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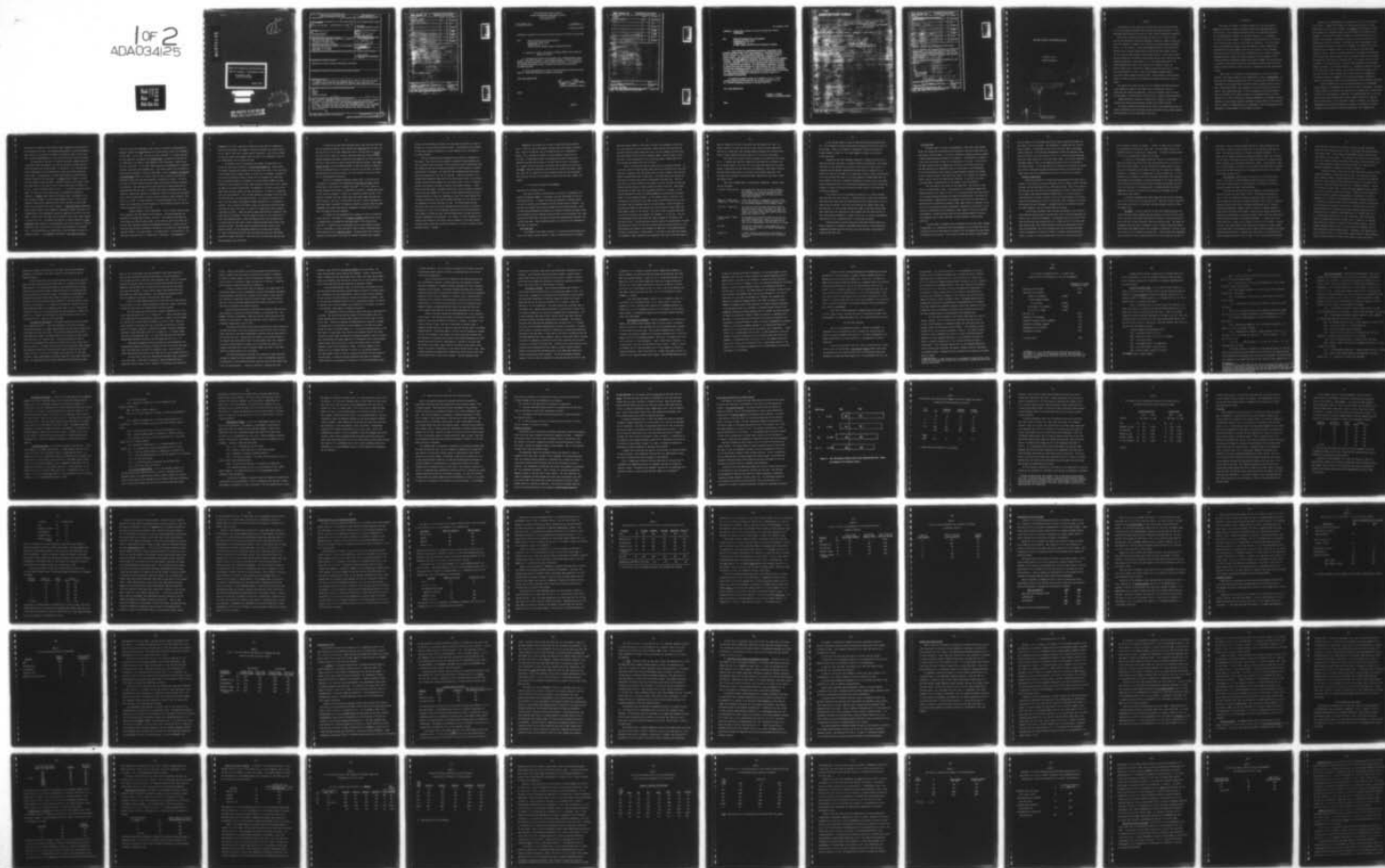
HUMAN RESOURCES RESEARCH ORGANIZATION ALEXANDRIA VA
FEAR AND COURAGE: A PSYCHOLOGICAL STUDY, (U)
JAN 59 R D WALK

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Papers for Presentation and Publication DO

Fear and Courage: A Psychological Study

by Richard D. Walk
Cornell University

January 1959



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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Fear Courage Stress Airborne Trainees		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) <i>contains</i> → This study will report an intensive analysis of fear and courage as anchored by material collected on several hundred young men undergoing parachute training. The major portion of this study will be concerned with two classes of Airborne Trainees that went through the airborne program in the summer of 1953. Questionnaires and performance measures were taken throughout the training cycle. <i>based on</i>		

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1 NAME OR TITLE Director, HumRRO	INITIALS	CIRCULATE
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REMARKS

The clearance on the earlier sections of Dr. Walk's manuscript apply to the attached.

Incl

Ltr fr HumRRO w/Incl

FROM NAME OR TITLE HERBERT C. HICKS, JR., Colonel. GS	DATE 9 March 59
ORGANIZATION AND LOCATION Chief, Human Factors Research Division	TELEPHONE 189/2325



THE GEORGE WASHINGTON UNIVERSITY
HUMAN RESOURCES RESEARCH OFFICE
POST OFFICE BOX 3596
WASHINGTON 7, D. C.

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THE DEPARTMENT OF THE ARMY

TELEPHONE:
METROPOLITAN B-6252

27 February 1959

SUBJECT: Request for Review of Research Report for Private Publication

TO: Chief of Research and Development
Department of the Army
Washington 25, D. C.
ATTN: Chief, Human Factors Research Division

1. Reference, Letter, this office to OCRD, HFRD, dtd 19 Feb 59, Subject as above.
2. Attached are the last two sections of Dr. Richard Walk's manuscript, "Fear and Courage: A Psychological Study", earlier portions of which were forwarded to you with the above cited letter. Your approval for publication of these earlier sections was received in this office 25 February 1959.
3. It is requested that you now review the attached sections in order that Dr. Walk may publish his complete monograph.

FOR THE DIRECTOR:

Eugene J. Zander
Eugene J. Zander
Assistant Operations Officer

Incls.

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For information.

FROM NAME OR TITLE C. J. Canella, Lt Col, GS	DATE 24 Feb 59
ORGANIZATION AND LOCATION HFR Div, ARO, OCRD	TELEPHONE

19 February 1959

**SUBJECT: Request for Review of Research Report for Private
Publication**

**TO: Chief of Research and Development
Department of the Army
Washington 25, D. C.
ATTN: Chief, Human Factors Research Division**

1. Your review for publication purposes is requested of the attached partial report "Fear and Courage: A Psychological Study", by Dr. Richard D. Walk of Cornell University, a former HumRRO staff scientist. The material for the study was collected by Dr. Walk in 1953 while engaged on HumRRO research tasks at Fort Benning, Georgia. The attached work comprises the Preface and Introduction. The three additional sections of the complete study will be submitted by Dr. Walk in the near future. It is the author's intention, however, to publish the attached material as a first installment, to be followed later by the remaining sections. In order to carry out this publication schedule, it is requested that you review the material which is now ready. Dr. Walk wishes eventually to publish the complete report as a Psychological Monograph.

It should be pointed out that on 28 January 1959 Lt. Colonel Canella approved by telephone the use of this material in one of Dr. Walk's Psychology courses at Cornell University.

FOR THE DIRECTOR:

**Eugene J. Zander
Assistant Operations Officer**

Incl.

DISPOSITION FORM

FEB 19 1959
19/59

FILE NO.
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TO: CINFO

FROM: C/R&D

DATE 18 February 59 COMMENT NO. 1

ATTN: Mr. John L. Mantle
Office, Chief of Public Info, OSA

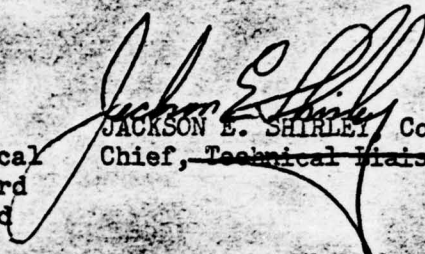
Mr. Willis/72830/gl

Request clearance of inclosed article. SUSPENSE: 2 March 1959.

FOR THE CHIEF OF RESEARCH AND DEVELOPMENT:

1 Incl

"Fear and Courage: A Psychological Study" (Partial Report) by Richard D. Walk, Cornell University dated Jan 59


JACKSON E. SHIRLEY, Colonel, GS
Chief, Technical Liaison Office

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1. Request the attached document be cleared for publication. It is proposed that this will be included in "Psychological Monographs." All data and material relate to research conducted under contract to DA.

2. This office interposes no objection to its release.

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Ltr from HumRRO
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FROM NAME OR TITLE G. J. CANELLA, Lt Col, GS	DATE 16 Feb 59
ORGANIZATION AND LOCATION Human Factors Research Div, ARO	TELEPHONE 2323

DD FORM 1 FEB 50 95

Replaces DA AGO Form 895, 1 Apr 48, and AFHQ Form 12, 10 Nov 47, which may be used.

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Fear and Courage: A Psychological Study

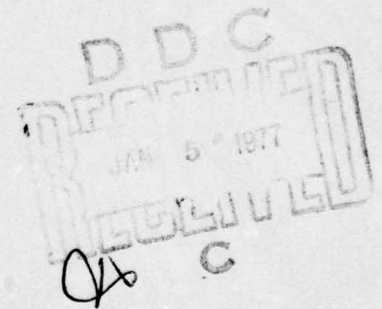
Richard D. Walk

~~Cornell University~~

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January, 1959

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PREFACE

The material for this study was collected while the author was employed by the Human Resources Research Office, George Washington University, in 1953. Subsequent analysis was facilitated by a grant from the Rockefeller Foundation.

