3147	0.0464
C36	46	1	1.1522	1.0000	1.1190	0.3632	0.0535
C37	46	1	1.4783	1.0000	1.4286	0.6232	0.0919
C38	46	1	3.500	4.000	3.548	1.560	0.230
C39	46	1	4.587	5.000	4.714	0.933	0.138
C40	45	2	4.556	5.000	4.683	0.943	0.141
C41	46	1	4.348	5.000	4.452	1.159	0.171
C42	46	1	1.826	2.000	1.738	0.973	0.143
C43	46	1	3.804	4.000	3.881	1.310	0.193
C44	46	1	3.717	4.000	3.762	1.328	0.196

C. GRADUATING ENLISTED SAMPLE

Descriptive Statistics

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C1	46	0	1.2826	1.0000	1.2619	0.4552	0.0671
C2	46	0	2.065	2.000	2.024	0.904	0.133
C3	46	0	1.1739	1.0000	1.1429	0.3832	0.0565
C4	46	0	2.609	2.000	2.571	0.714	0.105
C5	43	3	1.860	1.000	1.744	1.246	0.190
C6	43	3	0.930	0.000	0.769	1.470	0.224
C7	43	3	1.953	2.000	1.897	0.872	0.133
C8	43	3	0.791	0.000	0.436	2.122	0.324
C9	46	0	2.674	2.500	2.595	1.634	0.241
C10	45	1	3.622	4.000	3.634	1.051	0.157
C11	45	1	1.911	2.000	1.854	0.996	0.148
C12	42	4	1.4286	1.0000	1.4211	0.5009	0.0773
C13	46	0	1.6087	2.0000	1.6190	0.4934	0.0728
C14	46	0	1.565	0.000	1.357	2.354	0.347
C15	46	0	1.500	1.000	1.405	0.782	0.115
C16	46	0	1.457	1.000	1.357	0.751	0.111
C17	46	0	4.522	5.000	4.667	0.937	0.138
C18	46	0	4.261	5.000	4.381	1.255	0.185
C19	46	0	3.543	4.000	3.595	1.328	0.196
C20	46	0	4.587	5.000	4.690	0.805	0.119
C21	46	0	1.565	1.000	1.452	0.886	0.131
C22	46	0	4.370	5.000	4.500	1.040	0.153
C23	45	1	4.400	5.000	4.537	1.136	0.169
C24	46	0	4.087	4.000	4.167	1.112	0.164
C25	46	0	1.609	1.000	1.500	0.977	0.144
C26	46	0	3.196	3.000	3.214	1.327	0.196
C27	46	0	3.261	3.500	3.286	1.421	0.210
C28	45	1	1.444	1.000	1.341	0.785	0.117
C29	46	0	2.478	2.000	2.429	1.312	0.193
C30	46	0	1.587	1.000	1.500	0.858	0.127
C31	46	0	4.000	4.000	4.071	1.155	0.170
C32	45	1	4.400	5.000	4.512	0.915	0.136
C33	45	1	4.378	5.000	4.463	0.860	0.128
C34	46	0	2.913	2.000	2.905	1.396	0.206
C35	46	0	1.1957	1.0000	1.1190	0.4998	0.0737
C36	46	0	1.2174	1.0000	1.1667	0.4673	0.0689
C37	46	0	1.630	1.000	1.571	0.771	0.114
C38	46	0	3.826	4.000	3.905	1.270	0.187
C39	46	0	4.304	5.000	4.429	1.030	0.152
C40	46	0	4.065	4.500	4.143	1.162	0.171
C41	46	0	4.196	5.000	4.286	1.067	0.157
C42	46	0	1.935	2.000	1.881	0.827	0.122
C43	46	0	4.196	4.000	4.262	0.859	0.127
C44	46	0	4.174	4.000	4.238	0.926	0.137

D. BEGINNING OFFICERS SAMPLE

Descriptive Statistics

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C1	16	0	1.187	1.000	1.143	0.403	0.101
C2	16	0	4.500	4.500	4.500	1.033	0.258
C3	16	0	5.437	5.000	5.429	0.512	0.128
C4	16	0	4.312	4.000	4.286	0.479	0.120
C5	16	0	2.687	2.000	2.643	1.302	0.326
C6	16	0	3.750	3.500	3.643	3.337	0.834
C7	13	3	1.692	1.000	1.545	1.316	0.365
C8	13	3	0.846	0.000	0.455	1.819	0.504
C9	15	1	3.867	4.000	3.923	1.807	0.467
C10	16	0	3.375	4.000	3.429	1.025	0.256
C11	9	7	1.889	1.000	1.889	1.364	0.455
C12	14	2	1.8571	2.0000	1.9167	0.3631	0.0971
C13	16	0	1.312	1.000	1.286	0.479	0.120
C14	16	0	3.500	4.500	3.357	3.204	0.801
C15	16	0	1.500	1.000	1.429	0.730	0.183
C16	16	0	1.562	1.000	1.500	0.727	0.182
C17	16	0	4.687	5.000	4.857	0.793	0.198
C18	15	1	4.733	5.000	4.846	0.594	0.153
C19	16	0	4.437	5.000	4.643	1.094	0.273
C20	16	0	4.750	5.000	4.857	0.577	0.144
C21	16	0	1.875	2.000	1.714	1.088	0.272
C22	15	1	4.200	5.000	4.385	1.373	0.355
C23	16	0	4.312	5.000	4.500	1.250	0.312
C24	16	0	3.250	3.500	3.286	1.528	0.382
C25	16	0	1.750	2.000	1.643	0.775	0.194
C26	16	0	2.437	2.000	2.357	1.209	0.302
C27	15	1	3.533	4.000	3.615	1.457	0.376
C28	16	0	1.375	1.000	1.357	0.500	0.125
C29	16	0	1.625	1.000	1.500	0.885	0.221
C30	16	0	1.312	1.000	1.286	0.479	0.120
C31	16	0	4.000	4.000	4.071	0.966	0.242
C32	16	0	4.687	5.000	4.786	0.602	0.151
C33	16	0	4.375	5.000	4.500	0.885	0.221
C34	16	0	3.062	3.500	3.071	1.843	0.461
C35	16	0	1.187	1.000	1.143	0.403	0.101
C36	16	0	1.562	1.000	1.429	0.814	0.203
C37	16	0	1.875	2.000	1.857	0.619	0.155
C38	16	0	3.875	4.500	4.000	1.500	0.375
C39	16	0	4.437	5.000	4.500	0.727	0.182
C40	16	0	4.437	5.000	4.643	1.209	0.302
C41	16	0	4.375	5.000	4.571	1.204	0.301
C42	16	0	2.437	2.000	2.429	1.153	0.288
C43	16	0	3.875	4.000	3.929	0.885	0.221
C44	16	0	3.312	4.000	3.357	1.250	0.312

E. GRADUATING OFFICERS SAMPLE

Descriptive Statistics

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C1	49	1	1.1837	1.0000	1.1556	0.3912	0.0559
C2	50	0	4.500	4.000	4.455	1.298	0.184
C3	50	0	5.340	5.000	5.409	1.042	0.147
C4	50	0	3.960	4.000	4.000	0.727	0.103
C5	49	1	2.245	2.000	2.178	1.164	0.166
C6	46	4	3.022	1.500	2.881	3.531	0.521
C7	43	7	2.372	3.000	2.359	1.196	0.182
C8	45	5	0.622	0.000	0.293	1.898	0.283
C9	50	0	3.420	4.000	3.409	1.960	0.277
C10	47	3	3.426	4.000	3.442	0.972	0.142
C11	40	10	1.675	1.000	1.583	1.047	0.166
C12	46	4	1.6957	2.0000	1.7143	0.4652	0.0686
C13	50	0	1.4800	1.0000	1.4773	0.5047	0.0714
C14	50	0	1.920	1.500	1.659	2.337	0.331
C15	50	0	1.5800	1.0000	1.5000	0.7025	0.0993
C16	50	0	1.4200	1.0000	1.3864	0.5379	0.0761
C17	50	0	4.7000	5.0000	4.7955	0.6145	0.0869
C18	50	0	4.380	5.000	4.568	1.141	0.161
C19	50	0	3.640	4.000	3.727	1.321	0.187
C20	50	0	4.480	5.000	4.568	0.762	0.108
C21	50	0	1.940	2.000	1.864	0.890	0.126
C22	50	0	4.160	5.000	4.295	1.235	0.175
C23	50	0	4.040	5.000	4.182	1.293	0.183
C24	50	0	2.760	2.000	2.727	1.188	0.168
C25	50	0	1.700	2.000	1.591	0.763	0.108
C26	49	1	2.102	2.000	2.022	1.123	0.160
C27	50	0	3.600	4.000	3.682	1.400	0.198
C28	50	0	1.5400	1.0000	1.4773	0.7060	0.0998
C29	50	0	1.980	2.000	1.909	0.869	0.123
C30	48	2	1.646	1.000	1.568	0.911	0.131
C31	50	0	3.780	4.000	3.886	1.266	0.179
C32	50	0	4.3800	4.0000	4.4545	0.6966	0.0985
C33	50	0	4.140	4.000	4.227	0.904	0.128
C34	50	0	2.620	2.000	2.568	1.497	0.212
C35	49	1	1.2653	1.0000	1.2000	0.5692	0.0813
C36	49	1	1.5102	1.0000	1.4444	0.6494	0.0928
C37	48	2	1.937	2.000	1.909	0.755	0.109
C38	47	3	4.000	4.000	4.070	1.216	0.177
C39	49	1	4.306	5.000	4.422	1.103	0.158
C40	49	1	4.122	5.000	4.222	1.269	0.181
C41	49	1	4.306	5.000	4.400	1.084	0.155
C42	49	1	2.245	2.000	2.178	0.925	0.132
C43	49	1	3.796	4.000	3.844	1.136	0.162
C44	49	1	3.469	4.000	3.511	1.226	0.175

APPENDIX D **CORRELATION MATRICES**

A. ACTIVE DUTY SAMPLE

Correlation Matrix								
	C1	C2	C3	C4	C5	C6	C7	C8
C2	0.135							
C3	0.312	0.635						
C4	0.003	0.500	0.567					
C5	0.071	0.126	0.026	0.272				
C6	-0.173	0.066	0.077	0.339	0.409			
C7	0.035	0.099	-0.143	-0.004	0.269	-0.047		
C8	-0.146	0.106	-0.016	0.146	0.166	0.191	0.394	
C9	0.083	0.275	0.267	0.291	0.271	0.211	0.193	0.285
C10	0.408	0.182	0.113	0.058	0.228	-0.102	0.073	-0.016
C11	-0.063	-0.008	-0.281	-0.250	0.365	-0.135	0.467	0.117
C12	0.068	0.136	0.138	0.168	-0.084	-0.112	-0.255	-0.129
C13	0.042	-0.295	-0.261	-0.404	-0.288	-0.111	0.014	-0.088
C14	-0.065	0.236	0.172	0.345	0.155	0.167	0.067	0.251
C15	-0.015	-0.057	-0.065	-0.059	-0.079	-0.103	-0.035	-0.013
C16	0.090	0.012	-0.090	0.039	-0.089	-0.099	0.088	0.146
C17	-0.159	-0.101	-0.108	-0.065	0.019	0.090	0.076	0.123
C18	-0.074	-0.080	-0.169	-0.198	-0.049	-0.042	-0.057	-0.095
C19	-0.119	-0.066	-0.154	-0.019	0.031	0.071	0.137	0.025
C20	-0.047	-0.026	0.018	0.059	0.072	0.096	0.096	0.126
C21	0.044	0.161	0.116	0.208	0.143	0.169	0.089	0.077
C22	-0.169	-0.194	-0.187	-0.179	-0.013	-0.044	0.302	0.213
C23	-0.145	-0.135	-0.014	0.043	-0.060	0.068	0.040	0.270
C24	0.047	-0.081	-0.166	0.015	0.081	0.134	-0.077	0.041
C25	0.100	0.217	0.183	0.261	-0.040	0.147	-0.205	0.023
C26	0.076	-0.010	-0.123	-0.003	0.287	0.096	0.136	0.003
C27	0.131	0.024	-0.018	0.104	0.121	0.106	0.110	0.133
C28	0.059	0.098	0.049	0.082	-0.088	-0.029	0.003	0.028
C29	0.125	-0.173	-0.202	-0.071	-0.084	0.102	-0.063	0.004
C30	0.086	-0.175	-0.247	-0.149	-0.103	-0.083	-0.159	-0.024
C31	0.071	-0.184	-0.053	-0.008	-0.029	0.051	-0.211	-0.207
C32	-0.072	0.078	0.208	0.137	0.147	0.176	0.082	0.163
C33	-0.068	-0.083	0.012	-0.004	-0.022	0.044	-0.036	-0.180
C34	0.068	0.156	0.097	0.064	0.026	0.180	0.074	0.068
C35	0.166	0.043	0.034	0.126	-0.130	0.074	-0.078	-0.053
C36	0.014	0.142	0.037	0.185	-0.016	0.042	-0.131	-0.084
C37	0.017	0.037	0.031	0.111	-0.206	-0.029	-0.272	-0.173
C38	0.104	-0.007	0.011	0.116	0.248	0.084	0.174	0.013
C39	-0.123	-0.118	-0.067	-0.002	0.132	0.211	0.036	0.138
C40	-0.156	-0.144	-0.101	0.043	0.139	0.203	-0.053	0.076
C41	-0.141	-0.052	0.026	0.058	0.082	0.165	0.067	0.149
C42	-0.038	0.060	0.004	-0.045	-0.128	0.008	-0.248	-0.042
C43	-0.048	-0.136	-0.180	0.068	0.074	0.199	0.047	0.060
C44	0.047	-0.022	-0.209	0.015	0.175	0.158	0.041	0.135
	C9	C10	C11	C12	C13	C14	C15	C16
C10	0.305							
C11	-0.100	0.060						
C12	-0.268	-0.053	-0.131					

