

The Moral Domain of War

A View from the Cockpit

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Contents

<i>Chapter</i>		<i>Page</i>
	DISCLAIMER	<i>ii</i>
	ABSTRACT	<i>v</i>
	ABOUT THE AUTHOR	<i>vii</i>
	ACKNOWLEDGMENTS	<i>ix</i>
1	INTRODUCTION	1
	Notes	4
2	THE MORAL DOMAIN	7
	Notes	15
3	METHODOLOGY	17
	Notes	22
4	SURVEY RESULTS AND ANALYSIS	25
	Notes	34
5	CONCLUSION	37
	Notes	40
<i>Appendix</i>		
A	Combat Pilot Survey Examples	41
B	SPSS Principal Factor Component Analysis Results	58
C	Threats to Validity Table	85

Illustrations

<i>Figure</i>		
1	The Information Gap	3
2	The Domains of War	8

<i>Figure</i>		<i>Page</i>
3	The Balancing of Morale and Fear	10
4	General Moral Domain Model	14
5	The Moral Domain Factor Interactions Model	15
6	Survey-Derived Combat Motivation Model	28
 <i>Table</i>		
1	SPSS Survey Analysis Results	27

Abstract

This study uses Brig Gen J. F. C. Fuller's theory of war to investigate the motivation of pilots flying in combat. The study holds the physical and cognitive domains of war variables constant and analyzes the moral domain effects on pilot behavior. Vietnam-era F-105 pilots serve as the case study. A pilot combat motivation model based on Fuller's theory served as the framework for a survey. This survey, sent to 236 F-105 veterans, functioned as a vehicle to obtain data. The veterans returned 173 surveys for a 73.3 percent response rate. The Statistical Package for the Social Sciences (SPSS) analyzed the data and determined the validity of the model. Other empirical evidence, such as unit end of tour reports, flight surgeon aeromedical evaluations, and monographs written by the pilots during the war, helped verify findings. The results of this study strongly indicate that the proposed pilot combat motivation model explains pilot behavior in combat and suggests areas for future study.

About the Author

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Chapter 1

Introduction

Man's innate fascination with flight—movement in the third dimension—remains insatiate. Even after Capt Charles E. “Chuck” Yeager conquered the transonic demons on 14 October 1947 when he broke the sound barrier¹ and after the historic *Apollo 11* spaceflight of Neil Armstrong, Michael Collins, and Edwin “Buzz” Aldrin on 20 July 1969 successfully placed men on the moon,² this fascination continues. Yet, though the air environment allures and captures the imagination with its mystique, surprisingly the necessary factors relating to combat in this arena remain relatively obscure. What enables a pilot to endure combat? Do the same combat factors that cause stress in ground soldiers affect pilots in a similar manner? Many questions such as these remain inadequately answered. Since the inclusion of the airplane in war, few have investigated more complete answers. This work seeks to rectify this problem.

This study uses original research in an attempt to analytically determine the moral domain of war factors that enable a pilot to fly in combat. In chapter 2 a more complete definition of the moral domain appears; however, for now let it suffice to say that the moral domain consists of the motivation forces originating from within a person's heart and soul. Most combat motivation literature focuses on war from the soldier's perspective. This study deviates from this standard treatment and views motivation in war from the pilot's perspective. This emphasis shift gives insights that indicate a fundamentally different set of motivation factors operating on the pilot than generally assumed from projecting ground-combatant motivation factors on airmen.³ Specifically, this study argues that the combat motivation factors affecting pilot behavior in combat adhere to a pattern emanating from the moral domain of war. Since the pilot's combat environment radically differs from that of the soldier, the motivation factors required for operation in this environment may differ as well.

This study attempts to expand the body of knowledge concerning the motivation behind a pilot in combat. The aircraft, a fairly new addition to the technological arsenal, possesses more than just unique technology.⁴ It also places the combatant in a different environment. If the environment and the nature of aerial employment differ from that on the ground as logic suggests, to assume that constituent combatants undergo the same stresses may lead to incorrect conclusions. Although war imposes many similar stresses, the possible existence of unique stresses warrants a specific investigation for airmen.

Originally, this study sought to compare and contrast ground and air combatants. Since a dearth of information concerning air combatants exists in comparison to the plethora of that which exists for ground-combat

operations, it appeared necessary to first explore the nature of combat motivation focused on the air environment. A likely combat motivation model for pilots will be proposed. This information could possibly enhance training, organization, and employment at a time when force reductions threaten maintaining combat capability at high level. Though rigorous, this study is not exhaustive. This work also seeks to establish an effective instrument for future study in the nature of aerial combat.

For case-study purposes, this work focuses on combat operations of F-105 pilots during the Vietnam War. They arrived and fought the war from its beginning to end and took the war to the North. They suffered an extremely high casualty rate, yet their morale remained high. Why? How did the majority of these pilots continue to give 100 percent in the face of lethal defenses, high-attrition rates, and a perception that the national authorities did not value or understand what their mission entailed?⁵ This war and these pilots present a useful case study for the moral domain of war because of the stressful environment induced by the war's long duration and the unique employment characteristics of F-105 operations against North Vietnam.

The nature of war in the modern era fundamentally changed as a consequence of three revolutions. The political revolution increased the size of armies as witnessed by the *levée en masse* in France.⁶ Wars no longer confined themselves to mercenary armies of monarchs. Now nationalism affected the war effort and involved the entire society.⁷ The technological revolution increased the sophistication and quantity of weapons available to the armed forces.⁸ The industrial revolution, a product of the technological revolution, allowed economies of scale to produce mass quantities of weapons well within monetary constraints of national treasuries.⁹ Finally, the managerial revolution allowed the organization and operation of mass armies.¹⁰ Bodies such as the German General Staff created a professional officer corps trained in the skills of war planning and execution.¹¹ With these revolutions and their accompanying accomplishments, the American Civil War marked the dawning of the new era of modern warfare.¹² Its carnage served as a harbinger of things to come. World War I served as the initial culmination of this new state of warfare, the total war, followed by the even more lethal World War II.¹³

Technology changes constantly, management techniques change less frequently, but man himself has not changed since the creation.¹⁴ Leadership, strategy, and the force of arms still determine victory in war. The United States Air Force (USAF) does well exploiting technology and planning for employment in a conflict. However, the Air Force tends to avoid analyzing the moral elements because of the difficulty of incorporating them in either doctrine or organization. In wars of antiquity, when rapidly changing technology did not yet cede the advantage to the innovator, nations understood the sublime importance of the moral force in war. Hannibal's defeat of the Roman army at Cannae illustrates this point.¹⁵ So, while the leaders of old realized the moral domain's importance, today's

leaders seem to de-emphasize its centrality to warfare and concentrate more on technological capabilities.

Even with this concentration on the technological, it is imperative not to rely on what is thought to exist but what actually exists. Due to uncertainty, a nation cannot possess perfect information. So the information gap between reality and perception exists as illustrated in figure 1. The two circles represent information. As perceived information more clearly matches reality, the circles come closer together. The ideal situation would result if perceived information equaled reality in which case the circles would be superimposed on each other. In the real world the closer the circles coincide, the greater the likelihood that plans will achieve desired outcomes because the Strategist possesses a clearer understanding of cause and effect. Accurate information can decrease this information gap to form a much more substantial knowledge foundation on which to make decisions in this dynamic world.

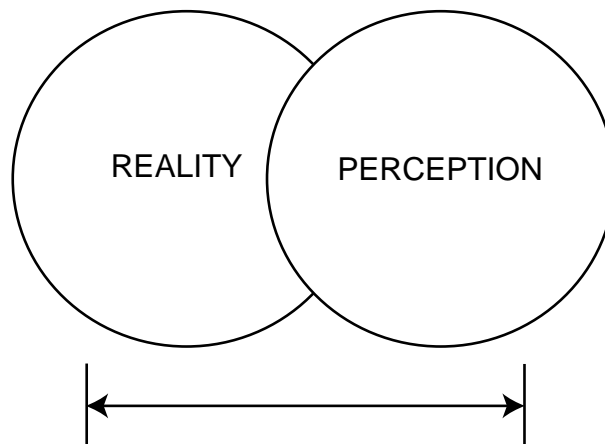


Figure 1. The Information Gap

With the demise of the Soviet Union, formally marking the end of the cold war era, the Gulf War marks the beginning of the real and pervasive threat to world peace—regional hegemony. Saddam Hussein sought to emerge as the leader of the Arab world. Many more regional hegemony wait in the wings for the right time to make their power play. The United States (US), the sole remaining superpower, cannot maintain the force structure required to respond everywhere at once. The United States, however, still needs a sufficient military force capable of preserving and protecting its vital interests. During this uncertain time when we cannot predict when or where the next conflict will erupt, the United States needs to use every component of force within its arsenal to prepare for conflict. Since Desert Storm demonstrated that airpower can indeed play a decisive role in a conflict, studying the motivation factors of pilots might reveal some of the underlying principles that enabled the pilots to achieve such high levels of success.¹⁶

Monetary forecasts project a 25 percent Air Force reduction within a total Department of Defense budget decrease to 4 percent of gross national product by 1995.¹⁷ This is the lowest level since World War II. In this new environment, the luxury of concentrating only on technological capabilities and war plans no longer exists. The nation must also elicit the maximum capability from its fighting forces. To achieve this goal, decision makers must thoroughly understand the nature of the combatants.

Any endeavor that decreases the gap between our "perceptions" versus "reality," contributes to a greater likelihood of success. For the pilot, control is important. Maintaining control is the key to success. As long as the environment remains familiar, problems do not generally inhibit accomplishing this task. When the environment changes, the pilot has a limited time to make things resemble the familiar. If the pilot fails to regain the familiar environment within sufficient time, loss of control ensues, usually with catastrophic results. The pilot leaves this time-sensitive environment after landing and walking away from the aircraft, not to reenter it until the next flight. The pilot, therefore, operates within a dynamic environment. In contrast, the soldier on the ground endures long periods of inactivity, followed by intense fighting, but when in the line, continuously remains immersed in the environment.¹⁸ The pilot resembles a sprinter or quarter-miler who runs heats until the final race for victory; while the soldier resembles the marathon runner who builds up endurance, enters the race, and runs for broke. This illustrates a fundamental difference between the nature of the ground war and the air war.

The US success in Desert Storm has engendered much analysis. This study presents a tool for one method of analysis. If the moral factors do not receive an in-depth treatment, the analysis cannot be considered comprehensive. Such a failure may create the potential for future defeat as the United States draws down its forces to extremely low levels. In the final analysis, some usefulness can result from knowing which variables affect pilot behavior in combat and to what degree. These relationships could provide some insight for developing training methods and tactics. Rising above the two-dimensional constraints of surface warfare, I intend to investigate the moral domain of war from the boundless expanse of the third dimension.

Notes

1. Jay Miller, *The X-Planes: X-1 to X-31* (New York: Aerofax, Inc., 1988), 18.
2. David Baker, *The History of Manned Space Flight* (New York: Crown Publishers, 1982), 339, 341. Also see C. D. B. Bryan, *The National Air and Space Museum* (New York: Peacock Press, 1982), 416, 491.
3. Anthony Kellett, *Combat Motivation: The Behavior of Soldiers in Battle* (Hingham, Mass.: Kluwer-Nijhoff Publishers, 1982), xvi.
4. Charles Christienne and Pierre Lissarrague, *A History of French Military Aviation*, trans. Francis Kianka (Washington, D.C.: Smithsonian Institution Press, 1986), 39. The Italians fought with the airplane first in a war against the Turks where they used the French Blériot to make reconnaissance flights in Libya from Tripoli in October 1911.

5. Jack Broughton, *Thud Ridge*, introduction by Hanson W. Baldwin (Philadelphia, Pa.: J. B. Lippincott, 1969), 12.
6. *Modern Warfare and Society*, ed. Lt Col Robert C. Ehrhart (Colorado Springs, Colo.: US Air Force Academy, Department of History, 1984), 5-10.
7. *Ibid.*, 5-1.
8. Martin van Creveld, *Technology and War: From 2000 B.C. to the Present* (New York: Free Press, 1989), 161.
9. *Ibid.*, 10-1.
10. *Ibid.*, 10-12-10-13.
11. *Ibid.*, 10-15.
12. *Ibid.*, 9-11, 9-16.
13. Theodore Ropp, *War in the Modern World* (New York: Collier Books, 1962), 255-56.
14. Frank H. Simonds in Col Ardant du Picq, *Battle Studies*, in *Roots of Strategy*, bk. 2, trans. Col John N. Greely and Maj Robert C. Cotton (Harrisburg, Pa.: Stackpole Books, 1987), 17.
15. Du Picq, 81. In this battle Hannibal encircled the Roman army, which was twice the size of his, and annihilated it.
16. Richard P. Hallion, *Storm over Iraq: Air Power and the Gulf* (Washington, D.C.: Smithsonian Institution Press, 1992).
17. Merrill A. McPeak, "Organize, Train, and Equip," Air Force Association National Convention, 18 September 1991, 2.
18. Roy R. Grinker, MD, and John P. Spiegel, MD, *Men Under Stress* (New York: McGraw-Hill Book Co., Inc., 1963), 28-29.

Chapter 2

The Moral Domain

Since war consists of many factors, much of the preparation effort fails to include an effective analysis of all applicable forces and the complexity of their interactions. In *War and Peace*, Nikolayevich Tolstoy illustrates the elusive nature of the study of war while portraying compelling evidence of how man seeks to ensure success in this arduous endeavor. Though ardent seekers, we seldom discover sublime solutions.

In warfare the force of armies is the product of the mass multiplied by something else, the unknown x . Military science, seeing in history an immense number of examples in which the mass of an army does not correspond with its force, and in which small numbers conquer large ones, vaguely recognizes the existence of this unknown factor, and tries to find it sometimes in some geometrical disposition of the troops, sometimes in the superiority of weapons, and most often in the genius of the leaders. But none of those factors yield results that agree with the historical facts.

One has but to renounce the false view that glorifies the effect of the activity of the heroes of history in warfare in order to discover this unknown quantity, x . X is the spirit of the army, the greater or less *[sic]* desire to fight and to face dangers on the part of all the men composing the army, which is quite apart from the question whether they are fighting under leaders of genius or not, with cudgels or with guns that fire thirty times a minute.¹

The very survival of a nation sometimes depends on the complex endeavor of war. To place war in context, I will investigate a few past theories concerning the moral domain and then explore a model applicable to the twentieth-century combat pilot. But how does one study war? Gen J. F. C. Fuller, a twentieth-century British military theorist, provides some fruitful insight into how to study war.

J. F. C. Fuller's Moral Domain

Gen J.F.C. Fuller systematically developed a method of analyzing war. He based war theory on three domains: the physical, the moral, and the cognitive (fig. 2). The hardware or tools of war compose the physical domain. Airplanes, air-to-air missiles, and bombs are examples of some of these tools. The cognitive domain includes intellectual endeavors with the expressed purpose of defeating an adversary. Within this domain, a nation develops war plans based on assumptions derived from information that frames its perception of reality. Instant Thunder, the Gulf War Allied Air Campaign Plan of 1991, typifies the intellectual function of the cognitive domain. Much more difficulty arises, however, when attempting to codify the moral domain. Within this domain lies the motivation force and other elements that enable military organizations to fight. Will and

capability combine within this domain and result in action. As Tolstoy so eloquently stated, the best weapons, numerical superiority, the most ingenious war plans, and the most adept leadership cannot compensate for the military force that fails to close with and destroy the enemy. The Falklands War serves as a good recent example. The Argentines fielded military force much closer to their mainland, which could operate with shorter lines of logistics support. Also, they possessed some superior weapons technology, such as the Exocet missile, yet their will to fight was less than that of the British.² Notably, the Argentine pilots fought courageously by aggressively attacking the British ships and suffering high attrition rates, but their valiant efforts could not compensate for the less-aggressive spirit of the entire military force employed. The moral domain, therefore, enables the physical and cognitive domains to achieve desired results. Napoléon's own proclamation, that morale exerts a force three times as potent as the physical force, highlights the critical nature of the moral domain to a great commander.³

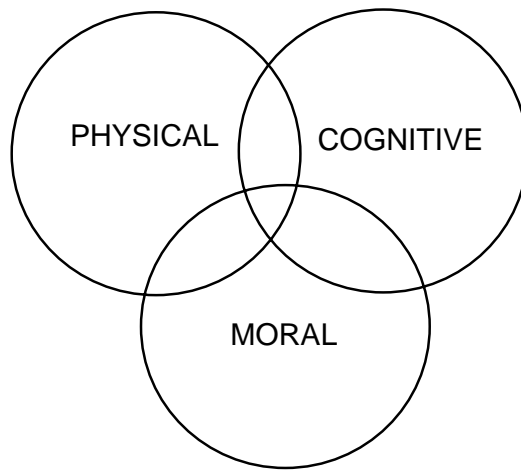


Figure 2. The Domains of War

General Principles and Basic Elements

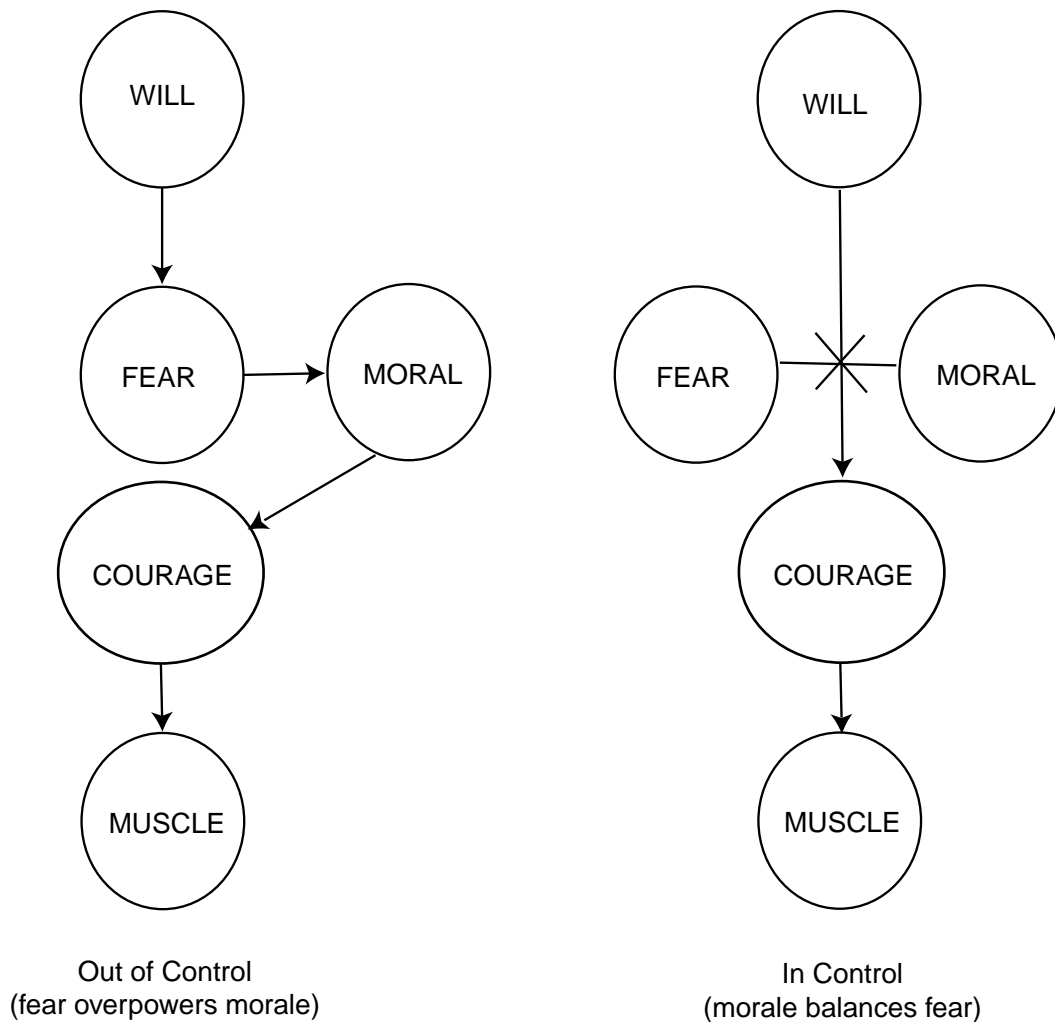
Fuller's treatment and insight into the domains of war form the basis of this study. I will not delve into the intricacies of the cognitive and physical domains since other works extensively cover them, but focus specifically on the moral domain.⁴ Fuller applied the inductive method to study war and recognized three general principles.⁵ The general principles of determination, endurance, and demoralization form the foundation for his moral domain model.⁶ To Fuller, the moral domain manifests itself in a force different than the cognitive and physical domains. When compared

to the physical and mental forces, the moral force at first appears nonexistent; its presence permeates all human endeavors. A pilot cannot fly a bomb run by the moral force alone; however, the pilot cannot fly the bomb run without its contributing force. The moral force holds things together and allows desire and will to combine in order to achieve action. The moral force is not the outcome of the action, but the ability and movement to act. Fuller said, "Though moral is all important in war, it is not a thing in itself, as it is so frequently considered to be, but a link between will and action."⁷ Through reasoning, Fuller goes on to define the realm of the moral domain by specifying its basic parts. He defines the moral sphere as "the domain of the soul, ego, or 'heart.'"⁸

Within the soldier, the sphere of the moral domain manifests itself in the instincts of self-preservation, self-sacrifice, and self-assertion. Those three instincts accentuate the elements of fear, courage, and comradeship through the elements of fear, moral, and will.⁹

Interactions

Investigating the relationship of the moral with the other domains and observing this domain's uniquely internal elements are essential to understanding the nature of the moral domain. The cognitive function of military training serves to "transmute conscious associations into subconscious habits."¹⁰ The physical domain uses repetition of necessary actions to make familiarity with the task second nature. Also, through the cognitive function, courage defeats moral fear through reason while in the physical domain courage defeats fear by physical means.¹¹ With the defeat of moral fear, a soldier's will is carried out in a physical act. However, the soldier needs fear to effectively control his actions. A soldier devoid of fear acts as a maniac. His subsequent irrational acts would probably thwart the military objective and would act as a detriment to his side's operations. A soldier without courage, who fails to close with and destroy the enemy when ordered to do so, equally threatens mission accomplishment. This soldier only feels comfortable striking when absolutely certain he possesses the advantage. The execution of military plans cannot proceed with efficiency in such a case. Thus, a force must exist within the soldier to balance fear allowing him or her to act willfully and courageously. The presence of sufficient fear fosters prudence in carrying out the mission, while courage enables the prompt and effective execution of the military task. Therefore, Fuller balances fear with the moral force--the force consisting of internal fortitude. This force then enables the soldier to disregard self-preservation in the face of danger to accomplish the military objective in a controlled manner. The presence of fear and courage and the balance between fear and morale allow constructive actions. When these elements are out of balance, the soldier subsequently loses control as shown in figure 3.



Source: J. F. C. Fuller, *The Foundation of the Science of War* (London: Hutchinson & Co., Ltd., 1925), 119.

Figure 3. The Balancing of Morale and Fear

Robert Jackson, MD, inspector general of British army hospitals in 1794, outlined a scientific approach of the moral domain:

Habits of practice give, to the soldier, such skill and management in the use of arms in the day of battle, as might be expected to be acquired by experience, in working, in unison, the separate parts of a machine of compound movement. The knowledge and ability, acquired by such experience, aided by a correct direction of powers in general movement, ensure the application of united impulse, at the proper time and in the proper circumstances of action, producing a powerful effect, and a calculable one, as depending upon a uniform rule. It is thus that experience of actual war imprints, upon the soldier, the character of veteran—a courage, arising from knowledge of things, and a consciousness of superiority in the art of applying powers. Such courage is cool and tempered: that of unexperienced troops is impetuous, blind, and headlong—liable to mistake its purpose unless plain and prominent in all its aspects.¹²

To Fuller, courage causes a military to seek victory with determination and not merely to display fearlessness. However, courage requires the support of a purpose.

Fuller postulates that the moral domain reveals itself within the soldier as simply love; moral courage produces love.¹³ This love manifests itself as a love of country in patriotism, respect for leaders in loyalty, confidence in colleagues in comradeship, confidence in self as self-respect, and confidence in arms as skill.¹⁴ This love empowers the soldier to release self-centeredness and sacrifice his own interest to contribute to achieving the group objective. The soldier internally strengthens these virtues if the leadership demonstrates its desire and commitment to preserve his life.¹⁵ In all, the moral domain endows the soldier with a spirit, which enables him to transcend selfishness and accomplish the tasks at hand.¹⁶

Carl von Clausewitz

In particular, Clausewitz places the moral domain of war in context:

[T]he moral elements are among the most important in war. They constitute the spirit that permeates war as a whole, and at an early stage they establish a close affinity with the will that moves and leads the whole mass of force, practically merging with it, since the will is itself a moral quantity.¹⁷

Within his concept of friction, we find the causes of stress in war. Adapting to friction essentially determines success or failure, victory or defeat.

Friction differentiates real war from paper war. When we plan at ground speed zero, we use the luxury of time and a pristine environment devoid of distractions. When flying using the terrain-following radar at 400 feet and 450 knots, the pilot operates in a totally different environment. The stress of high speed, unpredictable weather, and the possibility of a system malfunction allowing an unseen object to unexpectedly enter the aircraft's flight path causes concern. The stress of the actual situation differs from the planning portion of the mission because of the environment. Thus, though everything in war appears very simple, the simplest things are difficult to accomplish.¹⁸ As Clausewitz tells us, "Friction is the only concept that more or less corresponds to the factors that distinguish real war from war on paper."¹⁹ The moral force, then, exerts itself when the individual is under stress and remains inactive until this time.

Generating Stress

The realms of war consist of danger, physical exertion, and chance. Friction permeates these three realms, increasing the difficulty of accomplishing tasks according to plan. As Clausewitz expressed it, "Danger is part of the friction of war. Without an accurate conception of danger we cannot understand war."²⁰

Like danger, physical effort generates friction in war.²¹ Finally, chance or uncertainty concerning plans, the environment, and enemy actions or even actions of friendly military forces cause the combatant stress. The haphazard effects of chance explain why surprise acts as an effective principle of war. Surprise shocks the enemy, knocks him off balance, and keeps him preoccupied, making him susceptible to exploitation. Anything that distorts the plan can cause stress. Also, anything that causes the combatant to hesitate causes stress. All of these factors constitute friction that acts as the genesis of stress in war. Stress necessitates the use of the moral force to balance and neutralize its inhibiting effects and to allow the will to achieve its desired action. Thus, Clausewitz's concept of friction provides some guidance on how and where to look for the moral force in operation.²²

Other Theorists

Numerous other theorists made significant contributions toward understanding the moral domain. Several theorists from both Eastern and Western cultures demonstrate that this view of war did not manifest itself merely as a phenomenon of Western civilization. Nor did this phenomenon recently develop, for Sun Tzu wrote it in approximately 500 B.C.²³ The written evidence of two and one-half millennia suggests that the moral force consistently manifests itself whenever war occurs. Some of these theorists discuss warfare in the modern era.²⁴

Sun Tzu wrote of two key propositions for victory in warfare. He counseled to attack the enemy's plans as the primary objective. Though war plans are a cognitive element, thwarting them profoundly affects the moral domain by increasing the enemy's doubt of a favorable outcome. To achieve success in this endeavor Sun Tzu commanded, "Know the enemy and know yourself; in a hundred battles you will never be in peril."²⁵ Accomplishing these two tasks requires an understanding of the moral domain. Knowing the enemy and friendly forces requires some understanding of the moral force and how it operates because strategists predict future actions based on assumptions. Using Sun Tzu's principles, Mao Tse Tung defeated his Chinese rival Chiang Kai-Shek. He accomplished this with an army inferior in weapons and materiel.²⁶ Mao used the moral force against his adversary's physical force to achieve his war aims, which included preserving his forces while destroying the enemy's.²⁷

French colonel Ardant du Picq also contributed much to the study of the moral domain during the 1860s, writing of Frederick the Great and Napoleonic warfare from the combatant's viewpoint. He concluded that cohesion enabled an army inferior in numbers and weapons to defeat a superior adversary. Du Picq surveyed soldiers in combat to gather the data upon which he based his conclusions.²⁸ To gather data to make conclusions concerning World War II, S. L. A. Marshall updated du Picq's battle-

survey technique. Marshall further refined the analysis of the moral domain and surmised that cohesion could enhance communication and training. He concluded that fear severely degraded moral force effectiveness. Therefore, training needed to prepare the soldier to face this moral fear.²⁹ Finally, Lord Moran, a British physician who became a flight surgeon, observed soldiers in World Wars I and II and British pilots in World War II. He concluded that within the moral domain, courage enabled the combatants to achieve success. Therefore, all activities of the military should contribute to enhancing this courage.³⁰

Combat Pilot Moral Domain Model

The information and analysis gathered by these theorists present the ground soldier's perspective, except for Moran, who also dealt with Royal Air Force pilots in World War II. Only a smattering of writing deals with the airman's perspective. Granted, as mentioned earlier, the airplane, first used in warfare in 1911, only recently entered the profession of arms. However, it also operates in a profoundly different environment. Because of this unique environment, air combatants necessarily require a separate treatment. Ground analogies are not necessarily valid because soldiers move in two dimensions at a much slower pace than ubiquitous airmen who operate at an exponentially greater speed in three dimensions. Since a moral domain model does not exist for analyzing the activities of airmen in war, one is proposed in this study.