The author is particularly grateful for the aid of Dr. John L. Finan, chief of the Motivation, Morale and Leadership division of HumRRO at this time, and of Dr. Meredith P. Crawford, the director of the Human Resources Research Office. Lt. Col. Richard J. Seitz was commanding officer of the Airborne Department of the Infantry School during the spring and early summer of 1953, Lt. Col. Oscar E. Davis during the late summer and fall. They, their staffs, and the officers of the Infantry School proper made the study possible by their generous cooperation in every phase of it. The professional staff of the HumRRO Research Task Force at Fort Benning, Drs. Howard H. McFann and Charles Windle and Mr. Gerald Kent, helped to design and carry out the study, with the assistance of James F. Bean, James Pattillo, Asenath Harris, Sara Keast, Rosalie Teeter and Patty Wiens. Janet Heilmann of the Washington office of HumRRO did many of the preliminary analyses on which this study is based.

The analysis at Cornell was set up by Dr. Raymond Finck (who also helped as an employee of HumRRO at Fort Benning and in Washington), aided by Robert Ader and Alfred Steinschneider. Most of the clerical work at Cornell was performed by Joan Rafaj Olson, aided by Mrs. H. Posman and Louise Sherlock.

HumRRO advisors Dr. Richard L. Solomon and Dr. Edward L. Walker both visited Fort Benning and contributed insights that helped the study.

Of course, opinions and conclusions are those of the writer and do not necessarily represent views of the Human Resources Research Office, George Washington University, or of the Department of the Army.

I. Introduction

This study will report an intensive analysis of fear and courage as anchored by material collected on several hundred young men undergoing parachute training. The airborne training situation is an excellent opportunity for the psychologist interested in studying, almost as if in a laboratory, the topic of fear and courage. The trainees can be studied prior to the start of the training cycle, during it, and after its completion. While the stress is not as prolonged or intense as that encountered in combat, enough fear is engendered for the experimenter to study it and relate it to his interests. The major portion of this study will be concerned with two classes of airborne trainees that went through the airborne program in the late summer of 1953. Questionnaires and performance measures were taken throughout the training cycle. In addition, other studies carried out on previous training classes will be referred to where relevant to bolster and put in perspective the main experimental results.

What, then, is of interest to the psychologist in a study of fear and courage? The primary interest of the psychologist is that of understanding. To study fear and courage requires first of all a situation which reliably elicits the behavior to be studied and the airborne training program fulfills this purpose. What produces fear? What measures can be derived from the fearful situation? What enables some men to handle fear adequately while others cannot? What is the effect of the fearful situation on subsequent behavior of those exposed to it? This is the type of question engendered by an interest in understanding, in more general terms, the antecedent factors related to elicitation of fear or courage, an understanding of the processes of fear and courage, and the consequent of being exposed to the stressful situation.

Primary to any understanding is an adequate definition of the behavior to be studied. Webster defines fear as a "painful emotion marked by alarm, extreme awe, or anticipation of danger," and courage as "that quality of mind which enables one to encounter danger and difficulties with firmness; valor; boldness." The definitions serve the purpose of highlighting that fear is an "emotion" while courage is something (a "quality of mind") that aids one in a dangerous or difficult situation. While there are many disagreements in psychology about the status of "emotion" as a concept, it is easier to find concomitants for this "emotion" than it is to find them for this particular "quality of mind." Fear will be mainly defined in this study by the admission of the soldier that he was "afraid" and by his report of certain bodily responses known from other studies to accompany fear. But courage, since it refers to behavior in a situation, will be inferred from performance on tasks where danger is present, or by desirable behavior in a dangerous situation as defined by the choices of fellow trainees. The measures of fear and courage are not the same so that a given individual can be both "afraid" and "courageous". The extent to which an expressed lack of fear and courageous behavior are related is an empirical matter, one to be determined from the research materials.

One must remember that any study which abstracts out for measurement certain aspects of a phenomenon has limitations as well as advantages. Obviously, a fearful person may experience the reactions to be measured and yet never admit to them on the questionnaires; conversely, a courageous person may not be identified by the other trainees over the short course of training, or may accidentally perform poorly on the tasks where courage is inferred. But objective measurements also have many advantages in enabling the research to quantify reactions and interrelate the various measurements. The information so

derived can be checked for usefulness by other researchers using similar or very different situations. The advantages are enough to make the enterprise worth while, but no one study or series of studies can hope to attain more than a partial understanding of a topic as broad as that of fear or courage.

The reactions of the body to a fearful situation, although studied in a quantitative way only recently, are part of the written record that certainly goes back prior to the Greeks. In particular, it is illuminating to look to Shakespeare for apt descriptions of some of the bodily reactions studied here. Nervousness and a rapidly pounding heart are two reactions reported frequently by the trainees. In Hamlet Horatio reported to Hamlet that the guards had seen the ghost of Hamlet's father on their watch: "They, distilled almost to jelly with the act of fear, stand dumb, and speak not to him." Cannot "distilled almost to jelly ..." be allied to extreme nervousness? The reaction, "heart beating hard," was frequently reported by trainees. In Macbeth, where Macbeth is thinking about the prophecy of the three witches, he asks: "If good (a good portent), why do I yield to that suggestion whose horrid image doth unfix my hair and make my seated heart knock at my ribs against the use of nature?" In Romeo and Juliet Shakespeare uses a reaction close to cold sweats, an infrequent reaction reported by the trainees, when Juliet contemplates taking the portion given her by Friar Lawrence: "I have a faint cold fear thrills though my veins, that almost freezes up the heat of life." Or perhaps this reaction is better portrayed in Titus Andronicus, where trembling is also reported, when Quintus replies to Martins' request for help in getting out of the hole where Bassianus lies murdered with: "I am surprised with an uncouth fear; a chilling sweat o'er-runs my trembling joints." The "quasiness" mentioned in King Henry IV, Part II

("they did fight with queasiness") might better be inferred as squeamishness or hesitancy rather than nauseousness or the "upset stomach" used on the protocols of this study. Or is: "Yet I am sick with fear" (Richard II) a better candidate for this reaction? The passage from Twelfth Night, "He pants and looks pale as if a bear were at his heels," might possibly be the "shortness of breath" quantified in this study. In any event, these quotations from Shakespeare illustrate the bodily reactions that accompany fear. Many other sources, from literature or from historical documents, could have been used. Darwin's Expression of emotions in man and animal (1872) is a classic study of bodily indices of the emotions where fear, along with many other emotions, is described in detail. The point is, then, that these reactions are well known and have been faithfully reported for centuries. Now, one may quantify these reactions by asking about them on questionnaires (Dollard, 1943), or measure with precise instruments heart rate, trembling, respiration, sweating or biochemical indices of stress like eosinophil count, urinary ketosteroids, or salivary sodium potassium levels (Lindsley, 1951, Davis et al, 1952). The new precision is a valuable research tool, but the behavior to be quantified, with the exception of the biochemical indices, has been fairly well agreed on for a long time.

Courage, however, is more complicated. It has no bodily reactions that can be measured, but must depend on the situation. Aristotle recognized the complexity of courage when he wrote, "the man ... who faces and who fears the right things and from the right motive, in the right way and at the right time, and who feels confidence under the corresponding conditions, is brave, for the brave man feels and acts according to the merits of the case and in whatever way the rule directs." The right things -- the right motive -- the right way -- the right way: certainly this is a recognition of complexity. The dependence of

courage not only upon a particular situation but also upon the judgments of others may help explain the somewhat different hypotheses that emerge concerning it, some of them tied to rather special situations. And its very complexity may help explain the circular nature of some of the hypotheses, after the fact observations with no predictive power.

An example of one of the problems of courage, its specificity to a situation, comes from an analysis of Scott's Last Expedition. Captain Scott, the Antarctic explorer who perished while returning from a trek to the South Pole in 1911 (where he was actually beaten in being first by Amundsen), recorded in his diary his conscious attempt to screen out the strongest men, those best able to withstand stress, to accompany him on that historic dash to the Pole. He made his first selection at Cape Evans, choosing the best men for his journey, and again at the Upper Glacier Depot, on December 21, 300 miles from the Pole, where eight continued forward and four men returned. On January 4 he made his third and final selection. Four men were selected to accompany him to the Pole, now 150 miles away, and three were sent back. On January 8 he wrote of the party, "our five people are perhaps as happily selected as it is possible to imagine." But on January 20 he wrote, "Oates is feeling the cold and fatigue more than the rest of us," and, on January 23, "Evans (Petty Officer Evans) is a good deal run down." These two lasted longer (Evans dying on February 17 and Oates sacrificing himself to save the others on March 16), but these men hindered the progress of Scott, Wilson and Bowers so that they perished within 11 miles of One Ton Depot when a severe blizzard confined them to their tents for over ten days. One could argue, but hardly with much validity, that Lashly and Crean, who distinguished themselves in rescuing their leader, Lt. Evans, and who were sent back when 150 miles from the Pole, were better qualified to remain with Scott. The villain for the Scott party was not lack of courage but injury and scurvy.