C13	-0.285	0.037	0.161	0.021				
C14	0.278	-0.003	-0.102	0.002	-0.698			
C15	0.028	0.062	-0.033	0.064	0.021	0.037		
C16	0.016	0.084	0.059	-0.087	0.033	0.116	0.713	
C17	0.025	0.027	0.108	-0.109	0.131	-0.201	-0.243	-0.340
C18	-0.240	0.004	0.136	-0.120	0.180	-0.362	-0.404	-0.266
C19	-0.006	-0.115	-0.054	-0.068	0.050	-0.004	-0.312	-0.287
C20	0.031	-0.126	0.016	-0.017	-0.031	0.001	-0.461	-0.347
C21	0.044	0.018	0.084	-0.000	-0.070	0.276	0.413	0.476
C22	0.070	0.024	0.194	-0.310	0.059	-0.068	-0.273	-0.209
C23	0.116	-0.078	0.046	-0.067	-0.019	0.019	-0.099	0.025
C24	-0.034	0.123	-0.172	0.082	0.024	0.078	-0.088	-0.070
C25	-0.134	0.073	-0.211	0.251	0.100	-0.116	0.199	0.221
C26	0.049	-0.000	0.194	-0.066	-0.156	0.027	0.005	-0.024
C27	0.102	0.046	-0.023	-0.011	-0.135	0.167	-0.091	-0.015
C28	-0.205	0.042	-0.042	0.236	0.184	-0.185	0.447	0.303
C29	-0.212	-0.129	-0.065	0.171	0.086	-0.025	0.155	0.159
C30	-0.176	-0.056	-0.022	0.148	0.222	-0.160	0.316	0.196
C31	-0.162	-0.088	-0.221	0.019	0.048	-0.271	-0.005	-0.117
C32	0.219	0.199	0.024	-0.046	-0.183	0.164	-0.075	-0.098
C33	-0.090	0.086	-0.091	0.007	-0.133	0.195	-0.105	-0.091
C34	0.040	0.145	-0.033	-0.115	-0.024	0.051	-0.106	-0.073
C35	-0.095	0.066	-0.124	0.180	0.193	-0.176	0.203	0.271
C36	-0.046	0.146	0.036	0.198	0.083	0.008	0.349	0.397
C37	-0.161	-0.080	-0.192	0.178	0.105	-0.043	0.294	0.337
C38	0.186	0.035	0.011	-0.083	-0.191	-0.036	-0.238	-0.220
C39	0.130	0.012	-0.124	-0.240	-0.136	0.152	-0.064	-0.034
C40	0.309	-0.028	-0.061	-0.391	-0.134	0.114	-0.278	-0.237
C41	0.319	0.000	-0.100	-0.335	-0.195	0.192	-0.184	-0.101
C42	-0.164	-0.025	0.034	0.186	0.253	-0.182	0.287	0.255
C43	0.043	-0.002	-0.042	-0.189	-0.090	0.124	-0.166	-0.040
C44	0.130	0.138	-0.065	-0.271	-0.143	0.134	-0.090	0.051

	C17	C18	C19	C20	C21	C22	C23	C24
C18	0.184							
C19	0.327	0.213						
C20	0.544	0.257	0.449					
C21	-0.291	-0.130	-0.098	-0.385				
C22	0.423	0.320	0.298	0.335	-0.252			
C23	0.272	-0.020	0.305	0.208	-0.126	0.444		
C24	0.056	0.088	0.312	0.073	0.094	0.127	0.342	
C25	-0.061	-0.110	-0.175	-0.279	0.244	-0.295	-0.205	-0.022
C26	-0.112	0.180	0.196	0.049	0.115	0.158	0.009	0.179
C27	0.157	0.076	0.142	0.335	0.130	0.110	-0.006	0.352
C28	-0.190	-0.118	-0.222	-0.504	0.281	-0.260	-0.201	-0.128
C29	0.021	-0.044	-0.074	-0.021	0.145	-0.055	-0.052	0.132
C30	-0.212	-0.185	-0.223	-0.364	0.242	-0.194	-0.262	-0.106
C31	0.016	0.054	0.041	-0.004	-0.087	0.030	0.027	0.190
C32	0.289	-0.102	0.214	0.295	-0.086	0.280	0.500	0.301
C33	0.309	0.022	0.302	0.339	-0.055	0.272	0.429	0.364

	C17	C18	C19	C20	C21	C22	C23	C24
C34	0.046	0.232	0.266	0.118	0.018	0.090	-0.033	0.135
C35	-0.328	-0.173	-0.170	-0.225	0.191	-0.399	-0.267	-0.165
C36	-0.374	-0.288	-0.384	-0.412	0.324	-0.546	-0.231	-0.048
C37	-0.360	-0.255	-0.352	-0.410	0.309	-0.550	-0.206	-0.179
C38	0.165	0.129	0.254	0.290	-0.232	0.245	0.243	0.202
C39	0.162	0.119	0.088	0.181	-0.145	0.315	0.269	0.212
C40	0.168	0.112	0.307	0.267	-0.238	0.304	0.416	0.183
C41	0.145	0.222	0.189	0.285	-0.142	0.397	0.455	0.151
C42	-0.298	-0.108	-0.186	-0.312	0.159	-0.441	-0.188	-0.199

C43	0.163	0.044	0.289	0.118	0.014	0.284	0.235	0.418
C44	0.111	0.005	0.199	0.119	-0.046	0.179	0.265	0.508

	C25	C26	C27	C28	C29	C30	C31	C32
C26	-0.178							
C27	-0.024	0.167						
C28	0.501	-0.150	-0.069					
C29	0.298	0.041	0.142	0.211				
C30	0.353	0.051	0.025	0.425	0.248			
C31	0.082	0.067	0.083	0.149	0.394	0.237		
C32	-0.142	0.008	0.281	-0.331	-0.210	-0.321	-0.083	
C33	-0.184	0.065	0.221	-0.254	-0.064	-0.288	0.068	0.518
C34	-0.017	0.230	0.104	0.119	0.127	0.021	0.201	0.037
C35	0.384	0.003	0.040	0.456	0.289	0.480	0.121	-0.334
C36	0.445	-0.062	-0.163	0.367	0.143	0.266	-0.057	-0.222
C37	0.447	-0.138	-0.280	0.390	0.187	0.368	0.061	-0.425
C38	-0.094	0.228	0.300	-0.102	-0.036	-0.269	0.197	0.328
C39	-0.162	0.053	0.103	-0.224	-0.261	-0.141	0.007	0.531
C40	-0.291	0.123	0.220	-0.365	-0.219	-0.311	0.023	0.306
C41	-0.293	0.107	0.055	-0.364	-0.287	-0.357	-0.177	0.427
C42	0.304	-0.175	-0.381	0.326	0.013	0.232	-0.033	-0.301
C43	-0.062	0.145	0.200	-0.292	-0.158	-0.062	0.009	0.252
C44	-0.091	0.096	0.195	-0.210	-0.043	-0.057	0.035	0.216

	C33	C34	C35	C36	C37	C38	C39	C40
C34	0.140							
C35	-0.278	0.157						
C36	-0.255	-0.063	0.488					
C37	-0.287	-0.072	0.488	0.706				
C38	0.131	0.063	-0.153	-0.207	-0.326			
C39	0.330	0.102	-0.448	-0.268	-0.253	0.312		
C40	0.310	0.081	-0.352	-0.280	-0.270	0.383	0.437	
C41	0.310	0.038	-0.475	-0.251	-0.310	0.259	0.601	0.648
C42	-0.309	-0.089	0.295	0.455	0.428	-0.407	-0.291	-0.146
C43	0.236	0.095	-0.177	-0.146	-0.218	0.134	0.423	0.340
C44	0.184	0.097	-0.018	-0.006	-0.261	0.249	0.207	0.231

	C41	C42	C43
C42	-0.209		
C43	0.363	-0.154	
C44	0.282	-0.057	0.553

B. BEGINNING ENLISTED SAMPLE

Correlation Matrix

	C1	C2	C3	C4	C5	C6	C7	C8
C2	-0.025							
C3	0.152	0.316						
C4	-0.049	0.605	0.119					
C5	0.049	0.074	-0.079	0.384				
C6	-0.032	0.152	-0.182	0.158	0.474			
C7	-0.100	0.294	0.491	-0.008	-0.041	0.006		
C8	0.287	0.472	0.655	0.039	-0.045	0.083	0.646	
C9	-0.127	0.335	0.306	0.478	0.486	0.120	0.313	0.152
C10	0.281	0.155	0.073	0.168	0.274	0.375	0.034	0.264
C11	0.029	0.299	0.456	-0.055	-0.209	-0.048	0.542	0.499
C12	0.020	0.182	0.066	0.044	-0.081	0.127	-0.179	0.165
C13	0.143	-0.292	-0.103	-0.202	-0.418	-0.153	-0.073	-0.053
C14	-0.273	0.160	0.062	0.262	0.510	0.127	-0.006	-0.132
C15	0.103	-0.190	-0.184	-0.230	-0.037	0.308	-0.083	-0.012
C16	0.095	-0.234	0.070	-0.169	-0.058	0.092	-0.079	0.147
C17	0.135	0.200	-0.057	0.101	0.051	-0.008	-0.093	0.008
C18	-0.079	0.080	-0.051	0.173	0.231	0.241	0.011	-0.142
C19	0.046	0.219	0.162	0.154	0.070	0.008	0.055	0.184
C20	0.213	0.145	0.105	-0.074	-0.071	-0.113	-0.047	-0.014
C21	-0.036	-0.008	-0.050	-0.028	-0.040	0.295	-0.110	0.008
C22	0.203	-0.048	0.143	0.022	0.000	0.015	0.077	0.073
C23	0.131	-0.049	0.118	-0.151	0.050	0.037	-0.002	0.018
C24	0.046	0.145	-0.022	0.007	0.085	0.130	-0.204	-0.014
C25	0.277	-0.186	-0.188	-0.157	0.166	0.020	-0.119	-0.080
C26	0.181	-0.078	-0.236	-0.248	-0.066	-0.017	-0.085	-0.164
C27	-0.331	-0.023	0.267	-0.111	-0.015	0.006	0.194	0.167
C28	-0.206	-0.218	-0.152	-0.161	-0.093	0.024	-0.065	-0.110
C29	0.095	-0.379	-0.227	-0.308	0.123	0.054	-0.022	-0.131
C30	0.329	-0.212	-0.129	-0.158	0.027	0.025	-0.113	-0.090
C31	0.205	0.050	0.113	-0.115	-0.209	-0.073	-0.006	0.203
C32	0.028	-0.078	-0.107	0.213	0.203	-0.114	-0.286	-0.137
C33	0.217	0.057	0.102	-0.100	-0.020	0.019	-0.022	0.091
C34	0.286	-0.117	-0.099	-0.026	0.074	0.139	0.130	0.075
C35	-0.064	-0.150	0.140	-0.171	0.000	-0.055	0.099	0.304
C36	-0.131	-0.075	0.084	-0.207	-0.124	-0.155	0.103	0.212
C37	-0.095	-0.154	0.011	-0.258	-0.108	-0.087	0.090	0.056
C38	0.203	0.118	0.300	0.256	0.231	0.004	-0.120	-0.024
C39	0.281	0.056	0.138	0.056	0.096	0.096	0.010	0.096
C40	0.126	-0.132	0.149	-0.009	0.182	0.026	-0.073	-0.022
C41	-0.064	-0.177	0.176	-0.116	0.155	0.043	0.159	-0.010
C42	0.063	-0.133	0.056	-0.264	-0.323	-0.170	-0.168	0.233
C43	-0.203	0.229	0.285	0.248	0.172	0.022	0.256	0.130
C44	-0.086	0.067	0.243	0.077	0.220	0.252	0.234	0.094