Moral Domain Basic Elements

The moral domain for the combat pilot consists of three major areas that are further divided into subgroups where interactions occur between the basic elements. The major areas are relationships to absolutes, others, and self. The relationship to absolutes consists of the pilot's morality, the things he holds dearest—the ineffable factors that are the most difficult to articulate and yet the most profound. Factors such as his view of his responsibility or lack of responsibility to God, what he will die for, and what motivates him when no one else is watching all come into play. His true ideology exists in this realm of the moral domain. Within the relationship to others area exists factors such as cohesion with his contemporaries, views of leadership, and confidence in his equipment and group social approval. Within the relationship to self area exists control, courage, self-confidence, will, and desire. These basic elements come under the stress of distractions, fatigue, and fear, which tend to attenuate the original motivation and aptitude to fly. Therefore, the pilot uses institutionally developed and self-mechanisms to deal with these threats to his fundamental desire to accomplish the mission. Figure 4 illustrates the general moral domain model for the combat pilot.

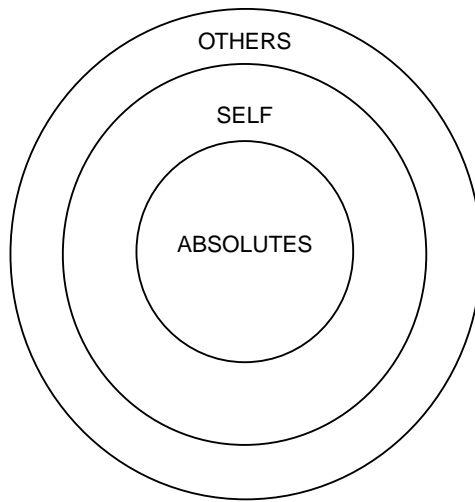


Figure 4. General Moral Domain Model

Interactions

The realm of the pilot hinges on maintaining control in an allotted time. Fuel constraints usually regulate the length of the mission. The aircraft's freedom of movement, in conjunction with its potential for attack from any direction, keeps the pilot continually vigilant. Therefore, the pilot must maintain continuous control to effectively operate in an air environment. Anything that threatens control threatens the pilot and increases the stress of time compression. When an unfamiliar situation arises, the pilot cannot stop monitoring other required tasks. He must now include an additional task within his already busy attention span. As the situation deteriorates, the potential for task saturation increases. Task saturation can potentially cause catastrophic results. The pilot, therefore, must maintain control to successfully accomplish the mission. A finite amount of time, usually dictated by limited fuel, constrains a pilot to promptly achieve a solution to all problems. He cannot wait for inspiration and insight; he must act immediately. Motivation and aptitude are the quintessential requirements for every pilot and serve as the source for all pilot responses.³¹ Even in World War II, one major difference between ground soldiers and airmen was that the airmen were volunteers for combat flying duties.³²

This motivation and aptitude then synergistically produce the desire and will to fly. The pilot maintains desire and will by controlling fear with courage through discipline within a stressful aviation environment filled with distractions. Factors that contribute to courage include self-confidence or competence; mutual trust with contemporaries, superiors, and subordinates; squadron cohesion; and the ability to control fatigue (fig. 5).

Thus, the resultant of the moral domain produces the moral force. The moral force acts to translate desire into action. In congruence with Fuller's

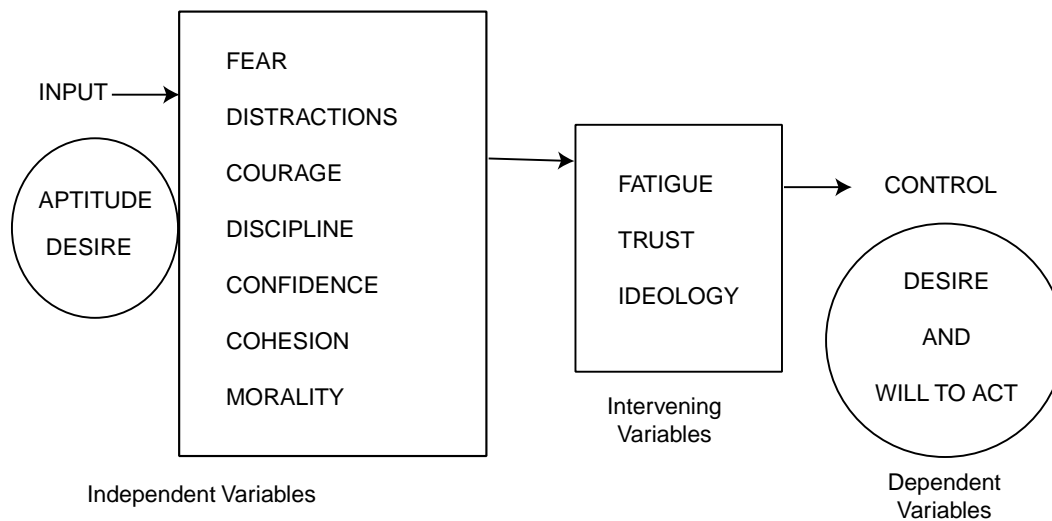


Figure 5. The Moral Domain Factor Interactions Model

theory, this force does not equal action itself, but the potential to carry out an action as well as the execution of the desired act. For example, the moral force enables the cognitive domain's training to combine with the physical domain's strength, which empowers the pilot with the ability to perceive the precise moment to pull back on the stick, which initiates aircraft takeoff rotation, while simultaneously moving the rudder in the necessary manner. On the basis of this context, I sought to explain what sustains pilot motivation while flying in combat. How do pilots maintain focus while numerous stresses seek to break concentration and, ultimately, to defeat them? As noted above, most theorists assume that the same combat motivational forces governing ground soldiers govern airmen. Because the operational environment of the airman differs dramatically from that of the ground soldier, I consider this analogy faulty. However, all men in arms probably share some basic principles in common. This study focuses, therefore, on the specific moral force components that affect the pilot. In the next chapter, I will test the veracity of the theory and the robustness of the model.

Notes

1. Nikolayevich Tolstoy, *War and Peace*, trans. Constance Garnett, vol. 3, pt. 15 (New York: McClure, Phillips, and Co., 1904), 268.
2. Dr. Charles Moskos, review of *Mates and Muchachos: Unit Cohesion in the Falkland/Malvinas War*, by Nora Kinzer Stewart, *Parameters: US Army War College Quarterly*, vol. 22, no. 3 (Autumn 1992): 111.
3. *Military Air Power: The CADRE Digest of Air Power Opinions and Thoughts*, compiled by Lt Col Charles M. Westenhoff (Maxwell Air Force Base [AFB], Ala.: Air University Press, 1990), 152.

4. For a complete treatment of J. F. C. Fuller's exposition of the domains of war, refer to his work *The Foundation of the Science of War* (London: Hutchinson & Co., Ltd., 1925). While Darwinism and fascism negatively influence some aspects of his theory and detract from its viability, overall the theory has merit. Also see Martin van Creveld's *Command in War* (London: Harvard University Press, 1985), and *Technology and War: From 2000 B.C. to the Present* (New York: Free Press, 1989) for a more recent treatment of the cognitive and physical domains respectively.
5. Fuller, 15, 45.
6. Ibid., 15.
7. Ibid., 115.
8. Ibid., 116.
9. Ibid., 117.
10. Ibid., 118.
11. Ibid., 122.
12. Robert Jackson, in Fuller's *The Foundation of the Science of War*, 122; and George Smith, Sir Leslie Stephen, and Sir Sidney Lee, eds., *The Dictionary of National Biography* (London: Oxford University Press, 1917), 542. Jackson studied medicine, eventually became a surgeon, and served with the British army.
13. The Bible in I John 4:18 says, "There is no fear in love. But perfect love drives out fear, because fear has to do with punishment. The man who fears is not made perfect in love." This supports Fuller's line of reasoning at this point in his theory. Though Fuller dabbled in the occult during his adult years, he was the son of an Anglican minister and probably was conversant with the Scripture. The Scripture probably influenced this area of his theory. For further investigation, concerning his background, see "A Memorial Appreciation of J. F. C. Fuller," *Military Affairs*, Summer 1966, 100.
14. Fuller, 123.
15. Ibid.
16. Ibid.
17. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), 184.
18. Ibid., 118.
19. Ibid.
20. Ibid., 114.
21. Ibid., 115.
22. I encourage the reader to explore *On War* in order to gain a full appreciation of Clausewitz's war theory.
23. Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (London: Oxford University Press, 1963), vii.
24. Charles Moskos, "From Citizens' Army to Social Laboratory," *Military and Society* (Winter 1993): 83-94.
25. Sun Tzu, 9, 84.
26. Mao Tse Tung, "Problems of Strategy in China's Revolutionary War," *Six Essays on Military Affairs* (Peking: Foreign Languages Press, 1972), 33.
27. Mao Tse Tung, "Problems of Strategy in Guerrilla War against Japan," *Six Essays on Military Affairs*, 271.
28. The reader should refer to Col Ardant du Picq's *Battle Studies in Roots of Strategy*, bk. 2, Col John N. Greely and Maj Robert C. Cotton trans. (Harrisburg, Pa.: Stackpole Books, 1987) to gain a fuller understanding of how Picq analyzed the moral domain. He discusses ancient warfare along with contemporary warfare for his time, which included the Napoleonic era.
29. S. L. A. Marshall, *Men Against Fire* (Gloucester, Mass.: Peter Smith, 1978), 37-38, 173.
30. Lord Moran, *The Anatomy of Courage*, 2d ed. (Garden City Park, N.Y.: Avery Publishing Group, Inc., 1966) is definitely worth exploring to gain insight into the unique environment in which the pilot operates.
31. Stanley J. Rachman, *Fear and Courage* (San Francisco: W. H. Freeman and Co., 1978), 59.
32. Samuel A. Stouffer et al., *The American Soldier: Combat and Its Aftermath*, vol. 2 (Princeton, N.J.: Princeton University Press, 1949), 324.

Chapter 3

Methodology

To determine analytically the nature of the moral force presents an interesting challenge. In general pilots do not talk about the moral force factors. Since this tendency helps to obscure these elements, devising a method to explore pilots' thoughts explicitly becomes important. A suitable environment to observe the interactions of the moral force components in operation also became essential. Vietnam presented a very appropriate environment because that war possessed certain unique characteristics. The F-105, which flew combat operations during the entire conflict, surfaced as a desirable weapon system for investigation. To obtain information from pilots who flew the F-105 in Vietnam, an anonymous survey based on the pilot combat motivation model developed in chapter 2 solicited their comments. The objective was to determine if the model accurately explains how the pilots dealt with the stresses of combat by comparing predicted behavior with actual behavior.

To balance the highly subjective nature of the survey, I investigated other sources of empirical data. These included unit end of tour reports, flight surgeon records, unit histories, and monographs written by the pilots themselves. This chapter explains how survey data and other supporting evidence, which constituted the empirical database, was used to evaluate the validity of the combat pilot moral domain model.

Vietnam

US vital interests, grand strategy, and military strategy influenced the use of the direct, or ordnance delivering, mode of airpower in Vietnam.¹ The outcome of the war demonstrates that the incorrect use of this mode of airpower failed to achieve US political goals. I conclude that this effort failed because the political decision makers formulated a faulty strategy that never established a link between military means and desired political outcomes. Thus, the frustration of attempting to execute an ineffective strategy created a high-stress environment for the combatants who saw operational and tactical errors resulting from that strategy and paid the high price in blood because of it. This stressful environment created an opportunity in which to observe the moral force motivational factors, which underwent stimulation and remained active in the combatants for the entire conflict.

The United States fought the Vietnam War in an attempt to contain communism.² The US Air Force, prepared to combat communism directly, felt convinced it could effectively fight a limited war. Therefore, communist

aggression within developing nations did not appear to present any major problems, since the prevailing logic assumed that the ability to fight a total war necessarily meant that a nation could prosecute a limited war.³

The Air Force incorrectly analyzed the Korean War when it considered that war an aberration. This blinded the Air Force to the volatile and complex nature of limited war.⁴ The Air Force never really accomplished the required peacetime planning necessary to prosecute a war of this nature. Therefore, viewing the festering insurgency in South Vietnam as instigated and supported by North Vietnam, an instrument of monolithic communism, the Johnson administration responded to block the insurgency.⁵ In 1965 the South Vietnamese Army with its American military advisors was not capable of accomplishing a successful ground campaign. So, President Lyndon Johnson turned to airpower as the means to carry out the military strategy necessary to achieve his political aims.⁶

Grand Strategy

President Johnson believed he could achieve the political objective of securing South Vietnam if the North Vietnamese stopped supporting the insurgency in the South. He theorized that if he applied sufficient pressure on North Vietnam, the insurgency would cease, and the South's government could then strengthen, reform, and protect itself. The constraints of avoiding Red Chinese or Soviet intervention while assuring the success of his domestic agenda caused President Johnson to search for an economical method to achieve his goals.⁷ He chose airpower because initially its use did not appear to mandate a ground commitment, and he could regulate its intensity.⁸

This plan of action resulted from the American perception that the enemy would behave as a Western nation. The air strategy aimed at gradually increasing the punishment level, demonstrating US ability to inflict greater damage.⁹ This punishment strategy intended to coerce the North Vietnamese to cease their support of South Vietnam's insurgents.¹⁰ If Hanoi did not comply, it risked incurring increasing damage inflicted on its people, economy, and military forces. If the strategy worked, the North Vietnamese would receive the signal and stop supporting the insurgency.¹¹ Gradually executing this plan would not alarm the communists into thinking that the United States desired to overthrow the North Vietnamese regime and minimize risks of Chinese or Soviet intervention.¹²

Military Strategy

Air Force strategy in 1965 was a subset of massive retaliation strategy and could not be used to effectively fight a limited guerrilla war.¹³ President John F. Kennedy had embraced Gen Maxwell Taylor's flexible response strategy as a solution to rectify this problem.¹⁴ President Johnson

used this strategy in the form of gradualism to coerce North Vietnam to stop supporting the insurgency in South Vietnam.¹⁵

The Air Force sought to systematically bring sufficient power to bear on the enemy so that he would see the American willingness to destroy selected military targets in North Vietnam. Relying on standard operating procedures, Air Force planners proposed targets threatening the industrial base to degrade war-making capability.¹⁶ President Johnson intended these attacks to change North Vietnamese behavior. He restricted this punishment strategy through the following methods: extensive rules of engagement, tight control over the frequency of bombing, and personal selection of targets.¹⁷ These constraints emanated from his major negative political objectives.

Mode of Airpower

The resulting mode of direct independent airpower named Rolling Thunder resulted in an interdiction bombing campaign initially designed to bring about the desired political objective through airpower alone.¹⁸ Using the domains of war, this paper will illustrate some salient factors related to obtaining this objective.

Physical components of this strategy consisted of the F-105 fighter-bombers, which dropped conventional bombs on North Vietnam. In theory, this approach increased North Vietnam's cost of supporting the insurgency. The match between aircraft attacking military and industrial targets with conventional general-purpose munitions appeared proportional and logical and, therefore, adequately matched strategy with means *provided* the enemy viewed US efforts in a like manner.

Within the cognitive domain, the United States's desire to thwart North Vietnam's support of the insurgency by raising the cost of the effort seemed less satisfactory. Secretary of Defense Robert S. McNamara's direction to the Joint Chiefs of Staff to institute a program of "graduated overt military pressure" demonstrated a lack of insight into the nature of the problem. Little evidence exists that proves the Johnson administration understood the insurgency.¹⁹ The administration assumed a solution by projecting Western characteristics upon the adversary.²⁰ The negative political objectives of avoiding Chinese or Soviet intervention, protecting the "Great Society," and maintaining favorable world opinion gave rise to the gradual response strategy. Finally, an unsatisfactory moral contest of US will to inflict damage against Hanoi's will to continue its effort resulted. The US leadership did not adequately establish the link between the North Vietnamese and the insurgency.²¹ Therefore, American leaders never explicitly determined the necessary conditions that sparked the insurgency. Even as originally conceived, the signaling plan did not convince the North Vietnamese of US resolve because the low bombing intensity and frequency did not critically affect them. Finally, President Johnson and his

advisors did not discern the moral factors influencing the viability of the South Vietnamese government. Any efforts that would strengthen these factors could help to legitimize the government in the eyes of the Vietnamese people and eliminate a lucrative source of political exploitation for the insurgents. Thus, they carried out a seriously flawed plan.²²

In the case of Operation Rolling Thunder, the US effort failed. The military strategy did not adequately support the positive political objective.²³ The direct and independent use of airpower against North Vietnam did not significantly affect the insurgency in the South.²⁴ It probably strengthened the enemy's will to resist while the United States supported an increasingly unstable South Vietnamese government.²⁵ Rolling Thunder failed because the Johnson administration did not link the use of airpower to the desired political outcome of an independent, stable, and free noncommunist South Vietnam. Faulty strategy at the top, coupled with indecision, adversely affected American pilot morale. Such actions ultimately increased tensions in the cockpit.

F-105 Characteristics

To adequately test the combat pilot motivation model required holding the cognitive and physical war domain variables constant. This would reveal how moral domain factors contributed to behavior. Since Vietnam's restrictive environment provided a fertile example of stress in a macro sense, the necessity arose to find a weapon system where the interactions of the moral domain factors interacted in a micro sense. The F-105 fulfilled the criteria. The domains of war serve as a tool to illustrate the uniqueness of this weapon system.

Limiting the study to one type of combat aircraft fixed the physical domain factors effecting this study. This eliminated the problems associated with equating different types of weapon systems while attempting to determine how they affected the pilots in combat. The F-105 Thunderchief, or more affectionately the "Thud,"²⁶ had longevity. The Thud flew the entire duration of the Vietnam War. As a primarily single-seat fighter, it allowed a less complex examination of one individual as opposed to the interactions of multiple crew members. This factor enabled a close investigation of stress effects and direct response of a single individual not attenuated or modified by the presence of others in the same aircraft. Though the "Wild Weasel" mission involved two crew members in a dual-seat fighter detecting and directing efforts to suppress enemy radar-guided ground defenses, this study focuses on the single-seat mission. Framing the problem in this manner enables a full investigation of the moral domain factors present in the pilot and how the factors affected his response to this stressful environment. The Thud also flew the same air-to-ground mission during the conflict. The absence of multiple primary missions obviated the need for diverse training and separate squadrons

with different primary missions. Notably, the Thud downed MiGs in air-to-air combat and also flew some close air support along with other important missions, but it primarily flew strikes against targets in North Vietnam. Consistent mission training produced a homogenous pilot cadre with common experiences. These two situations fixed the cognitive domain elements for the F-105 pilot and nullified any variations in behavior stemming from its effects.

The Combat Pilot Motivation Survey

The survey served as the primary means of determining the validity of the combat pilot moral domain model. Appendix A contains a copy of the survey. The objective proposed to gather analytical data relating the attitudes, perceptions, and behavior of pilots in combat. If accurate, the empirical data gleaned from the survey should verify the model. If not, corrections to the model should enable it to more accurately explain the data. The survey consisted of eight sections covering the pilots' attitudes toward combat operations, the aircraft, colleagues, background, and any other comments they desired to make. To obtain representative results, this study sought as large a number of these pilots as possible. The "River Rats," a fraternal organization of pilots who flew in North Vietnam, provided the means to obtain a large sample of aviators.²⁷

The survey questions resulted from the variables in the combat pilot moral domain model developed in chapter 2. Each question represented a unique variable. Theory guided the determination of interactions between the variables. Questions concerning fear, a major source of stress, were developed from the Peter Lang three-system model of fear.²⁸ This robust model investigates mental apprehensions, physiological responses, and emotional responses to fear and not simply a single-variable response. To discriminate between subtle differences in attitudes and behaviors, the survey contained Likert scales, which allow the respondent to differentiate between slight differences in attitude.²⁹ In some cases the survey also included Guttman scales, an even more precise attitude discriminator, to determine relationships between variables.³⁰ The survey questions also asked the pilot to differentiate between the beginning, middle, and end of his combat tour so as to determine how he adapted over time.

The survey also collected extensive background information. This data provided the pilot's profile, which the survey then used to determine how the educational, military, and aircraft training background related to combat attitudes and behavior. Some questions asked if the pilot experienced any aircraft damage, injuries, or internment as a prisoner of war while in combat. Finally, the last section provided short-answer questions to allow the respondent the chance to address any area omitted. Because the moral domain consists of many areas that a pilot generally does not like to discuss, the respondents remained anonymous. Anonymity, it was also

hoped, would increase participation. A statement at the end of the survey encouraged those who desired to write additional comments. By this method, if a major omission occurred, the veteran could make his opinion known. Comprehensiveness guided the design of the survey with intentions not to make it exhaustive.

Other Empirical Evidence

Because the perception of what actually happened during historical events tends to decrease in accuracy with time, the survey asked general questions not dealing with minute detail. To verify the subjective opinions and perceptions of the survey respondents, the analysis relied on other sources. These sources included unit end of tour reports, flight surgeon records, unit histories, and monographs written by the veterans themselves. Since the pilots wrote them during the war, these information sources do not tend to embellish results that could potentially influence accuracy; however, they could include some biases. Some sources, such as the flight surgeon reports, came from outside observers who possessed firsthand experience and familiarity with operations. Their detached status allowed for greater objectivity. These sources helped to establish the accuracy and reasonableness of the survey results. The stronger the correlation between the different data sources, the more convincing the results.

Notes

1. Mark Clodfelter, *The Limits of Air Power* (New York: Free Press, 1989), ix-xii.
2. Bernard Brodie, *War and Politics* (New York: MacMillan Publishing Co., Inc., 1973), 119; and John Schlight, *The War in South Vietnam: The Years of the Offensive 1965-1968* (Washington, D.C., Office of Air Force History, 1988), 2.
3. Clodfelter, 30.
4. Brodie, 106-7, 177-79; Bernard Brodie, *Strategy in the Missile Age* (Princeton, N.J.: Princeton University Press, 1965), 311, 314, 356; and Schlight, 33.
5. Douglas Kinnard, *The War Managers* (New York: Da Capo Press, Inc., 1979), 23; and Clodfelter, 40.
6. Schlight, 22.
7. Clodfelter, 43-44; and Schlight, 22-23.
8. Adm U. S. Grant Sharp, *Strategy for Defeat: Vietnam in Retrospect* (Novato, Calif.: Presidio Press, 1978), 268.
9. Clodfelter, 60, 69, 71.
10. Thomas C. Schelling, *Arms and Influence* (New Haven: Yale University Press, 1966), 69-91, 148-49, 151.
11. Wallace J. Thies, *When Governments Collide: Coercion and Diplomacy in the Vietnam Conflict 1964-1968* (Berkeley, Calif.: University of California Press, 1980), 4.
12. Brodie, *War and Politics*, 190; and Schlight, 61.
13. Brodie, *War and Politics*, 105, 121.
14. Schlight, 3.
15. Brodie, *War and Politics*, 125.
16. Graham T. Allison, *Essence of Decision* (Cambridge, Mass.: HarperCollins Publishers, 1971), 81-83.

17. USAF Oral History interview of Col Henry H. Edelen by Maj Samuel E. Riddlebarger and Lt Col S. Bissell, 27 January 1970, Air Force Historical Research Agency (AFHRA), no. K239.0512-243, 1-6, 15-17, 24-26; and Clodfelter, 86.
18. Schligh, 16.
19. Clodfelter, 71.
20. Brodie, *War and Politics*, 158.
21. Ibid., 141-42; and Schligh, 291.
22. Brodie, *War and Politics*, 164.
23. Sharp, xiii, 271.
24. Brodie, *War and Politics*, 179.
25. Ibid., 164, 168.
26. Jack Broughton, *Going Downtown: The War against Hanoi and Washington* (New York: Orion Books, 1988), xiii.
27. Mark Clodfelter and Barry Craig, *Red River Valley Fighter Pilots* (Paducah, Ky.: Turner Publishing Co., 1989), 27.
28. Stanley J. Rachman, *Fear and Courage* (San Francisco: W. H. Freeman and Co., 1978), 2.
29. Wayne K. Kirchner, "The Attitudes of Special Groups Toward the Employment of Older Persons," *Journal of Gerontology*, vol. 12 (1975): 216-20. Refer to appendix A, survey question A, sect. 1, Combat Operations, for an example of the Likert scale.
30. Norman Nie, Dale H. Bent, and Hull C. Hadlai, *Statistical Package for the Social Sciences* (New York: McGraw Hill, 1970), 529; and Raymond L. Gordon, *Undimensional Scaling of Social Variables* (New York: McMillan, 1977), 46. Refer to appendix A, survey question J, sect. 1, Combat Operations, for an example of the Guttman scale.

Chapter 4

Survey Results and Analysis

F-105 veterans returned 173 of the 236 surveys sent out. This exceptional response rate of 73.3 percent established the analysis database. This chapter discusses the survey analysis and presents its findings. Flight surgeon aeromedical evaluations and unit end of tour reports, as well as postwar monographs, corroborate survey findings. Based on the surveys received, it is argued that the behavior of F-105 combat pilots adheres to a pattern. Since the cognitive and physical domain variables remain constant for this study, the pilots' behavior patterns derive from the moral domain. This analysis demonstrates the existence and effect of the moral domain of war on pilot behavior during combat operations.

Survey Data Extraction

The survey included responses from former officers, ranging from lieutenants to full colonels, who had flown combat in Vietnam. Experience levels consisted of recent undergraduate pilot-training graduates, as well as seasoned fighter pilots with numerous hours.¹ Some respondents had even participated in World War II and the Korean War.² A total of 169 respondents flew over North Vietnam with an average of 92 missions each. The respondents participated in combat operations spanning from 1965 until 1973. The majority of the respondents had combat tours in 1966. The wide cross section of respondents made data skewing less likely. Once returned, the survey data fell into one of three categories.³ The first category, the analytical portion contained in sections I-IV of the survey, included numerical responses to the questions. The second category, sections V-VII, contained the profile or background data on each respondent. The last category consisted of short answers to questions listed in the back of the survey in section VIII and any marginal notes or additional comments made by the respondents. This last survey section contained the attitudes of the respondents and offers a wealth of information. The analysis focuses primarily on sections I-IV; examining the other two sections lies beyond the scope of this study.