In selecting his men Scott speculated about those that were qualified for his purposes and several times observed that older men were the best. The two men with him at the last, Bowers and Wilson, he wrote about on June 19, far prior to the journey to the Pole, when they made their morning bath, ^{naked,} by washing themselves with snow, though the other members of the party were content with a small ration of water allotted for washing purposes. Age, indifference to cold, have both been mentioned by others as related to endurance on the one hand and ability to survive in the Arctic on the other, so Scott's observations are not without support, but they do seem to be tied to endurance or low temperature situations.

The type of hypothesis concerning courage that is circular can be illustrated by a quotation from Shakespeare's King Henry VI, Part I where Suffolk says: "true nobility is exempt from fear." It is not circular in context because Suffolk says it to show that he himself is fearless when about to die, but as a statement in itself, as a quotation without context, "true nobility is exempt from fear" simply means that those exempt from fear are "truly" noble, a fact that is proved after the fact. Similar hypotheses are often made where "character" is defined as related to courage, those who have "character" are simply those who are courageous: one cannot predict until after the behavior has been observed.

Of course, not all hypotheses about courage are tied to a situation or are circular. Lord Moran in his Anatomy of Courage observed the ability of educated men to withstand the prolonged stress in the lines during World War I. Education can be quantified prior to the stressful situation and is, furthermore, a factor mentioned by other writers, including quantitative studies like the American Soldier. One might expect that a study of airborne training should yield some more general hypotheses about courage,

related to other studies, and might yield some that are specific, or seem to be specific, to the airborne situation itself. The relation of the findings of this study, general or specific, to prior research will be discussed in its proper context.

Fear and courage each have complexities and these are recognized at the outset. How, then, shall we proceed to understand these phenomena from the data derived from this study? After setting the stage by describing both the airborne course and the materials gathered, the main appeals of airborne training will be analyzed. The reason why men volunteer should help understand the attraction of this type of training. A detailed analysis of the trainees that passed and those that failed the airborne course in the classes studied should give some insight into the fearful ones, if fear is related to failure, and courage if success is defined as courageous behavior. Performance at the mock tower, a fearsome training aid, may give further information on both fear and courage for a group all of whom passed the training course. Intensive analysis of fear as a phenomena in itself will reveal whether fear is actually elicited by the training course, and where, as will analysis of the responses of the men that admit to fear. The stress sensitive tests were given just prior to the first parachute jump and this may be related to the material on fear or to the material gathered on the first questionnaire. Those chosen as leaders by their fellow trainees should be those selected as the most courageous of the soldiers. And, finally, the main findings of the present study should fit into other lines of research to form some coherent picture of what causes fear and what diminishes it, of what is related to that nebulous concept, "courage."

*As a
real tower!
sing.*

Throughout, an attempt will be made to keep the analysis parsimonious, to refer to simple and testable factors rather than complex and vague ones. Some of the material may be inferred as being of a "personality" nature. But a "personality factor" too often becomes a search for the Holy Grail, a never-ending quest for something that keeps slipping away. A personality factor does not glow in the dark (visible only in peripheral, not in direct vision), nor emit a tinkle that can be heard only by the cognoscente. Unless the operations that define such factors are simple, repeatable, they will be viewed with the dour suspicion that the fog surrounding them hides not the end of the rainbow but simply more fog; warm, buoyant and gaseous.

II. The Training Course, The Procedures

Description of Airborne Training

The course in which a trainee became qualified as a parachutist and earned his parachute badge or "jump wings" required three weeks at the time this study was made. A class of trainees was assembled in barracks toward the end of a week and an orientation film and lecture given on Saturday. The training cycle proper then started on Monday with mock tower training. While officers and non-commissioned officers had a slightly different and longer cycle, the three-week cycle for enlisted men was divided into the following: mock tower training the first week, free tower training the second week and parachute jumping the third week. Other important aspects of training will be considered as each week is identified.

Mock tower week

The purpose of mock tower training is to teach the trainee proper exit form as he leaves a moving aircraft. Mock-up airplane bodies on the ground

teach the proper conduct in the plane, the basic jump commands, and exit out of a mock airplane door onto the ground. These training aids can teach the trainee everything except proper body form in the air between the time he has left the aircraft and the time his parachute opens. The mock tower, a structure with a mock airplane door 34 ftt above the ground, teaches proper exit from the door and proper body form in the air.

Prior to mounting the tower a trainee puts on a parachute harness. At the 34-foot level the tower has two doors, one on the right and one on the left. Each door is served by two long cables which go from a telephone pole near the tower to another pole about 75 yards away. Each cable serves one trainee and four men can jump from the tower at approximately the same time. Riding on each cable is a small trolley with two wheels on top of the cable and from the trolley two long straps or risers extend with hooks on the end. These hooks are fastened to metal loops in the parachute harness of a trainee. As the trainee approaches the door the cadreman hands him one strap and the trainee hooks it to his parachute harness. At the command "stand in the door!" the trainee gets into position in the door, using a prescribed shuffling and turning motion, and the cadreman hooks up the second strap. After the grader on the ground has asked for and received from the trainee his roster number the cadre member "taps out" the trainee. The trainee jumps, assuming prescribed jump form and counting "one thousand, two thousand ..." in the air. The fall is approximately eight feet before the risers attached to the trolley snub and stop the fall. The trainee then rides the trolley for approximately 50 yards and during this ride he is pulling his risers apart and looking upward as if he were checking the canopy of his parachute to make sure it has opened correctly and has no large holes (a 'blown panel"). On arrival at the mound the trainee is unhooked by other trainees and he immediately runs back to the mock tower to

stand at attention in front of the grader who has observed his jump. The grader informs him of the jump faults, if any, and the trainee resumes his position on a bench with other trainees where he observes the jumping performance of other candidates and waits until it is his turn to jump again.

The grader has a record of each jump made by a trainee with the errors on it. A trainee must learn the proper exit form before he is allowed to go on to the next stage of training, that is, he must have been given two satisfactory jumps during the week before he can progress to "free tower" training. The mock tower rating system is a reliable one and raters agree well with each other as to whether a trainee has made a satisfactory jump (Kent, Windle and McFann, 1954).

The types of errors made by trainees are informative. Typical errors are the following:

- "no count" or "late count": the trainee must count in the air "one thousand, two thousand, ..." In the air a count as high as five thousand means the main parachute has not opened and the soldier must pull the rip cord on this reserve parachute.
- "head up," "knees bent," "elbows out," "feet apart": a taut body position is necessary to avoid injury to the trainee when his parachute opens and to keep him from being entangled in the parachute lines.
- "fall out," "squat out": men must exit from the plane with enough vigor to avoid hitting the side of the plane. An error like "squat out" where a man's knees collapse under him usually implies many other errors such as feet apart, knees bent, elbows out, etc.
- "hands crossed," "hands on top": the trainee must be ready to grasp the rip cord of the reserve parachute and this is at the end of the chute on his lower chest. Hands and arms must be free to avoid entanglement from the chute as it opens.
- "no tap": the trainee jumped before he was tapped out. If trainees exit too close to one another entanglement is more probable.
- "circle x": a general category meaning five or more errors. In such a case the most serious error is also usually recorded.

As the trainee learns to jump the more serious errors gradually drop out. Quite frequently the hand errors and the counting errors are the last to be corrected. Often in an attempt to concentrate on making no errors the trainee forgets to count or, if he does remember to count, he will make a slight body error.

Perhaps the next most important technique of jumping to which time is devoted during the first week is parachute landing fall technique. The trainee must learn to fall properly as he arrives on the ground to avoid injury. To eliminate any anticipatory movements which might tend to tighten him up or cause him to draw up his knees, he is instructed to keep his eyes on the horizon. As he hits the earth the legs of the jumper gradually collapse from under him and the force of the fall is absorbed progressively on feet, side of leg, knee, thigh, buttocks and back. This continuous collapsing type of motion leaves the trainee in a heap on the ground from which he must spring to run around and collapse his parachute.

The training aid for the parachute landing fall is a small platform, about two feet high, and a sand pit. Trainees practice jumping with hands half over their head, about where the hands would be as the trainee pulls in on his shroud lines on landing. Four basic fall positions are taught, front, back and each side. At one time each oblique was taught in addition, making eight basic positions in all and there is some evidence that the simplification of fall techniques has resulted in a lower injury rate. Of course, the parachute landing fall or PLF is practiced until it is entirely automatic.

Other features of training during the first week include lectures on safety, practice in collapsing a parachute being blown by a wind machine and progressively harder physical training to put the trainees in peak physical condition when they jump.

Free tower week

The second week of training is designated as "free tower" week because before the trainee can be graduated from this week of training he must make five jumps from a 250-foot tower. To do this, trainees are hoisted up from the ground in their parachute harness attached to a parachute. The parachute is clipped to a cone-like rigid frame, so that it is inflated all of the time. At the top of the tower the parachute is released from the frame, the trainee floats free and must manipulate the parachute risers on the way down to avoid obstacles. As he hits the ground he must execute a proper parachute landing fall, gather up the 'chute and return to the base of the tower. He is graded on his performance in the air and on his landing fall technique. He can fail the course or be sent back to another class if his progress is not satisfactory.

The free tower is the climax of free tower week. The trainee is also, prior to the free tower "jumps," given experience in a suspended harness that teaches control of the 'chute in the air, in an apparatus that drops the trainee to the ground from various angles to perfect his landing falls, in mock-ups for more experience in executing the jump commands, and at the mock tower where he perfects his exit technique and learns to make "mass" exits, so important to get men out of an airplane as rapidly as possible. Instruction is also given in malfunction of parachutes and in avoidance of other jumpers in the air to prevent entanglements. Through the whole week runs the strenuous physical training, more strenuous than in mock tower week, to keep trainees in peak physical condition.