	C9	C10	C11	C12	C13	C14	C15	C16
C10	0.097							
C11	0.199	0.068						
C12	-0.149	-0.051	-0.264					
C13	-0.505	-0.174	0.039	0.181				
C14	0.508	-0.010	-0.126	-0.145	-0.829			
C15	-0.377	-0.051	0.045	0.046	0.209	-0.260		
C16	-0.291	-0.089	-0.018	0.097	0.070	-0.091	0.476	
C17	0.225	0.248	-0.072	0.133	-0.076	0.058	-0.506	-0.286
C18	0.283	0.038	0.030	-0.011	-0.163	0.177	-0.008	-0.024
C19	0.339	-0.029	0.233	0.035	-0.061	-0.007	-0.088	0.101
C20	0.119	0.108	0.025	0.039	-0.102	0.150	-0.253	-0.192
C21	-0.233	0.095	0.029	-0.011	0.197	-0.257	0.588	0.290
C22	0.033	0.185	0.060	0.214	-0.007	-0.018	-0.076	-0.159
C23	0.075	0.107	-0.018	-0.049	-0.226	0.230	-0.210	-0.089
C24	0.048	0.070	0.113	0.204	-0.051	0.074	0.051	0.041
C25	-0.019	0.074	-0.100	-0.187	-0.010	-0.153	0.209	0.132
C26	-0.099	0.052	0.182	-0.075	-0.117	-0.053	0.159	0.201
C27	0.063	-0.091	0.209	-0.181	-0.124	0.299	0.041	-0.046
C28	-0.252	-0.131	-0.075	-0.016	0.166	-0.079	0.530	0.336
C29	0.023	0.173	0.056	-0.273	-0.178	0.120	0.064	-0.053
C30	-0.208	0.029	-0.129	0.093	0.192	-0.125	0.186	0.166
C31	-0.081	0.107	0.187	-0.046	0.113	-0.139	0.093	0.029
C32	0.141	0.235	-0.180	-0.279	0.067	0.045	-0.357	-0.148
C33	0.227	0.106	0.171	0.042	-0.117	0.048	-0.049	-0.034
C34	-0.011	0.212	-0.099	-0.028	0.233	-0.168	0.215	0.069
C35	-0.195	-0.119	0.049	0.073	0.243	-0.199	0.365	0.288
C36	-0.244	-0.245	0.269	0.020	0.295	-0.242	0.242	0.161
C37	-0.138	-0.127	0.120	0.067	0.013	-0.096	0.343	0.346
C38	0.179	-0.002	-0.074	-0.014	-0.165	0.162	0.012	0.128
C39	-0.016	0.100	-0.201	0.103	-0.010	0.062	-0.038	-0.100
C40	0.089	0.191	-0.334	0.141	-0.084	0.101	-0.175	-0.137
C41	0.226	0.009	0.059	-0.072	0.090	0.045	0.034	-0.050
C42	-0.476	0.029	-0.020	0.195	0.115	-0.212	0.261	0.367
C43	0.484	0.245	0.092	0.063	-0.177	0.217	-0.381	-0.194
C44	0.218	0.228	0.159	0.137	0.062	0.116	-0.115	0.072
	C17	C18	C19	C20	C21	C22	C23	C24
C18	0.171							
C19	0.261	0.094						
C20	0.507	0.312	0.172					
C21	-0.292	0.058	-0.160	-0.161				
C22	0.270	0.202	0.123	0.218	-0.205			
C23	0.409	0.420	0.101	0.571	-0.241	0.506		
C24	0.220	0.336	0.101	0.424	-0.016	0.095	0.418	
C25	-0.192	-0.061	-0.065	-0.135	0.248	-0.178	-0.248	-0.200
C26	0.195	0.076	0.117	0.138	0.100	-0.121	0.082	-0.085
C27	-0.020	-0.018	-0.085	0.051	0.182	0.042	0.141	-0.042
C28	-0.540	-0.107	-0.076	-0.415	0.345	-0.431	-0.320	-0.158
C29	-0.075	0.058	0.022	0.032	-0.063	0.003	0.130	-0.082
C30	-0.079	-0.404	0.099	-0.111	0.074	-0.044	-0.017	0.070
C31	0.325	0.104	0.254	0.127	0.025	0.281	0.240	0.205
C32	0.445	-0.013	0.307	0.192	-0.214	0.124	0.185	0.042
C33	0.273	0.043	0.277	0.370	-0.317	0.127	0.156	0.316
C34	0.129	0.086	-0.081	0.147	0.109	0.047	0.206	0.126
C35	-0.344	-0.310	-0.007	-0.327	0.407	-0.343	-0.413	-0.422
C36	-0.249	-0.225	0.010	-0.241	0.277	-0.240	-0.310	-0.374
C37	-0.259	-0.233	-0.005	-0.296	0.274	-0.242	-0.370	-0.401
C38	0.065	-0.029	0.155	-0.068	0.000	0.205	0.016	-0.059
C39	0.256	0.230	-0.006	0.222	-0.311	0.367	0.381	0.182
C40	0.352	0.268	-0.066	0.362	-0.080	0.502	0.607	0.173

C41	0.078	0.149	0.250	0.228	-0.155	0.369	0.374	0.096
C42	-0.281	-0.301	-0.202	-0.281	0.273	-0.127	-0.121	-0.281
C43	0.405	0.330	0.440	0.217	-0.296	0.280	0.337	-0.060
C44	0.373	0.198	0.374	0.244	-0.103	0.335	0.344	0.387

	C25	C26	C27	C28	C29	C30	C31	C32
C26	0.336							
C27	-0.315	-0.049						
C28	0.205	-0.029	0.010					
C29	0.179	0.023	0.132	0.242				
C30	0.138	-0.010	-0.276	0.350	0.252			
C31	-0.097	0.258	0.194	-0.126	0.061	0.213		
C32	-0.078	0.008	-0.041	-0.174	0.025	0.015	0.037	
C33	-0.165	0.035	-0.047	-0.214	0.084	-0.123	-0.116	0.216
C34	0.208	0.173	-0.120	0.134	0.036	0.252	0.262	0.048
C35	0.315	0.079	0.180	0.413	0.096	0.022	-0.129	-0.045
C36	0.201	-0.068	0.084	0.297	0.049	-0.032	-0.194	0.044
C37	0.241	0.212	-0.002	0.352	0.271	0.145	-0.050	-0.258
C38	-0.211	0.185	0.143	-0.252	-0.339	-0.104	0.111	0.079
C39	-0.056	0.044	0.013	-0.271	-0.157	-0.011	0.343	0.101
C40	-0.125	-0.030	0.076	-0.404	-0.039	-0.055	0.176	0.112
C41	-0.134	-0.157	0.005	-0.033	-0.015	0.103	0.150	0.131
C42	0.249	0.017	-0.010	0.424	0.093	0.188	0.029	-0.124
C43	-0.329	-0.006	0.129	-0.207	-0.004	-0.307	0.129	0.307
C44	-0.161	-0.044	0.102	-0.240	-0.108	0.153	0.416	0.224

	C33	C34	C35	C36	C37	C38	C39	C40
C34	-0.042							
C35	-0.242	0.032						
C36	-0.141	-0.114	0.824					
C37	-0.195	-0.159	0.635	0.653				
C38	0.159	-0.151	-0.113	-0.255	-0.114			
C39	0.107	0.330	-0.298	-0.401	-0.417	0.191		
C40	0.024	0.199	-0.211	-0.322	-0.201	0.268	0.552	
C41	0.275	0.264	-0.106	-0.076	-0.143	0.172	0.239	0.468
C42	-0.164	-0.074	0.499	0.454	0.433	-0.088	-0.154	-0.052
C43	0.126	0.082	-0.163	-0.216	-0.182	0.245	0.242	0.341
C44	0.057	0.292	-0.138	-0.185	-0.155	0.113	0.406	0.405
	C41	C42	C43					
C42	-0.241							
C43	0.441	-0.254						
C44	0.412	-0.211	0.427					

C. GRADUATING ENLISTED SAMPLE

Correlation Matrix

	C1	C2	C3	C4	C5	C6	C7	C8
C2	-0.046							
C3	-0.161	0.480						
C4	0.006	0.591	0.173					
C5	-0.393	0.437	0.054	0.529				
C6	-0.256	0.131	0.023	0.426	0.632			
C7	-0.154	0.184	0.442	0.085	0.110	-0.020		
C8	-0.069	0.341	0.447	0.289	0.250	0.120	0.638	
C9	-0.082	0.361	0.306	0.364	0.585	0.444	0.287	0.375
C10	0.185	-0.173	-0.080	0.120	0.087	0.069	0.010	0.225
C11	0.207	-0.118	0.042	-0.048	0.046	0.028	0.136	0.294
C12	-0.188	-0.075	-0.129	-0.062	-0.154	0.023	-0.209	-0.089
C13	0.404	0.058	-0.102	0.060	-0.134	0.024	-0.210	-0.287
C14	-0.318	0.045	0.234	0.055	0.263	0.108	0.277	0.510

C15	-0.156	-0.110	0.000	-0.080	-0.118	-0.233	0.205	0.020
C16	-0.191	-0.012	0.027	-0.074	-0.055	-0.287	0.354	0.105
C17	0.011	0.064	-0.073	0.046	0.098	0.160	-0.086	0.016
C18	0.024	-0.035	-0.050	0.067	0.082	0.147	0.052	-0.017
C19	0.071	0.303	-0.102	0.299	0.103	0.238	-0.121	-0.050
C20	0.022	-0.054	-0.122	-0.055	0.008	0.151	-0.162	-0.040
C21	-0.129	0.119	0.162	0.041	-0.011	-0.219	0.244	0.025
C22	-0.085	0.021	-0.053	-0.010	0.161	0.289	-0.059	0.044
C23	-0.183	0.076	-0.114	0.078	0.147	0.123	-0.064	0.038
C24	0.170	-0.006	0.120	0.072	-0.080	-0.155	0.130	0.082
C25	-0.146	0.130	0.067	-0.065	0.107	-0.245	0.337	0.257
C26	0.054	-0.085	-0.068	-0.269	-0.179	-0.231	0.110	-0.011
C27	-0.116	0.159	-0.004	0.190	0.193	0.321	-0.187	0.147
C28	-0.112	-0.082	-0.009	0.080	0.020	-0.256	0.403	0.244
C29	-0.008	-0.083	0.008	-0.223	-0.022	-0.303	0.375	0.126
C30	-0.036	-0.136	-0.047	-0.197	-0.202	-0.317	0.133	0.034
C31	0.211	-0.085	-0.050	-0.108	-0.014	0.001	0.153	0.056
C32	0.314	0.049	-0.141	0.028	-0.002	0.137	-0.269	-0.053
C33	0.146	-0.004	-0.275	-0.058	0.084	0.088	0.117	0.082
C34	-0.030	-0.189	0.195	-0.258	-0.053	-0.086	0.272	0.037
C35	-0.248	-0.078	0.050	-0.092	-0.102	-0.232	0.235	0.063
C36	-0.086	-0.139	-0.092	-0.139	-0.263	-0.280	0.026	-0.091
C37	-0.012	0.035	0.072	-0.026	-0.173	-0.249	-0.027	-0.035
C38	0.164	0.165	-0.028	0.046	0.131	-0.032	-0.157	-0.128
C39	-0.235	-0.093	-0.024	-0.046	0.157	-0.018	0.284	0.118
C40	-0.330	-0.004	0.024	-0.022	0.330	0.113	0.217	0.135
C41	-0.162	0.079	0.024	-0.043	0.181	-0.065	0.248	-0.031
C42	-0.068	0.006	0.037	-0.119	-0.210	-0.138	-0.262	-0.178
C43	0.026	0.040	0.097	0.200	0.285	0.084	0.317	0.210
C44	-0.119	0.092	0.163	0.240	0.180	-0.079	0.382	0.213

	C9	C10	C11	C12	C13	C14	C15	C16
C10	0.237							
C11	0.124	0.176						
C12	-0.365	-0.134	-0.145					
C13	-0.217	0.114	0.018	-0.014				
C14	0.390	0.141	0.168	0.019	-0.839			
C15	-0.113	-0.173	0.202	0.035	-0.058	-0.012		
C16	-0.039	-0.288	-0.007	0.063	-0.107	0.039	0.738	
C17	-0.003	0.062	0.049	-0.029	0.067	-0.006	-0.577	-0.472
C18	0.162	0.037	-0.053	-0.372	0.061	-0.059	-0.294	-0.136
C19	-0.009	-0.096	-0.051	0.341	0.128	-0.179	-0.182	-0.210
C20	-0.189	0.155	0.037	0.184	-0.024	0.079	-0.547	-0.526
C21	0.007	-0.159	0.057	-0.015	0.060	-0.082	0.706	0.639
C22	-0.058	0.145	0.096	0.136	0.028	0.103	-0.533	-0.420
C23	-0.170	0.176	-0.057	0.264	-0.008	0.122	-0.402	-0.354
C24	-0.045	0.177	0.271	-0.173	0.104	0.100	-0.026	-0.022
C25	0.030	-0.229	-0.014	-0.097	-0.186	0.098	0.495	0.612
C26	0.010	-0.042	0.063	0.159	-0.220	0.127	0.054	-0.002
C27	0.334	0.017	0.033	0.010	-0.041	0.121	0.080	-0.010
C28	0.110	0.065	0.141	-0.152	-0.144	0.128	0.691	0.656
C29	-0.019	-0.044	0.088	-0.071	-0.013	-0.032	0.217	0.450
C30	-0.241	0.055	-0.042	-0.087	-0.075	0.063	0.414	0.299
C31	-0.024	0.093	0.024	-0.313	0.234	-0.172	-0.320	-0.256
C32	0.003	0.019	-0.072	0.010	0.041	-0.036	-0.480	-0.592
C33	0.117	0.106	0.202	-0.056	-0.011	0.031	-0.145	-0.207
C34	0.056	-0.060	0.012	-0.297	-0.051	0.103	0.061	0.229
C35	-0.083	0.017	0.081	0.013	-0.223	0.131	0.654	0.526
C36	-0.283	0.127	0.043	0.072	-0.008	-0.033	0.183	0.091
C37	-0.292	0.016	0.073	0.055	0.196	-0.238	0.240	0.068
C38	0.015	-0.024	-0.068	-0.147	0.066	0.086	-0.358	-0.381
C39	0.073	0.040	0.003	-0.320	-0.198	0.239	-0.221	0.046
C40	0.210	0.125	0.025	-0.291	-0.109	0.165	-0.208	-0.111
C41	0.037	-0.100	-0.006	-0.230	-0.105	0.141	-0.253	-0.058
C42	-0.378	-0.029	0.020	0.083	0.263	-0.255	0.292	0.120
C43	0.205	0.177	0.152	-0.255	0.080	0.054	-0.248	-0.141
C44	0.053	0.062	0.042	-0.266	-0.091	0.117	-0.123	0.043
	C17	C18	C19	C20	C21	C22	C23	C24
C18	0.581							
C19	0.303	0.046						
C20	0.793	0.373	0.402					
C21	-0.497	-0.176	-0.286	-0.569				
C22	0.801	0.367	0.173	0.744	-0.400			
C23	0.737	0.271	0.224	0.730	-0.301	0.737		
C24	0.126	0.031	-0.003	0.016	0.039	0.125	0.060	
C25	-0.355	-0.114	-0.141	-0.351	0.467	-0.248	-0.187	-0.009
C26	-0.048	-0.031	0.165	0.098	0.093	0.075	0.042	-0.208
C27	0.079	0.023	-0.018	-0.079	0.074	-0.112	0.008	-0.141
C28	-0.528	-0.272	-0.305	-0.591	0.696	-0.528	-0.404	0.095
C29	-0.443	-0.091	-0.293	-0.461	0.278	-0.360	-0.431	-0.121
C30	-0.638	-0.310	-0.383	-0.510	0.343	-0.497	-0.343	-0.031
C31	0.267	0.230	-0.159	0.072	-0.130	0.314	0.154	0.294
C32	0.468	0.287	0.428	0.508	-0.457	0.346	0.318	0.078
C33	0.232	0.101	0.405	0.234	-0.309	0.190	0.183	0.210
C34	-0.118	0.051	-0.405	-0.191	0.041	-0.008	-0.040	0.263
C35	-0.650	-0.367	-0.331	-0.513	0.548	-0.441	-0.381	-0.031
C36	-0.214	-0.061	-0.159	-0.051	0.233	-0.169	-0.042	-0.037
C37	-0.127	0.033	-0.060	-0.108	0.345	-0.214	0.010	0.012
C38	0.321	0.085	0.189	0.363	-0.227	0.184	0.283	0.341
C39	0.385	0.247	-0.059	0.235	-0.071	0.432	0.238	0.403
C40	0.376	0.262	-0.023	0.148	-0.058	0.384	0.261	0.116
C41	0.474	0.326	0.002	0.329	0.045	0.454	0.378	0.266