The Statistical Package for the Social Sciences (SPSS) is used to interpret the survey's first four sections.⁴ This computer program determines the existence of principal component factors inherent in a body of data and gives insight into the strength of the correlations or interrelationships between those factors. As mentioned earlier, the survey contained questions developed from the theory of the moral domain of war. Each question related to one of the elements of the proposed combat motivation model and also represented a unique variable. These variables in the raw data

form establish the foundation for interpretation. The SPSS routines evaluated the veracity of the pilot motivation model and the associations between the elements presented in chapter 2. SPSS, a powerful statistical analysis program, provides numerous capabilities that include determining the number of cases in each variable category, calculating variable averages, determining associations among variables, determining variable correlations, accomplishing regression analysis, and creating tables and graphs.⁵ Information extracted from the survey constituted the analysis data for the SPSS program. A unique computer program in SPSS syntax was created to extract the combat pilot survey data. The computer program extracted the raw data from the surveys and then used the SPSS principal component factor analysis procedure. This procedure used the Pearson r technique to determine whether the variables were associated in the manner that the model in chapter 2 predicted.⁶ This process produced the evidence necessary to evaluate the validity of the combat motivation model.

Predicted Results

The combat pilot motivation model illustrated in chapter 2 postulated the existence of 13 elements that govern the pilot's behavior in combat. These elements predict pilot response as presented in the following relationship. An input element consisting of motivation and aptitude results in the desire and will to fly.⁷ The pilot maintains this desire and will by controlling fear with courage through discipline within the hazardous combat environment. Distractions may also deter the pilot from successfully accomplishing the mission. The elements of mutual trust, cohesion, and the ability to control fatigue enhance courage and self-confidence or competence. Finally, the model output, control, or the desire and will to act determines which behavior the pilot manifests (refer to fig. 5).

In a "perfect" environment, the input of motivation and aptitude would translate directly into the pilot's desire and will to act. Mere desire would equate to action. However, real-world inputs tend to attenuate the initial input and transform this simple relationship into a much more complex one.

In a balanced process, the initial input signal maintains sufficient strength to allow the pilot to maintain control. In an unbalanced process, fear overcomes courage and jeopardizes control. In severe cases a pilot experiences loss of control that usually ends in catastrophe. In the final analysis, some usefulness can result from knowing which variables affect pilot behavior in combat and to what degree. These relationships, for example, provide some insight for developing training methods and tactics.

Results

SPSS determined the data contained 12 of the original 13 elements mentioned in chapter 2 that possessed statistically significant relation-

ships. The statistical significance of the Pearson *r* analysis determined the strength or weakness of the interrelationship between factors. This analysis considered a range of .0000 to .0009 as an indication of a strong interrelationship and a range of .0010 to .0099 as a weak interrelationship. A value of .0000 equated to perfect statistical significance meaning that the factors shared mutual effects indicating the strongest possible interrelationship. This analysis considered anything greater than a value of .0099 as insignificant or no interrelationship between factors.⁸ Another method of interpreting the statistical significance lies in recognizing that the smaller the number, the more unlikely the correlation between variables occurred by chance. At .0000, however, there is a greater possibility that chance produced the observed outcome. At .0100, however, there is greater possibility that chance produced the observed outcome. These factors, therefore, constitute the elements of the combat pilot motivation model. Table 1 lists the SPSS analysis results of the survey data. Appendix B contains graphs illustrating the factor interrelationships for this study.

Table 1
SPSS Survey Analysis Results

FACTOR INTERACTION	SIGNIFICANCE	PERCENTAGE OF EFFECT
INPUT X COURAGE	.0055 w*	5.77%
INPUT X TRUST	.0047 w	7.30%
INPUT X MORALITY	.0002	9.85%
INPUT X CONFIDENCE	.0000	19.89%
INPUT X CONTROL	.0000	15.14%
FEAR X COURAGE	.0000	19.38%
FEAR X TRUST	.0074 w	7.96%
FEAR X FATIGUE	.0000	29.17%
TRUST X CONTROL	.0071 w	6.52%
FATIGUE X DISTRACTION	.0000	15.77%
DISCIPLINE X IDEOLOGY	.0038 w	6.99%
MORALITY X IDEOLOGY	.0005	8.96%
DISTRACTION X IDEOLOGY	.0055 w	5.87%
CONTROL X IDEOLOGY	.0000	17.02%
CONFIDENCE X CONTROL	.0000	13.86%

*w - weak interaction significance

Appendix B contains graphs illustrating the factor interrelationships for this study.

The results of this analysis yielded different relationships between the elements than originally theorized in chapter 3. Therefore, the original model inaccurately explained the survey results. Modifications of the variable relationships alter the original model to alleviate this inaccuracy. Figure 6 illustrates the new pilot combat motivation model based on the survey results. An investigation of each factor determined by the survey results follows.

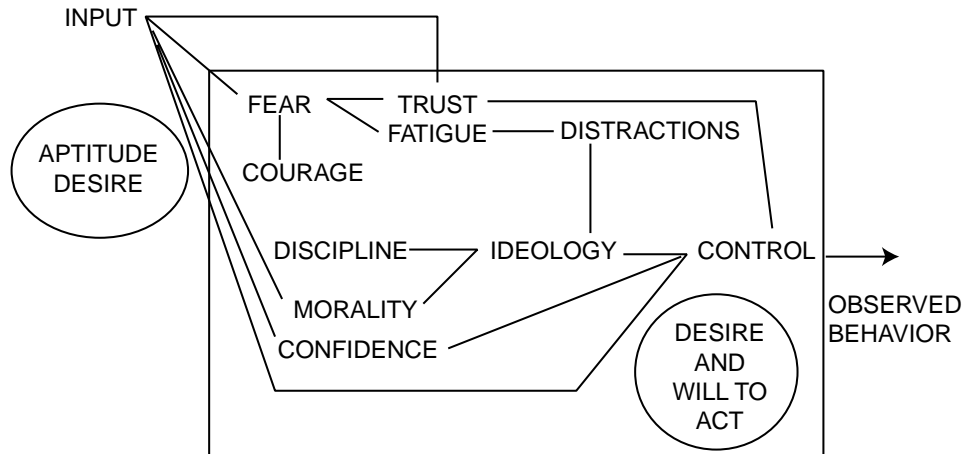


Figure 6. Survey-Derived Combat Motivation Model

Factor Analysis

Input

The factors of motivation and aptitude comprise the input element. As determined during World War II, all qualified military pilots possess these two factors.⁹ Logic supports this finding because pilots will not graduate from pilot training if they lack the motivation to fly or if they do not possess the cognitive ability or physical coordination required. Many pilots commented in the survey concerning their strong desire to fly from their early childhood years. Input, therefore, acts as the combat pilot motivation model's entering element.

Fear

Because of this element, the pilot "feels anxiety and agitation caused by the presence or nearness of danger, pain, dread, terror, fright, or apprehension."¹⁰ SPSS detected the presence of multiple factors relating to fear.

In this study fear acts as the major source of stress in combat. This key variable excited the other factors to respond and not remain dormant. Just as the three-systems model of fear developed by Peter Lang explained behavior more accurately than the lump-sum model, the survey data revealed that there may exist a more definitive model of fear.¹¹ Refining the element of fear may give rise to other obscure nuances that might more accurately explain combat pilot behavior. As mentioned earlier, the survey developed from the model used Lang's physical, physiological, and mental responses to fear. Perhaps distinct subdivisions lie within each of these categories. Or possibly, a totally new paradigm in fact exists.

Ninety-six percent of the respondents stated they had fear. Flight surgeon monthly aeromedical reports written during the war verified this finding. A flight surgeon wrote of seven ejections in one unit with only five recoveries during July 1967. The following account insightfully illustrates the stressful combat flying environment in which fear operated.

On 2 July, an F-105 pilot ejected over North Viet Nam after his aircraft was hit by ground fire. While descending in his parachute he noted that villagers were running towards him, and he was able to slip his chute away from the enemy in the direction of some hills. After landing, he heard the sound of shouting and gunfire from the valley below, and immediately took cover in thick underbrush approximately 50 yards from his parachute. Within minutes, the area was surrounded by armed villagers, some of which [sic] were 20 feet away from the pilot's hiding place. A rescue effort was begun, but was called off because of darkness. The pilot spent the night hiding under the thick brush, while the villagers continued their search. At dawn, the rescue aircraft returned. They had difficulty communicating with the pilot because he was unable to raise his radio antenna or speak above a whisper for fear of giving away his position to the enemy. He stated that the hiss of the radio was unusually loud, and he was forced to turn it off several times due to the proximity of the North Vietnamese. After fourteen hours on the ground, the pilot was rescued by a CH-3C crew. There were no injuries from ejection or evasion, and the pilot reported only fatigue.¹²

Author and retired USAF Brig Gen Kenneth Bell, who flew combat as a major, noted that from 1965 to 1972 321 F-105s were lost in combat out of 833 built. During 1966 alone, 111 of these aircraft were lost.¹³ This high-attrition rate definitely caused fear. It affected the pilots because friends died around them continuously over the one-year or one-hundred-mission tour. Each pilot knew he might be next to meet his demise, but the majority did not dwell on this point. The following comment made by the director of base medical service at Korat Royal Thai AFB (RTAFB), Thailand, supports this proposition:

The prevalent bad weather over the past month has provided a much needed respite from the grim losses of October and November [1967], with an according rise in the spirits of the strike air crews. It must be remembered that crews now in mid-tour have made half of their missions in high risk areas and had quite reasonably began to feel "there is no way" to finish a hundred missions. The chance to acquire "counters" in lower risk areas during this period has allowed them again to feel, as a man must in this type of encounter, that they can reasonably expect to survive. Given the current condition, I feel that the fear of flying case will remain an isolated one.¹⁴

Courage

This element combats fear and enables the pilot to compartmentalize it or simply put it in a box out of his conscious thoughts while flying the mission.¹⁵ The courageous manifest “the attitude of facing and dealing with anything recognized as dangerous, difficult, or painful, instead of withdrawing from it.”¹⁶ Self-preservation logic infers that only the abnormal person willfully places himself in danger of death. Therefore, the F-105 pilots overcame the natural tendency to avoid danger and, in fact, embraced it when they flew their hazardous missions.

A flight surgeon’s report noted on 30 April 1967 that an F-105 pilot was admitted to the Clark Air Force Base Hospital in the Philippines due to “an acute depressive reaction during his trip through Jungle Survival School.” After treatment the Air Force granted him a waiver to fly in combat.¹⁷ On the next report four months later, the flight surgeon stated, “The F-105 pilot referred to in the report for the period March through April [1967] who received a waiver for an acute depressive reaction has since completed 100 missions over North Vietnam. During his tour he performed very well and distinguished himself in combat.”¹⁸

This account illustrates how a pilot overcame fear. His subsequent actions demonstrated courage, an element prevalent among the Thud pilots.

Trust

Pilots working together manifest trust because they possess a mutual firm belief or confidence in the honesty, integrity, and reliability of each other.¹⁹ Successful mission accomplishment depends on trust. Many respondents stated that survival in the target area depended on mutual support. They trusted the other formation members to carry out their respective responsibilities to the flight. For example, each pilot knew that after weapons release he must leave the target quickly to minimize vulnerability to the strike flight by rendering mutual electronic countermeasure support.²⁰ Without trust the pilots could not achieve mutual support.

Fatigue

Fatigue insidiously affects the pilot. It causes “physical or mental exhaustion, or weariness.”²¹ Vietnam flight surgeons defined fatigue as “that condition characterized by a detrimental alteration or decrement in skilled performance.”²² The pilot may not detect fatigue initially and may need another person to indicate its presence to him.²³ Because of the prolonged nature of the Vietnam War, the pilots strongly experienced the effects of fatigue. Fatigue can also affect the pilot for an extended period of time if he cannot attain adequate rest. The flight surgeons warned that without adequate rest chronic fatigue could eventually develop. Survey respondents commented that many times pilots did not desire to take an R&R (rest and recovery) break because they desired to fly their one hundred missions and complete their tours in the minimum amount of time.²⁴

Discipline

Through discipline a pilot manifests “self-control, orderliness and efficiency.”²⁵ Disciplined pilots adhere to common procedures and practices. This enhances teamwork by establishing a common baseline of expected behavior. Discipline allows squadron pilots to fly with various flight members on different occasions and still achieve the same high mission-success rate. Col Michael C. Horgan, commander of the 355th Tactical Fighter Wing, stated that the pilots achieved maximum effectiveness by maintaining discipline and flight integrity over the target area.²⁶

Morality

The pilot manifests morality in “the character of being in accord with the principles or standards of right conduct.”²⁷ In order for a pilot to maintain an effective working relationship with other squadron members, he must exhibit satisfactory professional conduct. In Vietnam the F-105 pilots would meticulously prepare for the mission to enable themselves to handle multiple contingencies. Several respondents indicated that this practice occupied their minds and kept them from dwelling on the more negative aspects of combat. Some of the respondents who led strike missions implied that this practice allowed them to do all they could to preserve the lives of their flight members. Through morality these men strengthened their relationships with others based on personal expectations. Some drew on a relationship to God, while others strove to live up to expectations of others and of themselves.

Retired Air Force Col Jack Broughton, former 388th Tactical Fighter Wing vice wing commander, Takhli RTAFB, records in his book, *Thud Ridge*:

Although I never bothered to inquire into the religious habits of my pilots, I was impressed by the numbers who made it to the chapel for one service or another, and I can tell you for sure there are very few atheists in the arming area. When you watch comrades fall from the sky day after day, you realize that it is going to take some help and guidance from a level above your own to hack the course.²⁸

Distractions

Anything that diverts or draws the mind away from the primary objective distracts the pilot.²⁹ The combat mission environment contains many distractions ranging from unexpected weather to the appearance of an enemy aircraft attempting to disrupt the strike flight. When fatigue begins to thwart compartmentalization, even situations on the ground can distract the pilot while flying.

Ideology

Ideology also governs conduct through “the doctrines, opinions, or way an individual thinks.”³⁰ Ideology, though seldom discussed among pilots,

strongly influenced the survey respondents who indicated that they flew in Vietnam because they were expected to. They had trained to fly and fight, and now they would carry out the task. Their professional expectation superseded any other thoughts they had concerning the conflict. This corporate ideology fostered a positive working relationship among the pilots. Even when their attitude reflected bewilderment and anger toward the president and the secretary of defense, their behavior remained consistent with carrying out the combat mission based on principle.³¹

Confidence

A common belief holds that all pilots possess self-confidence. However, the survey respondents stated that some of the best talkers in peacetime did not live up to their bombastic pronouncements under wartime conditions. Yet, some of the more quiet pilots truly rose to the challenge of Vietnam. Confidence then consists of a "firm belief, the fact of being or feeling certain; assurance."³² Confidence strongly enables the pilot to maintain control. Most survey respondents expressed confidence in the aircraft and their personal ability to accomplish the mission.

Control

Control "exercises authority over, directs or commands."³³ All pilots must possess and maintain this element. This critical ability allows the pilot to employ the aircraft in the way he desires, precisely when he needs it to respond. The control of the flight leader extends to conducting the flight according to plan. Unit leaders exercise control over the individuals under their command to carry out the unit mission. By controlling immediate surroundings, the pilot seeks to control the current situation. All behavior of the pilot in combat relates to control.

Cohesion

Cohesive people tend to stick together.³⁴ Pilots possess a high degree of esprit de corps, gained during training and longevity in the profession. Thus, sticking together naturally occurs.

Model Element Interactions

This study interestingly revealed that cohesion did not show a relationship to any of the other factors. Trust and competence appeared important, as expected, but not cohesion. One possible explanation relates to the nature of pilots flying in combat. Strike flight members must possess mutual trust and view each other as competent, especially the flight leader. However, one does not necessarily need to prefer to associate with every member of the flight. The time interval covering mission accomplishment involves a realm much different than nonmission-related ground operations. Cohesion logically helps flight members get along; however, trust

and competence affect operations much more profoundly. Appendix B shows that cohesion did not correlate to any of the other model elements.

Another possible explanation may relate to the nature of the pilots' deployment. The F-105 pilots lived in an isolated location with no alternatives to continuous close association with each other. Many commented in the survey that the base officers' club, where everyone gathered, provided the only alternative to their quarters for relaxation. Cohesion among these pilots may have remained constant and therefore did not vary. In that case the survey may not have detected it. Some consider mutual trust and esprit de corps as parts of cohesion.³⁵ However, this broad assumption does not precisely define cohesion and, therefore, does not satisfy the requirements of this study.

Another important discovery involves factor determination. SPSS revealed many more factors inherent in the survey than originally suspected. This analysis grouped related factors into the model elements and looked for interrelationships. Assumptions based elements on specific questions and, therefore, could not arbitrarily change after data interpretation without valid reasoning. This implies that more factors affecting pilot behavior exist, buried within this analysis. The evidence database thus provides fertile ground from which to glean these other factors and to develop a more robust model.

Based on the survey data and the logical construct from chapter 2, the following proposition demonstrates how the revised model illustrated in figure 6 explains the behavior of pilots in combat. The pilot motivated to fly encounters fear. Courage offsets fear and allows the pilot to compartmentalize it. Trust enhances, while fatigue tends to obstruct, the compartmentalization of fear. Distractions indirectly inhibit the compartmentalization of fear by increasing the effect of fatigue. Discipline helps maintain ideology, which in turn helps to mitigate the injurious effects of distractions. Ideology directly affects the pilot's ability to maintain control, the desired end state. Input indirectly enhances the pilot's control by strengthening morality, which also enhances ideology. Input directly supports confidence, which enhances control. Finally, input directly affects control. In a balanced situation, the pilot maintains the initial input motivation and aptitude, which results in the desire and will to act. This desire and will manifest themselves in the pilot's actions or behavior. Under stress the negative factors associated with fear, fatigue, and distractions work to destroy the pilot's ability to maintain control. In any situation where the pilot cannot compartmentalize fear, control is also jeopardized. This results from a severe decrease or total elimination of either the desire or the will to act.

Survey Critique

Several factors constrained this analysis.³⁶ The survey size limited the number of questions asked. The question concerning alcohol, poorly writ-

ten, confused many of the respondents. Aside from these responses, the evidence strongly supports the existence of a pattern of behavior manifested by the F-105 veterans. The model derived from the survey analysis represents one interpretation of the data. Other empirical evidence corroborates these findings.

Other Empirical Data

Flight Surgeon Aeromedical Reports

These reports portray in detail some of the combat stresses the F-105 pilots endured. Flight surgeons monitored the physical and mental health status of the flying personnel. Specifically, they informed unit commanders if any abnormal trends developed among the pilots. Since the flight surgeon also investigated and debriefed any pilot involved in an ejection, these reports record the event accurately because the flight surgeon wrote them immediately after the pilot returned. Therefore, these reports written closely in time to the actual event serve as a highly credible information source. Some other pertinent themes discussed in these reports included pilots who responded adversely to the stressful environment, aircraft mishaps, deaths, pilots missing or killed in action, and overall pilot morale.

End of Tour Reports and Unit Histories

These documents give the reader a chronology of events the unit experienced and the perception of the commander. Written during the war, these documents serve as a source of primary information. They revealed useful insights explaining what specifically happened during the conflict.

Monographs

Writings reconstructed from personal diaries give a perspective not usually accessible to individuals outside the unit. These firsthand accounts record the perceptions of the individuals who experienced combat. The monographs provide an invaluable source of information.

The strong agreement between the survey data and the historical evidence indicates that the combat pilot motivation model explains what most strategists and decision makers consider imponderable. This survey allowed an analysis of the moral domain of war, not necessarily exhaustively, but rigorously. The more rigorous the analysis the more insightful and refined the results.

Notes

1. Michael C. Horgan, commander, 355th Tactical Fighter Wing, *End of Tour Report 30 June 1968-27 June 1969* (Maxwell AFB, Ala.: USAF Historical Research Agency, 1969), HRA K717.131.

2. Brig Gen William S. Chairsell, commander, 388th Tactical Fighter Wing, *End of Tour Report August 1966–July 1967* (Maxwell AFB, Ala.: USAF Historical Research Agency, 1967), HRA K717.131.
3. Refer to appendix A for the survey.
4. Statistical Package for the Social Sciences (SPSS/PC + 4.0), Chicago: SPSS.
5. John Hedderson, *SPSS/PC + Made Simple* (Belmont, Calif.: Wadsworth Publishing Co., 1991), 4.
6. E. S. Pearson and C. J. Clopper, "The Use of Confidence Intervals or Fiducial Limits Illustrated in the Case of the Binomials," *Biometrika*, vol. 26 (1934): 404–13.
7. Stanley J. Rachman, *Fear and Courage* (San Francisco: W. H. Freeman and Co., 1978), 59; and David R. Jones, MD, *U.S. Air Force Combat Psychiatry* (Brooks AFB, Tex.: USAF School of Aerospace Medicine, Aerospace Medical Division [AFSC], January 1986), DTIC Report AD-A165 011, 12 March 1986, 3.
8. Hedderson, 117–18.
9. Rachman, 59.
10. David B. Guralnik, ed., *Webster's New World Dictionary: of the American Language*, 2d ed. (New York: World Publishing Co., 1970), 511.
11. Rachman, 2, references Peter Lang's three-system model of fear.
12. Maj Dana King, Flight Surgeon Aeromedical Report RCS 1-HAF-M7, Korat RTAFB, Thailand, 31 August 1967, 2; and Pacific Air Force Flight Surgeon Aeromedical Reports 1963–1973, David R. Jones Personal Paper Collection (Maxwell AFB, Ala.: USAF Historical Research Agency).
13. Brig Gen Kenneth H. Bell, *100 Missions North* (Washington, D.C.: Brassey's, 1993), 144h.
14. RCS 1-HAF-M7, 31 December 1967, 11, in David R. Jones Personal Paper Collection.
15. No rigorous theory concerning compartmentalization exists. In his flying safety lectures to aircrews, Cmdr Frank Dully, US Navy flight surgeon, uses this term. It originates from a stress coping mechanism stated by Maj George T. Brandt, MD, of the Uniformed Services University of the Health Sciences, F. Edward Herbert School of Medicine, Bethesda, Md., during a 1 April 1993 telephone interview. It is also not unique to pilots. Others involved in high-stress professions exhibit the same characteristics.
16. Guralnik, 325.
17. RCS 1-HAF-M7, 30 April 1967, 1.
18. RCS 1-HAF-M7, 31 August 1967, 1.
19. Guralnik, 1527.
20. Chester W. Griffin Jr., experienced F-105 Vietnam veteran, telephone interview, 10 March 1993.
21. Guralnik, 509.
22. RCS 1-HAF-M7, 28 February 1973, 4.
23. Lt Col Joyce Teters, MD, chief aviation psychologist, Headquarters Air Force Safety Agency, telephone interview, 21 January 1993. She mentioned a swing in personality sometimes indicates the presence of fear. The change is most often transparent to the individual, who must be told by another individual.
24. Griffin interview.
25. Guralnik, 401.
26. Horgan.
27. *Ibid.*, 925.
28. Jack Broughton, *Thud Ridge*, introduction by Hanson W. Baldwin (Philadelphia, Pa.: J. B. Lippincott Co., 1969), 234.
29. Guralnik, 409.
30. *Ibid.*, 696.
31. Jack Broughton, *Going Downtown: The War against Hanoi and Washington* (New York: Orion Books, 1988), 12–13; and Gene I. Basel, *Pak Six* (La Mesa, Calif.: Associate Creative Writers, 1982), 175.
32. Guralnik, 297.
33. *Ibid.*, 309.
34. *Ibid.*, 276; and Gen Charles G. Boyd, F-105 veteran and former prisoner of war in North Vietnam, interview by author, 17 May 1993, at Maxwell AFB, Ala. When I questioned him concerning this finding, he said, "It doesn't matter what you call it, but presently we

have a military culture where men will fight. They don't fight for the government, for the military, or for their commanders. They fight for each other."

35. Maj Gen James E. McNerney, F-105 pilot in Vietnam, telephone interview, 25 May 1993.

36. Refer to the threats to validity table in appendix C for a list of analysis constraints that affected this study.

Chapter 5

Conclusion

Airmen who desire to attack the will of the enemy directly and bypass the preliminaries of battle may find that such a goal is not conducive to changing enemy behavior. The means to successfully attack will still elude them. To date, the cause-and-effect relationship between military force and desired outcome remains a subject of heated debate. An accurate view of man's nature lies at the center of this debate. In the past, arguments developed from a "social Darwinian" perspective.¹ Airpower theorists during World War II held this viewpoint and postulated that bombing cities would cause an enemy to capitulate due to the collapse of the will of the people. This assumption, however, proved inaccurate in the cases of Germany and England.

This study investigated the F-105 pilots in Vietnam to discover what motivated those airmen in that very stressful conflict. Observing what actually occurred provides the foundation for useful theories for future use. Instead of postulating what constitutes man's motivation and then looking for evidence, this study sought to look at what happened first and then determine why. For that reason, my results differ with those of Martin van Creveld concerning the primary motivations of the combatant. Granted, he focused on ground combatants and concluded that the high level of unit cohesion in the German army enabled it to achieve superior performance in World War II. This investigation of the F-105 pilots in Vietnam suggests that many other factors more profoundly affected the airmen's success in combat. To correctly investigate and substantiate this difference, an analysis of the Luftwaffe during World War II contrasted against the German army would be necessary. This study provides a rigorous method of accomplishing this type of analysis.

Findings

In this study the SPSS analysis revealed the presence of 12 of the original 13 pilot combat motivation model elements. Also, the analysis showed that the factors related to each other in a different fashion than originally postulated. The principal component factor analysis also revealed that many more factors may in fact exist than originally theorized. Fear, a critical element, revealed multiple factors that might mean that there exists a much finer definition of fear's components than is known at this time. Unexpectedly, cohesion did not manifest a strong relationship to any of the analysis variables. The possibility exists that cohesion may have been so high that the analysis could not detect it.

Recommendations

The survey served as an excellent information-gathering tool. Without the survey a researcher would not find much of the information necessary to conduct this type of study. The survey contained some problems that a researcher should correct before using it again to gather information. For example, the researcher should rewrite the question concerning alcohol. The desire to collect as much data as possible within the confines of the survey resulted in a confusing question. A simpler question is suggested that determines if drinking started, increased, decreased, or completely stopped during the combat tour. More questions concerning the particular job that the pilot held in the unit during the combat tour might prove useful. Also, for Vietnam, questions concerning the rules of engagement would give some useful insights.

An in-depth investigation of why cohesion manifested itself in the study in this manner is necessary. The implications of such a study may reveal a key difference between ground and air combatants. Martin van Creveld provided a useful illustration of how the essential element of cohesion enabled the ground forces in World War II to achieve success.²

A study concerning the attitudes of the F-105 pilots as portrayed in the additional comments made on the survey and in section VIII is definitely appropriate. Researchers can glean much from these comments concerning training for combat, employment, and actual combat operations. Such lessons learned as the lethality of large volume antiaircraft fire should help develop effective strike aircraft employment tactics. The tactics should then influence weapon development. This data contains insights that may improve Air Force operations by decreasing the width of the information gap mentioned in the introduction. Though uncertainty prevents reaching the ideal of "perfect" information, a better understanding of how combatants function in war will certainly allow a more constructive approach to combat planning and training. Some survey respondents commented that the first F-105 instructors with combat experience did not necessarily pass on lessons learned during the early phases of the war.