The free tower is evidently not as frightening as the mock tower, though, interestingly, it is potentially much more dangerous, since trainees can injure limbs as they fall to the ground or be blown by the wind against the high towers or obstacles on the ground. In this study trainees were asked to check whether

the mock tower or the free tower made them the most afraid and 63% chose the mock tower, 37% the free tower. The difference in invoked fear may be due to several factors. One hypothesis might be that the mock tower is the first fearful situation. While trainees overwhelmingly choose the parachute jumps, which occur last, as the most fearful of all, it is true no control group was given free tower jumps prior to the mock tower jumps. But the most reasonable hypothesis seems to refer to the essentially passive role of the trainee in free tower jumping. In the mock tower and in jumping from the plane the trainee must initiate coordinated movements under stress while at the free tower he simply waits until he is released and then tries to control the parachute.

Parachute jumping week

During the last week of training each trainee makes five jumps from an aircraft. The first few jumps are individual "tap out" jumps at about 1200 feet altitude, the last ones mass exits at 1000 feet altitude. Men on the ground at the drop zone rate the ability of the parachutists to control their chutes in the air and to make proper parachute landing falls. As at other points in training where he is rated a trainee may fail or be turned back if his performance is not satisfactory, but this is relatively rare. Refusals to jump from the aircraft are also infrequent. Presumably most of the potential failures have been removed by the two previous weeks of training.

To make their parachute jumps, trainees are marched to the airfield, a short distance from the regular training area, and, as the time approaches for them to jump, fitted with parachutes. The parachute used at the time of this study was the type used during World War II, known as the T-7, one that gave more opening shock, had a higher malfunction rate and caused more injuries than a new parachute, the T-10, introduced soon after this study was made. After his parachute is fitted the trainee, in complete uniform including a helmet, is taken to a large building where he waits to board the aircraft

with his group or "stick" of jumpers. A "stick" is usually led by officers or noncommissioned officers who jump first. The place where "sticks" are assembled and wait is known as the "sweat shed." As Bradley and Wood remark, "not all of the perspiration comes from the heat."

In the air, at the command "stand up!" "hook up!" trainees stand and hook their static lines, which pull open the parachute like a rip cord, to a cable inside the airplane. The clip type hook is locked closed by a small piece of wire inserted by the trainee so that the clip cannot come unhooked accidentally. Trainees exit on command and, in case of malfunction, or if the parachute has not opened by the time the trainee has counted "one thousand, two thousand, three thousand," he pulls the release on his reserve parachute. After he arrives on the ground the trainee collapses the parachute and runs off of the drop zone to an assigned area. The parachute must be collapsed immediately because in a high wind the trainee may be dragged along the ground and injure himself.

As training progresses the trainee jumps with more and more equipment until he is jumping with field pack and rifle. Under some training conditions the trainee may jump with an auxiliary load that weighs as much as he does.

The Present Study

The sample. The basic material for the study reported here was collected from two airborne classes that were trained in the fall of 1953. While this is the core of the study other material collected in the spring and summer of 1953 will be used frequently along with the main study. The reason for presenting this other work is threefold: first, it helps to show the context within which the present material was collected, to show that it was not pulled out of the air but is related to previous work. Second, these prior researches help to justify the use of material which may not have turned out too well in

this study. That is, previous results may help to justify analyses or conclusions which would not stand on their own if only presented with the core study. And, lastly, replication of results is extremely important. In a study like the present one where many cross analyses are made, one can easily say that some of the results are due to special features of the sample itself, without, perhaps, any implications beyond this sample. Where possible, reference to other research conclusions will show which conclusions can be regarded as the most reliable because they are representative not only of this sample but of other studies as well.

The situation. Several special features of the core study require mention. The first of these concerns the world situation in the fall of 1953, and the second refers to a modification in the method of obtaining airborne trainees from basic training centers.

The Korean War was still going on, although at a diminished tempo, during the spring and early summer of 1953. The armistice was signed on July 27, 1953, but there had been heavy fighting as late as May and June. What influence did this have on airborne training? This is hard to interpret because of conflicting lines of evidence, both probably valid. Airborne training was apparently viewed by some as a method of delaying shipment to Korea, since the course itself lasted a month and some trained parachutists were sent as replacements to airborne divisions within the United States while others entered the stream of replacement personnel. (A combat team of airborne troops was in Japan, not in Korea, at the time of this study). Airborne training, thus, might delay or even preclude participation in ground combat. On the other hand, a questionnaire given at basic training centers by the Human Resources Research Office in December 1952 found that, of all soldiers, airborne volunteers were more likely to want to go to Korea than other soldiers.

This same study found that all soldiers, including airborne volunteers, agreed that the airborne was less likely to see combat than ground infantry. The paradox, then, is that airborne soldiers were slightly more eager but less likely to go into combat. With the end of the Korean War any "secondary gain" from airborne training was erased and airborne training remained as one of the most dangerous courses of training available to a soldier with no secondary advantage of release from or delay in combat duty.

The second special factor about the main study was the change in basic training procedures. During the spring of 1953 a new system was put into effect whereby airborne volunteers received basic training not as earmarked members of regular basic training companies but with other airborne volunteers only, and this training was given at Ft. Campbell, Kentucky. The men in an airborne training class in August 1953 were completing basic training at the time the Korean armistice was signed. Perhaps it was the change in the world situation, perhaps overzealousness or ignorance on the part of personnel at Ft. Campbell, but, whatever the reason, men began arriving at Ft. Benning who actively wished to avoid the special training for which they had volunteered on enlistment into the army. Ordinarily men at the basic training centers had to volunteer again before actually being sent to airborne training, but apparently some personnel at Ft. Campbell sent men to Ft. Benning without inquiring as to their intentions. The situation was speedily corrected and men were not sent from Ft. Campbell to Ft. Benning unless they still wished to volunteer for the airborne training. The two classes comprising the core part of the main study were assembled just as these complicating factors became evident. Therefore, a very special category of failure is part of the main study, men who refused to begin training. These men failed because of refusal just as surely as other men failed

because they refused to jump from the mock tower, but they are considered separately, on the whole, from other failures in the section on men who passed and failed.

A third complication for the study was that some of the men received some mock tower training on the training aids at Ft. Campbell, an airborne troop location. This uncontrolled source of past experience was not recognized so no questions were asked to determine which of the trainees had had previous experience with the mock tower. This source of uncontrolled past experience has another feature which makes an analysis of the pass-fail material difficult and dictates against ignoring the men who refused to begin training in the analysis. It is known that many men fail airborne training because the mock tower is so frightening they refuse to jump. How many men "refused to begin" at Ft. Benning because they were exposed to a fearful situation at Ft. Campbell which ordinarily would have occurred as part of the training cycle at Ft. Benning is also not known.

The measuring instruments. The research materials used in the study can be summarized briefly. After the orientation film given on Saturday trainees were marched to a large classroom where they were given a fairly long questionnaire and two brief tasks. The first task required the trainee to punch holes with a small large-headed map pin in the center of small circles along the route of an irregular maze. The second consisted of lines of capital O's interspersed with capital C's and the task of the trainee was to cross out every C. On Monday, the first day of mock tower week, some trainees were observed making their first mock tower jumps and rated on their force (vigor) of exit. At the end of the week, at the completion of mock tower training, a short questionnaire on fearful reactions to mock tower jumping was given. No questionnaires were given or observations made during free tower

week, but all trainees were given the psychomotor tasks (the maze-dotting task and the C-cancellation task) as they stood in the sweat sheds with full equipment waiting to make their first parachute jump. Since the trainees boarded the airplane almost as soon as the tasks were completed the first parachute jump was made from 15 minutes to 30 minutes from the time these tests were administered. A final, fairly lengthy questionnaire was given when parachute jumping was completed. The trainees were marched directly from the graduation exercises to take the last questionnaire.

To go into these research materials in more detail each questionnaire will be taken up in turn, then the psychomotor tasks and, finally, other data available for the study from observations or official records.

The first questionnaire began with a sentence completion test of the type, "when they asked Jack to be in charge, he ..." These items were placed at the beginning of the questionnaire because only a limited time was allowed for them and the trainees were not allowed to go back to them. These sentence completion items were given for the purpose of obtaining by indirect means the trainees' reactions to potentially stressful situations regarding leadership ("when they asked Jack to be in charge, he ..."), danger ("when they said it was dangerous, Bert ..."), and situations where the individual needed resourcefulness ("finding no one who could help him, Will ...").

The sentence completion test was followed by three thermometer-like sketches which asked the trainee to estimate his fear on his first mock tower jump, first free tower jump and first parachute jump. Here an attempt to relate prior estimation of fear to that made later to the stressful situation.

The main part of the first questionnaire concerned direct questions in many topic areas. These were the following: general background such as education, marital status, size of community of upbringing, age, weight and

height. Athletic participation and physical prowess was inferred from a number of questions on participation in sports like football or baseball, on number of athletic teams to which the trainee had belonged, and estimation of ability to do physical tasks like push-ups or chin-ups. A question was also asked on previous positions of leadership.

A number of questions were asked on endurance, attitudes toward the airborne and toward the army, psychosomatic reactions and general confidence. The questionnaire concluded with a request for the names of those trainees the individual believed would pass the airborne course, those he believed would fail and a free answer question where the trainee was asked to write down why he volunteered for airborne training.