C42	-0.299	-0.133	0.033	-0.141	0.294	-0.204	-0.078	-0.114
C43	0.146	0.013	-0.056	0.023	-0.119	0.191	0.124	0.447
C44	0.252	0.209	-0.187	0.069	0.013	0.255	0.359	0.438

	C25	C26	C27	C28	C29	C30	C31	C32
C26	0.078							
C27	0.011	-0.334						
C28	0.469	0.065	-0.018					
C29	0.323	-0.004	-0.235	0.379				
C30	0.412	0.112	-0.201	0.550	0.456			
C31	0.079	-0.218	-0.095	-0.089	0.147	0.022		
C32	-0.323	0.288	-0.064	-0.502	-0.462	-0.282	0.116	
C33	-0.123	0.130	-0.033	-0.145	-0.078	-0.159	0.077	0.491
C34	0.284	-0.111	-0.246	0.149	0.157	0.248	0.303	-0.256
C35	0.524	0.075	-0.136	0.689	0.329	0.711	-0.154	-0.571
C36	0.190	0.252	-0.121	0.341	0.117	0.561	0.000	-0.264
C37	0.217	0.072	0.090	0.229	0.047	0.402	0.075	-0.084
C38	-0.271	0.126	-0.196	-0.250	-0.282	-0.128	0.076	0.575
C39	0.099	-0.110	-0.238	0.090	-0.061	-0.232	0.411	-0.077
C40	0.003	-0.095	-0.145	0.028	0.110	-0.195	0.298	0.111
C41	-0.032	-0.075	-0.298	-0.042	0.059	-0.298	0.379	0.065
C42	-0.005	0.052	-0.042	0.031	0.152	0.305	-0.163	-0.096
C43	-0.092	-0.288	-0.297	-0.019	0.171	-0.189	0.448	-0.035
C44	0.151	-0.263	-0.204	0.059	-0.015	-0.159	0.353	-0.155

	C33	C34	C35	C36	C37	C38	C39	C40
C34	-0.035							
C35	-0.283	0.248						
C36	-0.268	0.064	0.575					
C37	-0.288	0.073	0.365	0.722				
C38	0.195	0.142	-0.400	-0.085	0.024			
C39	0.133	0.235	-0.075	-0.002	-0.191	0.092		
C40	0.236	0.045	-0.252	-0.313	-0.295	0.158	0.633	
C41	0.049	0.161	-0.198	-0.176	-0.126	0.386	0.652	0.634
C42	-0.154	-0.005	0.139	0.325	0.519	0.052	-0.289	-0.157
C43	0.109	0.163	-0.195	-0.385	-0.392	0.195	0.408	0.432
C44	0.028	0.287	-0.075	-0.192	-0.188	0.064	0.502	0.423

	C41	C42	C43
C42	-0.212		
C43	0.418	-0.325	
C44	0.459	-0.362	0.654

D. BEGINNING OFFICERS SAMPLE

Correlation Matrix

	C1	C2	C3	C4	C5	C6	C7	C8
C2	-0.240							
C3	-0.101	0.315						
C4	0.367	0.067	0.221					
C5	-0.262	-0.025	-0.081	-0.261				
C6	0.335	-0.484	-0.049	0.177	0.364			
C7	-0.158	-0.154	0.225	-0.365	0.348	0.097		
C8	-0.140	-0.385	-0.007	-0.323	0.467	0.231	0.884	
C9	-0.307	0.263	0.148	-0.270	0.050	-0.360	0.383	0.313
C10	-0.020	0.378	0.048	0.017	0.194	-0.088	-0.028	0.165
C11	-0.244	-0.389	-0.251	0.251	0.183	0.007	*	*
C12	0.213	-0.150	-0.059	0.304	0.000	0.203	-0.671	-0.671
C13	-0.324	0.067	0.221	-0.164	-0.368	-0.073	-0.058	-0.202
C14	0.284	0.060	-0.061	0.152	0.359	0.237	-0.095	0.159

C15	0.113	-0.354	0.267	0.286	-0.175	0.520	0.094	-0.054
C16	0.298	-0.222	0.190	0.419	-0.013	0.584	-0.209	-0.225
C17	0.195	0.285	0.031	0.099	0.157	-0.384	0.034	0.118
C18	-0.160	0.415	-0.031	-0.245	0.174	-0.668	0.278	0.246
C19	-0.047	0.384	0.231	0.103	0.196	-0.151	0.135	0.145
C20	-0.072	0.559	0.169	-0.181	0.244	-0.554	0.220	0.194
C21	0.665	-0.297	-0.015	0.336	-0.029	0.670	-0.089	-0.012
C22	-0.201	0.412	0.060	-0.107	0.421	-0.120	0.147	0.188
C23	-0.256	0.439	-0.020	-0.174	0.392	-0.060	0.098	0.112
C24	-0.406	0.296	-0.149	-0.570	0.243	-0.432	-0.217	-0.048
C25	0.374	-0.333	-0.546	0.045	-0.149	-0.155	-0.318	-0.070
C26	0.231	-0.187	-0.545	-0.022	-0.500	-0.120	-0.276	-0.178
C27	-0.071	0.139	-0.599	-0.336	0.115	-0.372	0.200	0.240
C28	0.289	-0.258	0.098	0.313	-0.320	0.420	-0.058	-0.111
C29	0.397	-0.146	0.092	0.295	-0.051	0.598	-0.216	-0.223
C30	0.367	-0.472	0.221	0.418	-0.154	0.595	0.030	-0.037
C31	0.514	-0.200	-0.404	0.288	-0.318	0.207	0.000	0.000
C32	-0.017	0.590	0.041	-0.101	0.207	-0.473	-0.023	0.028
C33	-0.397	0.146	-0.092	-0.452	0.166	-0.576	0.216	0.272
C34	-0.196	0.403	0.181	-0.099	0.120	0.144	0.352	0.191
C35	0.179	-0.560	-0.101	0.367	-0.262	0.533	-0.234	-0.206
C36	-0.140	0.278	-0.310	0.032	-0.326	-0.092	-0.185	-0.251
C37	0.100	0.104	-0.236	0.141	-0.052	0.242	-0.149	-0.087
C38	0.152	0.387	0.249	-0.220	0.320	0.033	0.312	0.294
C39	-0.071	0.399	0.168	-0.227	0.506	-0.117	0.151	0.173
C40	0.094	0.454	-0.114	-0.252	0.220	-0.335	0.121	0.130
C41	-0.017	0.536	0.041	-0.101	0.292	-0.357	0.121	0.130
C42	-0.332	-0.196	-0.346	-0.143	0.275	0.256	0.208	0.292
C43	0.257	0.146	0.129	-0.374	0.022	-0.237	0.142	0.125
C44	-0.124	-0.026	-0.124	-0.508	0.023	-0.252	-0.035	0.006

	C9	C10	C11	C12	C13	C14	C15	C16
C10	0.101							
C11	-0.115	-0.428						
C12	-0.515	-0.040	*					
C13	-0.270	0.017	0.061	-0.122				
C14	0.346	0.426	-0.316	0.201	-0.761			
C15	-0.528	-0.356	0.432	0.000	0.477	-0.484		
C16	-0.633	-0.302	-0.182	0.320	0.036	-0.043	0.690	
C17	0.307	0.236	-0.580	0.072	-0.604	0.459	-0.748	-0.484
C18	0.590	0.227	-0.254	-0.217	-0.411	0.278	-0.831	-0.788
C19	-0.078	0.439	0.244	0.523	0.103	0.086	-0.209	-0.246
C20	0.497	0.394	-0.580	-0.198	-0.422	0.324	-0.791	-0.595
C21	-0.501	-0.135	-0.016	0.311	-0.048	0.038	0.504	0.685
C22	0.490	0.039	-0.580	0.016	-0.426	0.339	-0.672	-0.268
C23	0.559	0.111	-0.580	-0.228	-0.285	0.308	-0.621	-0.280
C24	0.262	0.405	-0.292	0.209	-0.023	0.272	-0.717	-0.555
C25	-0.140	0.126	0.618	0.151	-0.315	0.242	-0.118	-0.089
C26	-0.381	-0.034	-0.125	0.165	0.094	-0.112	0.038	0.005
C27	0.350	0.343	0.346	-0.447	-0.067	0.086	-0.413	-0.611
C28	-0.639	-0.423	0.061	0.304	0.313	-0.416	0.730	0.664
C29	-0.556	-0.276	0.061	0.293	0.138	-0.165	0.619	0.764
C30	-0.594	-0.527	0.254	0.258	0.127	-0.283	0.858	0.802
C31	-0.458	-0.202	0.317	0.204	0.144	-0.366	0.378	0.285
C32	0.470	0.635	-0.580	-0.198	-0.332	0.432	-0.834	-0.637
C33	0.381	0.129	-0.050	0.132	-0.138	0.141	-0.619	-0.660
C34	-0.056	0.022	-0.466	-0.016	0.052	-0.119	0.074	0.171
C35	-0.535	-0.343	0.580	0.213	0.367	-0.284	0.793	0.526
C36	-0.420	0.050	-0.031	0.072	0.545	-0.498	0.168	-0.007
C37	-0.511	0.394	0.389	0.295	0.366	-0.168	0.295	0.019
C38	0.197	0.336	-0.828	0.211	-0.128	0.361	-0.426	-0.115
C39	0.581	0.391	-0.561	-0.320	-0.419	0.558	-0.690	-0.370
C40	0.566	0.289	-0.580	-0.189	-0.482	0.456	-0.868	-0.526
C41	0.535	0.365	-0.580	-0.213	-0.448	0.432	-0.834	-0.561
C42	-0.202	0.078	0.848	0.131	0.340	-0.298	0.356	-0.075
C43	0.440	0.129	-0.689	-0.064	-0.216	0.376	-0.516	-0.194
C44	0.325	-0.202	-0.444	0.251	-0.174	0.241	-0.548	-0.353
	C17	C18	C19	C20	C21	C22	C23	C24
C18	0.835							
C19	0.245	0.306						
C20	0.837	0.901	0.290					
C21	-0.203	-0.645	-0.175	-0.372				
C22	0.637	0.606	0.253	0.683	-0.180			
C23	0.441	0.497	-0.009	0.577	-0.214	0.943		
C24	0.344	0.546	0.369	0.454	-0.542	0.336	0.306	
C25	-0.027	-0.010	-0.020	-0.149	-0.040	-0.534	-0.534	0.056
C26	-0.056	-0.068	-0.154	-0.310	0.044	-0.385	-0.405	0.045
C27	0.220	0.501	0.035	0.259	-0.377	-0.032	0.071	0.325
C28	-0.357	-0.658	-0.198	-0.577	0.705	-0.328	-0.413	-0.567
C29	-0.368	-0.740	-0.232	-0.457	0.917	-0.173	-0.188	-0.518
C30	-0.428	-0.771	-0.279	-0.663	0.720	-0.426	-0.508	-0.752
C31	-0.261	-0.409	0.000	-0.359	0.634	-0.336	-0.331	-0.542
C32	0.759	0.797	0.323	0.911	-0.369	0.590	0.581	0.526
C33	0.463	0.740	0.439	0.457	-0.710	0.274	0.128	0.764
C34	-0.123	-0.079	0.151	0.141	0.104	0.383	0.367	-0.148
C35	-0.639	-0.844	-0.198	-0.931	0.361	-0.704	-0.653	-0.514
C36	-0.226	-0.125	0.154	-0.248	0.009	-0.113	-0.053	-0.013
C37	-0.221	-0.288	0.382	-0.280	0.272	-0.421	-0.377	-0.035
C38	0.413	0.424	0.564	0.500	0.031	0.694	0.520	0.422
C39	0.599	0.626	0.079	0.754	-0.263	0.762	0.793	0.435
C40	0.708	0.760	0.148	0.835	-0.260	0.787	0.786	0.442

C41	0.829	0.833	0.221	0.911	-0.318	0.843	0.803	0.417
C42	-0.497	-0.318	0.261	-0.426	0.047	-0.397	-0.332	-0.028
C43	0.415	0.456	0.060	0.457	-0.087	0.364	0.339	0.468
C44	0.307	0.476	0.137	0.208	-0.411	0.363	0.275	0.690

	C25	C26	C27	C28	C29	C30	C31	C32
C26	0.409							
C27	0.438	0.365						
C28	-0.258	0.372	-0.406					
C29	-0.243	-0.023	-0.508	0.791				
C30	-0.135	0.094	-0.569	0.870	0.767			
C31	0.267	0.342	0.075	0.552	0.546	0.432		
C32	-0.036	-0.258	0.371	-0.692	-0.485	-0.795	-0.344	
C33	0.146	0.148	0.454	-0.490	-0.745	-0.610	-0.468	0.360
C34	-0.549	-0.133	-0.340	0.190	0.220	0.052	0.112	0.019
C35	0.160	0.368	-0.189	0.620	0.397	0.713	0.342	-0.841
C36	-0.185	0.614	0.249	0.430	0.127	0.032	0.424	-0.162
C37	0.070	0.434	0.209	0.377	0.274	0.141	0.446	-0.112
C38	-0.316	-0.225	0.019	-0.200	-0.088	-0.313	-0.184	0.471
C39	-0.266	-0.535	0.186	-0.664	-0.349	-0.610	-0.569	0.790
C40	-0.089	-0.231	0.308	-0.620	-0.397	-0.713	-0.228	0.841
C41	-0.250	-0.303	0.291	-0.581	-0.422	-0.679	-0.344	0.908
C42	0.131	0.093	0.293	0.159	0.106	0.098	0.359	-0.366
C43	0.049	-0.070	0.205	-0.339	-0.234	-0.374	-0.312	0.422
C44	0.017	0.168	0.110	-0.307	-0.429	-0.397	-0.442	0.138

	C33	C34	C35	C36	C37	C38	C39	C40
C34	-0.220							
C35	-0.397	-0.286						
C36	-0.035	0.331	0.267					
C37	-0.152	0.183	0.367	0.678				
C38	0.339	0.292	-0.510	-0.048	-0.090			
C39	0.246	0.028	-0.753	-0.443	-0.463	0.603		
C40	0.335	0.166	-0.863	-0.199	-0.367	0.620	0.829	
C41	0.360	0.139	-0.841	-0.162	-0.291	0.581	0.866	0.933
C42	0.025	0.080	0.386	0.360	0.642	-0.275	-0.482	-0.481
C43	0.404	-0.240	-0.490	-0.359	-0.517	0.690	0.608	0.615
C44	0.731	-0.183	-0.256	-0.119	-0.377	0.449	0.280	0.389

	C41	C42	C43
C42	-0.462		
C43	0.485	-0.596	
C44	0.271	-0.286	0.640

*Note * All values in column are identical.