This study requires expansion. To progress from the particular to a general theory of the moral domain, other studies from the Vietnam War ought to take place to determine general principles. Researchers should investigate other weapon systems to determine if the same variables apply and investigate other services' aircraft as needed. A study of other types of aircraft, to include aircraft with multiple crew members, should enhance this area. Such an effort would establish the basis for a macro moral domain of war model for airmen. To assist in this process, the US military should as soon as possible prepare, implement, and organize--in continuously updated real time--a survey to collect the best data possible. This survey could prove invaluable during war when the Air Force

could collect data during hostilities. This method would resemble the Stouffer Studies accomplished during World War II.³

In parallel with this effort, the development of general moral, physical, and cognitive domain of war models for an entire military should occur. They would constitute a comprehensive macro analysis. First, this task should be accomplished for each combatant arm: Air Force, Army, Navy, Marine Corps, and so forth and then for a composite military force with a combined-arms concept. Questions for investigation may explore functions unique to each service and determine overlaps in capabilities. Thus the United States could determine resultant domains of war models for the composite military force. The interactive model elements and unique or mutually exclusive relationships would readily manifest themselves. Accomplishing this task could maximize the use of the physical, cognitive, and moral forces. This proposal effectively fulfills Sun Tzu's proposition "know yourself."⁴

The United States ought to also accomplish this task for allies and potential adversaries. In the case of ourselves and our allies, it will demonstrate relative strengths and weaknesses that will allow different nations to complement each other's capabilities. This useful information could enhance the success of future coalition wars. Knowing capabilities beforehand will enhance coalition building and operations. In the case of adversaries, this process will allow the United States to maintain vigilance over likely threats to our national interest. It will also allow us to keep our superior capabilities continually analyzing the threat. With the long lead times for fielding new weapon systems and the complex task of developing new processes, this important effort should help to minimize surprises. Finally, in our volatile world our friends today might become our enemies tomorrow--as in the case of Iran and Iraq. Therefore, we must remain ever vigilant. This process fulfills Sun Tzu's proposition of "know your enemy."⁵

Future Implications

Accomplishing this task requires an iterative process necessary for continual refinement and improvement of accuracy. The core ideas of the domains of war, once established, will probably remain the same. However, the possibility of gaining new insight into the foundation from which these factors originate now exists. This process would aid decision makers in developing force structure based on a more accurate view of present capabilities, instead of allowing technological innovation to serve as a main driver for force structure. This macroscopic foundation allows useful analysis of past wars to guide strategy development for fighting future wars. However, no comprehensive analysis ensures victory in war, but without such an analysis, a greater probability of defeat exists. This process would suggest courses of action based on reality instead of false

premises—like the bankrupt theory of social Darwinism. As Solomon the wise king once said, “What has been will be again, what has been done will be done again; there is nothing new under the sun.”⁶

Notes

1. Francis A. Schaeffer, *How Should We Then Live? The Rise and Decline of Western Thought and Culture* (Old Tappan, N.J.: Fleming H. Revell Co., 1967), 148–51. Dr. Schaeffer explains how neo-Darwinian evolution theory developed into social Darwinism and its subsequent influence on some of the atrocities of World War II and its aftermath.
2. Martin van Creveld, *Fighting Power* (Westport, Conn.: Greenwood Press, 1982), 170.
3. Samuel A. Stouffer et al., *The American Soldier: Adjustment during Army Life*, vol. 1 (Princeton, N.J.: Princeton University Press, 1949), ix.
4. Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (London: Oxford University Press, 1963), 84.
5. Ibid.
6. The Bible, Ecclesiastes 1:9.

Appendix A

Combat Pilot Survey Examples

Page

42 – 45	Basic survey.
46 – 49	Survey of young pilot entering combat.
50 – 53	Survey of experienced pilot entering combat.
54 – 57	Survey of a prisoner of war.

If you desire to obtain the actual surveys used in this study, contact the Air University Library, Maxwell Air Force Base (AFB), Alabama 36112. The information may also be obtained from the Air Force Historical Research Agency, Maxwell AFB, Alabama 36112-6678.

MORAL DOMAIN OF WAR COMBAT PILOT SURVEY

This Is An Anonymous Survey!

The purpose of this survey is to determine what motivational forces were present during your Vietnam combat tour, which helped you succeed in accomplishing your mission while facing a difficult and stressful situation. It is important that you recall your activities in detail so that those who go after you can benefit from your tremendous efforts and outstanding accomplishments.

In response to questions in Items I-III, you will be asked to recall your thoughts at different time periods during your combat tour(s). Using the scale indicated below, write a number in each of the three spaces on the right side of the page, corresponding to the specific combat tour time periods.

Tour(s) Time Periods: BEGINNING - Initial missions where you didn't really know what to expect.
MIDDLE - Understood the routine.
END - Anticipation of returning to the U.S.

Reporting Scale: 1 - Strongly Agree; 2 - Agree; 3 - Neutral; 4 - Disagree; 5 - Strongly Disagree

	Point in Time During Tour		
	Beginning	Middle	End
I. COMBAT OPERATIONS			
A. I was confident in my ability to accomplish the mission.	_____	_____	_____
B. Others were confident in my ability to accomplish the mission.	_____	_____	_____
C. The squadron pilots were very capable of accomplishing the mission.	_____	_____	_____
D. I was confident in my flight commander's flying ability.	_____	_____	_____
E. I was confident in my squadron commander's flying ability.	_____	_____	_____
F. I was confident in my squadron commander's decisions.	_____	_____	_____
G. I was confident in my wing commander's flying ability.	_____	_____	_____
H. I was confident in my wing commander's decisions.	_____	_____	_____
I. When entering the combat area:			
1. my body remained calm	_____	_____	_____
2. I was mildly uncomfortable	_____	_____	_____
3. I was sweating like a pig	_____	_____	_____
4. I was nauseous	_____	_____	_____
5. my muscles twitched	_____	_____	_____
J. When entering the combat area I knew I would:			
1. definitely destroy the target	_____	_____	_____
2. destroy the target	_____	_____	_____
3. probably destroy the target	_____	_____	_____
4. hit the target and not destroy it	_____	_____	_____
5. miss the target	_____	_____	_____
K. When entering the combat area my flying ability was:			
1. significantly improved	_____	_____	_____
2. slightly improved	_____	_____	_____
3. unchanged	_____	_____	_____
4. slightly degraded	_____	_____	_____
5. significantly degraded	_____	_____	_____

	Point in Time During Tour		
	Beginning	Middle	End
I. I flew combat missions primarily because:			
1. I wanted to fulfill my squadron's expectations of me.	_____	_____	_____
2. I believed in American ideals.	_____	_____	_____
3. I liked the thrill of combat.	_____	_____	_____
4. I wanted to fulfill my family's expectations of me.	_____	_____	_____
5. I wanted to fulfill the expectations of the American people.	_____	_____	_____
M. Excellent training enabled me to respond automatically when I flew combat.	_____	_____	_____
N. When unexpected events occurred in flight, I responded in accordance with my training and did not feel the need to invent new procedures to accomplish the mission successfully.	_____	_____	_____
O. I understood U.S. war aims.	_____	_____	_____
P. My squadron collectively understood the U.S. war aims.	_____	_____	_____
II. AIRCRAFT			
A. I never doubted the ability of maintenance personnel to deliver a combat-ready aircraft by stop time.	_____	_____	_____
B. The aircraft was well suited to accomplish the combat mission.	_____	_____	_____
III. INTERACTIONS			
A. I preferred being by myself during off duty times.	_____	_____	_____
B. I preferred being with the other squadron pilots during off duty times.	_____	_____	_____
C. I preferred being with the squadron commander during off duty times.	_____	_____	_____
D. I preferred being with the wing commander during off duty times.	_____	_____	_____
E. There were things which occurred on the ground that made me less effective in flying the combat mission.	_____	_____	_____
F. I was often restless when on the ground.	_____	_____	_____
G. At night, I could not sleep very well.	_____	_____	_____
H. A belief in God helped me in combat.	_____	_____	_____
I. My major source of fear in combat was:			
1. the enemy shooting me down	_____	_____	_____
2. an aircraft catastrophic mechanical failure	_____	_____	_____
3. death or injury	_____	_____	_____
4. letting my flight members down	_____	_____	_____
5. finding myself in a situation I couldn't control	_____	_____	_____
6. I had no fear	_____	_____	_____
J. When I didn't particularly want to fly, my major source of motivation to fly was:			
1. seeing my wing commander fly	_____	_____	_____
2. seeing my squadron commander fly	_____	_____	_____
3. seeing other squadron members fly	_____	_____	_____
4. carrying my share of the load	_____	_____	_____
5. not wanting to draw attention to myself	_____	_____	_____

	Point in Time During Tour		
	Beginning	Middle	End
K. I wanted to fly combat sorties.	_____	_____	_____
L. Given what I know now, I would fly in Vietnam again. (only one response required)	_____	_____	_____
M. While flying, there were things which distracted my attention from flying the combat mission	_____	_____	_____

In response to items in IV, use the scale below and write a number in each of the three spaces on the right.
Reporting Scale: 1 - Always; 2 - Regularly; 3 - Frequently; 4 - Occasionally; 5 - Never

IV. PERSONAL ATTITUDE TOWARD FLYING

A. My alcohol intake compared to peacetime operations

1. I did not drink alcohol.
2. My alcohol intake remained the same.
3. My alcohol intake increased slightly.
4. I started drinking alcohol once in combat.
5. My alcohol intake increased significantly.

B. Regardless of how I felt, I flew.

C. I aborted for maintenance problems.

D. I received aircraft battle damage.

E. I felt tired.

F. I had bad dreams.

G. I felt tense.

H. I was easily angered.

I. I went duty not to include flying (DNIF).

J. I vomited before I stepped to fly.

K. I had diarrhea before I stepped to fly.

	Beginning	Middle	End
1. I did not drink alcohol.	_____	_____	_____
2. My alcohol intake remained the same.	_____	_____	_____
3. My alcohol intake increased slightly.	_____	_____	_____
4. I started drinking alcohol once in combat.	_____	_____	_____
5. My alcohol intake increased significantly.	_____	_____	_____
B. Regardless of how I felt, I flew.	_____	_____	_____
C. I aborted for maintenance problems.	_____	_____	_____
D. I received aircraft battle damage.	_____	_____	_____
E. I felt tired.	_____	_____	_____
F. I had bad dreams.	_____	_____	_____
G. I felt tense.	_____	_____	_____
H. I was easily angered.	_____	_____	_____
I. I went duty not to include flying (DNIF).	_____	_____	_____
J. I vomited before I stepped to fly.	_____	_____	_____
K. I had diarrhea before I stepped to fly.	_____	_____	_____

V. PROFILE (Check and fill in the blanks)

A. How were you commissioned?

- ☐ 1. Academy
☐ 2. ROTC
☐ 3. OTS
☐ 4. Aviation Cadet
☐ 5. Other — Specify _____

B. What was your level of education prior to entering combat?

- ☐ 1. Bachelors Degree
☐ 2. Professional Degree
☐ 3. Masters Degree
☐ 4. Doctorate Degree
☐ 5. Two year College
☐ 6. High School
☐ 7. Other - Specify _____

C. What was your time in service prior to combat?

Specify: _____ years _____ months

D. Please list the aircraft and hours accumulated and the Major Air Command (MAJCOM) before training in your combat aircraft.

Aircraft	Hours	MAJCOM
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____

VI. PREPARATION FOR COMBAT

A. When were you trained? _____ month _____ year

B. Where were you trained?

Location _____

(Continued)

VI. PREPARATION FOR COMBAT (Continued)

- C. How many hours in your combat aircraft did you have before your combat tour?
_____ hours
- D. Were you comfortable flying the aircraft after training?
☐ 1. Yes ☐ 2. No

VII. COMBAT PROFILE

- A. What was your rank when entering combat?
☐ 1. 2nd Lt ☐ 4. Major
☐ 2. 1st Lt ☐ 5. Lt Col
☐ 3. Capt ☐ 6. Col
- B. In what squadron(s) did you fly?
Specify _____
- C. What types of missions did you fly?
☐ 1. CAS
☐ 2. Interdiction
☐ 3. Weasel
☐ 4. Other — Specify _____
- D. What was your initial tour length?
☐ (1) 100 missions ☐ (2) 1 year
- E. What were the inclusive dates of your combat tour(s)
_____ month _____ year to _____ month _____ year
- F. How many combat missions did you fly?

- G. How many of your combat missions were over North Vietnam? _____
- H. Were you ever shot down?
☐ 1. Yes ☐ 2. No
(If no, go to question L; If yes, continue)
- I. When were you shot down in relation to your original tour length? (check one)
☐ 1. At the Beginning
☐ 2. In the Middle
☐ 3. Toward the End
- J. Were you injured? (check one)
☐ 1. Yes ☐ 2. No
- K. How long after returning to your squadron did it take before you flew again? Specify _____
- L. Were you a POW?
☐ 1. Yes ☐ 2. No

Please record brief responses to each of the following six questions in Section VIII.

VIII. SHORT ANSWER RESPONSE

- A. What did you fear, and when did you first realize it?

- B. How did you cope with fear?

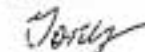
- C. What made you fly regardless of fear?

- D. If there were pilots who did not like to fly, how did they avoid flying?

- E. If there was someone you did not desire to fly with, how did you avoid flying with them?

- F. Any other comments you would like to make.

Thank you for filling out this survey. I appreciate your assistance. Please mail this survey back to me in the envelope provided.


Tony Grady
Major, USAF

MORAL DOMAIN OF WAR COMBAT PILOT SURVEY

This Is An Anonymous Survey!

The purpose of this survey is to determine what motivational forces were present during your Vietnam combat tour, which helped you succeed in accomplishing your mission while facing a difficult and stressful situation. It is important that you recall your activities in detail so that those who go after you can benefit from your tremendous efforts and outstanding accomplishments.

In response to questions in items I-III, you will be asked to recall your thoughts at different time periods during your combat tour(s). Using the scale indicated below, write a number in each of the three spaces on the right side of the page, corresponding to the specific combat tour time periods.

Tour(s) Time Periods: BEGINNING - Initial missions where you didn't really know what to expect.
MIDDLE - Understood the routine.
END - Anticipation of returning to the U.S.
Reporting Scale: 1 - Strongly Agree; 2 - Agree; 3 - Neutral; 4 - Disagree; 5 - Strongly Disagree.

	Point in Time During Tour		
	Beginning	Middle	End
I. COMBAT OPERATIONS			
A. I was confident in my ability to accomplish the mission.	<u>2</u>	<u>1</u>	<u>1</u>
B. Others were confident in my ability to accomplish the mission.	<u>2</u>	<u>2</u>	<u>1</u>
C. The squadron pilots were very capable of accomplishing the mission.	<u>2</u>	<u>1</u>	<u>1</u>
D. I was confident in my flight commander's flying ability.	<u>2</u>	<u>2</u>	<u>2</u>
E. I was confident in my squadron commander's flying ability.	<u>2</u>	<u>2</u>	<u>2</u>
F. I was confident in my squadron commander's decisions.	<u>2</u>	<u>2</u>	<u>2</u>
G. I was confident in my wing commander's flying ability.	<u>1</u>	<u>1</u>	<u>1</u>
H. I was confident in my wing commander's decisions.	<u>1</u>	<u>1</u>	<u>1</u>
I. When entering the combat area:			
1. my body remained calm	<u>2</u>	<u>2</u>	<u>2</u>
2. I was mildly uncomfortable	<u>2</u>	<u>2</u>	<u>2</u>
3. I was sweating like a pig	<u>4</u>	<u>4</u>	<u>4</u>
4. I was nauseous	<u>5</u>	<u>5</u>	<u>(5)</u>
5. my muscles twitched	<u>5</u>	<u>5</u>	<u>5</u>
J. When entering the combat area I knew I would:			
1. definitely destroy the target	<u>3</u>	<u>3</u>	<u>3</u>
2. destroy the target	<u>2</u>	<u>2</u>	<u>2</u>
3. probably destroy the target	<u>2</u>	<u>2</u>	<u>2</u>
4. hit the target and not destroy it	<u>4</u>	<u>4</u>	<u>4</u>
5. miss the target	<u>5</u>	<u>5</u>	<u>5</u>
K. When entering the combat area my flying ability was:			
1. significantly improved	<u>2</u>	<u>2</u>	<u>2</u>
2. slightly improved	<u>3</u>	<u>3</u>	<u>3</u>
3. unchanged	<u>3</u>	<u>3</u>	<u>3</u>
4. slightly degraded	<u>4</u>	<u>4</u>	<u>4</u>
5. significantly degraded	<u>5</u>	<u>5</u>	<u>5</u>

	Point in Time During Tour		
	Beginning	Middle	End
I. I flew combat missions primarily because:			
1. I wanted to fulfill my squadron's expectations of me.	<u>1</u>	<u>1</u>	<u>1</u>
2. I believed in American ideals.	<u>1</u>	<u>1</u>	<u>(1)</u>
3. I liked the thrill of combat.	<u>1</u>	<u>1</u>	<u>1</u>
4. I wanted to fulfill my family's expectations of me.	<u>1</u>	<u>1</u>	<u>1</u>
5. I wanted to fulfill the expectations of the American people.	<u>1</u>	<u>1</u>	<u>1</u>
M. Excellent training enabled me to respond automatically when I flew combat.	<u>1</u>	<u>1</u>	<u>1</u>
N. When unexpected events occurred in flight, I responded in accordance with my training and did not feel the need to invent new procedures to accomplish the mission successfully.	<u>1</u>	<u>1</u>	<u>1</u>
O. I understood U.S. war aims.	<u>1</u>	<u>1</u>	<u>1</u>
P. My squadron collectively understood the U.S. war aims.	<u>1</u>	<u>1</u>	<u>1</u>
II. AIRCRAFT			
A. I never doubted the ability of maintenance personnel to deliver a combat-ready aircraft by stop time.	<u>1</u>	<u>1</u>	<u>1</u>
B. The aircraft was well suited to accomplish the combat mission.	<u>1</u>	<u>1</u>	<u>1</u>
III. INTERACTIONS			
A. I preferred being by myself during off duty times.	<u>2</u>	<u>2</u>	<u>2</u>
B. I preferred being with the other squadron pilots during off duty times.	<u>2</u>	<u>2</u>	<u>2</u>
C. I preferred being with the squadron commander during off duty times.	<u>4</u>	<u>4</u>	<u>4</u>
D. I preferred being with the wing commander during off duty times.	<u>5</u>	<u>5</u>	<u>(5)</u>
E. There were things which occurred on the ground that made me less effective in flying the combat mission.	<u>4</u>	<u>4</u>	<u>4</u>
F. I was often restless when on the ground.	<u>4</u>	<u>4</u>	<u>4</u>
G. At night, I could not sleep very well.	<u>4</u>	<u>4</u>	<u>4</u>
H. A belief in God helped me in combat.	<u>1</u>	<u>1</u>	<u>1</u>
I. My major source of fear in combat was:			
1. the enemy shooting me down	<u>1</u>	<u>1</u>	<u>1</u>
2. an aircraft catastrophic mechanical failure	<u>4</u>	<u>4</u>	<u>4</u>
3. death or injury	<u>1</u>	<u>1</u>	<u>1</u>
4. letting my flight members down	<u>4</u>	<u>4</u>	<u>4</u>
5. finding myself in a situation I couldn't control	<u>4</u>	<u>4</u>	<u>4</u>
6. I had no fear	<u>3</u>	<u>3</u>	<u>3</u>
J. When I didn't particularly want to fly, my major source of motivation to fly was:			
1. seeing my wing commander fly	<u>2</u>	<u>2</u>	<u>2</u>
2. seeing my squadron commander fly	<u>2</u>	<u>2</u>	<u>2</u>
3. seeing other squadron members fly	<u>2</u>	<u>2</u>	<u>(2)</u>
4. carrying my share of the load	<u>1</u>	<u>1</u>	<u>1</u>
5. not wanting to draw attention to myself	<u>3</u>	<u>3</u>	<u>3</u>

DON'T REMEMBER THIS AS A FACTOR

	Point in Time During Tour		
	Beginning	Middle	End
K. I wanted to fly combat sorties.	<u>1</u>	<u>1</u>	<u>1</u>
L. Given what I know now, I would fly in Vietnam again. (only one response required)			<u>1</u>
M. While flying, there were things which distracted my attention from flying the combat mission	<u>4</u>	<u>4</u>	<u>4</u>

In response to items in IV, use the scale below and write a number in each of the three spaces on the right.
Reporting Scale: 1 - Always; 2 - Regularly; 3 - Frequently; 4 - Occasionally; 5 - Never.

IV. PERSONAL ATTITUDE TOWARD FLYING

A. My alcohol intake compared to peacetime operations			
1. I did not drink alcohol.	<u>4</u>	<u>4</u>	<u>4</u>
2. My alcohol intake remained the same.	<u>2</u>	<u>2</u>	<u>2</u>
3. My alcohol intake increased slightly.	<u>4</u>	<u>4</u>	<u>4</u>
4. I started drinking alcohol once in combat.	<u>5</u>	<u>5</u>	<u>5</u>
5. My alcohol intake increased significantly.	<u>5</u>	<u>5</u>	<u>5</u>
B. Regardless of how I felt, I flew.	<u>1</u>	<u>1</u>	<u>1</u>
C. I aborted for maintenance problems.	<u>5</u>	<u>5</u>	<u>5</u>
D. I received aircraft battle damage.	<u>1</u>	<u>1</u>	<u>1</u>
E. I felt tired.	<u>5</u>	<u>5</u>	<u>5</u>
F. I had bad dreams.	<u>5</u>	<u>5</u>	<u>5</u>
G. I felt tense.	<u>4</u>	<u>4</u>	<u>4</u>
H. I was easily angered.	<u>5</u>	<u>5</u>	<u>5</u>
I. I went duty not to include flying (DNIF).	<u>5</u>	<u>5</u>	<u>5</u>
J. I vomited before I stepped to fly.	<u>5</u>	<u>5</u>	<u>5</u>
K. I had diarrhea before I stepped to fly.	<u>5</u>	<u>5</u>	<u>5</u>

V. PROFILE (Check and fill in the blanks)

- A. How were you commissioned?
- ☐ 1. Academy
- ☒ 2. ROTC
- ☐ 3. OTS
- ☐ 4. Aviation Cadet
- ☐ 5. Other - Specify _____
- B. What was your level of education prior to entering combat?
- ☒ 1. Bachelor's Degree
- ☐ 2. Professional Degree
- ☐ 3. Masters Degree
- ☐ 4. Doctorate Degree
- ☐ 5. Two year College
- ☐ 6. High School
- ☐ 7. Other - Specify _____

C. What was your time in service prior to combat?

Specify: 1 years 6 months

D. Please list the aircraft and hours accumulated and the Major Air Command (MAJCOM) before training in your combat aircraft.

Aircraft	Hours	MAJCOM
1. <u>T-37</u>	<u>100</u>	<u>ATC</u>
2. <u>T-36</u>	<u>130</u>	<u>ATC</u>
3. <u>F-105</u>	<u>100</u>	<u>ATC</u>
4. _____	_____	_____
5. _____	_____	_____

VI. PREPARATION FOR COMBAT

A. When were you trained? JUL month 6/2 year

B. Where were you trained?

Location Nellis

(Continued)

VI. PREPARATION FOR COMBAT (Continued)

- C. How many hours in your combat aircraft did you fly before your combat tour?
1000 hours
- D. Were you comfortable flying the aircraft after training?
☒ 1. Yes ☐ 2. No

VII. COMBAT PROFILE

- A. What was your rank when entering combat?
☐ 1. 2nd Lt ☐ 4. Major
☒ 2. 1st Lt ☐ 3. Lt Col
☐ 3. Capt ☐ 6. Col
- B. In what squadron(s) did you fly?
 Specify 357 TFS/LATE = 17 WWS
- C. What types of missions did you fly?
☐ 1. CAS
☒ 2. Interdiction - FIRST TOUR
☒ 3. Weasels - SECOND TOUR
☐ 4. Other - Specify _____
- D. What was your initial tour length?
☒ (1) 100 missions ☐ (2) 1 year
- E. What were the inclusive dates of your combat tour(s)?
12-month 66 year to 7 month 67 year
- F. How many combat missions did you fly?
112
- G. How many of your combat missions were over North Vietnam? 100
- H. Were you ever shot down?
☐ 1. Yes ☒ 2. No
 (If no, go to question L; if yes, continue)
- I. When were you shot down in relation to your original tour length? (check one)
☐ 1. At the Beginning
☐ 2. In the Middle
☐ 3. Toward the End
- J. Were you injured? (check one)
☐ 1. Yes ☐ 2. No
- K. How long after returning to your squadron did it take before you flew again? Specify _____
- L. Were you a POW?
☐ 1. Yes ☐ 2. No

Please record brief responses to each of the following six questions in Section VIII.

VIII. SHORT ANSWER RESPONSE

- A. What did you fear, and when did you first realize it?
THE THOUGHT OF NOT GETTING HOME.
- B. How did you cope with fear?
LOOKING AROUND - EVALUATING WHAT WAS DOING THEIR JOB UNDER THE SAME PRESSURE (LARGE MESS, AS I WAS A 1LT WITH NO FAMILY TO WORRY ABOUT)
- C. What made you fly regardless of fear?
THAT WAS MY DUTY
- D. If there were pilots who did not like to fly, how did they avoid flying?
GOING DOWN, FINDING 'OTHER PRESSING DUTIES'
- E. If there was someone you did not desire to fly with, how did you avoid flying with them?
AS A 1ST LT, I JUST FLEW WHEN I WAS SCHEDULED.
- F. Any other comments you would like to make.
WOULD REALLY APPRECIATE YOUR SENDING ME AN ORIGINAL (IF YOU CAN GET IT) OF THE MAGNUS PETER (WIFE-PERSONAL POWER FOR PETER), MAY 22, 1970 PAGE 20 ARTICLE ABOUT MY AWARDS. MY FATHER
 Thank you for filling out this survey. I appreciate your assistance. Please mail this survey back to me in the envelope provided.
 SENT 10 A WEEK AGO, PROBABLY COPY I'D LIKE TO FRANKLY. ONLY A GOOD COPY REMAINS.
 Tony Grady
 Major, USAF
 THANKS

MORAL DOMAIN OF WAR COMBAT PILOT SURVEY

NAME
VLC

002
Source/

This Is An Anonymous Survey!

The purpose of this survey is to determine what motivational forces were present during your Vietnam combat tour, which helped you succeed in accomplishing your mission while facing a difficult and stressful situation. It is important that you recall your activities in detail so that those who go after you can benefit from your tremendous efforts and outstanding accomplishments.

In response to questions in Items I-III, you will be asked to recall your thoughts at different time periods during your combat tour(s). Using the scale indicated below, write a number in each of the three spaces on the right side of the page, corresponding to the specific combat tour time periods.

Tour(s) Time Periods: BEGINNING - Initial missions where you didn't really know what to expect.
MIDDLE - Understood the routine.
END - Anticipation of returning to the U.S.