These questions were asked to determine which question areas were the most important in passing the airborne courses or in performing well. Presumably attitudes or background items would identify those potentially more courageous or more fearful. These same questions formed a baseline to relate subsequent questionnaire items on fear.

The second questionnaire was primarily concerned with fearful reactions. Trainees were asked to rate fear experienced on each of their first five mock tower jumps and to check which psychosomatic reactions they had experienced in the previous few days. Trainees were also asked to write down the names of two trainees they would like to serve as squad leaders under their command if they were a platoon leader in combat, and to write down the names of two trainees they would like to have as platoon leaders over them if they were a member of a platoon about to go into combat.

The third questionnaire continued with questions on fear, asking the trainees to estimate the fear experienced on their five parachute jumps and the same series of physiological reaction questions that had been asked on the first two questionnaires. A number of questions on "sweating out" the

parachute jumps, taken from The American Soldier, were also asked. The combat platoon leader choice question was repeated. Finally, trainees were asked to compare the fear experienced on mock tower, free tower and parachute jumps, to say whether they had used the latrine prior to the parachute jumps and to write down their own fear reactions to parachute jumping.

From the questionnaires, then, one could obtain an estimate of fear and fear-related reactions which occurred during the period of airborne training. Answers on the first questionnaire could be related to later admission of fear as could the characteristics of those later chosen as leaders. Some of the types of interrelations which will be investigated concern, in addition to those on fear, choice as leader, and performance in the course, the topics of intelligence, participation in sports and "anxiety".

The psychomotor tasks were chosen to obtain some data on susceptibility to stress. The maze-dotting task was chosen with the hypothesis that fine muscle movement would be impaired under stress and this would lead to errors on the task. Preliminary research had demonstrated that those who increased in errors prior to the parachute jump was compared to the base task (given before the start of training) seemed to be the ones who performed poorly at the mock tower, in other words, that errors in the stressful task of mock tower jumping and errors under the stress of an impending parachute jump was related. The C-cancellation was chosen because of its resemblance to the Discrimination Reaction Test, and Air Force test in which the subject makes a different response to each of four patterns of lights. While the response to the pattern (a "C") is always the same, to cancel it, the searching aspect of this task seemed to give it more of a cognitive component than was present on the maze task. A review of various psychomotor-type tasks by Fleischman (1954) shows that an assumption of similarity in different psychomotor tasks

is rather optimistic. Still, this was the reason for its choice along with the favorable report given this task as a stress sensitive one by Miller (1953) and his associates.

While the primary reason for adoption of the maze-dotting task and the C-cancellation test was to investigate their fruitfulness as stress-sensitive instruments, a secondary purpose concerned their role as possible predictors of performance. Preliminary research had shown that a two-hand coordination task and the Discrimination Reaction Test, used with outstanding success by the Air Force in World War II (Melton, 1947), could be used as predictors of both pass-fail and performance on the mock tower during airborne training. Since both the maze-dotting and the C-cancellation tasks seemed to contain a speed-coordination factor, the base tests were also used to predict both pass-fail and mock tower performance in this study.

Material from army records and other observations is very important to this study. Each trainee who enters an airborne training class is either passed or failed and the reason for failure is recorded. An example of the types of failure is that a man may be turned back to another class, a temporary disqualification, or refuse to jump from the mock tower, a permanent disqualification. The various types of failure, and the theoretical interest of each, are discussed in the chapter on those who pass and those who fail. The records of the groundtraining group on mock tower performance are useful because they show the type of performance of a trainee at the mock tower. The number of mock tower jumps a trainee took before he was given a satisfactory jump rating is recorded as is the errors he made on each jump. These airborne records are supplemented by observations of the force of exit made by the HumRRO staff on some of the trainees. Official personnel forms

maintained by the army on each soldier gave additional information on the trainees. From these were obtained the army estimate of general intelligence, Armed Forces Qualification Test (AFQT) scores, a number of specific abilities such as mechanical aptitude or arithmetical reasoning, education level, age, and an entry for participation in sports.

Preliminary research. The preliminary research which helped to plan the main study was carried out in the spring and summer of 1953. The first study, a comparison of volunteers and non-volunteers for the airborne with additional comparisons of those who passed and failed the airborne course was carried out under the direction of Dr. Eugene A. Cogan and analyzed by Dr. Rita Hausknecht. This study carried many questions used in the present one. Several studies were made of a self-rating of fear at the mock tower to determine the relation of expressed fear to performance. Preliminary research using force of exit during initial mock tower jumps was performed on several airborne classes prior to this study. The sentence completion test used here was formulated with the help of Dr. J. W. Getzels and given to two airborne classes prior to its use in this study. The maze-dotting task as a possible indicator of sensitivity to stress was extensively pretested at the mock tower, it was given to one class of trainees waiting in the sweat shed for their first parachute jump and to one plane load of trainees just prior to boarding an airplane for their third parachute jump and again in the air on the way to the drop zone. Another type of stress sensitive test, the water jar einstellung test (see Luchins or Cowen), showed promising results in the sense that trainees waiting in the sweat shed showed more "rigid" solutions than their controls. Its use was abandoned, however, because it took too long to administer so that the men were not able to jump

on schedule and this delay of perhaps fifteen minutes caused resentment, and to interpret the results as entirely caused by anticipatory fear would have been somewhat tenuous. Another program of preliminary research was a large scale use of air force psychomotor tests, the two-hand coordination test and the discrimination reaction time test, as a predictor of success and failure and of performance at the mock tower. Many of the trainees who took these coordination tests were also given a test designed to measure proneess to anxiety.

These preliminary research results will be referred to where they are relevant to the research results of the present study. As has been pointed out before, the preliminary research is a necessary background to understand some of the analyses and results of this study, and the preliminary research is particularly helpful where the present results replicate those found previously.

The question of analysis. Before a presentation of the results is begun, a few decisions about analysis were made which should be explained. The most important of these concerns the complete elimination from analysis of the sentence completion test. The sentence completion test is used by clinical psychologists primarily as a diagnostic instrument for an individual case, and it is useful because underlying trends may be revealed which could not be elicited by direct questions. A person might write in response to a sentence like, "When they put him under pressure, Ted..." a word like "quit" or "cracked up" even though he would admit no such feelings to himself by direct questioning. Thus, "Ted" serves as a fiction that makes it easier to reveal thoughts that are really about oneself. The critical supposition here

is that the questions would not be responded to in the same manner if asked directly, yet in the case of these soldiers the indirect approach seemed to elicit little in addition to the information obtained by direct questions. This is not to imply that answers to direct and indirect questions are identical. Rather the direct questions elicited replies more reliable and related to the purposes of this study. The disadvantages of the sentence completion items can be summed up as follows: first, the frequent criticism of this type of test: how do we know that the trainees true feelings were revealed about himself, but rather his feelings about a real "Ted" or people in general? "People in general" might be very revealing but without intensive knowledge of the individual case it is difficult to determine whether direct or complementary projection is being measured, that is, whether the characteristics of oneself are ascribed to others, (direct projection), or characteristics are asailed to others that may be the opposite of ones own characteristics but provide a reasonable excuse for ones own action (complementary projection). Second, the results are unstable, answers are not easily categorized and there is much wastage because not all individuals can be classified. A third problem, and a disadvantage for this study, is that educated and uneducated soldiers responded differently with the uneducated giving more stereotyped replies. The important point, to sum up, is that the sentence completion test, while yielding some information, did not yield enough insight on the topic of fear and courage to compensate for the difficulties of interpreting the meaning of the results.

A second decision concerns elimination from analysis any questions concerning the component parts of physical fitness, questions asking the trainee how many push-ups, squat jumps, etc. he could do. The purpose of these questions was to determine whether some component parts of the physical fitness profile predicted as well as the entire physical training test scores. But the questions seemed to be more of a projective type, they were only slightly related to actual physical training test performance. Since they missed their purpose entirely and contributed no new information that could not be secured either from the test scores themselves or from questions about a trainee's confidence in his physical ability, they were eliminated from further consideration.

There will be other questions of analysis that will be taken up in their proper context, but these two areas of investigation missed their purpose enough to justify eliminating them from consideration at the outset.

III. Why They Volunteer

Why do men seek parachute training? What are its appeals? To determine some of the reasons why the men entered the airborne training course an open-ended question was included on the first questionnaire which asked, "Write below in your own words why you volunteered for Airborne training."

This is not, of course, the first study to investigate some aspect of the appeal of this training. The American Soldier series investigated job satisfaction in the army and found high job satisfaction among paratroopers as, indeed, was found among all men who volunteered for their job

in the service. They mention the pride of the paratroopers in their distinctive boots and badges and observe, "in most cases the men who deliberately chose such an outfit probably did not seek it for the thrill alone but for the associated status symbols as well." (Volume I, p. 329). Basowitz et al (1955) report a selected number of brief case studies of paratroopers and for most of them bring out the predominant reason for volunteering in the airborne. Sample reasons given are the appeal of the uniforms, the extra pay, the influence of friends, to avoid Korea or to avoid the consequence of "getting a girl in trouble" at home. The HumRRO study (1954) is a systematic comparison of volunteers and non-volunteers for the airborne. This study reported that airborne volunteers believe the Airborne to be high in prestige, they are attracted by excitement and adventure and they have had more personal contact with paratroopers than non-volunteers.