E. GRADUATING OFFICERS SAMPLE

Correlation Matrix

	C1	C2	C3	C4	C5	C6	C7	C8
C2	-0.017							
C3	-0.048	0.445						
C4	0.079	0.022	0.180					
C5	-0.206	-0.121	0.184	0.061				
C6	-0.045	-0.133	0.040	0.087	0.387			
C7	-0.322	-0.142	-0.084	-0.167	0.418	0.121		
C8	-0.096	0.043	-0.156	-0.302	-0.058	0.090	0.283	
C9	0.021	0.173	0.079	-0.045	0.449	0.196	0.162	0.093
C10	0.202	0.241	0.025	0.174	0.242	0.116	0.026	-0.094
C11	0.010	0.170	0.177	-0.171	0.012	0.001	0.014	0.299
C12	-0.114	0.119	0.083	0.244	-0.390	-0.057	-0.278	-0.271
C13	0.082	0.187	-0.123	-0.058	-0.279	-0.268	-0.227	0.013
C14	-0.037	-0.215	0.028	0.022	0.210	0.214	0.100	-0.022
C15	0.126	0.078	0.143	0.166	-0.104	0.021	-0.035	0.001

C16	0.014	0.190	0.213	0.044	-0.170	0.054	0.205	0.303
C17	-0.107	-0.218	-0.220	-0.03	0.135	0.043	0.100	0.110
C18	-0.104	0.103	0.009	0.12	0.212	0.239	0.147	0.086
C19	-0.010	-0.012	-0.191	0.35	0.108	0.026	0.184	-0.041
C20	-0.224	-0.268	-0.235	-0.001	0.289	0.061	0.157	-0.122
C21	0.212	0.133	0.110	-0.193	-0.051	0.223	-0.195	-0.103
C22	-0.047	-0.102	-0.027	0.235	0.163	-0.025	0.085	-0.288
C23	-0.170	0.073	0.005	0.349	0.231	0.163	0.107	-0.178
C24	-0.144	0.066	0.150	0.178	0.220	0.038	0.045	-0.152
C25	0.249	0.258	0.131	0.052	0.109	0.269	0.054	-0.145
C26	-0.101	-0.050	-0.084	0.106	-0.012	0.146	0.078	-0.235
C27	-0.019	0.202	0.249	0.164	0.296	0.068	0.017	-0.034
C28	0.228	0.167	0.106	0.202	-0.293	-0.058	-0.203	-0.057
C29	0.061	0.081	0.098	0.063	-0.382	-0.148	-0.391	-0.126
C30	0.295	0.159	0.097	0.245	-0.113	-0.126	-0.034	-0.087
C31	-0.202	0.242	0.120	-0.032	0.048	0.132	0.059	-0.213
C32	-0.176	-0.169	-0.125	0.111	0.034	0.148	0.099	0.152
C33	-0.242	-0.183	-0.073	-0.147	0.104	0.087	0.156	-0.067
C34	0.040	0.047	0.124	0.136	0.005	-0.019	0.055	-0.106
C35	0.335	-0.066	-0.113	0.026	-0.112	-0.023	0.109	0.097
C36	0.274	0.141	-0.036	-0.043	-0.218	-0.021	-0.066	0.272
C37	0.101	0.159	-0.140	0.261	-0.132	0.053	0.153	0.158
C38	-0.054	-0.071	0.089	0.243	-0.064	0.058	-0.157	-0.353
C39	-0.030	0.197	0.038	-0.010	-0.145	-0.130	-0.136	0.122
C40	-0.124	0.051	0.016	-0.129	0.138	0.009	0.152	0.103
C41	-0.130	0.010	0.020	-0.089	0.020	-0.092	-0.069	-0.383
C42	0.287	0.140	0.195	-0.016	-0.290	-0.158	-0.310	-0.200
C43	-0.159	-0.085	-0.013	0.065	0.161	-0.111	0.376	0.016
C44	-0.243	-0.068	0.024	0.207	0.275	-0.108	0.241	0.020

	C9	C10	C11	C12	C13	C14	C15	C16
C10	0.338							
C11	0.429	0.193						
C12	-0.629	-0.114	-0.437					
C13	-0.270	-0.175	-0.040	0.160				
C14	0.275	0.049	0.190	-0.212	-0.797			
C15	-0.136	-0.297	0.270	0.070	0.235	-0.220		
C16	-0.229	-0.162	0.180	0.095	0.069	-0.086	0.584	
C17	0.242	0.021	0.021	-0.172	-0.250	0.281	-0.487	-0.357
C18	0.219	0.187	0.105	-0.117	-0.217	0.188	-0.051	0.067
C19	0.004	0.352	0.195	0.002	-0.133	0.043	0.010	0.102
C20	0.095	0.018	0.016	-0.141	-0.081	0.011	-0.149	-0.253
C21	-0.009	-0.209	0.010	-0.074	0.247	-0.257	0.351	0.267
C22	0.444	0.253	0.050	-0.252	-0.224	0.287	-0.156	-0.226
C23	0.533	0.447	0.217	-0.192	-0.405	0.406	-0.138	-0.113
C24	0.158	0.176	0.047	-0.097	-0.110	-0.014	-0.172	-0.063
C25	0.031	0.114	-0.095	0.125	-0.042	0.032	0.065	0.214
C26	0.057	0.020	-0.064	0.243	-0.123	0.239	0.135	0.098
C27	0.129	0.331	0.076	-0.144	-0.214	0.127	-0.195	-0.070
C28	-0.300	-0.156	-0.018	0.319	0.346	-0.307	0.590	0.250
C29	-0.271	-0.224	-0.038	0.254	0.255	-0.202	0.454	0.324
C30	-0.094	-0.055	-0.172	0.252	0.162	-0.094	0.240	0.220
C31	-0.126	-0.058	-0.016	0.160	0.137	-0.330	0.215	0.108
C32	0.135	0.088	0.158	-0.257	-0.181	0.169	-0.251	-0.326
C33	0.220	-0.039	0.260	-0.253	-0.195	0.170	-0.131	-0.333
C34	-0.014	0.141	0.069	0.272	-0.024	0.032	0.059	-0.077
C35	-0.077	-0.154	-0.118	-0.022	0.283	-0.320	0.328	0.047
C36	0.004	-0.153	0.132	-0.113	0.208	-0.137	0.328	0.167
C37	-0.200	-0.098	-0.365	0.140	0.024	-0.061	0.228	0.222
C38	0.181	0.114	0.133	0.152	-0.390	0.309	-0.050	-0.033
C39	0.155	0.129	0.212	-0.157	-0.264	0.327	-0.024	0.136
C40	0.482	0.124	0.101	-0.272	-0.352	0.352	-0.292	-0.258
C41	0.305	0.266	0.009	-0.061	-0.345	0.308	-0.351	-0.291
C42	-0.088	-0.027	0.116	0.334	-0.028	0.091	0.061	0.088
C43	0.298	0.161	0.283	-0.064	-0.375	0.310	0.180	0.105
C44	0.246	0.118	0.215	-0.085	-0.195	0.217	0.009	-0.076
	C17	C18	C19	C20	C21	C22	C23	C24
C18	0.166							
C19	0.317	0.390						
C20	0.444	0.068	0.378					
C21	-0.332	-0.118	-0.210	-0.137				
C22	0.387	0.144	0.249	0.242	-0.325			
C23	0.349	0.183	0.439	0.229	-0.246	0.737		
C24	0.235	0.355	0.438	0.288	-0.188	0.472	0.445	
C25	-0.109	-0.054	0.012	-0.204	0.063	0.009	0.095	-0.014
C26	-0.087	0.049	0.094	-0.204	0.099	0.106	0.271	-0.142
C27	0.142	0.225	0.274	0.356	-0.020	0.132	0.257	0.444
C28	-0.560	-0.184	-0.203	-0.378	0.280	-0.335	-0.292	-0.183
C29	-0.241	0.049	-0.149	-0.293	0.262	-0.111	-0.235	0.037
C30	-0.311	-0.274	-0.303	-0.219	0.078	0.021	-0.090	-0.108
C31	-0.191	0.073	0.147	0.154	0.278	-0.212	-0.057	0.127
C32	0.272	-0.185	0.130	0.188	-0.292	0.141	0.209	-0.011
C33	0.298	0.027	0.214	0.493	-0.091	0.181	0.187	0.184
C34	0.073	-0.236	0.136	-0.052	-0.171	0.232	0.208	0.085
C35	-0.495	-0.025	-0.198	-0.161	0.358	-0.268	-0.323	-0.278
C36	-0.464	-0.005	-0.212	-0.345	0.269	-0.311	-0.271	-0.440
C37	-0.177	0.050	-0.046	-0.203	0.027	-0.080	0.044	-0.092
C38	0.258	0.061	0.270	0.138	-0.039	0.340	0.569	0.231
C39	0.101	0.057	0.149	0.065	0.019	0.266	0.497	0.243
C40	0.529	0.126	0.138	0.194	-0.066	0.514	0.525	0.197
C41	0.323	0.109	0.267	0.342	-0.130	0.517	0.535	0.424

C42	-0.168	-0.224	-0.145	-0.349	0.169	-0.071	-0.112	-0.025
C43	0.064	-0.021	0.252	0.141	-0.257	0.465	0.553	0.150
C44	0.265	0.348	0.413	0.238	-0.257	0.453	0.482	0.415

	C25	C26	C27	C28	C29	C30	C31	C32
C26	-0.132							
C27	-0.115	-0.277						
C28	0.269	-0.015	-0.169					
C29	0.176	0.044	-0.124	0.650				
C30	0.133	-0.031	-0.030	0.281	0.160			
C31	0.247	-0.071	0.018	0.067	0.070	-0.071		
C32	-0.396	-0.049	0.075	-0.301	-0.527	-0.187	-0.088	
C33	-0.293	-0.074	0.190	-0.313	-0.308	-0.278	0.010	0.437
C34	0.077	0.121	-0.132	0.044	-0.006	0.176	-0.067	0.063
C35	0.130	-0.077	-0.137	0.508	0.211	0.264	0.084	-0.106
C36	0.090	-0.013	-0.157	0.372	0.148	0.200	-0.010	-0.077
C37	0.044	0.162	-0.064	0.265	0.133	0.425	-0.015	-0.155
C38	0.023	0.133	0.127	-0.150	0.021	0.048	-0.028	0.000
C39	-0.290	0.176	0.372	-0.220	-0.153	-0.055	-0.127	0.113
C40	-0.092	0.163	0.144	-0.494	-0.265	-0.253	-0.073	0.086
C41	-0.093	0.231	0.090	-0.468	-0.178	-0.207	0.156	0.142
C42	0.219	0.132	-0.123	0.330	0.234	0.157	-0.023	-0.149
C43	-0.021	0.320	0.031	-0.194	-0.254	-0.036	-0.075	0.049
C44	-0.210	0.182	0.310	-0.112	-0.118	-0.304	-0.064	0.171

	C33	C34	C35	C36	C37	C38	C39	C40
C34	0.055							
C35	-0.187	-0.086						
C36	-0.246	-0.222	0.697					
C37	-0.344	-0.080	0.138	0.240				
C38	0.165	0.415	-0.309	-0.246	-0.121			
C39	0.181	0.003	-0.331	-0.135	0.073	0.304		
C40	0.209	0.111	-0.334	-0.229	-0.081	0.209	0.419	
C41	0.364	0.183	-0.337	-0.345	-0.365	0.375	0.373	0.502
C42	-0.242	0.078	0.111	0.030	-0.098	-0.058	-0.095	-0.044
C43	0.189	0.191	-0.172	-0.110	0.008	0.250	0.367	0.321
C44	0.154	0.011	-0.212	-0.255	-0.131	0.131	0.338	0.377