Reporting Scale: 1 - Strongly Agree; 2 - Agree; 3 - Neutral; 4 - Disagree; 5 - Strongly Disagree

	Point in Time During Tour		
	Beginning	Middle	End
I. COMBAT OPERATIONS			
A. I was confident in my ability to accomplish the mission.	2	1	1
B. Others were confident in my ability to accomplish the mission.	2	2	2
C. The squadron pilots were very capable of accomplishing the mission.	2	2	2
D. I was confident in my flight commander's flying ability.	2	2	2
E. I was confident in my squadron commander's flying ability.	2	2	2
F. I was confident in my squadron commander's decisions.	2	2	2
G. I was confident in my wing commander's flying ability.	3	3	3
H. I was confident in my wing commander's decisions.	2	2	2
I. When entering the combat area:			
1. my body remained calm	2	1	1
2. I was mildly uncomfortable	4	4	4
3. I was sweating like a pig	4	4	4
4. I was nauseous	5	5	5
5. my muscles twitched	5	5	5
J. When entering the combat area I knew I would:			
1. definitely destroy the target	3	3	3
2. destroy the target	2	2	2
3. probably destroy the target	4	4	4
4. hit the target and not destroy it	4	4	4
5. miss the target	4	4	4
K. When entering the combat area my flying ability was:			
1. significantly improved	3	3	3
2. slightly improved	3	3	3
3. unchanged	2	2	2
4. slightly degraded	5	5	5
5. significantly degraded	5	5	5

	Point in Time During Tour		
	Beginning	Middle	End
L. I flew combat missions primarily because:			
1. I wanted to fulfill my squadron's expectations of me.	<u>2</u>	<u>2</u>	<u>2</u>
2. I believed in American ideals.	<u>2</u>	<u>2</u>	<u>2</u>
3. I liked the thrill of combat.	<u>2</u>	<u>2</u>	<u>2</u>
4. I wanted to fulfill my family's expectations of me.	<u>2</u>	<u>2</u>	<u>2</u>
5. I wanted to fulfill the expectations of the American people.	<u>3</u>	<u>3</u>	<u>3</u>
M. Excellent training enabled me to respond automatically when I flew combat.	<u>2</u>	<u>2</u>	<u>2</u>
N. When unexpected events occurred in flight, I responded in accordance with my training and did not feel the need to invent new procedures to accomplish the mission successfully.	<u>4</u>	<u>4</u>	<u>4</u>
O. I understood U.S. war aims.	<u>3</u>	<u>3</u>	<u>3</u>
P. My squadron collectively understood the U.S. war aims.	<u>4</u>	<u>4</u>	<u>4</u>
II. AIRCRAFT			
A. I never doubted the ability of maintenance personnel to deliver a combat-ready aircraft by step time.	<u>2</u>	<u>2</u>	<u>2</u>
B. The aircraft was well suited to accomplish the combat mission.	<u>2</u>	<u>2</u>	<u>2</u>
III. INTERACTIONS			
A. I preferred being by myself during off duty times.	<u>4</u>	<u>4</u>	<u>4</u>
B. I preferred being with the other squadron pilots during off duty times.	<u>2</u>	<u>2</u>	<u>2</u>
C. I preferred being with the squadron commander during off duty times.	<u>3</u>	<u>3</u>	<u>3</u>
D. I preferred being with the wing commander during off duty times.	<u>3</u>	<u>3</u>	<u>3</u>
E. There were things which occurred on the ground that made me less effective in flying the combat mission.	<u>4</u>	<u>4</u>	<u>4</u>
F. I was often restless when on the ground.	<u>4</u>	<u>4</u>	<u>4</u>
G. At night, I could not sleep very well.	<u>4</u>	<u>4</u>	<u>4</u>
H. A belief in God helped me in combat.	<u>2</u>	<u>2</u>	<u>2</u>
I. My major source of fear in combat was:			
1. the enemy shooting me down	<u>4</u>	<u>4</u>	<u>4</u>
2. an aircraft catastrophic mechanical failure	<u>4</u>	<u>4</u>	<u>4</u>
3. death or injury	<u>3</u>	<u>3</u>	<u>3</u>
4. letting my flight members down	<u>2</u>	<u>2</u>	<u>2</u>
5. finding myself in a situation I couldn't control	<u>3</u>	<u>3</u>	<u>3</u>
6. I had no fear	<u>5</u>	<u>5</u>	<u>5</u>
J. When I didn't particularly want to fly, my major source of motivation to fly was:			
1. seeing my wing commander fly	<u>3</u>	<u>3</u>	<u>3</u>
2. seeing my squadron commander fly	<u>3</u>	<u>3</u>	<u>3</u>
3. seeing other squadron members fly	<u>3</u>	<u>3</u>	<u>3</u>
4. carrying my share of the load	<u>2</u>	<u>2</u>	<u>2</u>
5. not wanting to draw attention to myself	<u>3</u>	<u>3</u>	<u>3</u>

	Point in Time During Tour		
	Beginning	Middle	End
K. I wanted to fly combat sorties.	<u>1</u>	<u>1</u>	<u>1</u>
L. Given what I know now, I would fly in Vietnam again. (only one response required)			<u>1</u>
M. While flying, there were things which distracted my attention from flying the combat mission	<u>4</u>	<u>4</u>	<u>4</u>

In response to items in IV, use the scale below and write a number in each of the three spaces on the right.

Reporting Scale: 1 - Always; 2 - Regularly; 3 - Frequently; 4 - Occasionally; 5 - Never

IV. PERSONAL ATTITUDE TOWARD FLYING

A. My alcohol intake compared to peacetime operations

1. I did not drink alcohol.
2. My alcohol intake remained the same.
3. My alcohol intake increased slightly.
4. I started drinking alcohol once in combat.
5. My alcohol intake increased significantly.

<u>5</u>	<u>5</u>	<u>5</u>
<u>1</u>	<u>4</u>	<u>5</u>
<u>4</u>	<u>2</u>	<u>3</u>
<u>5</u>	<u>5</u>	<u>5</u>
<u>4</u>	<u>2</u>	<u>1</u>

B. Regardless of how I felt, I flew.

C. I aborted for maintenance problems.

D. I received aircraft battle damage.

E. I felt tired.

F. I had bad dreams.

G. I felt tense.

H. I was easily angered.

I. I went duty not to include flying (DNIF).

J. I vomited before I stepped to fly.

K. I had diarrhea before I stepped to fly.

<u>1</u>	<u>1</u>	<u>1</u>
<u>4</u>	<u>4</u>	<u>4</u>
<u>4</u>	<u>4</u>	<u>4</u>
<u>3</u>	<u>3</u>	<u>3</u>
<u>5</u>	<u>5</u>	<u>5</u>
<u>4</u>	<u>4</u>	<u>4</u>
<u>4</u>	<u>4</u>	<u>4</u>
<u>5</u>	<u>5</u>	<u>5</u>
<u>5</u>	<u>5</u>	<u>5</u>
<u>5</u>	<u>5</u>	<u>5</u>

V. PROFILE (Check and fill in the blanks)

A. How were you commissioned?

- ☐ 1. Academy
☒ 2. ROTC
☐ 3. OTS
☐ 4. Aviation Cadet
☐ 5. Other - Specify _____

B. What was your level of education prior to entering combat?

- ☒ 1. Bachelors Degree
☐ 2. Professional Degree
☐ 3. Masters Degree
☐ 4. Doctorate Degree
☐ 5. Two year College
☐ 6. High School
☐ 7. Other - Specify _____

C. What was your time in service prior to combat?

Specify: 18 years 4 months

D. Please list the aircraft and hours accumulated and the Major Air Command (MAJCOM) before training in your combat aircraft.

Aircraft	Hours	MAJCOM
1. <u>T-53</u>	<u>400</u>	<u>LTC + TAC</u>
2. <u>F-4</u>	<u>800</u>	<u>TAC + WAFB</u>
3. <u>F-100</u>	<u>900</u>	<u>WAFB + TAC</u>
4. <u>F-105</u>	<u>1200</u>	<u>TAC + WAFB</u>
5. _____	_____	_____

VI. PREPARATION FOR COMBAT

A. When were you trained? _____ month _____ year

B. Where were you trained?

Location WAFB + WRIGHT PATTENSON
4 RECOILERS NO SPECIFIC TRAINING.
 (Continued)

VI. PREPARATION FOR COMBAT (Continued)

- C. How many hours in your combat aircraft did you have before your combat tour?
1200 hours
- D. Were you comfortable flying the aircraft after training?
☒ 1. Yes ☐ 2. No

VII. COMBAT PROFILE

- A. What was your rank when entering combat?
☐ 1. 2nd Lt ☒ 4. Major
☐ 2. 1st Lt ☐ 5. Lt Col
☐ 3. Capt ☐ 6. Col
- B. In what squadron(s) did you fly?
Specify 13, 421, 469
- C. What types of missions did you fly?
☐ 1. CAS
☒ 2. Interdiction
☒ 3. Wreacel left out
☐ 4. Other — Specify _____
- D. What was your initial tour length?
☒ (1) 100 missions ☐ (2) 1 year
- E. What were the inclusive dates of your combat tour(s)?
Dec month 66 year to Jan month 67 year
- F. How many combat missions did you fly?
129
- G. How many of your combat missions were over North Vietnam? 112
- H. Were you ever shot down?
☐ 1. Yes ☒ 2. No
(If no, go to question L; if yes, continue)
- I. When were you shot down in relation to your original tour length? (check one)
☐ 1. At the Beginning
☐ 2. In the Middle
☐ 3. Toward the End
- J. Were you injured? (check one)
☐ 1. Yes ☐ 2. No
- K. How long after returning to your squadron did it take before you flew again? Specify _____
- L. Were you a POW?
☐ 1. Yes ☒ 2. No

Please record brief responses to each of the following six questions in Section VIII.

VIII. SHORT ANSWER RESPONSE

- A. What did you fear, and when did you first realize it?
A SAM on MIG 1 night 305
IN TIME
- B. How did you cope with fear?
CONFIDENCE + TACTICS TO ALIVE
AFTER THREATS
PRAYER
- C. What made you fly regardless of fear?
DUTY
- D. If there were pilots who did not like to fly, how did they avoid flying?
DNEF
MAINTENANCE AGENTS
- E. If there was someone you did not desire to fly with, how did you avoid flying with them?
ONLY ONE TOWN OPS OFFICER
HOT TO EVER SCHEDULE HIM WITH ME
- F. Any other comments you would like to make.

Thank you for filling out this survey. I appreciate your assistance. Please mail this survey back to me in the envelope provided.

Tony
 Tony Grady
 Major, USAF

MORAL DOMAIN OF WAR COMBAT PILOT SURVEY

UVV
504/461

This Is An Anonymous Survey!

The purpose of this survey is to determine what motivational forces were present during your Vietnam combat tour, which helped you succeed in accomplishing your mission while facing a difficult and stressful situation. It is important that you recall your activities in detail so that those who go after you can benefit from your tremendous efforts and outstanding accomplishments.

In response to questions in items I-III, you will be asked to recall your thoughts at different time periods during your combat tour(s). Using the scale indicated below, write a number in each of the three spaces on the right side of the page, corresponding to the specific combat tour time periods.

Tour(s) Time Periods: BEGINNING - Initial missions where you didn't really know what to expect.
MIDDLE - Understood the routine.
END - Anticipation of returning to the U.S.

Reporting Scale: 1 - Strongly Agree; 2 - Agree; 3 - Neutral; 4 - Disagree; 5 - Strongly Disagree

	Point in Time During Tour		
	Beginning	Middle	End
I. COMBAT OPERATIONS			
A. I was confident in my ability to accomplish the mission.	1	2	
B. Others were confident in my ability to accomplish the mission.	2	1	
C. The squadron pilots were very capable of accomplishing the mission.	2	2	
D. I was confident in my flight commander's flying ability.	1	1	
E. I was confident in my squadron commander's flying ability.	4	4	
F. I was confident in my squadron commander's decisions.	3	2	
G. I was confident in my wing commander's flying ability.	1	4	
H. I was confident in my wing commander's decisions.	2	2	
I. When entering the combat area:			
1. my body remained calm	5	3	
2. I was mildly uncomfortable	2	4	
3. I was sweating like a pig	4	4	
4. I was nauseous	5	5	0
5. my muscles twitched	4	4	
J. When entering the combat area I knew I would:			
1. definitely destroy the target	4	2	
2. destroy the target	3	2	
3. probably destroy the target	2	2	
4. hit the target and not destroy it	2	2	
5. miss the target	5	5	
K. When entering the combat area my flying ability was:			
1. significantly improved	4	5	
2. slightly improved	4	3	
3. unchanged	4	4	
4. slightly degraded	2	3	
5. significantly degraded	3	4	

	Point in Time During Tour		
	Beginning	Middle	End
L. I flew combat missions primarily because:			
1. I wanted to fulfill my squadron's expectations of me.	<u>1</u>	<u>1</u>	
2. I believed in American ideals.	<u>3</u>	<u>3</u>	<u>(7)</u>
3. I liked the thrill of combat.	<u>4</u>	<u>3</u>	
4. I wanted to fulfill my family's expectations of me.	<u>3</u>	<u>2</u>	
5. I wanted to fulfill the expectations of the American people.	<u>4</u>	<u>4</u>	
M. Excellent training enabled me to respond automatically when I flew combat.	<u>1</u>	<u>1</u>	
N. When unexpected events occurred in flight, I responded in accordance with my training and did not feel the need to invent new procedures to accomplish the mission successfully.	<u>3</u>	<u>3</u>	
O. I understood U.S. war aims.	<u>5</u>	<u>5</u>	
P. My squadron collectively understood the U.S. war aims.	<u>5</u>	<u>5</u>	
II. AIRCRAFT			
A. I never doubted the ability of maintenance personnel to deliver a combat-ready aircraft by step time.	<u>1</u>	<u>1</u>	
B. The aircraft was well suited to accomplish the combat mission.	<u>2</u>	<u>2</u>	
III. INTERACTIONS			
A. I preferred being by myself during off duty times.	<u>5</u>	<u>5</u>	
B. I preferred being with the other squadron pilots during off duty times.	<u>1</u>	<u>1</u>	
C. I preferred being with the squadron commander during off duty times.	<u>4</u>	<u>4</u>	
D. I preferred being with the wing commander during off duty times.	<u>3</u>	<u>3</u>	<u>(7)</u>
E. There were things which occurred on the ground that made me less effective in flying the combat mission.	<u>3</u>	<u>2</u>	
F. I was often restless when on the ground.	<u>2</u>	<u>2</u>	
G. At night, I could not sleep very well.	<u>4</u>	<u>4</u>	
H. A belief in God helped me in combat.	<u>2</u>	<u>2</u>	
I. My major source of fear in combat was:			
1. the enemy shooting me down	<u>4</u>	<u>4</u>	
2. an aircraft catastrophic mechanical failure	<u>3</u>	<u>4</u>	
3. death or injury	<u>3</u>	<u>3</u>	
4. letting my flight members down	<u>3</u>	<u>2</u>	
5. finding myself in a situation I couldn't control	<u>3</u>	<u>3</u>	
6. I had no fear	<u>5</u>	<u>5</u>	
J. When I didn't particularly want to fly, my major source of motivation to fly was:			
1. seeing my wing commander fly	<u>5</u>	<u>5</u>	
2. seeing my squadron commander fly	<u>4</u>	<u>4</u>	
3. seeing other squadron members fly	<u>1</u>	<u>1</u>	<u>(7)</u>
4. carrying my share of the load	<u>1</u>	<u>1</u>	
5. not wanting to draw attention to myself	<u>4</u>	<u>4</u>	

	Point in Time During Tour		
	Beginning	Middle	End
K. I wanted to fly combat sorties.	<u>1</u>	<u>1</u>	
L. Given what I know now, I would fly in Vietnam again. (only one response required)			<u>5</u>
M. While flying, there were things which distracted my attention from flying the combat mission	<u>3</u>	<u>3</u>	

In response to items in IV, use the scale below and write a number in each of the three spaces on the right.
Reporting Scale: 1 = Always; 2 = Regularly; 3 = Frequently; 4 = Occasionally; 5 = Never

IV. PERSONAL ATTITUDE TOWARD FLYING

A. My alcohol intake compared to peacetime operations

1. I did not drink alcohol.
2. My alcohol intake remained the same.
3. My alcohol intake increased slightly.
4. I started drinking alcohol once in combat.
5. My alcohol intake increased significantly.

<u>5</u>	<u>5</u>	
<u>3</u>	<u>3</u>	
<u>2</u>	<u>1</u>	
<u>3</u>	<u>3</u>	
<u>2</u>	<u>1</u>	

B. Regardless of how I felt, I flew.

C. I aborted for maintenance problems.

D. I received aircraft battle damage.

E. I felt tired.

F. I had bad dreams.

G. I felt tense.

H. I was easily angered.

I. I went duty not to include flying (DNIF).

J. I vomited before I stepped to fly.

K. I had diarrhea before I stepped to fly.

<u>1</u>	<u>1</u>	
<u>5</u>	<u>5</u>	
<u>5</u>	<u>4</u>	
<u>4</u>	<u>4</u>	<u>(0)</u>
<u>5</u>	<u>5</u>	
<u>1</u>	<u>2</u>	
<u>1</u>	<u>1</u>	
<u>5</u>	<u>5</u>	
<u>5</u>	<u>5</u>	
<u>4</u>	<u>4</u>	

V. PROFILE (Check and fill in the blanks)

A. How were you commissioned?

- ☐ 1. Academy
☐ 2. ROTC
☐ 3. OTS
☒ 4. Aviation Cadet
☐ 5. Other - Specify _____

B. What was your level of education prior to entering combat?

- ☐ 1. Bachelors Degree
☐ 2. Professional Degree
☐ 3. Masters Degree
☐ 4. Doctorate Degree
☒ 5. Two year College
☐ 6. High School
☐ 7. Other - Specify _____

C. What was your time in service prior to combat?

Specify: 10 years 5 months

D. Please list the aircraft and hours accumulated and the Major Air Command (MAJCOM) before training in your combat aircraft.

Aircraft	Hours	MAJCOM
1. <u>F-24F</u>	<u>500</u>	<u>SAF + TAC</u>
2. <u>F-10D</u>	<u>1000</u>	<u>TAC + PACAF</u>
3. <u>F-105</u>	<u>500</u>	<u>TAC + PACAF</u>
4. _____	_____	_____
5. _____	_____	_____

VI. PREPARATION FOR COMBAT

A. When were you trained? 5 month 55 year

B. Where were you trained?

Location Lowry Field

(Continued)

VI. PREPARATION FOR COMBAT (Continued)

- C. How many hours in your combat aircraft did you have before your combat tour?
700 hours
- D. Were you comfortable flying the aircraft after training?
☒ 1. Yes ☐ 2. No

VII. COMBAT PROFILE

- A. What was your rank when entering combat?
☐ 1. 2nd Lt ☐ 4. Major
☐ 2. 1st Lt ☐ 5. Lt Col
☒ 3. Capt ☐ 6. Col
- B. In what squadron(s) did you fly?
 Specify 12 TFS
- C. What types of missions did you fly?
☐ 1. CAS
☒ 2. Interdiction
☐ 3. Weasel
☐ 4. Other — Specify _____
- D. What was your initial tour length?
☐ (1) 100 missions ☐ (2) 1 year
- E. What were the inclusive dates of your combat tour(s)?
3 month 65 year to 7 month 65 year
- F. How many combat missions did you fly?
20
- G. How many of your combat missions were over North Vietnam? 18
- H. Were you ever shot down?
☒ 1. Yes ☐ 2. No
 (If no, go to question L; if yes, continue)
- I. When were you shot down in relation to your original tour length? (check one)
☒ 1. At the Beginning
☐ 2. In the Middle
☐ 3. Toward the End
- J. Were you injured? (check one)
☒ 1. Yes ☐ 2. No
- K. How long after returning to your squadron did it take before you flew again? Specify _____
- L. Were you a POW?
☒ 1. Yes ☐ 2. No

Please record brief responses to each of the following six questions in Section VIII.

VIII. SHORT ANSWER RESPONSE

- A. What did you fear, and when did you first realize it?
I feared being hit by hostile fire. I felt this mainly on my first few missions.
- B. How did you cope with fear?
The desire to fly combat was much stronger than the fear.
- C. What made you fly regardless of fear?
Just wanting to do it, fullfilling the great desire of my life!
- D. If there were pilots who did not like to fly, how did they avoid flying?
Usually by being assigned to non combat positions or shorting tourman gubli.
- E. If there was someone you did not desire to fly with, how did you avoid flying with them?
I would usually fly with them anyway, but I was just careful not to let them get me in trouble.
- F. Any other comments you would like to make.
The magnitude of the early loss was never explained to me and I never had anyone ask me about it. Very little of this type communication existed officially.
 Thank you for filling out this survey. I appreciate your assistance. Please mail this survey back to me in the envelope provided.

If I can help further let me know
 Tony Grady
 Thru Major, USAF

Appendix B

SPSS Principal Factor Component Analysis

Index of SPSS Principal Factor Component Plots

	<i>Page</i>
1. Discipline with Fatigue	60
2. Control with Confidence	61
3. Control with Ideology	62
4. Control with Trust	63
5. Fear with Courage	64
6. Fear with Fatigue	65
7. Fear with Trust	66
8. Ideology with Discipline	67
9. Ideology with Distractions	68
10. Ideology with Morality	69
11. Input with Confidence	70
12. Input with Courage	71
13. Input with Morality	72
14. Input with Trust	73
15. Cohesion with Confidence	74
16. Cohesion with Control	75
17. Cohesion with Courage	76
18. Cohesion with Discipline	77
19. Cohesion with Distractions	78
20. Cohesion with Fatigue	79
21. Cohesion with Fear	80
22. Cohesion with Ideology	81
23. Cohesion with Input	82
24. Cohesion with Morality	83
25. Cohesion with Trust	84

Interpreting SPSS Graphs

The following graphs illustrate the SPSS Principal Factor Component Analysis interrelationships between the survey variables. The numbers located at the bottom of the page under each plot represent the pertinent statistical information. The values of interest for this study are the second number in line 2, following "R Squared." Multiplying this number by one hundred yields the percentage that the two variables account for variation in each other. The higher the value, the stronger the relationship between the two variables. The next value of interest is the last number in line 2, following "Sig." This number represents the statistical significance. The closer this value is to 0, the stronger the interrelationship between the two variables. On the plot itself, the steeper the line, the stronger the variable interrelationship. Note that the lines on all of the cohesion plots are fairly horizontal.

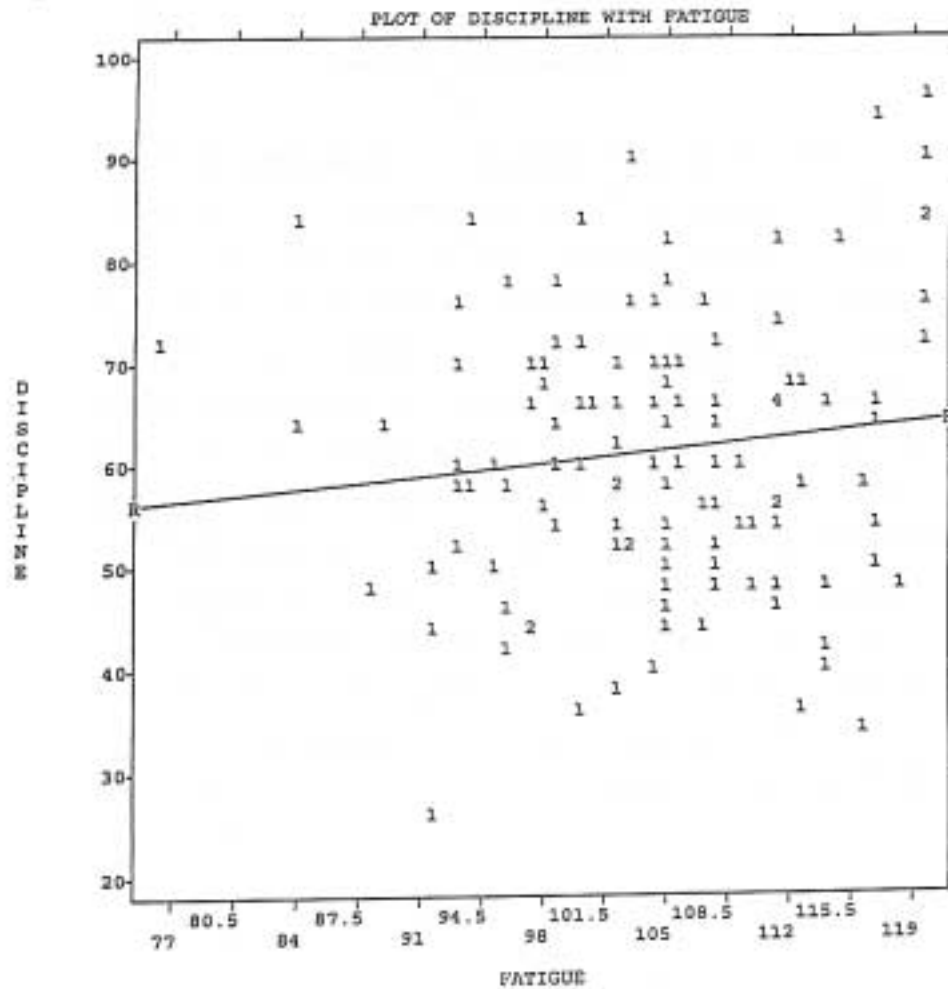
Data Information

173 unweighted cases accepted.

Page 67

SPSS/PC+

5/26/93



120 cases plotted. Regression statistics of DISCIPLINE on FATIGUE:
Correlation .09790 R Squared .00960 S.E. of Est 13.58270 Sig. .2871
Intercept(S.E.) 44.48502(15.22041) Slope(S.E.) .15514(.14506)

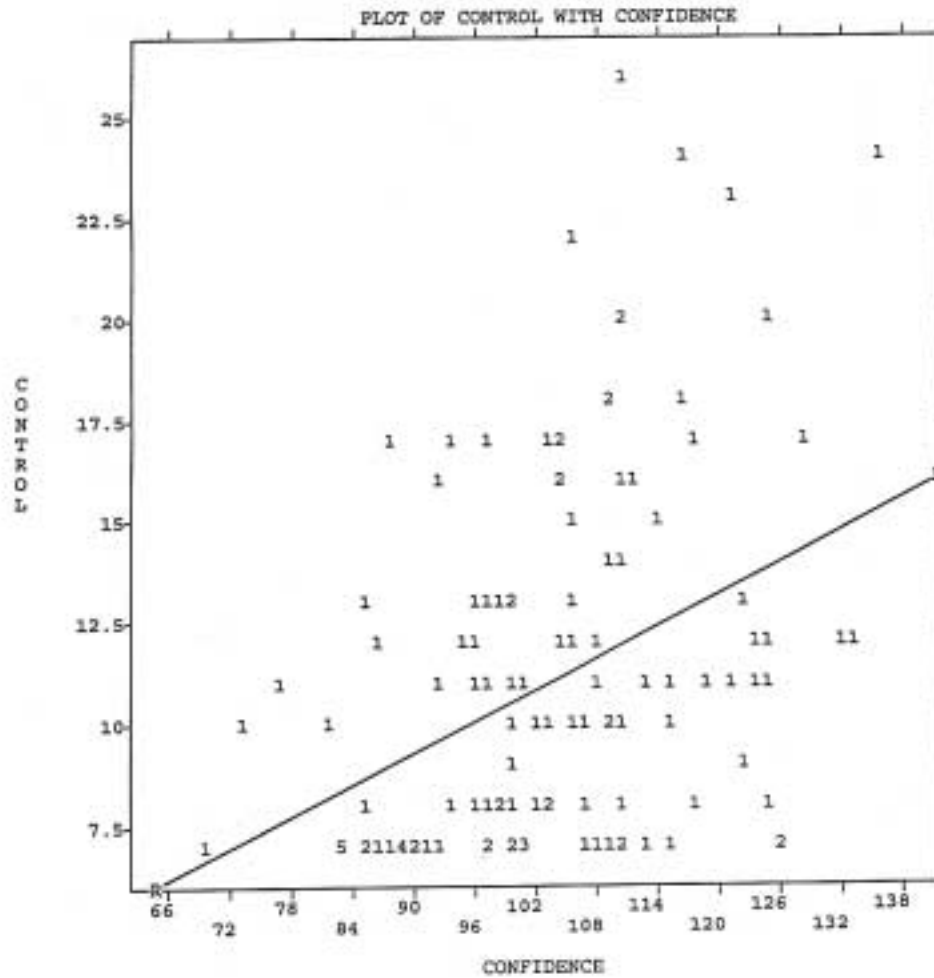
Data Information

173 unweighted cases accepted.