The free answer situation of the present study brings out many of the same reasons. The five reasons most frequently cited are the group or "best outfit" appeal, the excitement appeal, the extra pay appeal, the prestige appeal and the personal contact appeal. The incidence of these appeals has been scored and is presented in Table I. This table includes 539 scored reasons presented by a total of 351 men of whom 254 completed training with their assigned class and 97 of whom failed to complete the course on schedule although some of the temporary failures did pass it eventually.¹ Of the 539 scored reasons only two were markedly unfavorable to the airborne: one individual, who passed, claimed he had not volunteered and another trainee, a temporary failure, answered that he would not volunteer again if asked.

1. Men who refused to begin training are not considered in this section, since many of them (approximately 50 per cent) concentrated on reasons why they should not have volunteered.

Table I

The Appeals of Airborne Training, A Summary of the
Reasons Given By 351 Trainees as to Why They Volunteered¹

	Percentage of Trainees Giving This Reason
The "best outfit" appeal	35.9
Excitement and adventure	35.9
Danger and excitement	(11.4%)
To prove oneself, accept the challenge	(14.0%)
The appeal of the training	(6.3%)
To jump from a plane	(6.3%)
The extra pay	22.5
Prestige of the airborne	17.4
Friends or relatives were in airborne	8.0
Airborne is different, unusual	5.7
Trainee about to be drafted	4.0
Miscellaneous reasons	22.2
No reason given	(4.6)

¹. Reasons sum to more than 100 per cent since many gave more than one reason, an average of 1.6 reasons per trainee. The same applies to the section on "excitement and adventure" which sums to 38 per cent, and shows some overlap.

Perhaps the best method of understanding the reason behind the act of volunteering is to let the trainees explain in their own words, so the following sections will lean heavily on verbatim transcripts from the questionnaires.

The "best outfit" appeal. The reputation of the Airborne as a group of fighting men that not every soldier can join since only those who surmount the rite de passage of airborne training are admitted, has the strongest appeal. Thirty-six percent of the trainees mention it as one of their reasons. One trainee (304) wrote:²

"Sir: I volunteered for the Airborne because the Airborne is the best, the cleanest, the roughest, the hardest-hitting soldiers in the U.S. Armed Forces today, in fact, all over the world. I was in an Airborne training unit where they have discipline and the heart to go on. There were some times when it got rough, but I would look at the others and say, "If they can do it, so can I." That is why I like the Airborne, they go all the way, and have the morale to do it."

Further examples of these responses are:

- 114. ...the best outfit in the U.S.
- 453. I want to be in the best: the U.S. Airborne.
- 162. A very good outfit.
- 210. The sharpest outfit to be proud of...
- 214. ...the best outfit I have heard of...
- 270. The best branch of service we have...

2. Numbers refer to roster numbers.

510. ...I want to be in an outfit that has a lot of pride and gets rid of all the "knuckle heads."

465. I wanted to be in the best outfit possible so I could really be proud of myself and my outfit.

457. Sharp outfit, sharpest in the Army and some of the craziest but best guys in the world.

458. The Airborne is a great fighting, sharp outfit, the best in the U.S. army.

22. I figured while I was joining the service I just as soon join the best...

121. It is the best in a lot of ways: training, discipline, better men to work with, high morale, best weapons, smart lieutenants, good NCO's.

172. Because it was supposed to be the most dangerous and the best outfit.

304. Because the Airborne is a proud and rugged organization and I wanted to be one of the team. (Failed)

325. I volunteered for Airborne training because I think that it is the best outfit in the world, and the only way I won't go through it is they got to kick me out.

472. They are tough and proud, they are way out in front of the ones the papers say are first.

One direct question is relevant to the organization appeal of airborne. Asked how civilians feel about airborne eighty per cent of the trainees replied that civilians thought airborne was better than most outfits.³ The airborne unit as a reference group toward which one can feel pride is a very important part of its appeal.

3. The HUMPRO study (1954) asked the same question and about fifty per cent of the volunteers as compared to twenty-five per cent of non-volunteers answered that airborne was better than most outfits. The fact that the Korean war was still active at the time of that study, with no airborne units in combat, may be partially responsible for the difference observed.

The adventure appeal. The airborne soldier learns to jump from an airplane with a parachute and this is perceived as exciting, adventurous, dangerous and a challenge. As one trainee expressed it, "anyone can be an RA leg," meaning that any soldier can be a "regular army straight-leg," or footsoldier. One who failed wrote, "it is a man's outfit. I want to find out if I'm a man." Perhaps other appeals interact with this one since the distinctive insignia, referred to by one as "the badge of courage," would have little meaning unless it were a symbol of the unusual experience of these soldiers. The way some of these trainees expressed this appeal of airborne training is given verbatim in the comments that follow.

14. I volunteered for Airborne training because most of the boys in our neighborhood say it is too hard so I want to show them that I can make it.

25. I volunteered for Airborne training because I wanted adventure and thought Airborne would be the best outfit for it.

117. The training is good for you. It also helps you to become a man.

119. I like to do things I am a little afraid of.

215. Build me up, rough, proud, excitement.

402. I wanted to find something that was exciting and that was a challenge. Everyone hasn't the guts to jump from a plane.

110. I think I'd like the thrill of jumping from an airplane.

209. Because I think I can do anything anybody else can do, and I want to prove it to myself.

220. I wanted something different. Something other men would be scared of.

574. Because I was of small character and build and I was told I wouldn't make it. I am here to try and prove otherwise.

The "extra pay" appeal. At the time this study was conducted airborne enlisted men received incentive pay of \$50.00 a month and officers \$100.00 extra a month. This was seldom referred to as the primary incentive for volunteering, but often mentioned as one of the attractions of airborne service. An example of this type of multi-attractiveness of airborne training is the trainee who replied, "because I was going to be drafted and I didn't want to be a straight-leg. Also, for the extra money and I knew what kind of an outfit the Airborne is." While the monetary incentive was mentioned by 79 trainees it was given as the only reason by only ten of them. One soldier eloquently expressed his reason for joining the airborne as follows: "I volunteered for Airborne because I needed a job to help my Mother. I couldn't find a job at home because I didn't have enough schooling so I joined the service and the reason that I joined the Airborne is because it is the highest paying outfit."

The prestige appeal. By the prestige appeal of the airborne we meant the emphasis on the status symbols worn by airborne troops, the distinctive wings and uniform, and the "glory" of being a paratrooper and being in an airborne unit. To some extent this appeal may overlap with the organizational appeal and the danger appeal, but the stress is on the status factor rather than on the contributing features of the organization to the soldier or his chance for excitement. As one trainee answered, "I want the wings so that when people look at me and see them, they'll say to themselves, "There goes a man." Whether the soldier is a "man" is not so important as that others will think he is. Other representative answers follow.

7. To earn the wings.

16. I wanted to be looked up to and the thought of being Airborne thrilled me.

110. The glory of being a trooper.

120. It is quite an honor and a privilege to wear the parachutist's badge.

255. Because I've always been on the same level as every one of my friends so I wanted to accomplish something that would make them look up to me.

269. I liked the look of the Airborne and its soldiers in it.

313. I wanted something that was special and I liked the uniform.

418. Because I like to be a person people admire and I think most people admire an Airborne soldier.

519. Because the people look up to an Airborne soldier and the Airborne has a high standing and is the sharpest looking unit for dress.

567. I think an Airborne soldier is sharper and is noticed more.

16. I like the Airborne because they are very sharp in their uniforms.

218. Extra pay and prestige.

270. ...I like the uniform, especially the wings and boots.

313. I want to be among the leaders.

The personal contact appeal. Many of the trainees, although not not nearly so many as mentioned the other appeals of Airborne, mentioned personal contact with other airborne soldiers, either relatives or friends. That a large portion of the volunteers for the airborne come from the southern part of the country reflects not only the fact that the South has a high

proportion of volunteers for the armed services, but also that the main duty stations for the airborne - Ft. Bragg, North Carolina; Fort Benning, Georgia; Fort Campbell, Kentucky - are in that area. Representative of these answers is one who answered, "I volunteered for training as my two brothers did," and another who said, "It is the unit that all my pals back home went to." One man, who refused to jump in the second week of training, wrote, "My uncle said it was too rough for me, so I will show him. He was a jumper himself."

Miscellaneous reasons. Many of the miscellaneous reasons given are not very informative. For example, a representative non-informative answer was, "Because I wanted to be an Airborne trooper." Others would simply reply that they volunteered because they liked it or because they had wanted to be a paratrooper for a long time. Other miscellaneous answers reflect a stereotype of the airborne trainee as one who is irresponsible and reckless. Examples of these are given below.

424. I was not married and was very drunk.

457. Because I didn't care what I did or what happened.

515. Alcoholism in college; a pregnant friend...

112. I was going to college at the time, and doing pretty badly, and things weren't going too good at home.

210. ...I had to leave because a girl wanted me to marry her...

These answers, however, are only a small proportion of the miscellaneous reasons. As mentioned above, most of the miscellaneous reasons contained little information.

It might be of interest to inquire whether the reasons for volunteering were related to later performance. While no systematic study was made of later performance and motivation to join as revealed on the free answer question, those

who passed or failed the training course were noted along with reasons given for joining. The only real difference noted was that those who later passed were more apt to cite airborne as a good organization, the "best outfit" appeal, than those who later failed. While 39 per cent of those who later passed gave this as one of their reasons, it was cited by 33 per cent of the temporary failures and 23 per cent of the permanent failures. Only the difference between the permanent failures and the men who passed is statistically reliable. Other reasons for volunteering are cited with almost the same frequency by those who passed and those who failed. Miscellaneous reasons and "no answers" were higher among the fail group. Most of the miscellaneous answers, it will be remembered, were short answers with little content. These answers probably reflect the lower educational level, and hence lower verbal facility of the men who failed rather than any other factor. This seems to be a conservative way to look at this difference rather than attributing it to indecisiveness or lack of a real reason for volunteering for the Airborne.