	C41	C42	C43
C42	0.028		
C43	0.255	-0.051	
C44	0.281	-0.103	0.549

THIS PAGE LEFT BLANK

APPENDIX E
RESPONSE PERCENTAGES

A. ACTIVE DUTY SAMPLE

Response Percentages

C1	PERCENT	C2	PERCENT	C3	PERCENT	C4	PERCENT
1	54.95	1	14.29	1	43.82	1	3.30
2	45.05	2	20.88	2	20.22	2	37.36
		3	16.48	3	10.11	3	41.76
		4	13.19	5	2.25	4	10.99
		5	18.68	6	4.49	5	6.59
		6	4.40	7	19.10		
		7	8.79				
		8	3.30				
C5	PERCENT	C6	PERCENT	C7	PERCENT	C8	PERCENT
1	22.22	0	24.44	1	29.49	0	47.30
2	44.44	1	14.44	2	41.03	1	16.22
3	30.00	2	22.22	3	8.97	2	12.16
4	2.22	3	12.22	4	20.51	3	9.46
5	1.11	4	12.22			4	4.05
		5	3.33			5	2.70
		6	1.11			6	2.70
		7	1.11			7	1.35
		8	4.44			8	1.35
		9	4.44			9	2.70
C9	PERCENT	C10	PERCENT	C11	PERCENT	C12	PERCENT
1	8.99	1	3.37	1	35.29	1	52.56
2	10.11	2	5.62	2	41.18	2	47.44
3	12.36	3	14.61	3	11.76		
4	13.48	4	56.18	4	11.76		
5	32.58	5	17.98				
6	22.47	6	2.25				
C13	PERCENT	C14	PERCENT	C15	PERCENT	C16	PERCENT
1	28.89	0	73.33	1	52.75	1	56.04
2	71.11	1	6.67	2	37.36	2	30.77
		2	10.00	3	4.40	3	5.49
		3	2.22	4	3.30	4	4.40
		4	2.22	5	2.20	5	3.30
		5	2.22				
		6	1.11				
		7	1.11				
		9	1.11				
C17	PERCENT	C18	PERCENT	C19	PERCENT	C20	PERCENT
1	4.44	1	4.49	1	7.69	1	3.30
2	2.22	2	1.12	2	28.57	2	4.40
3	5.56	3	2.25	3	12.09	3	8.79
4	20.00	4	20.22	4	16.48	4	16.48
5	67.78	5	71.91	5	35.16	5	67.03
C21	PERCENT	C22	PERCENT	C23	PERCENT	C24	PERCENT
1	46.59	1	1.11	1	2.22	1	13.19
2	36.36	2	6.67	2	8.89	2	19.78

3	7.95	3	4.44	3	5.56	3	15.38
4	6.82	4	26.67	4	21.11	4	25.27
5	2.27	5	61.11	5	62.22	5	26.37
C25	PERCENT	C26	PERCENT	C27	PERCENT	C28	PERCENT
1	54.95	1	18.68	1	11.24	1	56.04
2	36.26	2	25.27	2	22.47	2	34.07
3	4.40	3	35.16	3	15.73	3	6.59
4	3.30	4	8.79	4	21.35	4	2.20
5	1.10	5	12.09	5	29.21	5	1.10
C29	PERCENT	C30	PERCENT	C31	PERCENT	C32	PERCENT
1	31.87	1	59.77	1	4.40	1	5.49
2	34.07	2	18.39	2	14.29	2	14.29
3	18.68	3	8.05	3	18.68	3	12.09
4	9.89	4	9.20	4	28.57	4	25.27
5	5.49	5	4.60	5	34.07	5	42.86
C33	PERCENT	C34	PERCENT	C35	PERCENT	C36	PERCENT
1	3.30	1	15.38	1	79.78	1	59.55
2	16.48	2	25.27	2	15.73	2	25.84
3	12.09	3	20.88	3	4.49	3	13.48
4	20.88	4	12.09			5	1.12
5	47.25	5	26.37				
C37	PERCENT	C38	PERCENT	C39	PERCENT	C40	PERCENT
1	40.45	1	7.87	1	1.15	1	1.12
2	33.71	2	16.85	2	6.90	2	11.24
3	21.35	3	17.98	3	5.75	3	2.25
4	3.37	4	14.61	4	22.99	4	20.22
5	1.12	5	42.70	5	63.22	5	65.17
C41	PERCENT	C42	PERCENT	C43	PERCENT	C44	PERCENT
1	2.25	1	32.95	2	21.35	1	4.55
2	12.36	2	29.55	3	15.73	2	23.86
3	5.62	3	23.86	4	30.34	3	13.64
4	17.98	4	10.23	5	32.58	4	32.95
5	61.80	5	3.41			5	25.00

B. BEGINNING ENLISTED SAMPLE

Response Percentages

C1 PERCENT		C2 PERCENT		C3 PERCENT		C4 PERCENT	
1 72.34		1 61.70		1 91.49		1 2.13	
2 27.66		2 25.53		2 8.51		2 72.34	
		3 8.51				3 21.28	
		4 2.13				4 4.26	
		5 2.13					
C5 PERCENT		C6 PERCENT		C7 PERCENT		C8 PERCENT	
1 34.04		0 42.55		1 69.77		0 83.33	
2 44.68		1 10.64		2 25.58		1 2.38	
3 8.51		2 25.53		4 4.65		2 7.14	
4 12.77		3 10.64				3 2.38	
		4 2.13				4 2.38	
		5 6.38				5 2.38	
		6 2.13					
C9 PERCENT		C10 PERCENT		C11 PERCENT		C12 PERCENT	
1 40.43		2 8.70		1 79.07		1 4.88	
2 17.02		3 8.70		2 13.95		2 5.12	
3 14.89		4 76.09		3 4.65			
4 4.26		5 4.35		4 2.33			
5 19.15		6 2.17					
6 4.26							
C13 PERCENT		C14 PERCENT		C15 PERCENT		C16 PERCENT	
1 34.04		0 68.09		1 70.21		1 57.45	
2 65.96		1 2.13		2 23.40		2 29.79	
		2 4.26		3 6.38		3 10.64	
		3 4.26				4 2.13	
		4 4.26					
		5 4.26					
		6 8.51					
		8 2.13					
		9 2.13					
C17 PERCENT		C18 PERCENT		C19 PERCENT		C20 PERCENT	
3 2.13		3 4.26		1 4.26		4 10.64	
4 12.77		4 8.51		2 17.02		5 89.36	
5 85.11		5 87.23		3 12.77			
				4 23.40			
				5 42.55			
C21 PERCENT		C22 PERCENT		C23 PERCENT		C24 PERCENT	
1 70.21		1 4.26		1 2.13		1 4.26	
2 25.53		2 6.38		2 4.26		2 25.53	
3 4.26		3 2.13		3 2.13		3 10.64	
		4 10.64		4 8.51		4 25.53	
		5 76.60		5 82.98		5 34.04	
C25 PERCENT		C26 PERCENT		C27 PERCENT		C28 PERCENT	
1 63.83		1 10.64		1 12.77		1 8.72	
2 27.66		2 10.64		2 25.53		2 9.15	
3 6.38		3 27.66		3 6.38		3 2.13	
5 2.13		4 17.02		4 17.02			
		5 34.04		5 38.30			
C29 PERCENT		C30 PERCENT		C31 PERCENT		C32 PERCENT	
1 27.66		1 78.72		2 6.38		1 2.13	

2	31.91	2	14.89	3	19.15	2	6.38
3	25.53	3	2.13	4	27.66	3	4.26
4	12.77	4	2.13	5	46.81	4	29.79
5	2.13	5	2.13			5	57.45
C33	PERCENT	C34	PERCENT	C35	PERCENT	C36	PERCENT
1	2.13	1	12.77	1	89.13	1	84.78
2	8.51	2	29.79	2	10.87	2	15.22
3	10.64	3	12.77				
4	6.38	4	10.64				
5	72.34	5	34.04				
C37	PERCENT	C38	PERCENT	C39	PERCENT	C40	PERCENT
1	58.70	1	17.39	1	2.17	1	2.22
2	34.78	2	13.04	2	2.17	2	4.44
3	6.52	3	13.04	3	10.87	3	4.44
		4	15.22	4	4.35	4	13.33
		5	41.30	5	80.43	5	75.56
C41	PERCENT	C42	PERCENT	C43	PERCENT	C44	PERCENT
1	2.17	1	47.83	1	4.35	1	2.17
2	13.04	2	28.26	2	19.57	2	28.26
3	2.17	3	19.57	3	10.87	3	6.52
4	13.04	4	2.17	4	21.74	4	21.74
5	69.57	5	2.17	5	43.48	5	41.30

C. GRADUATING ENLISTED SAMPLE

Response Percentages

C1 PERCENT		C2 PERCENT		C3 PERCENT		C4 PERCENT	
1 71.74		1 28.26		1 82.61		2 52.17	
2 28.26		2 45.65		2 17.39		3 34.78	
		3 17.39				4 13.04	
		4 8.70					
C5 PERCENT		C6 PERCENT		C7 PERCENT		C8 PERCENT	
1 55.81		0 60.47		1 27.91		0 83.72	
2 23.26		1 16.28		2 60.47		1 2.33	
3 6.98		2 6.98		4 11.63		3 4.65	
4 6.98		3 6.98				4 2.33	
5 6.98		4 4.65				6 2.33	
		5 4.65				8 2.33	
						9 2.33	
C9 PERCENT		C10 PERCENT		C11 PERCENT		C12 PERCENT	
1 34.78		1 2.22		1 40.00		1 57.14	
2 15.22		2 17.78		2 42.22		2 42.86	
3 23.91		3 11.11		3 4.44			
4 6.52		4 55.56		4 13.33			
5 13.04		5 11.11					
6 6.52		6 2.22					
C13 PERCENT		C14 PERCENT		C15 PERCENT		C16 PERCENT	
1 39.13		0 60.87		1 60.87		1 63.04	
2 60.87		1 6.52		2 32.61		2 32.61	
		2 4.35		3 4.35		3 2.17	
		3 4.35		5 2.17		5 2.17	
		4 6.52					
		5 8.70					
		6 4.35					
		7 2.17					
		8 2.17					
C17 PERCENT		C18 PERCENT		C19 PERCENT		C20 PERCENT	
1 4.35		1 8.70		1 8.70		1 2.17	
3 4.35		2 4.35		2 17.39		3 6.52	
4 21.74		3 2.17		3 15.22		4 19.57	
5 69.57		4 21.74		4 28.26		5 71.74	
		5 63.04		5 30.43			
C21 PERCENT		C22 PERCENT		C23 PERCENT		C24 PERCENT	
1 60.87		1 4.35		1 4.44		1 2.15	
2 28.26		2 4.35		2 6.67		2 13.04	
3 6.52		3 2.17		3 4.44		3 4.35	
4 2.17		4 28.26		4 13.33		4 34.78	
5 2.17		5 60.87		5 71.11		5 45.65	
C25 PERCENT		C26 PERCENT		C27 PERCENT		C28 PERCENT	
1 60.87		1 8.70		1 13.04		1 66.67	
2 28.26		2 26.09		2 23.91		2 26.67	
3 2.17		3 28.26		3 13.04		3 4.44	
4 6.52		4 10.87		4 23.91		5 2.22	
5 2.17		5 26.09		5 26.09			
C29 PERCENT		C30 PERCENT		C31 PERCENT		C32 PERCENT	
1 23.91		1 60.87		1 2.17		1 2.22	
2 41.30		2 23.91		2 13.04		2 4.44	

3	8.70	3	10.87	3	13.04	3	2.22
4	15.22	4	4.35	4	26.09	4	33.33
5	10.87			5	45.65	5	57.78
C33	PERCENT	C34	PERCENT	C35	PERCENT	C36	PERCENT
2	6.67	1	15.22	1	84.78	1	80.43
3	4.44	2	36.96	2	10.87	2	17.39
4	33.33	3	6.52	3	4.35	3	2.17
5	55.56	4	23.91				
		5	17.39				
C37	PERCENT	C38	PERCENT	C39	PERCENT	C40	PERCENT
1	52.17	1	8.70	1	4.35	1	2.17
2	34.78	2	8.70	2	4.35	2	13.04
3	10.87	3	10.87	3	2.17	3	10.87
4	2.17	4	34.78	4	34.78	4	23.91
		5	36.96	5	54.35	5	50.00
C41	PERCENT	C42	PERCENT	C43	PERCENT	C44	PERCENT
1	2.17	1	30.43	2	6.52	2	8.70
2	8.70	2	52.17	3	8.70	3	8.70
3	8.70	3	10.87	4	43.48	4	39.13
4	28.26	4	6.52	5	41.30	5	43.48
5	52.17						

D. BEGINNING OFFICERS SAMPLE

Response Percentages

C1 PERCENT		C2 PERCENT		C3 PERCENT		C4 PERCENT	
1 81.25		3 18.75		5 56.25		4 68.75	
2 18.75		4 31.25		6 43.75		5 31.25	
		5 31.25					
		6 18.75					
C5 PERCENT		C6 PERCENT		C7 PERCENT		C8 PERCENT	
1 12.50		0 18.75		1 76.92		0 76.92	
2 43.75		1 18.75		4 23.08		2 7.69	
3 25.00		2 6.25				3 7.69	
5 18.75		3 6.25				6 7.69	
		4 18.75					
		6 6.25					
		7 6.25					
		9 18.75					
C9 PERCENT		C10 PERCENT		C11 PERCENT		C12 PERCENT	
1 13.33		1 6.25		1 66.67		1 14.29	
2 13.33		2 12.50		3 11.11		2 85.71	
3 13.33		3 25.00		4 22.22			
4 20.00		4 50.00					
5 13.33		5 6.25					
6 26.67							
C13 PERCENT		C14 PERCENT		C15 PERCENT		C16 PERCENT	
1 68.75		0 37.50		1 62.50		1 56.25	
2 31.25		2 6.25		2 25.00		2 31.25	
		4 6.25		3 12.50		3 12.50	
		5 25.00					
		6 6.25					
		7 6.25					
		8 6.25					
		9 6.25					
C17 PERCENT		C18 PERCENT		C19 PERCENT		C20 PERCENT	
2 6.25		3 6.67		1 6.25		3 6.25	
4 12.50		4 13.33		3 6.25		4 12.50	
5 81.25		5 80.00		4 18.75		5 81.25	
				5 68.75			
C21 PERCENT		C22 PERCENT		C23 PERCENT		C24 PERCENT	
1 43.75		1 6.67		1 6.25		1 12.50	
2 37.50		2 13.33		2 6.25		2 31.25	
3 12.50		4 13.33		3 6.25		3 6.25	
4 6.25		5 66.67		4 12.50		4 18.75	
				5 68.75		5 31.25	