Page 30

SPSS/PC+

5/26/93



120 cases plotted. Regression statistics of CONTROL on CONFIDENCE:
Correlation .37233 R Squared .13863 S.E. of Est 4.18863 Sig. .0000
Intercept(S.E.) -1.58263(2.97319) Slope(S.E.) .12421(.02850)

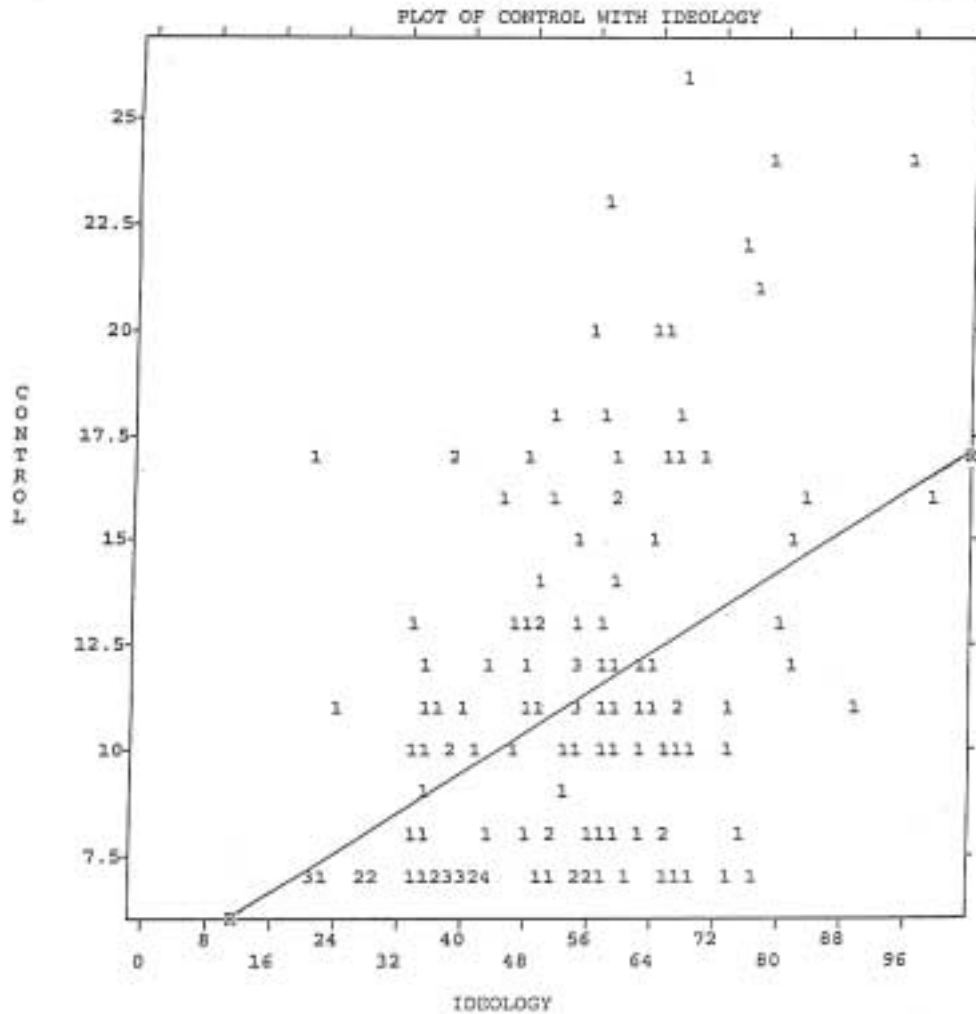
Data Information

173 unweighted cases accepted,

Page 33

SPSS/PC+

5/26/93



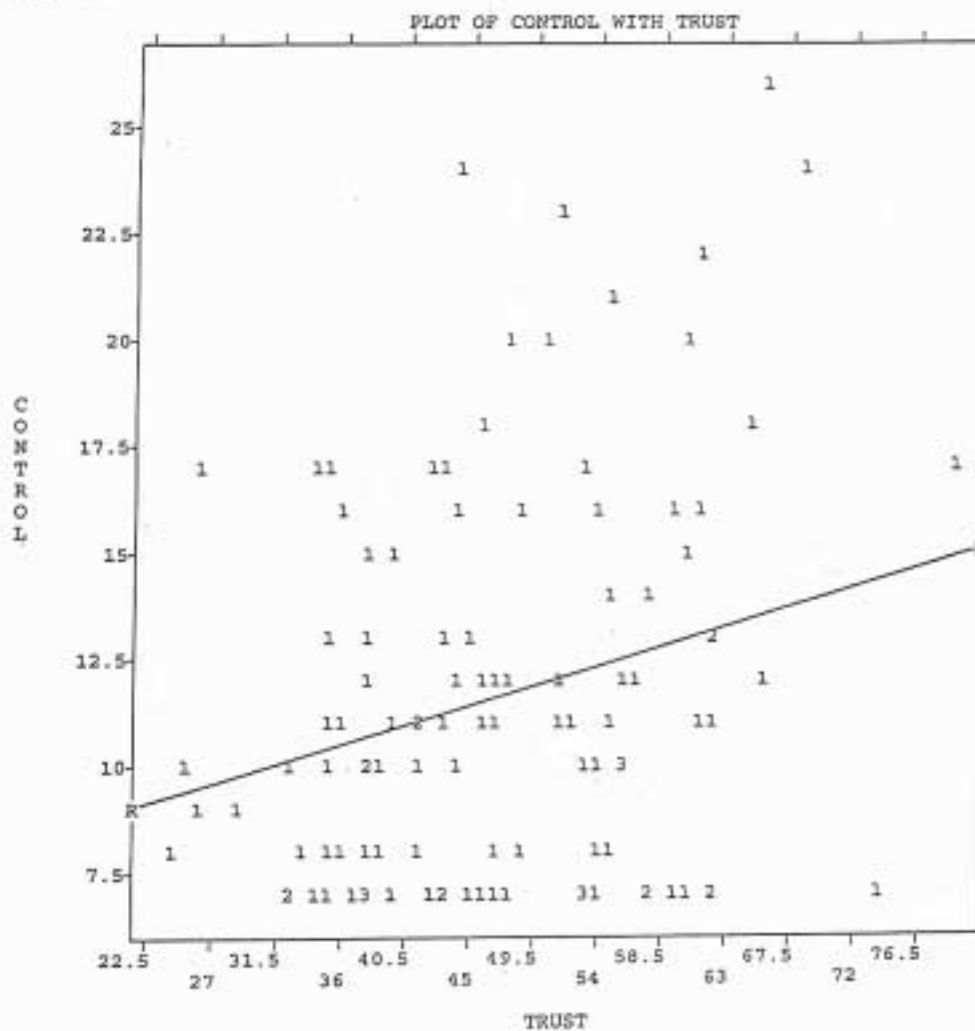
134 cases plotted. Regression statistics of CONTROL on IDEOLGY
Correlation .41253 R Squared .17018 S.E. of Est 4.03171 Sig. .0000
Intercept(S.E.) 5.17708(1.22562) Slope(S.E.) .11494(.02209)

173 unweighted cases accepted.

Page 27

SPSS/PC+

5/26/93



110 cases plotted. Regression statistics of CONTROL on TRUST:
 Correlation .25527 R Squared .06516 S.E. of Est 4.40243 Sig. .0071
 Intercept(S.E.) 6.64364(1.06109) Slope(S.E.) .10554(.03046)

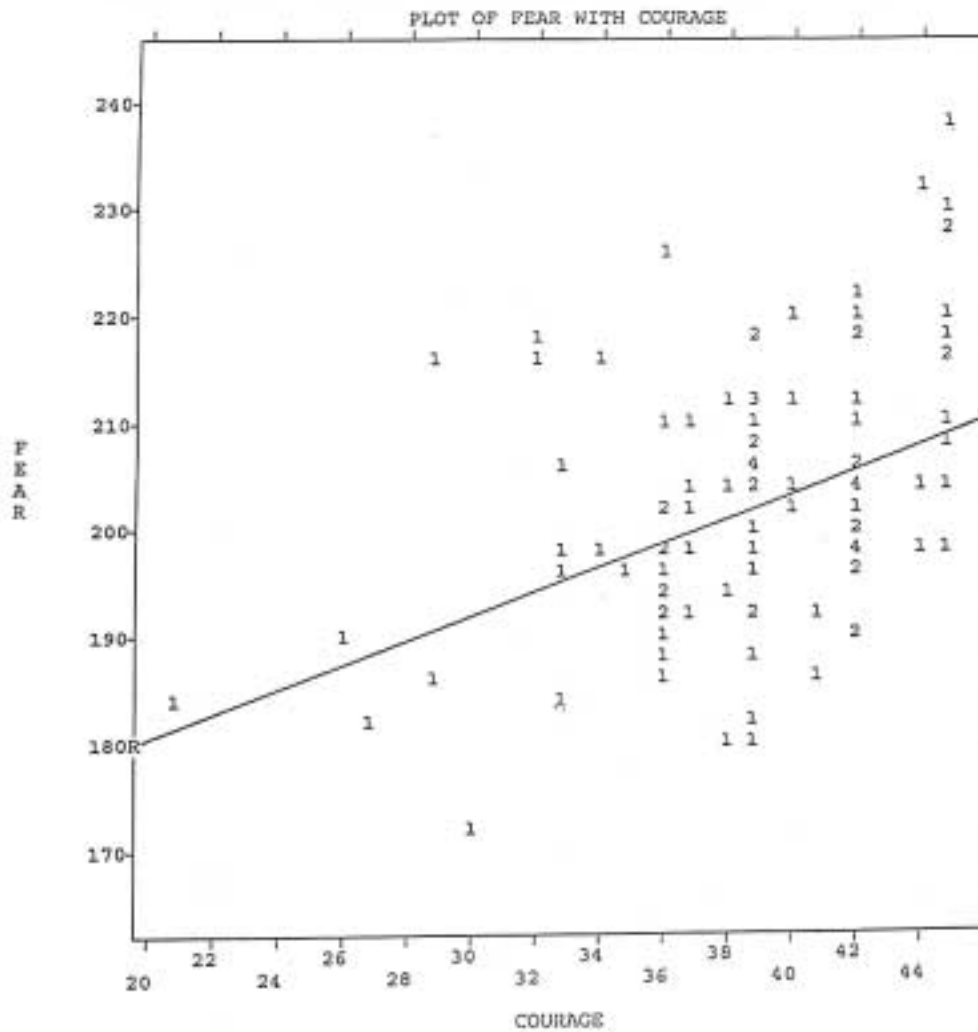
Data Information

173 unweighted cases accepted.

Page 42

SPSS/PC+

5/26/93



104 cases plotted. Regression statistics of FEAR on COURAGE:
Correlation .44017 R Squared .19375 S.E. of Est 11.22655 Sig. .0000
Intercept(S.E.) 155.55215(9.58116) Slope(S.E.) 1.21301(.24501)

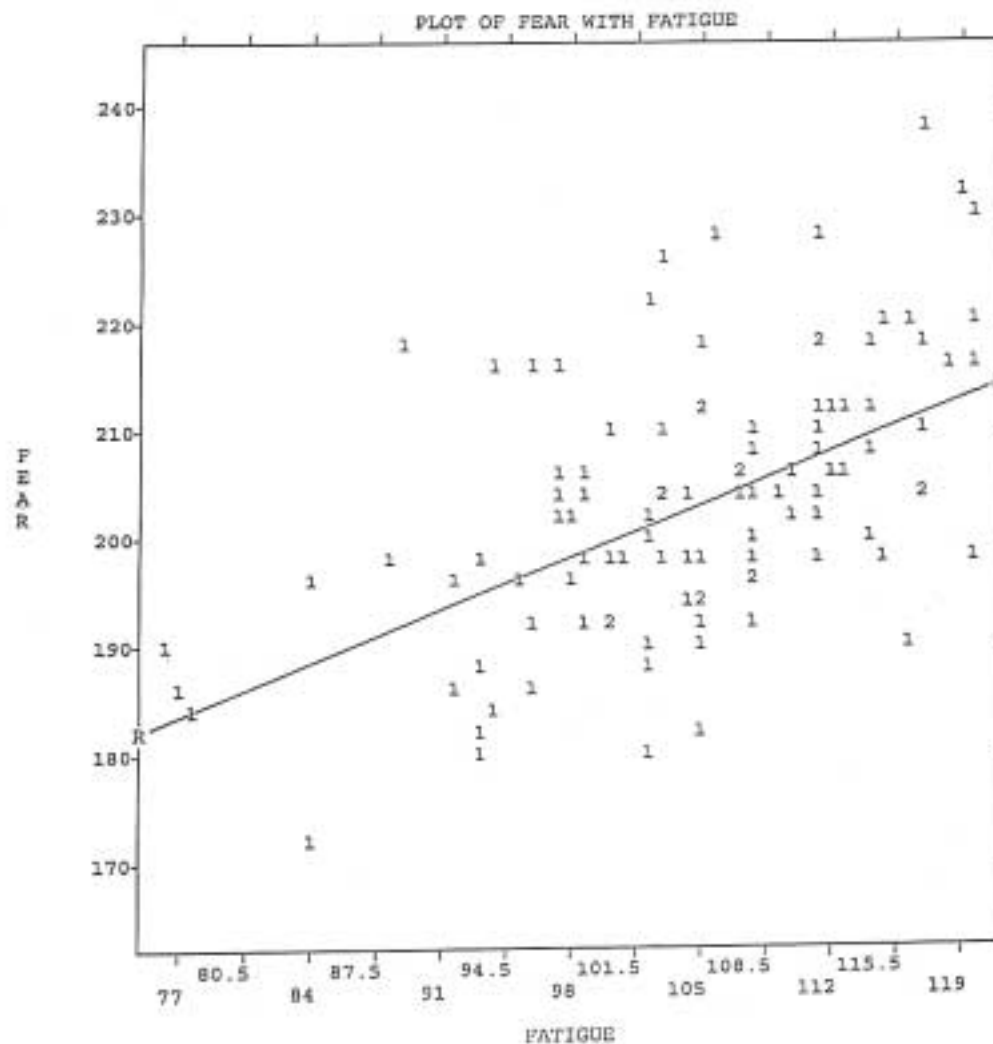
Data Information

173 unweighted cases accepted.

Page 39

SPSS/PC+

5/26/93



104 cases plotted. Regression statistics of FEAR on FATIGUE:
Correlation .54006 R Squared .29166 S.E. of Est 10.52278 Sig. .0000
Intercept(S.E.) 129.18533(11.38634) Slope(S.E.) .70394(.10862)

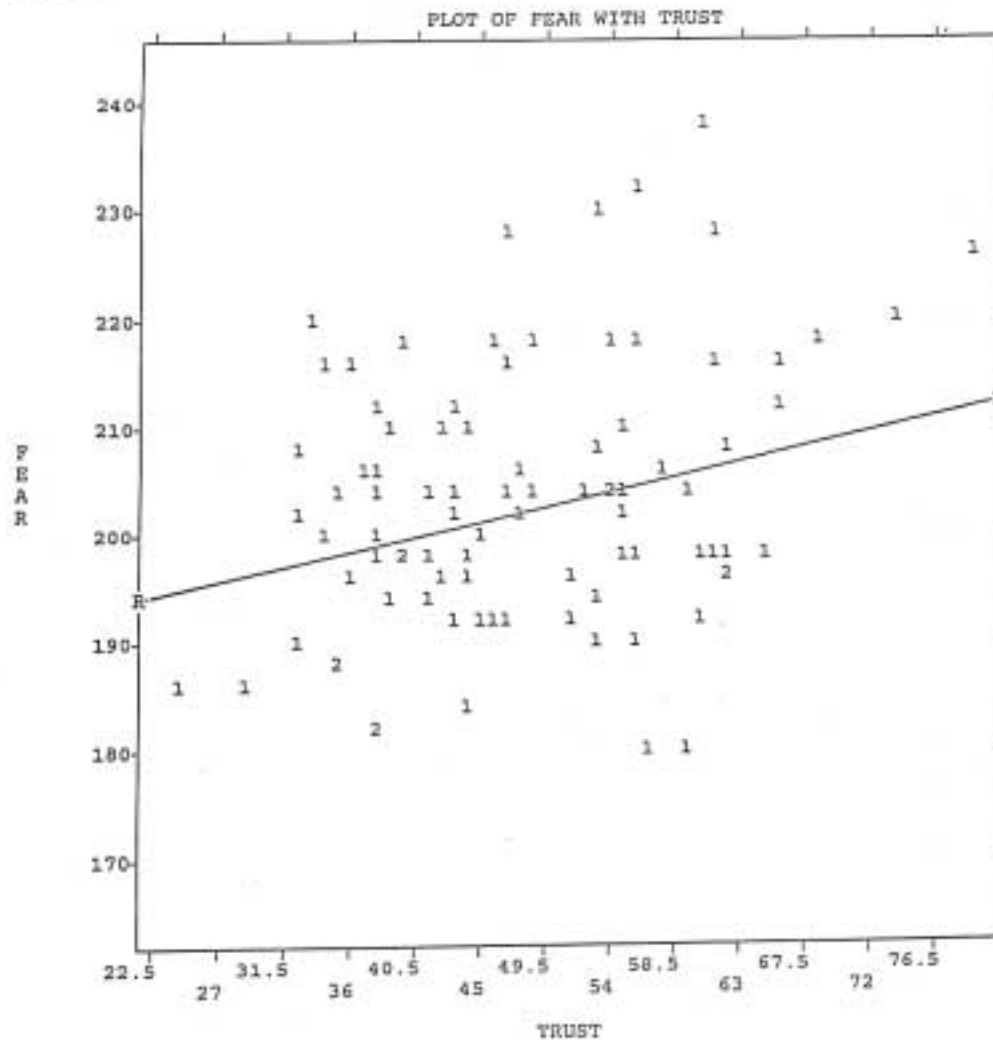
Data Information

173 unweighted cases accepted.

Page 36

SPSS/PC+

5/26/93



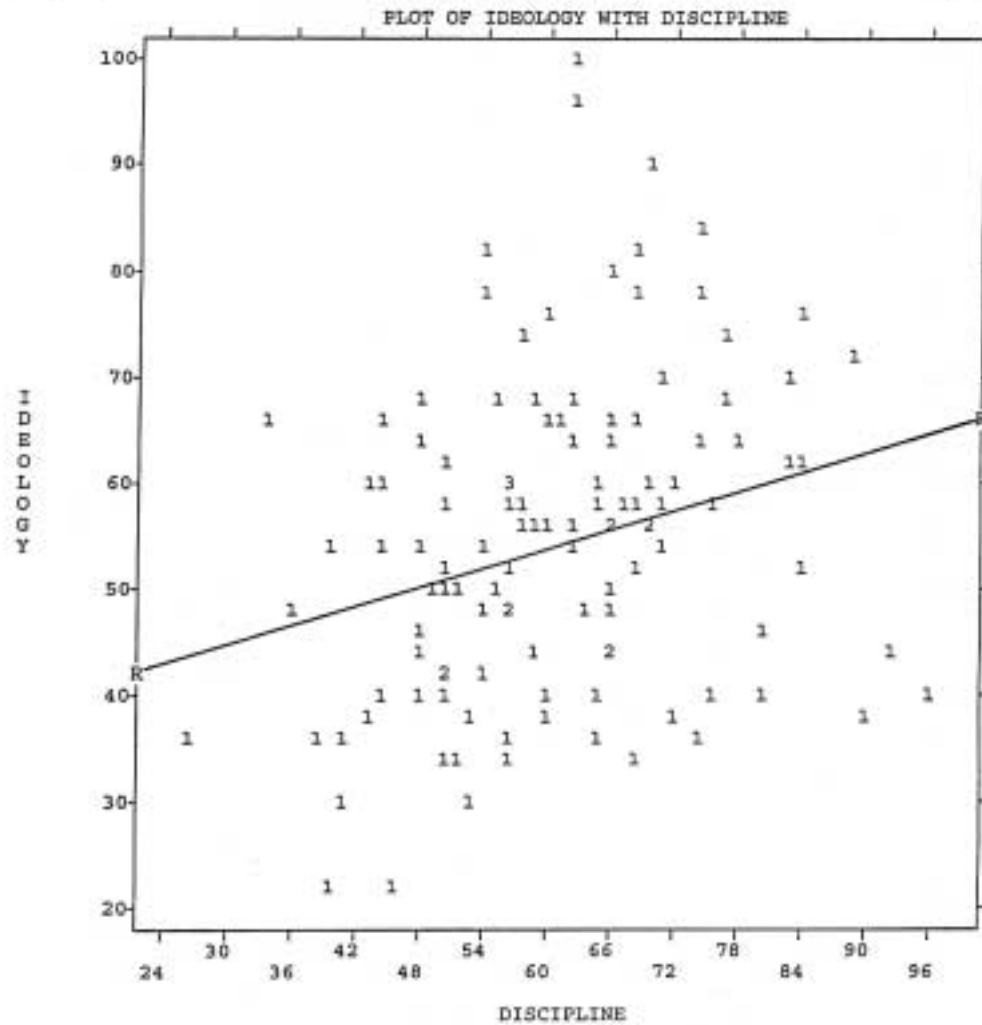
89 cases plotted. Regression statistics of FEAR on TRUST:
 Correlation .28221 R Squared .07964 S.E. of Est 11.00010 Sig. .0074
 Intercept(S.E.) 187.61393(5.67350) Slope(S.E.) .31566(.11505)

173 unweighted cases accepted.

Page 60

SPSS/PC+

5/26/93



118 cases plotted. Regression statistics of IDEOLOGY on DISCIPLINE: Correlation Squared .06986 S.E. of Est 14.61893 Sig. .0038 Intercept(S.E.) 35.94004(Slope(S.E.) .30168(.10220) Data Information

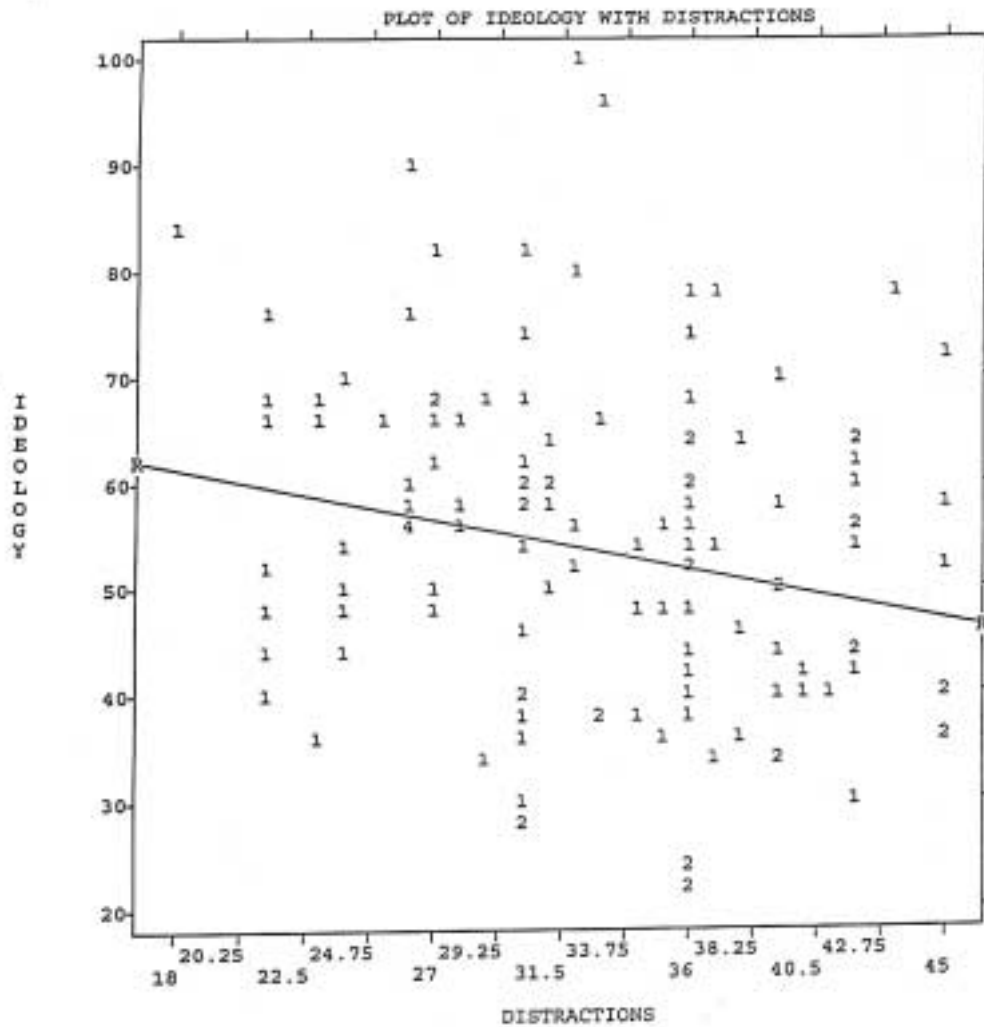
Data Information

173 unweighted cases accepted.

Page 63

SPSS/PC+

5/26/93



130 cases plotted. Regression statistics of IDEOLOGY on DISTRACTIONS:
 Correlation -.24233 R Squared .05872 S.E. of Est 15.04691 Sig. .0055
 Intercept(S.E.) 72.07343(6.69579) Slope(S.E.) -.56292(.19920)

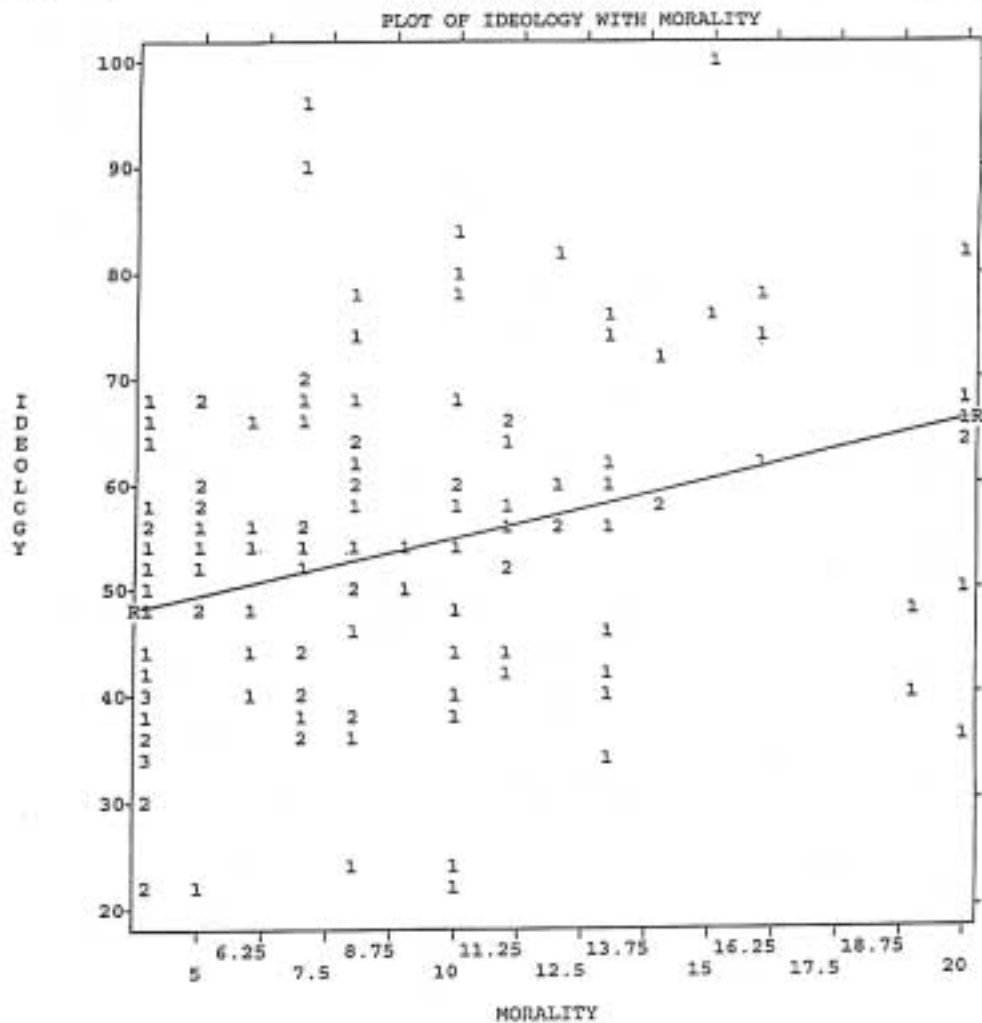
Data Information

173 unweighted cases accepted.