IV. Those Who Pass and Those Who Fail Airborne Training

Most of the previous research on airborne training has concerned a comparison of those who pass with those who fail the training courses. This is natural enough. These studies are mainly interested in the practical problem of attrition in a program that has a fairly high percentage of failures. This type of analysis is interested in airborne training as it would be in a course in radio code sending, truck driving or lathe operating. Presumably scores on a soldier's records might be used in some fashion to weed out failures before they enter the training course. Even with such a practical bent, however, some of these studies are interested in airborne training from a broader point of view. Implicit in some is the notion that the airborne course is one of a restricted number of courses which take "guts" to pass. Those who pass airborne training might have qualities desirable in combat or in any task where fortitude is required.

The present study is interested in analyzing the differences between those who pass and those who fail, but this interest is tempered by the recognition that passing or failing the airborne course is complicated by many factors extrinsic to fear and courage. For example, a man may fail because he is not in good enough physical condition; he might deliberately wash-out because he dislikes noncoms or the discipline; or he might quite because he is under pressure from his parents or his girl back home. True, physical condition, an ability to withstand petty annoyances or even the ability to continue the course despite pressure from home may be related to courage. But the fail criterion obscures more than seems necessary factors idiosyncratic to fear. Our interest in pass-fail is confined to its relation to fear and courage. It is fortunate

that the data collected in this study can be used to go beyond the pass-fail criterion because of the many measures on all trainees.

The interest in men who pass can be summed up as three-fold:

1. Those who pass should show an ability to overcome fear and thus have qualities desirable in those least susceptible to stress.
2. The present study should replicate the results of previous research on airborne training.
3. The various types of failure in airborne training should be of theoretical interest in relation to stress.

Reasons for failure

Trainees who do not receive their parachute badge with a particular training class are of two types: permanent failures and temporary failures. A temporary failure may either be one who is sent to another class (a turn back as they are called) or one who is temporarily relieved from training because of physical injury, illness, an emergency leave or other reasons. Many of the temporary failures later pass the airborne course.

The predominant reasons for permanent failure are refusal to jump or a judgment by the cadre that a trainee is "not adaptable" for airborne training. Since the airborne training program is a volunteer one a trainee may refuse to jump from the training aids (the mock tower or the free tower) or from an airplane. This permanently disqualifies the trainee from becoming a paratrooper but is not otherwise punishable. Once a trainee is a qualified parachutist, however, refusal to jump may lead to court martial. The "not adaptable" are judged as permanent failures because they cannot learn satisfactory jump form at the mock tower, they cannot keep up with the physical training or other serious errors in training are committed. The distinction between those who refuse to jump and those who are not adaptable ~~is that between those who~~

~~are not adaptable~~ is that between those who will not and those who would but cannot. This does not mean that those not adaptable are free from emotional reasons that may lead to failure in airborne training. Many of them cannot master the mock tower: they fall out time after time as their legs collapse on exit, a reaction influenced by fear, though they do not, like the refusals, quit. Some of them cannot control their fear enough for satisfactory jump form, others cannot keep up with the physical training.

It should be made clear that a clean line between the types of permanent failures is probably meaningful in a gross sense, but it may not be meaningful for the individual. Men refuse to jump because they do not like the physical training or resent the discipline as well as because they are afraid. A man who is afraid may deliberately fall out on the runs and the fail a physical training (PT) test to avoid the stigma of being a "quitter". A recognition of the overlap in the categories points up some of the inadequacies of failure as a criterion if ones primary interest is in fear. It should not dissuade an examination of these categories to see what can be learned.

A further type of failure, one peculiar to this study, is those who refuse to begin training. While apparently this was due to an administrative mixup, this type of failure will also be analyzed in this chapter.

Thus, in comparison to the men who pass three types of failures will be considered: the temporary failures, the permanent failures and the men who refused to begin. Occasionally the permanent failures will be subdivided into those who refused to jump and those who were judged as not adaptable.

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Intelligence, education and related factors

Intelligence, as inferred from the Armed Forces Qualification Test (AFQT), gives much the same sort of relationship in this study as that reported previously in The American Soldier. The higher the AFQT score the better his chances of passing. This is shown graphically in Figure 1 which agrees very closely with the American Soldier figures based on over 5,000 men. In Table 1 a distribution of the AFQT score for the men who passed and for the various types of failures is shown. The main difference between the pass group and the failure groups is the higher proportion of men in AFQT Groups I and II and the lower proportion in Groups IV and V. All groups of failures have a very similar distribution of AFQT scores. It is noteworthy that the men who refused to begin have a distribution of scores almost identical to the distribution of scores of those who were permanently disqualified during the training program.

Education followed the same trend as the AFQT scores, the two being very highly related. The average number of years of education was 10.5 for the men who pass, 9.8 for the temporary failures, 9.6 for the permanent failures and 9.5 for the men who refused to begin airborne training. To put it another way, 92% of those who went to college passed the airborne course, 77% of those who graduated from high school, 70% of those who had some high school but did not graduate, and 49% who had only a grammar school education.

Related to the intelligence test scores are the many aptitude tests given to the soldiers at the time they are inducted into the army. The aptitude scores separately consider such factors as reading vocabulary, arithmetical reasoning, pattern analysis, clerical speed, etc. The individual scores are also combined into various "aptitude areas", thus, aptitude area I is a combination of scores on reading vocabulary, arithmetical reasoning and pattern

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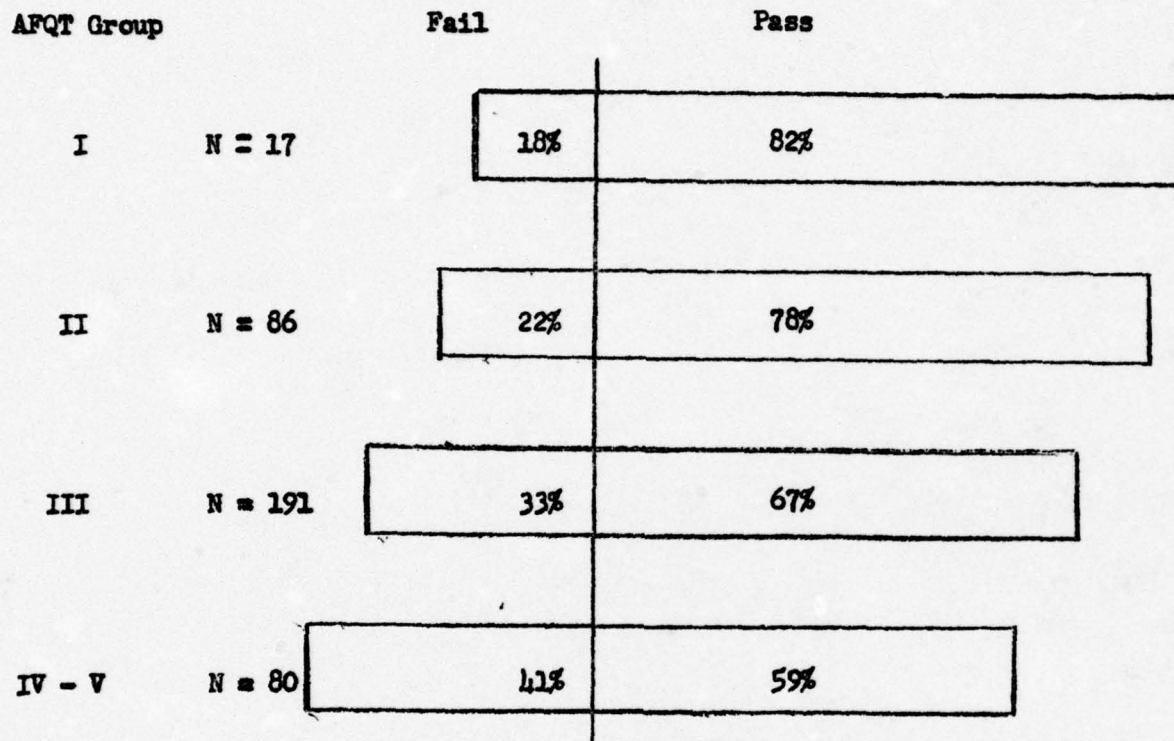


Figure 1. The relationship between Armed Forces Qualification Test scores and success in the Airborne course.

TABLE 1

Armed Forces Qualifications Test Scores for Those Who Passed the Airborne Course and the Various Types of Failures¹

AFQT Group	Pass	Temporary Failures	Permanent Failures	Refused to Begin
I	6%	2%	3%	3%
II	26	18	15	15
III	50	55	52	53
IV-V	<u>18</u>	<u>25</u>	<u>30</u>	<u>29</u>
	100%	100%	100%	100%
Number of Cases	256	51	33	34

1. Scores were not available on all trainees.

analysis. For this study, these tests revealed little that could not be learned from the general AGCT score. Whereas the general AGCT score gave a biserial correlation of $+0.19^1$ with success in training only reading vocabulary, clerical speed and radio code aptitude were higher correlations, none of them significantly higher. The aptitude areas followed the trend observed on the individual tests, not enough higher than the AGCT scores to warrant serious attention.