C25 PERCENT
1 37.50
2 56.25
4 6.25

C26 PERCENT
1 25.00
2 31.25
3 25.00
4 12.50
5 6.25

C27 PERCENT
1 6.67
2 26.67
3 13.33
4 13.33
5 40.00

C28 PERCENT
1 62.50
2 37.50

C29 PERCENT
1 56.25
2 31.25
3 6.25
4 6.25

C30 PERCENT
1 68.75
2 31.25

C31 PERCENT
2 6.25
3 25.00
4 31.25
5 37.50

C32 PERCENT
3 6.25
4 18.75
5 75.00

C33 PERCENT
2 6.25
3 6.25
4 31.25
5 56.25

C34 PERCENT
1 37.50
2 6.25
3 6.25
4 12.50
5 37.50

C35 PERCENT
1 81.25
2 18.75

C36 PERCENT
1 56.25
2 37.50
4 6.25

C37 PERCENT
1 25.00
2 62.50
3 12.50

C38 PERCENT
1 12.50
2 12.50
4 25.00
5 50.00

C39 PERCENT
3 12.50
4 31.25
5 56.25

C40 PERCENT
1 6.25
2 6.25
4 12.50
5 75.00

C41 PERCENT
1 6.25
2 6.25
4 18.75
5 68.75

C42 PERCENT
1 25.00
2 31.25
3 18.75
4 25.00

C43 PERCENT
2 12.50
3 6.25
4 62.50
5 18.75

C44 PERCENT
1 12.50
2 12.50
3 18.75
4 43.75
5 12.50

E. GRADUATING OFFICERS SAMPLE

Response Percentages

C1 PERCENT		C2 PERCENT		C3 PERCENT		C4 PERCENT	
1 81.63		2 2.00		2 2.00		2 4.00	
2 18.37		3 18.00		3 4.00		3 16.00	
		4 40.00		5 64.00		4 60.00	
		5 22.00		6 12.00		5 20.00	
		6 4.00		7 18.00			
		7 14.00					
C5 PERCENT		C6 PERCENT		C7 PERCENT		C8 PERCENT	
1 30.61		0 45.65		1 39.53		0 86.67	
2 34.69		1 4.35		2 2.33		1 2.22	
3 20.41		2 8.70		3 39.53		2 2.22	
4 8.16		3 2.17		4 18.60		4 2.22	
5 6.12		4 8.70				5 2.22	
		5 4.35				7 2.22	
		7 4.35				9 2.22	
		8 8.70					
		9 13.04					
C9 PERCENT		C10 PERCENT		C11 PERCENT		C12 PERCENT	
1 34.00		1 6.38		1 65.00		1 30.43	
2 2.00		2 6.38		2 12.50		2 69.57	
3 8.00		3 31.91		3 12.50			
4 16.00		4 51.06		4 10.00			
5 24.00		5 2.13					
6 16.00		6 2.13					
C13 PERCENT		C14 PERCENT		C15 PERCENT		C16 PERCENT	
1 52.00		0 48.00		1 52.00		1 60.00	
2 48.00		1 2.00		2 40.00		2 38.00	
		2 18.00		3 6.00		3 2.00	
		3 8.00		4 2.00			
		4 10.00					
		5 4.00					
		6 4.00					
		7 2.00					
		8 4.00					
C17 PERCENT		C18 PERCENT		C19 PERCENT		C20 PERCENT	
3 8.00		1 6.00		1 8.00		2 2.00	
4 14.00		2 4.00		2 16.00		3 10.00	
5 78.00		3 4.00		3 14.00		4 6.00	
		4 18.00		4 28.00		5 62.00	
		5 68.00		5 34.00			

C21 PERCENT	C22 PERCENT	C23 PERCENT	C24 PERCENT
1 34.00	1 4.00	1 6.00	1 12.00
2 44.00	2 12.00	2 12.00	2 40.00
3 18.00	3 8.00	3 8.00	3 16.00
4 2.00	4 16.00	4 20.00	4 24.00
5 2.00	5 60.00	5 54.00	5 8.00
C25 PERCENT	C26 PERCENT	C27 PERCENT	C28 PERCENT
1 42.00	1 36.73	1 10.00	1 58.00
2 52.00	2 32.65	2 14.00	2 30.00
4 6.00	3 18.37	3 22.00	3 12.00
	4 8.16	4 14.00	
	5 4.08	5 40.00	
C29 PERCENT	C30 PERCENT	C31 PERCENT	C32 PERCENT
1 30.00	1 58.33	1 8.00	2 2.00
2 48.00	2 22.92	2 8.00	3 6.00
3 18.00	3 16.67	3 20.00	4 44.00
4 2.00	5 2.08	4 26.00	5 48.00
5 2.00		5 38.00	
C33 PERCENT	C34 PERCENT	C35 PERCENT	C36 PERCENT
2 6.00	1 30.00	1 77.55	1 55.10
3 16.00	2 28.00	2 20.41	2 40.82
4 36.00	3 10.00	4 2.04	3 2.04
5 42.00	4 14.00		4 2.04
	5 18.00		
C37 PERCENT	C38 PERCENT	C39 PERCENT	C40 PERCENT
1 29.17	1 2.13	1 4.08	1 4.08
2 50.00	2 17.02	2 6.12	2 14.29
3 18.75	3 8.51	3 6.12	3 6.12
4 2.08	4 23.40	4 22.45	4 16.33
	5 48.94	5 61.22	5 59.18
C41 PERCENT	C42 PERCENT	C43 PERCENT	C44 PERCENT
1 2.04	1 20.41	1 2.04	1 4.08
2 10.20	2 42.86	2 18.37	2 24.49
3 4.08	3 32.65	3 8.16	3 16.33
4 22.45	5 4.08	4 40.82	4 30.61
5 61.22		5 30.61	5 24.49

APPENDIX F **QUESTIONNAIRE SCORES**

A. ACTIVE DUTY SAMPLE

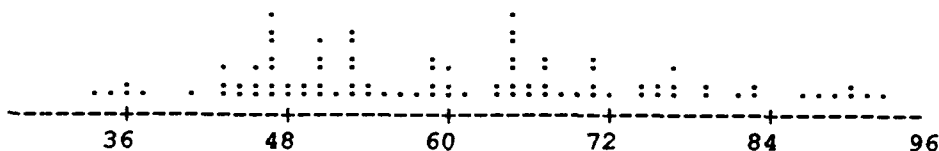
1. Score Statistics

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C45	91	59.25	58.00	58.94	14.64	1.53
	MIN	MAX	Q1	Q3		
C45	32.00	91.00	47.00	69.00		

2. Histogram of C45 N = 91

Midpoint	Count	
30	1	*
35	4	****
40	4	****
45	14	*****
50	14	*****
55	7	*****
60	8	*****
65	14	*****
70	6	*****
75	7	*****
80	5	*****
85	3	***
90	4	****

3. Dotplot C45



4. Correlation C1-C14 C45

	C1	C2	C3	C4	C5	C6	C7	C8
C45	0.121	0.085	0.086	0.018	-0.182	-0.100	-0.173	-0.083
	C9	C10	C11	C12	C13	C14		
C45	-0.150	-0.009	-0.009	0.229	0.196	-0.069		

5. Tally

C45	COUNT	CUMCNT	PERCENT	CUMPCT	C45	COUNT	CUMCNT	PERCENT	CUMPCT
32	1	1	1.10	1.10	58	2	46	2.20	50.55
34	1	2	1.10	2.20	59	3	49	3.30	53.85
35	2	4	2.20	4.40	60	1	50	1.10	54.95
36	1	5	1.10	5.49	62	2	52	2.20	57.14
40	1	6	1.10	6.59	63	5	57	5.49	62.64
42	3	9	3.30	9.89	64	2	59	2.20	64.84
43	2	11	2.20	12.09	65	2	61	2.20	67.03

44	3	14	3.30	15.38	66	4	65	4.40	71.43
45	3	17	3.30	18.68	67	1	66	1.10	72.53
46	4	21	4.40	23.08	68	1	67	1.10	73.63
47	2	23	2.20	25.27	69	2	69	2.20	75.82
48	2	25	2.20	27.47	70	2	71	2.20	78.02
49	5	30	5.49	32.97	71	1	72	1.10	79.12
50	1	31	1.10	34.07	73	2	74	2.20	81.32
51	1	32	1.10	35.16	74	2	76	2.20	83.52
52	5	37	5.49	40.66	75	1	77	1.10	84.62
53	2	39	2.20	42.86	76	2	79	2.20	86.81
54	1	40	1.10	43.96	78	2	81	2.20	89.01
55	1	41	1.10	45.05	80	1	82	1.10	90.11
56	1	42	1.10	46.15	82	2	84	2.20	92.31
57	2	44	2.20	48.35	85	1	85	1.10	93.41

C45	COUNT	CUMCNT	PERCENT	CUMPCT
86	1	86	1.10	94.51
87	1	87	1.10	95.60
89	2	89	2.20	97.80
90	1	90	1.10	98.90
91	1	91	1.10	100.00

N= 91

B. BEGINNING ENLISTED SAMPLE

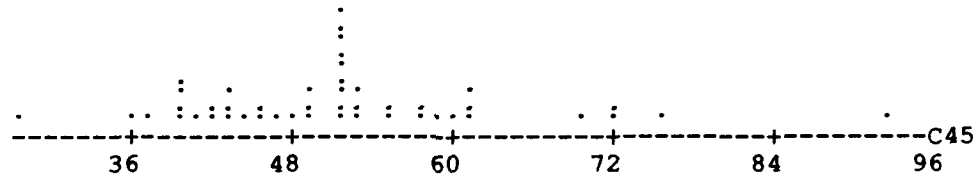
1. Score Statistics

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C45	47	51.57	51.00	50.98	11.55	1.68
	MIN	MAX	Q1	Q3		
C45	28.00	92.00	43.00	58.00		

2. Histogram of C45

Midpoint	Count	
30	1	*
35	2	**
40	7	*****
45	7	*****
50	13	*****
55	5	*****
60	7	*****
65	0	
70	3	***
75	1	*
80	0	
85	0	
90	1	*

3. Dotplot C45



4. Correlation of C1-C14 C45

	C1	C2	C3	C4	C5	C6	C7	C8
C45	0.015	-0.180	-0.242	-0.151	-0.142	-0.026	-0.028	-0.025
	C9	C10	C11	C12	C13	C14		
C45	-0.409	-0.091	-0.037	-0.045	0.229	-0.297		

5. Tally

C45	COUNT	CUMCNT	PERCENT	CUMPCT
28	1	1	2.13	2.13
36	1	2	2.13	4.26
37	1	3	2.13	6.38
39	1	4	2.13	8.51
40	3	7	6.38	14.89
41	1	8	2.13	17.02
42	2	10	4.26	21.28
43	3	13	6.38	27.66
44	1	14	2.13	29.79
46	2	16	4.26	34.04
47	1	17	2.13	36.17
48	1	18	2.13	38.30
49	3	21	6.38	44.68
51	4	25	8.51	53.19
52	5	30	10.64	63.83
53	3	33	6.38	70.21
55	2	35	4.26	74.47
58	2	37	4.26	78.72
59	1	38	2.13	80.85
60	1	39	2.13	82.98
61	3	42	6.38	89.36

C45	COUNT	CUMCNT	PERCENT	CUMPCT
69	1	43	2.13	91.49
72	2	45	4.26	95.74
76	1	46	2.13	97.87
92	1	47	2.13	100.00
N=	47			

C. GRADUATING ENLISTED SAMPLE

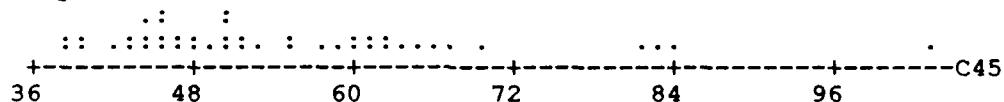
1. Score Statistics

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C45	46	54.63	50.00	53.57	13.54	2.00
	MIN	MAX	Q1	Q3		
C45	38.00	103.00	45.00	61.25		

2. Histogram of C45 N = 46

Midpoint	Count	
40	10	*****
50	17	*****
60	11	*****
70	4	****
80	3	***
90	0	
100	1	*

3. Dotplot C45



4. Correlation C1-C14 C45

	C1	C2	C3	C4	C5	C6	C7	C8
C45	-0.062	-0.100	0.090	-0.133	-0.203	-0.272	0.093	-0.022
	C9	C10	C11	C12	C13	C14		
C45	-0.132	-0.129	-0.018	0.051	-0.012	-0.092		

5. Tally

C45	COUNT	CUMCNT	PERCENT	CUMPCT
38	2	2	4.35	4.35
39	1	3	2.17	6.52
40	1	4	2.17	8.70
42	1	5	2.17	10.87
43	2	7	4.35	15.22
44	3	10	6.52	21.74
45	3	13	6.52	28.26
46	2	15	4.35	32.61
47	2	17	4.35	36.96
48	2	19	4.35	41.30
49	1	20	2.17	43.48
50	4	24	8.70	52.17
51	1	25	2.17	54.35
52	1	26	2.17	56.52
53	1	27	2.17	58.70
55	2	29	4.35	63.04
58	1	30	2.17	65.22
59	1	31	2.17	67.39
60	2	33	4.35	71.74
61	2	35	4.35	76.09
62	2	37	4.35	80.43

C45	COUNT	CUMCNT	PERCENT	CUMPCT
64	1	38	2.17	82.61
65	1	39	2.17	84.78
66	1	40	2.17	86.96
67	1	41	2.17	89.13
70	1	42	2.17	91.30
81	1	43	2.17	93.48
83	1	44	2.17	95.65
84	1	45	2.17	97.83
103	1	46	2.17	100.00
N=	46			