Page 57

SPSS/PC+

5/26/93



132 cases plotted. Regression statistics of IDEOLOGY on MORALITY:
 Correlation .29933 R Squared .08960 S.E. of Est 14.95023 Sig. .0005
 Intercept(S.E.) 44.14967(2.94279) Slope(S.E.) 1.06426(.29753)

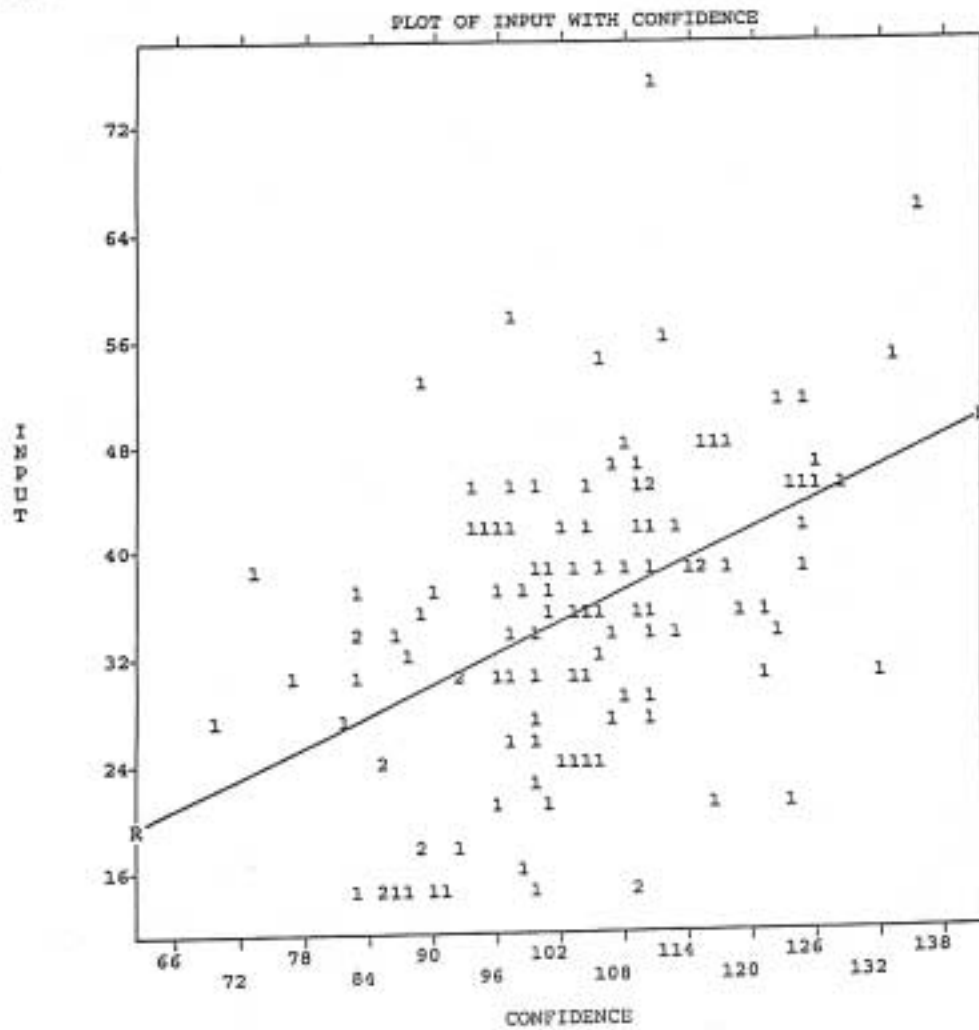
DATA Information

173 unweighted cases accepted.

Page 45

SPSS/PC+

5/26/93



119 cases plotted. Regression statistics of INPUT on CONFIDENCE:
 Correlation .44598 R Squared .19890 S.E. of Est 10.34308 Sig. .0000
 Intercept(S.E.) -4.43136(7.35101) Slope(S.E.) .37961(.07043)

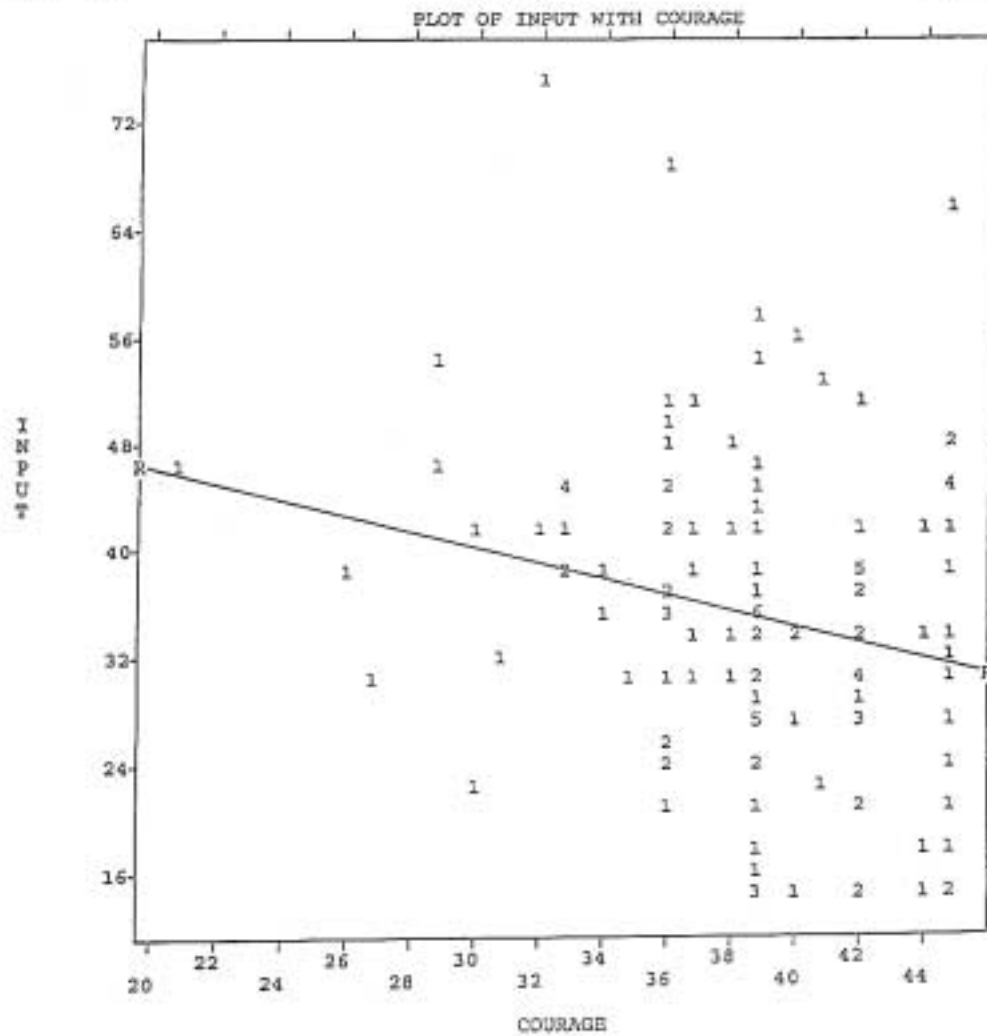
Data Information

173 unweighted cases accepted.

Page 54

SPSS/PC+

5/26/93



132 cases plotted. Regression statistics of INPUT on COURAGE:
 Correlation = .24014 R Squared = .05767 S.E. of Est = 11.27329 Sig. = .0055
 Intercept(S.E.) = 59.19958(8.57707) Slope(S.E.) = -.61911(.21950)

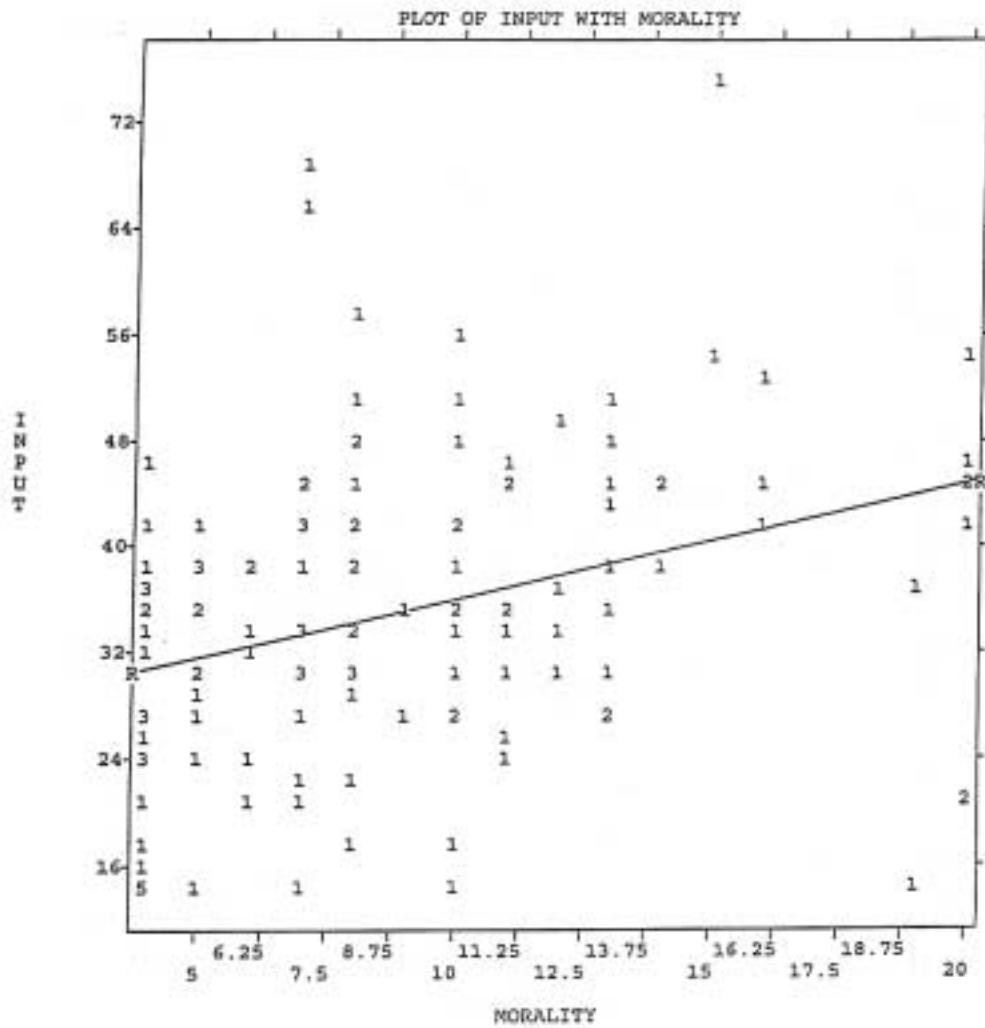
Data Information

173 unweighted cases accepted.

Page 48

SPSS/PC+

5/26/93



133 cases plotted. Regression statistics of INPUT on MORALITY:
 Correlation .31380 R Squared .09847 S.E. of Est 11.02306 Sig. .0002
 Intercept(S.E.) 27.73795(2.16421) Slope(S.E.) .82925(.21922)

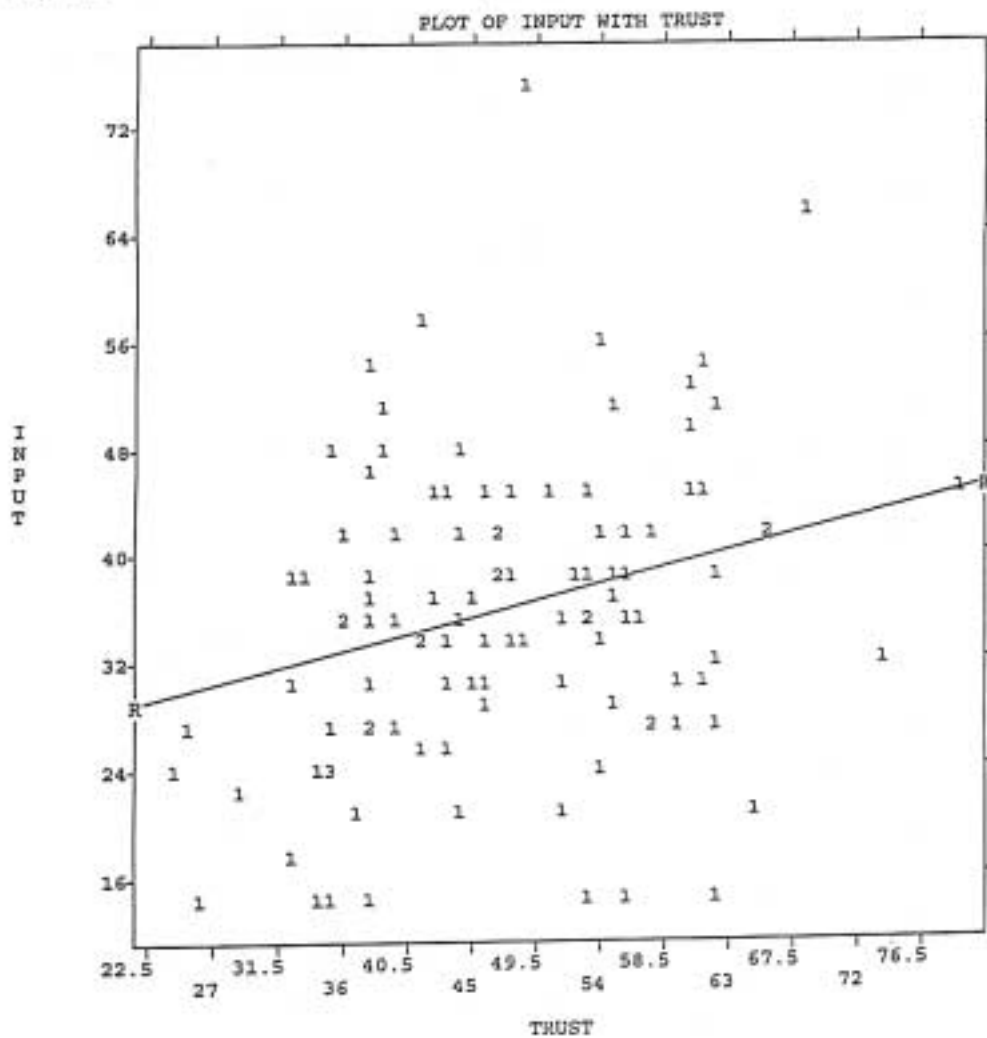
Data Information

173 unweighted cases accepted.

Page 51

SPSS/PC+

5/26/93



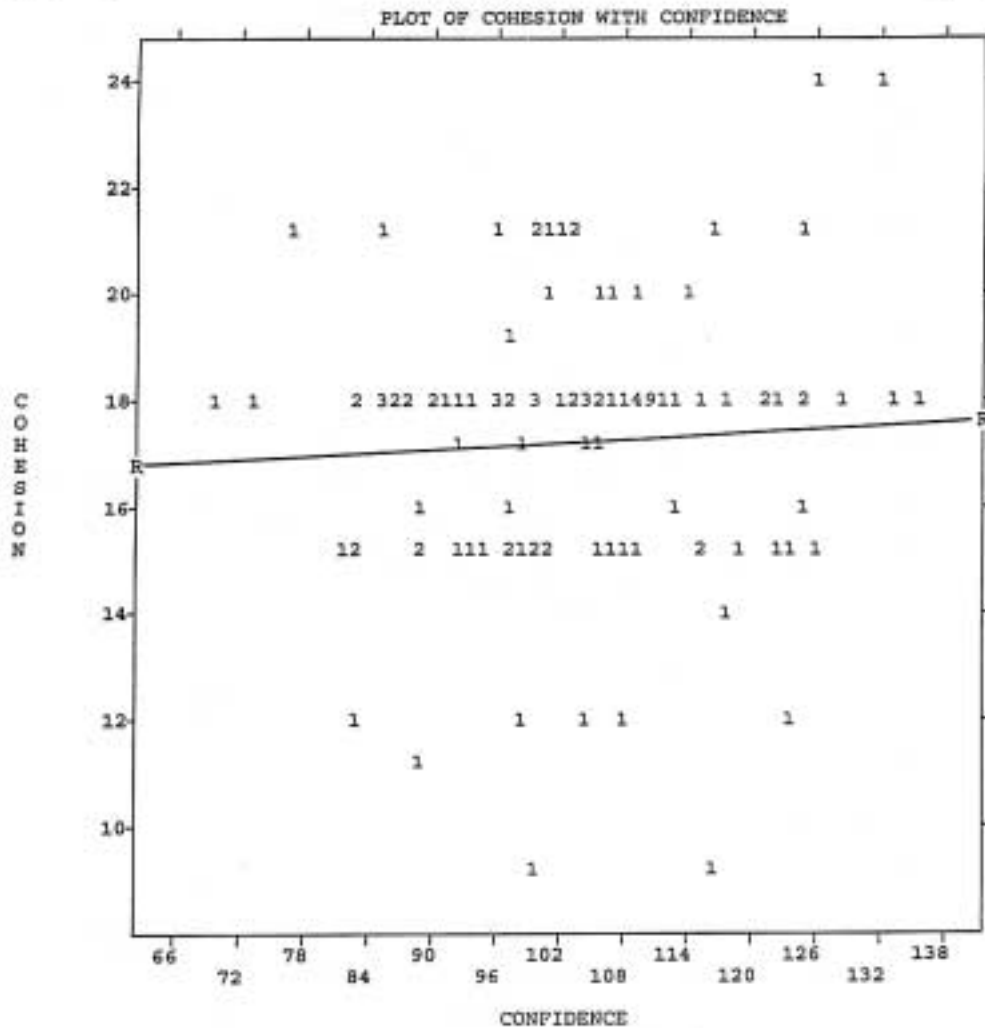
108 cases plotted. Regression statistics of INPUT on TRUST:
 Correlation .27018 R Squared .07300 S.E. of Est 10.83861 Sig. .0047
 Intercept(S.E.) 22.41477(4.64451) Slope(S.E.) .27604(.09554)

173 unweighted cases accepted.

Page 91

SPSS/PC+

5/26/93



120 cases plotted. Regression statistics of COHESION on CONFIDENCE:
Correlation .07826 R Squared .00613 S.E. of Est 2.55738 Sig. .3955
Intercept(S.E.) 15.73485(1.81528) Slope(S.E.) .01484(.01740)

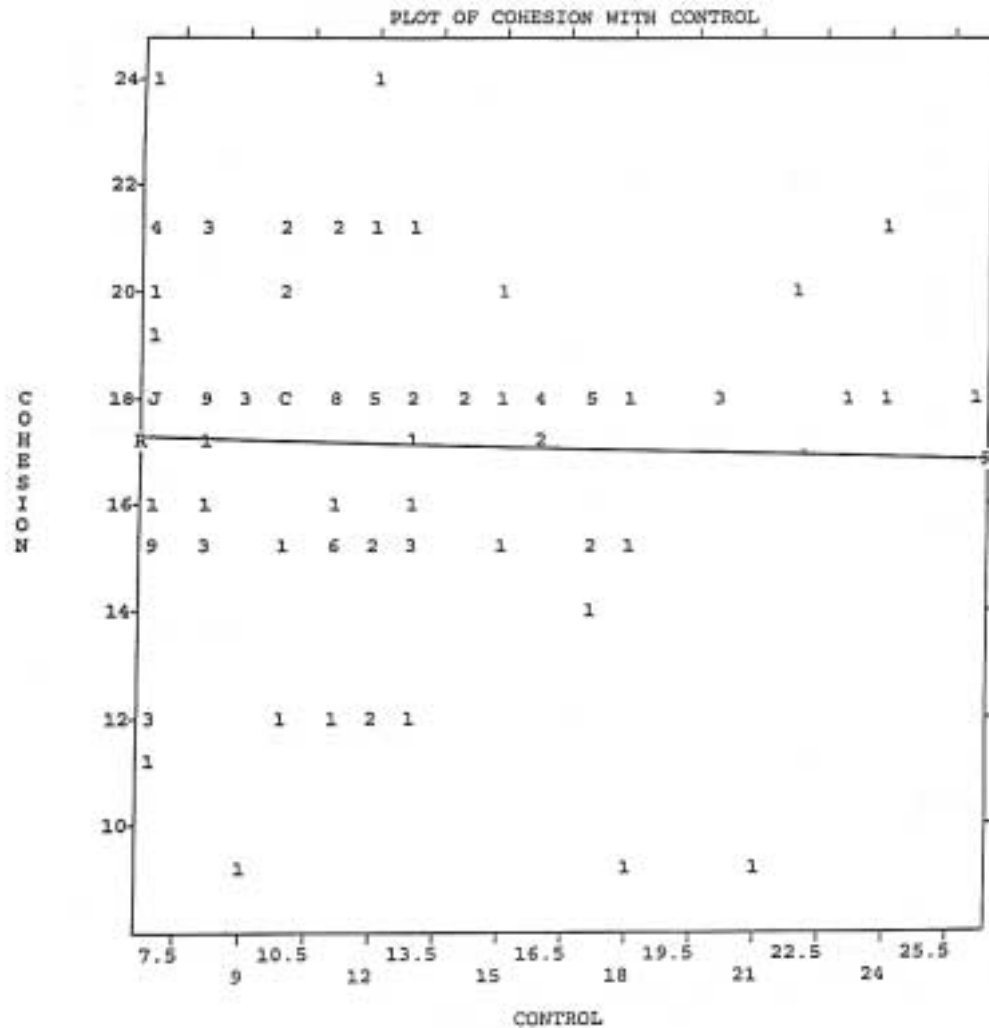
Data Information

173 unweighted cases accepted.

Page 82

SPSS/PC+

5/26/93



148 cases plotted. Regression statistics of COHESION on CONTROL:
Correlation = .03671 R Squared .00135 S.E. of Est 2.60816 Sig. .6578
Intercept(S.E.) 17.45622(.59591) Slope(S.E.) -.02230(.05024)

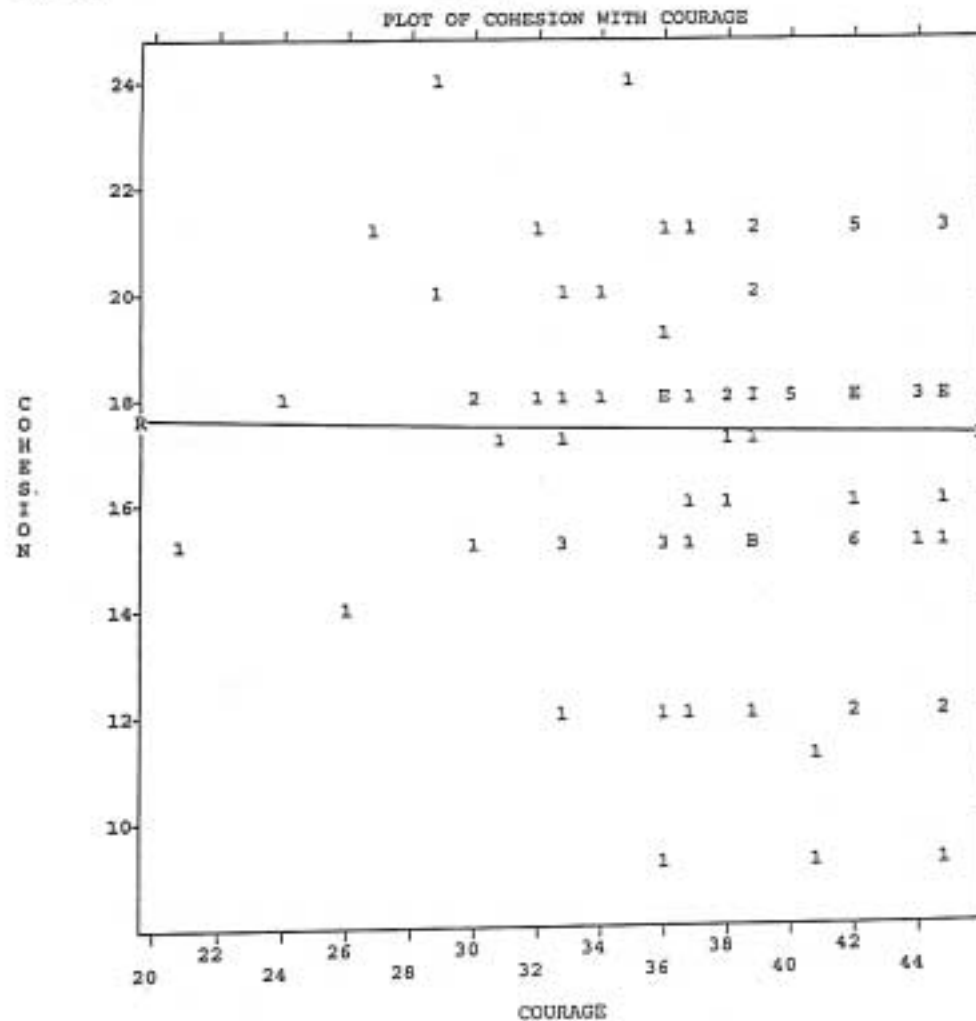
Data Information

173 unweighted cases accepted.

Page 94

SPSS/PC+

5/26/93



148 cases plotted. Regression statistics of COHESION on COURAGE:
 Correlation -.04453 R Squared .00198 S.E. of Est 2.60733 Sig. .5910
 Intercept(S.E.) 18.18219(1.81875) Slope(S.E.) -.02501(.04643)

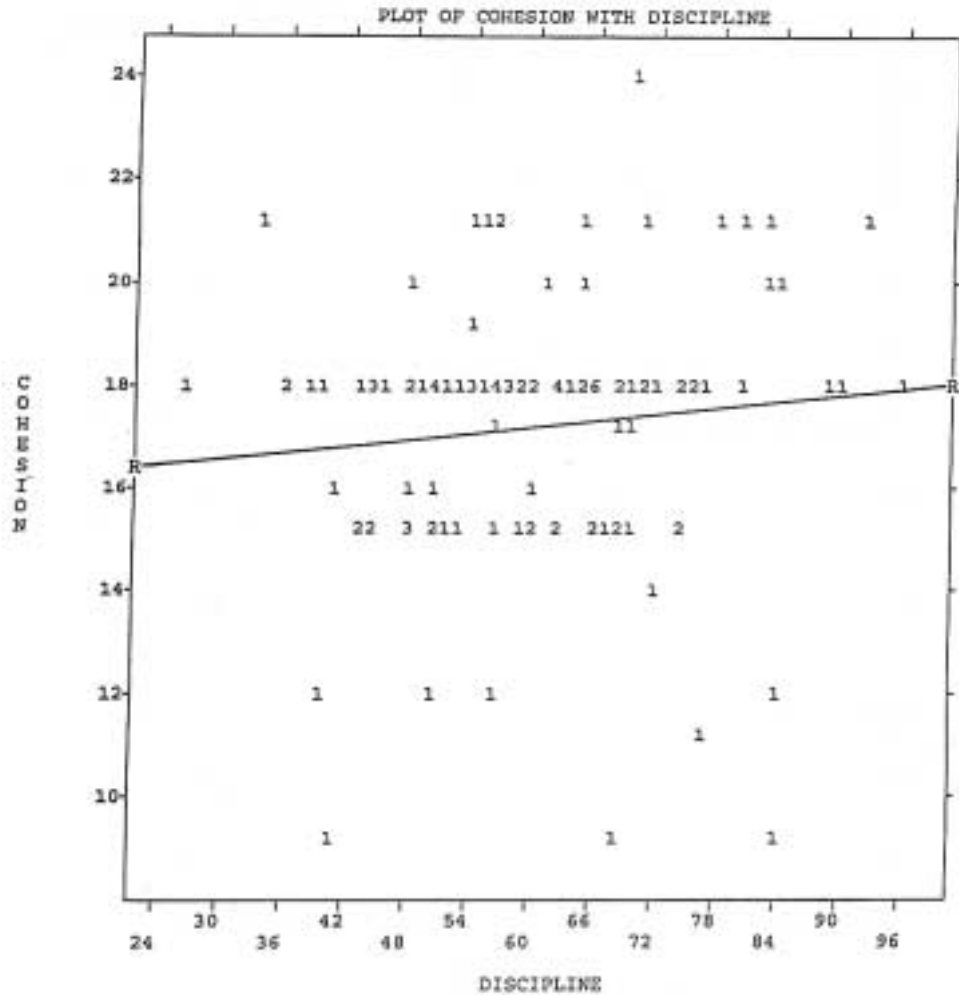
Data Information

173 unweighted cases accepted,

Page 73

SPSS/PC+

5/26/93



121 cases plotted. Regression statistics of COHESION on DISCIPLINE:
Correlation .09542 R Squared .00910 S.E. of Est 2.53645 Sig. .2978
Intercept(S.E.) 16.10454(1.06346) Slope(S.E.) .01798(.01719)

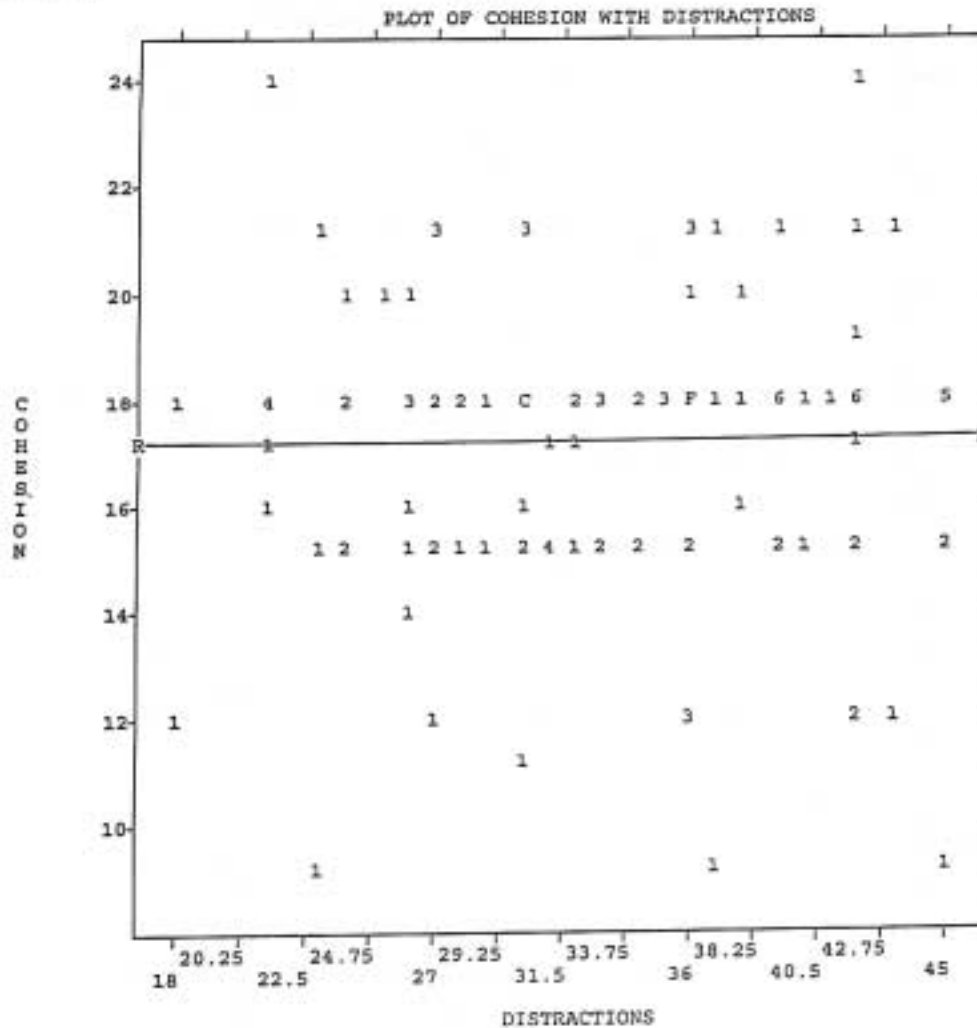
Data Information

173 unweighted cases accepted.

Page 100

SPSS/PC+

5/26/93



144 cases plotted. Regression statistics of COHESION on DISTRACTIONS:
 Correlation -.02419 R Squared .00059 S.E. of Est 2.64223 Sig. .7735
 Intercept(S.E.) 17.50248(1.11433) Slope(S.E.) -.00947(.03283)

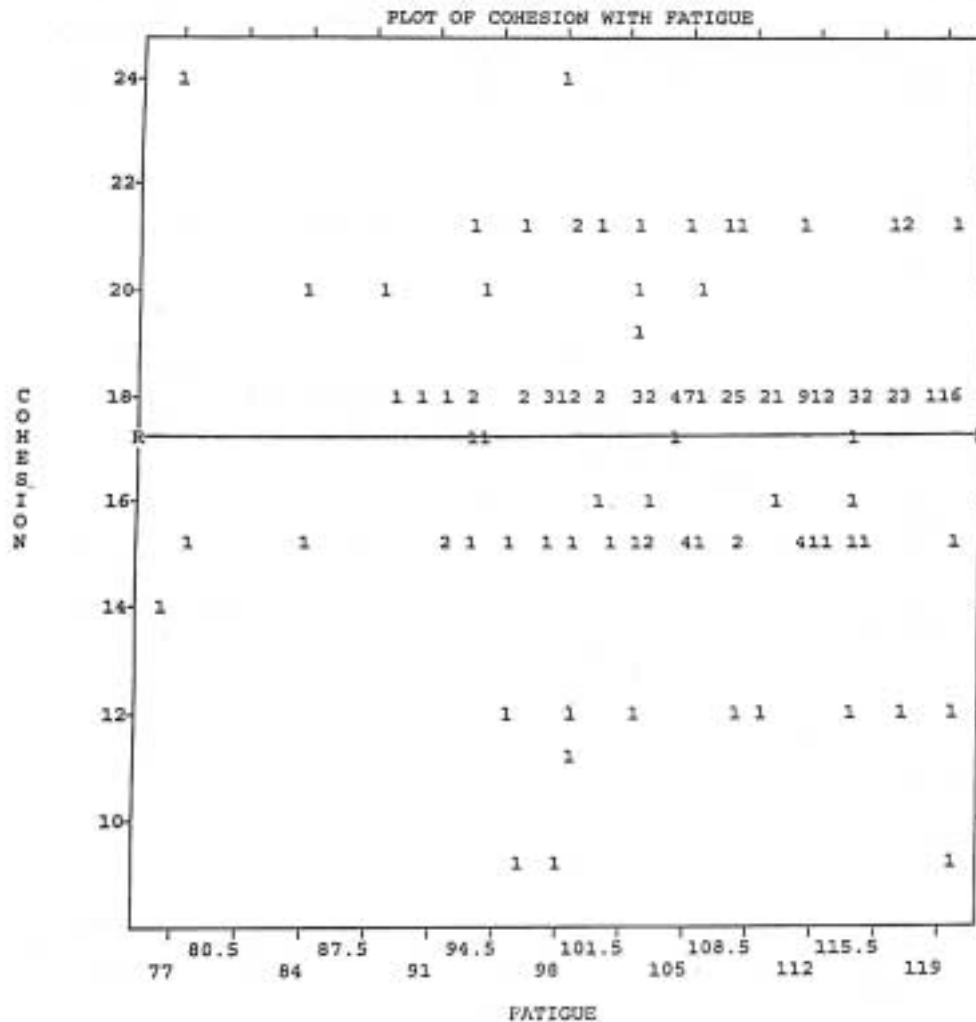
Data Information

173 unweighted cases accepted.

Page 97

SPSS/PC+

5/26/93



143 cases plotted. Regression statistics of COHESION on FATIGUE:
 Correlation = -.01995 R Squared = .00040 S.E. of Est = 2.65094 Sig. = .8130
 Intercept(S.E.) = 17.77236(2.50220) Slope(S.E.) = -.00561(.02366)

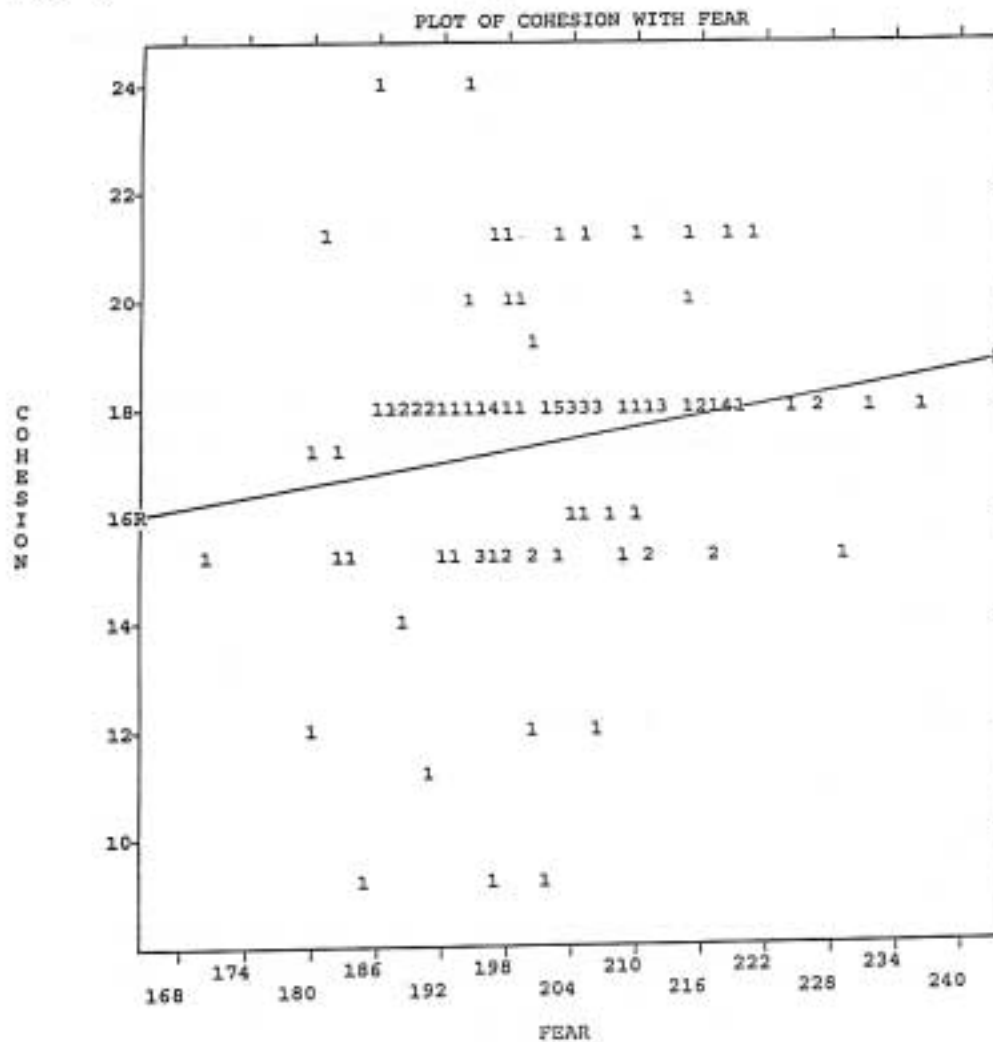
Data Information

173 unweighted cases accepted.

Page 76

SPSS/PC+

5/26/93



103 cases plotted. Regression statistics of COHESION on FEAR:
 Correlation .17055 R Squared .02909 S.E. of Est 2.63984 Sig. .0850
 Intercept(S.E.) 9.83623(4.26576) Slope(S.E.) .03652(.02100)

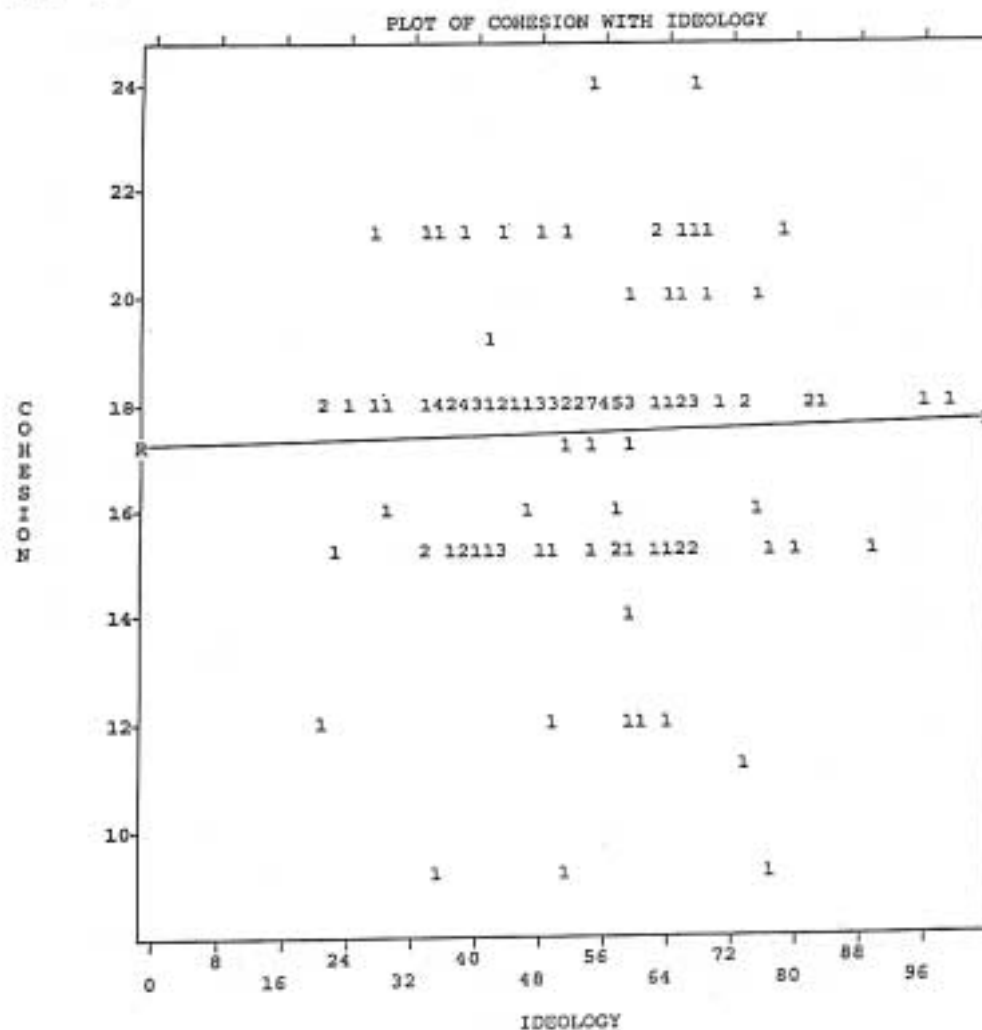
Data Information

173 unweighted cases accepted.

Page 70

SPSS/PC+

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132 cases plotted. Regression statistics of CONESION on IDEOLOGY:
 Correlation .01599 R Squared .00026 S.E. of Est 2.60532 Sig. .8556
 Intercept(S.E.) 17.13905(.60741) Slope(S.E.) .00264(.01450)

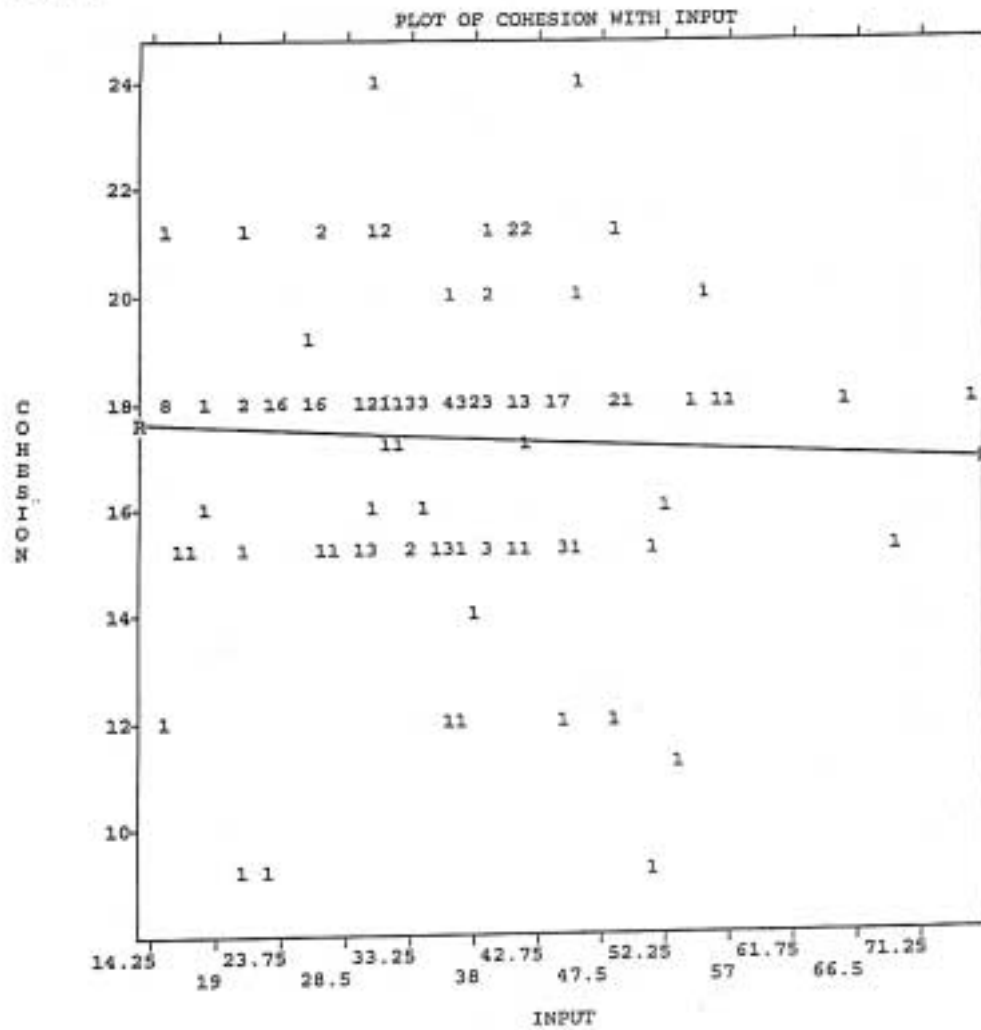
Data Information

173 unweighted cases accepted.

Page 88

SPSS/PC+

5/26/93



133 cases plotted. Regression statistics of COHESION on INPUT:
 Correlation -.03001 R Squared .00090 S.E. of Est 2.60210 Sig. .7316
 Intercept(S.E.) 17.49577(.71343) Slope(S.E.) -.00666(.01937)

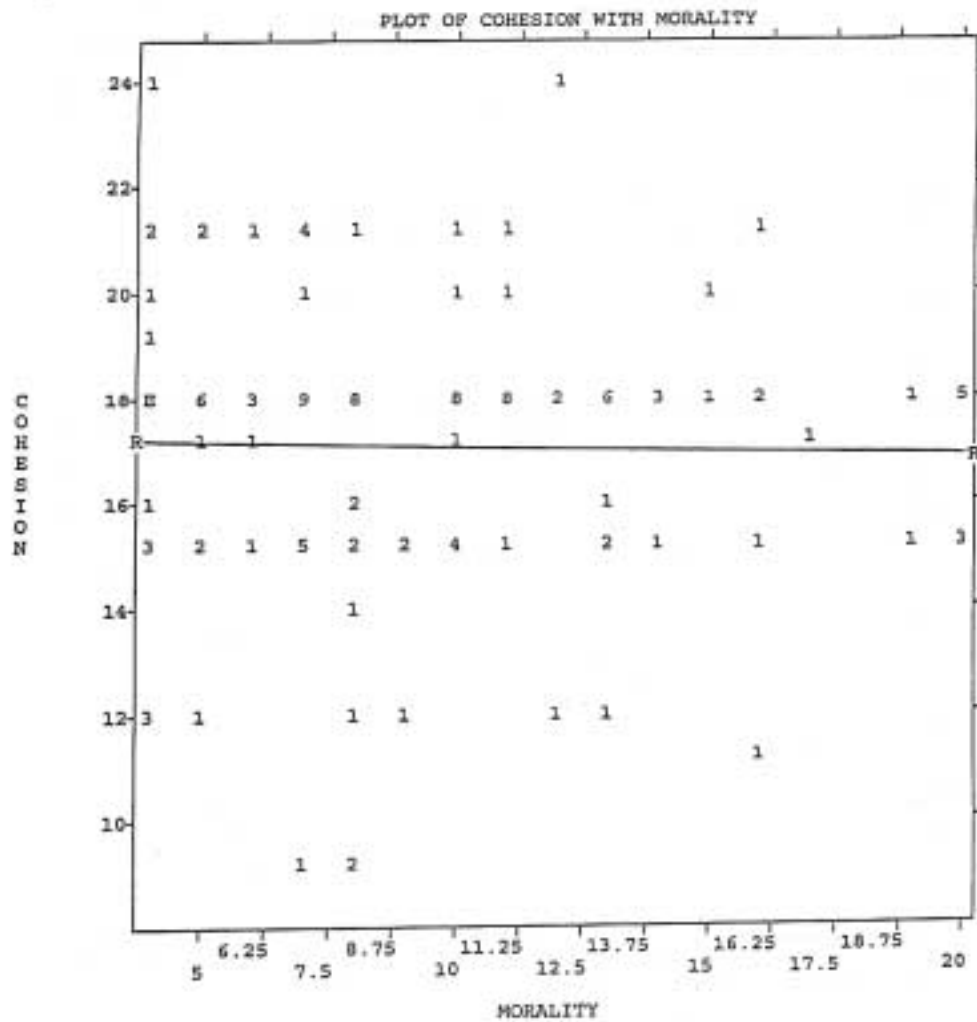
Data Information

173 unweighted cases accepted.

Page 79

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5/26/93



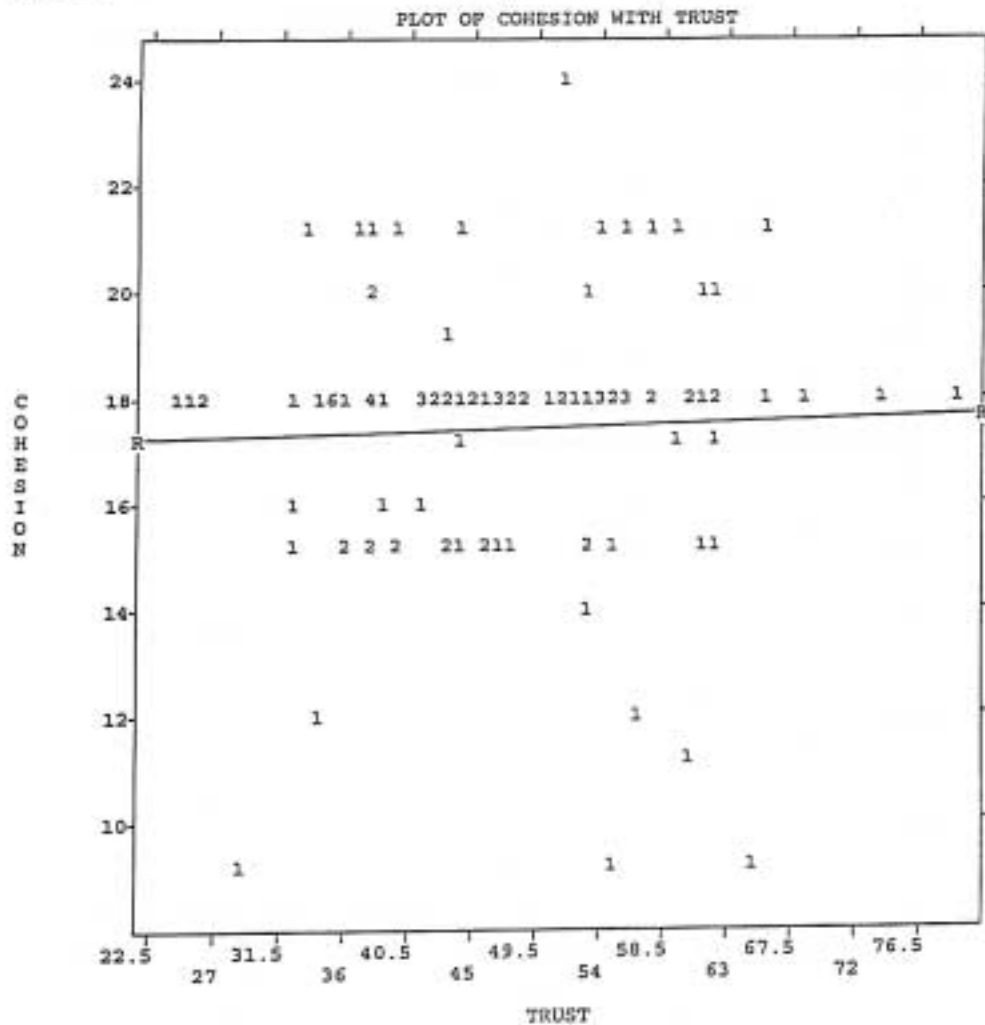
146 cases plotted. Regression statistics of COHESION on MORALITY:
 Correlation -.04596 R Squared .00211 S.E. of Est 2.60515 Sig. .5017
 Intercept(S.E.) 17.42217(.49187) Slope(S.E.) -.02673(.04842)

173 unweighted cases accepted.

Page 85

SPSS/PC®

5/26/93



109 cases plotted. Regression statistics of COHESION on TRUST:
Correlation .02347 R Squared .00055 S.E. of Est 2.50038 Sig. .8086
Intercept(S.E.) 17.11908(1.04847) Slope(S.E.) .00526(.02165)

Appendix C

Threats to Validity Table

Table C-1
Threats to Validity

-
1. This study did not use a control group.
 2. No rigorous evaluation was done to see if each question measured what was intended. Expert testimony established the basis for the questions.*
 3. This study was not constructed as a rigorous scientific study with a null hypothesis.
 4. Questionnaire size limited the number of questions asked.
 5. All questions carried equal weight in the analysis process.
 6. The elapsed time period, approximately 25 years, would tend to make survey respondents embellish past events. However, monographs, end of tour reports and unit histories, and Flight Surgeon Aeromedical Reports written during the war, helped to offset this influence on the analysis process.
 7. The survey did not include question reversals to eliminate mechanical responses.
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*The author, a test pilot with thirty-two hundred hours of flight time, has extensive experience in over 25 different aircraft. Dr. David R. Jones, MD, a retired USAF flight surgeon who continues to consult with pilots, reviewed the survey for logic and completeness. Lt Col Albert Mitchum, a political and military affairs specialist serving on the staff and faculty of the Air Command and Staff College, Maxwell AFB, Alabama, supervised construction of the survey. Mr. Pat Dowd of the Air Force Aeromedical Evaluation Division, Brooks AFB, Texas, and Anthony Kellett, author of *Combat Motivation: The Behavior of Soldiers in Battle*, reviewed the survey.