D. BEGINNING OFFICERS SAMPLE

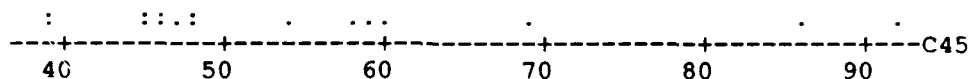
1. Score Statistics

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C45	16	55.06	48.00	53.57	15.52	3.88
	MIN	MAX	Q1	Q3		
C45	39.00	92.00	45.25	59.75		

2. Histogram of C45 N = 16

Midpoint	Count	
40	2	**
45	5	*****
50	2	**
55	1	*
60	3	***
65	0	
70	1	*
75	0	
80	0	
85	1	*
90	1	*

3. Dotplot C45



4. Correlation C1-C14 C45

	C1	C2	C3	C4	C5	C6	C7	C8
C45	0.115	-0.393	0.063	0.320	-0.210	0.522	-0.090	-0.140
	C9	C10	C11	C12	C13	C14		
C45	-0.607	-0.316	0.511	0.112	0.383	-0.440		

* NOTE * All values in column are identical

5. Tally

C45	COUNT	CUMCNT	PERCENT	CUMPCT
39	2	2	12.50	12.50
45	2	4	12.50	25.00
46	2	6	12.50	37.50
47	1	7	6.25	43.75
48	2	9	12.50	56.25
54	1	10	6.25	62.50
58	1	11	6.25	68.75
59	1	12	6.25	75.00
60	1	13	6.25	81.25
69	1	14	6.25	87.50
86	1	15	6.25	93.75
92	1	16	6.25	100.00

N= 16

E. GRADUATING OFFICERS SAMPLE

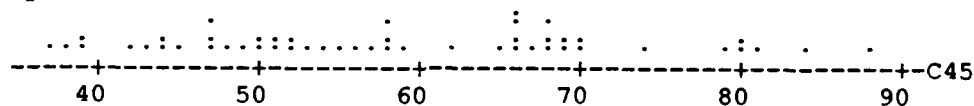
1. Score Statistics

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C45	50	58.58	57.50	58.23	13.16	1.86
	MIN	MAX	Q1	Q3		
C45	37.00	88.00	47.75	68.00		

2. Histogram of C45 N = 50

Midpoint	Count	
35	1	*
40	4	****
45	7	*****
50	8	*****
55	5	*****
60	5	*****
65	6	*****
70	7	*****
75	1	*
80	4	****
85	1	*
90	1	*

3. Dotplot C45



4. Correlation C1-C14 C45

	C1	C2	C3	C4	C5	C6	C7	C8
C45	0.310	0.069	0.026	-0.102	-0.282	-0.040	-0.219	0.129
	C9	C10	C11	C12	C13	C14		
C45	-0.376	-0.325	-0.167	0.253	0.394	-0.335		

5. Tally

C45	COUNT	CUMCNT	PERCENT	CUMPCT
37	1	1	2.00	2.00
38	1	2	2.00	4.00
39	2	4	4.00	8.00
42	1	5	2.00	10.00
43	1	6	2.00	12.00
44	2	8	4.00	16.00
45	1	9	2.00	18.00
47	3	12	6.00	24.00
48	1	13	2.00	26.00
49	1	14	2.00	28.00
50	2	16	4.00	32.00
51	2	18	4.00	36.00
52	2	20	4.00	40.00
53	1	21	2.00	42.00
54	1	22	2.00	44.00
55	1	23	2.00	46.00
56	1	24	2.00	48.00
57	1	25	2.00	50.00
58	3	28	6.00	56.00
59	1	29	2.00	58.00
62	1	30	2.00	60.00

C45	COUNT	CUMCNT	PERCENT	CUMPCT
65	1	31	2.00	62.00
66	4	35	8.00	70.00
67	1	36	2.00	72.00
68	3	39	6.00	78.00
69	2	41	4.00	82.00
70	2	43	4.00	86.00
74	1	44	2.00	88.00
79	1	45	2.00	90.00
80	2	47	4.00	94.00
81	1	48	2.00	96.00
84	1	49	2.00	98.00
88	1	50	2.00	100.00
N=	50			

List of References

1. Brod, C., *Techno Stress*, Addison-Wesley Publishing Company, 1984.
2. Stoner, J. A., Freeman, R., *Management*, 4th ed., Prentice Hall, 1989.
3. Weinberg, S., Fuerst, M., *Computerphobia: How to Slay the Dragon of Computer Fear*, Banbury Books, July 1982.
4. Power, Kevin, "IRMS Report Says Govt. Owns 1 Million Micros," *Government Computer News*, 1 October 1990.
5. "Computers become A Key Tool For Success," *Army Times, Special Issue: "Fifty Years of Military Life 1990,"* October 1990.
6. Green, Robert, "Army Beefs Up Processing Power for Desert Shield," *Government Computer News*, 12 November 1990.
7. Weinberg, Nathan, *Computers in the Information Society*, Westview Press Inc., 1990.
8. Bentley, L., Barlow, V., and Whitten, J., *Systems Analysis & Design Methods*, 2nd ed., Irwin Inc., 1989.
9. Prodigy (R) Interactive Personal Service (Online), *Academic American Encyclopedia*, Grolier Electronic Publishing, Inc., 1990.
10. Office of Military Leadership, United States Military Academy, *A Study of Organizational Leadership*, Stackpole Books, 1976.
11. Adler, J., Hager, M., Zabarsky, M., Jackson, T., Friendly, D., Abramson, P., "The Fight to Conquer Fear," *Newsweek*, 23 April 1984.
12. *The Random House College Dictionary*, Revised Edition, Random House Inc., 1980.
13. Cambre, M., Cook, D., "Measurement and Remediation of Computer Anxiety," *Educational Technology*, December 1987.
14. Igbaria, M., Chakrabarti, A., "Computer Anxiety and Attitudes Towards Microcomputer Use," *Behavior & Information Technology*, vol. 9, no. 3, pp. 229-241.

15. Meier, S., "Predicting Individual Differences in Performance on Computer-Administered Tests and Tasks: Development of the Computer Aversion Scale," *Computers in Human Behavior*, vol. 4, pp. 175-187, Pergamon Press, 1988.
16. Pearce, C., Sleeth, R., "Communication Barriers Appear As Technology," *Information Executive*, 1990.
17. Sievert, M., and others, "Investigating Computer Anxiety in an Academic Library," *Information Technology and Libraries*, vol. 7, no. 3, September 1988.
18. Gardner, E., Render, B., Ruth, S., and Ross, J., "Human-Oriented implementation cures 'cyberphobia'," *Data Management*, November 1985.
19. Toris, C., "Suggested Approaches to the Measurement of Computer Anxiety," Paper presented at *Computer Anxiety: Does It Really Exist?* Symposium conducted at the meeting of the Southeastern Psychological Association, New Orleans, Louisiana, 29 March 1984.
20. Patrick, J., "Traditionalists and True Believers," *Computerworld*, 9 April 1990.
21. Rice, B., "Curing Cyberphobia," *Psychology Today*, August 1983.
22. Guarnieri, H., Guarnieri, E., "The Psycho-Computer Syndrome," *Computerworld*, November 1982.
23. London, K., *The People Side of Systems*, McGraw Hill, 1976.
24. First, S., "All Systems Go: How to Manage Technological Change," *Working Woman*, April 1990.
25. Collins, T., "Back to the Future as the Millennium Dawns," *Computer Weekly*, 4 January 1990.
26. Brod, C., "Managing Technostress: Optimizing the Use of Computer Technology," *Personnel Journal*, pp. 16, October 1982.
27. Taylor, A., "Dealing with Terminal Phobia," *Time*, 19 July 1982.
28. "How to Conquer Fear of Computers." *Business Week*, 29 Mar 1982.
29. Vizachero, R., "Talking Computers Will Be Big New Thing," *Government Computer News*, 12 November 1990.

30. Ogozalek, V., Praag, J., "Comparison of Elderly and Younger Users on Keyboard and Voice Input Computer-Based Composition Tasks," *CHI'86 Proceedings*, 1986.
31. Monk, A., *Fundamentals of Human-Computer Interaction*, Academic Press, 1984.
32. Shore, J., *The Sachertorte Algorithm*, Viking Penguin Inc., 1985
33. Honeyman, D., White, W., "Computer Anxiety in Educators Learning to Use the Computer: A Preliminary Report," *Journal of Research on Computing in Education*, 1987.
34. Banks, J., Havice, M., "Strategies for Dealing with Computer Anxiety: Two Case Studies," *Educational Technology*, January 1989.
35. Howard, G., and others, "Computer Anxiety Considerations For Design of Introductory Computer Courses," *Education Research Quarterly*, 1987.
36. Lewis, L., "Adults and Computer Anxiety: Fact or Fiction?" *Lifelong Learning: An omnibus of practice and research*, Vol. 11, No. 8, 1988.
37. Holmes, B., "Eliminate Computerphobia through Training and Software Design," *Computerdata*, July 1990.
38. Kuhn, D., "A Study of the Attitudes of Female Adults Toward Computers," *Community/Junior College*, Hemisphere Publishing, 1989.
39. U.S. Army Research Institute for the Behavioral and Social Sciences, "Questionnaire Construction Manual," Office, Deputy Chief of Staff for Personnel, Department of the Army, June 1989.
40. Weiss, N., Hassett, M., *Introductory Statistics*, 2nd Ed., Addison-Wesley Publishing, June 1989.
41. Tanur J., and others, *Statistics: A Guide to the Unknown*, Holden-Day, Inc., 1972
42. CHI'86 Conference Proceedings, CHI '86, *Human Factors In Computing Systems*, Edited By: Mantei, M., and Orbeton, P., Unclassified, 13-17 April 1986.

Bibliography

Anderson, J., "The Heartbreak of Cyberphobia," *Creative Computing*, August 1983.

Awad, E., *Management Information Systems; Concepts, Structure, and Applications*, Awad and Associates, 1988.

Bolt, Richard A., *The Human Interface, Where People and Computers Meet*, Lifetime Learning Publications, 1984.

Chin, K., "Cyberphobia, Fight or Flight Reactions to Computers," *InfoWorld*, 18 July 1983.

Curley, P., "Confessions of a Cyberphobe," *Best's Review*, April 1983.

Goldfield, R. J., "Fear of Computers Can be Overcome by Good Training," *Office*, January 1983.

Gross, P., "Flushing Out the Fear of Computing," *Data Management*, June 1983.

Hurst, R., Kolodziej, S., "University Study Aims to Combat Users' Fear of Computers," *Computerworld*, 12 November 1986.

James, F., "Get Vertigo Over Video Displays? Maybe It's a Case of Cyberphobia," *Wall Street Journal*, 8 June 1982.

Maurer, M., Simonson, M., "Development and Validation of Measure of Computer Anxiety," paper presented at the Annual Meeting of the Association for Educational Communications and Technology, Dallas, TX, 20-24 January 1984.

McElhone, A., "Training Perspective: Take the Awe Out of Automation," *The Office*, July 1982.

Nelson, R., "Culture Clash at the Top," *Personal Computing*, 27 April 1990.

Norris, C. M., Lumsden, B., "Functional Distance and the Attitudes of Educators Toward Computers," *The Journal*, January 1984.

Parasuraman, S., Igarria, M., "An Examination of Gender Differences in the Determinants of Computer Anxiety and Attitudes Toward Microcomputers Among Managers," *International Journal of Man-Machine Studies*, v. 32, Academic Press Limited, 1990.

Plato, G., "The Individual Versus the Computer: An Examination of Attitude Problems and Their Impact on System Development," Master's Thesis, Naval Postgraduate School, Monterey, CA, June 1981.

Powers, M., Cheney P., and Crow, G., *Structured Systems Development; Analysis, Design, Implementation*, 2nd ed., Ch 14, Boyd and Fraser, 1990.

Stone, J., Barker, J., "Human Connection Cyberphobic Tells How She Conquered DP," *Computerworld*, 11 April 1983.

Stone, J., "Cyberphobics Need Medical, Not DP, Advice," *Computerworld*, 4 April 1983.

Stone, J., Barker, J., "Not All DP Resisters Are Cyberphobics," *Computerworld*, 28 March 1983.

Stone, J., Barker, J., "Can DPs Handle Cyberphobics?," *Computerworld*, 14 March 1983.

Stone, J., "Human Connection--Cyberphobia: Not a Routine System Problem," *Computerworld*, 21 March 1983.

Sycuro F., "Human Adaption to the Computer," Master's Thesis, Naval Postgraduate School, Monterey, CA, September 1986.

Temple, L., Gavillet, M., "The Development of Computer Confidence in Seniors," paper presented at the Annual Meeting of the American Association for Adult and Continuing Education, Washington, DC., 19-24 October 1987.

Vredenburg, X., and others, "Sex Differences in Attitudes, Feelings, and Behaviors toward Computers," paper presented at the Annual Convention of the American Psychological Association, Ontario, Canada, 24-28 August 1984.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center 2
ATTN: Selection Section (DTIC-FDAC)
Building 5, Cameron Station
Alexandria, Virginia 22304-6145
2. Library, Code 0124 2
Naval Postgraduate School
Monterey, California 93943-5002
3. Director 1
U.S. Army Computer Science School
ATTN: ATZH-SS
Fort Gordon, Georgia 30905
4. U.S. Army Institute for Research in Management 1
Information, Communications, and Computer Science
115 O'Keefe Building
Georgia Tech
Atlanta, Georgia 30332-0800
5. Crew System Ergonomics Information Analysis Center 1
(CSERIAC) Program Office
AAMRL/HE/CSERIAC
Wright-Patterson AFB, Ohio 45433-6573
6. CPT Michael S. Buchner 2
Office of the Dean, ORD
USMA, (MADN-2)
West Point, New York 10996-5000
7. Professor Tung Bui 1
Department of Administrative Science
Naval Postgraduate School
Code AS/BD
Monterey, California 93943-5000