The short psychomotor tests, the C-cancellation test and the map tack test, were chosen for tasks to be given under the stress of an impending parachute jump, but the base test, against which the scores under stress were to be compared, was given to all trainees at the same time as the questionnaires. These tasks can also be used for pass-fail comparisons. While the differences between groups are not large the tasks do show that the men that pass obtain significantly higher net scores than those that later failed the course. The means of the groups and the t-test comparisons are shown in Table 2. It is interesting that the men later judged not adaptable, whose physical proficiency and motor coordination are supposedly less than that of other failures, should have the lowest mean scores on each test. Also interesting is the fact that a short test, requiring a total of a couple of minutes testing time, can statistically differentiate men that pass from the failures even though the differences are not large.

The most important conclusion of this section is the replication of previous studies on the importance of intelligence (AFQT scores) and education in success

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Correlation coefficients vary between $+1.00$, a high positive relationship, and -1.00 a marked negative relationship. The size of the correlation coefficient that is important depends on many complicating factors (see any elementary statistics book such as Guilford, 1956), but, for this study, a correlation over $+0.50$ might have some practical use while those between $+0.20$ and $+0.50$ are marked enough to be interesting.

TABLE 2

, Net Scores on the C-Cancellation Test and the Map Tack Test for
the Pass Group and the Various Types of Failures

Category	<u>C-Cancellation Test</u>			<u>Map Tack Test</u>		
	N	Mean Net Score	T-test Vs. Pass	N	Mean Net Score	T-test Vs. Pass
Pass	256	65.7	--	222	41.1	--
Temporary failure	54	60.4	2.599*	51	40.4	0.497
Not adaptable	18	59.4	1.864	16	36.6	2.150*
Refused to jump	31	63.5	0.849	29	37.8	1.973*
Refused to begin	66	64.2	0.795	57	39.8	1.049
All fail combined	169	62.3	2.484*	153	39.3	2.009*

*p < .05

in the airborne program. The aptitude tests show that no particular factor is more important than the overall AFQT scores. The C-cancellation test and the map tack test results serve as a background for the later use of these as stress sensitive tasks.

Adjustment

A study carried out during World War II by Satter had found that adjustment, as measured by a paper and pencil test, the Personal Inventory, was highly predictive of success in the airborne course. The biserial correlation of scores with pass-fail was .39 as compared to a correlation with the AGCT scores of .26. Although several types of failures were recorded for that study, they are not comparable to those used in the present one with the exception of the men who refused to jump from the mock tower, and all types of failures had fairly similar scores. The spring sample in 1953 (classes 36 and 37) was examined to determine their scores on the seven physiological reaction questions and the men who refused to jump from the mock tower (RJMT) had significantly higher scores than the other failures. Subsequent samples of trainees were given a "personal check list" an exploratory measure of adjustment being developed by the Human Resources Research Office (Walk, 1953B). This test did not significantly differentiate men who passed from men who failed until it was rescored, using mainly physiological reaction type questions or 20 of the 50 items on the test. This research demonstrated that the RJMT's had significantly higher scores than both the pass and the other types of failures. While the other failures had higher scores than the men who passed, the differences were not significant. All previous research, then, had shown that men who failed, particularly men who refused to jump, had higher scores than the men who passed.

For the present study the seven physiological reaction questions (heart beat hard, nervousness, cold sweats, hands sweating, shortness of breath, hands trembling, upset stomach -- see section V) were scored so that alternatives "never" or "once in a great while" were considered to be negative answers while "sometimes", "often", or "very often" were scored as positive. Trainees, thus, could obtain scores from zero to seven. For the entire sample the relation between number of positive responses and percentage of trainees who passed or failed can be expressed as follows:

Positive responses	Number in this category	Number failed	Percent	
			Passed	Failed
0	185	55	70%	30%
1	101	28	72%	28%
2	60	25	58%	42%
3	38	24	37%	63%
4	28	13	54%	46%
5 or more	32	28	12%	88%

It is obvious from the above table that one positive response is not very different from none, but that two or more positive responses means less of a probability of passing the airborne course.

Occurrence of these symptoms, or at least the checking of them on a questionnaire, appears to be related to graduation from the airborne course. The various types of failure in the course can most easily be examined by comparing the average score obtained on the physiological reaction items for each group.

Category	N	Average Score
Pass	271	1.0
Temporary failure	55	1.3
Not adaptable	18	1.7
Refused to jump	31	2.4
Refusal to begin training	66	2.8

There is, of course, the obvious possibility that the men who refused to begin training were inclined to inflate their scores. One can recognize this possibility, but another possibility, that these are real differences, must also be considered. Ignoring this group, the men who refused to jump have significantly higher scores than the men who passed and the temporary failures. The results of the present study, in other words, are essentially similar to the results of the research carried out in the spring of 1953.

If the men who refused to begin are excluded from the table on page the relationship between number of reactions checked and pass-fail is expressed as follows:

Positive responses	Number in this category	Number failed	Percent	
			Passed	Failed
0	173	43	75%	25%
1	90	17	81%	19%
2	54	19	65%	35%
3	24	10	58%	42%
4	22	7	68%	32%
5 or more	15	11	27%	73%

The extent of the relationship is reduced, but it is still there. Even if we remove those with five or more positive responses and compare those with zero or one positive response with those who check from two to four positive responses, the difference is statistically reliable.

Interest in the types of failures prompts a closer look at the response patterns of the men judged not adaptable and the men that refused to jump. The men judged not adaptable, it will be remembered, are intermediate between the pass group and the men that refuse to jump. Because of the small number of men in these groups the refusals to jump and the not-adaptables from the spring sample were added to this group, but this only adds 11 more that refused to jump and 14 more judged not adaptable. While the men that refused to jump are higher in physiological reaction scores to those judged not adaptable they are not quite significantly higher. A look at each of the seven individual physiological reaction questions revealed the same relationship on almost all questions: the men that refused to jump higher, but not significantly higher, than those that refused to jump (the reactions of nervousness and heart beat hard were the same for both groups and on the hands sweating question both groups were indistinguishable from the pass group). Thus, further analysis reveals only that no particular physiological reactions characterized either group. A more fruitful method is to analyze the men that refused to jump on the basis of whether they actually made any mock tower jumps at all, or whether they refused later (after making some mock tower jumps or even later in the training cycle). Those that refused to jump on their first jump, before making any jumps at all, had significantly higher physiological reaction scores than those that made one or more mock tower jumps before refusing; if the men that made no jumps at all are removed from the analysis so that only those that made a jump are considered, the physiological reaction patterns of the men judged not adaptable are almost identical to those that refused to jump. Since four classes are now considered (two from the spring, two from the fall) either the combined not adaptable group by itself or the combined "late" refusals to jump are significantly higher in physiological reaction scores

to the combined pass group. The rank order, then, is highest, men that refused to jump at the mock tower before a jump was made, intermediate, those that refused after one or more mock tower jumps and those judged not adaptable, and, lowest, the pass group.

Anyone who has observed many men jump from the mock tower cannot help but be impressed by the apparent unpremeditated nature of the refusals. Men seem to arrive at the 34-foot level only under moderate strain but, when they stand in the door and look at the ground, the blood drains from their faces, hands and knees tremble, they actively resist jumping. Later, on the ground, many of these men request another chance at the tower and, when again in the exit door, go through the same series of reactions a second time. Other men, often officers or NCO's who feel they have to pass, may make 20-25 jumps from the tower and collapse like a sack of meal at each exit, apparently unable to master their fear enough to jump a few inches into the air as they leave the tower (these, of course, are among those judged not adaptable). For many men the mock tower is no simple training aid but, as the romanticists would say, a "moment of truth" that reveals a weakness they may not have suspected. This reaction of excessive fear, considering the safety of the equipment, might reasonably seem to be related to some measure of "emotionality." This analysis seems to show that it is related to "emotionality", but the physiological reaction scores are only part of the story. In this restricted sample of almost 700 men, only using the pass group and these two types of failures, less than one in five (22 percent) with the high physiological reaction scores fail the airborne course, as against about one in thirteen (7 percent) of those with the low scores. Either something more than "emotionality" is involved or the measure of emotionality is too gross and unreliable. Undoubtedly both unreliability and other factors play a part: intelligence has been taken up already. Subsequent sections will try to pinpoint some of the other factors.

Physical proficiency and sports participation

To pass the airborne training program may require courage, but it also requires physical stamina. The trainees are given strenuous physical training and those who cannot keep up on the runs or those who cannot do the required exercises are failed. Because of the importance of physical conditioning information was secured from the Army Form 20, where possible, on the number of points made on the army physical training (P.T.) test, and the records were screened for an entry in the "sports" column. In addition, questions on sports participation were asked the trainees.

The average score recorded on the Form 20 for the men who passed was 334 points. Since the minimum score needed by a soldier is 200 points, this average score indicates that the men who pass are in very good physical condition. The average score for all failures on whom records were available was 327, not much lower than the pass group. Interesting differences emerge when the types of failures are separated. The men who refused to begin training had an average score of 326 points, the men who refused to jump from the mock tower 363 points, the men judged not adaptable 300 points and the temporary failures 321 points. While records were not available on all trainees, and the men who refused to jump may have been a little more physically proficient than might have been expected, the difference between the men who refused to jump and those judged not adaptable is evident. Those who refused to jump had significantly higher scores than those judged not adaptable. Since the men who refused to jump were less well adjusted as defined by the checking of more physiological reactions, these differences are in agreement with an expected difference between these groups: that many who refuse to jump fail for emotional reasons while many of those judged not adaptable fail for physical reasons.

The relation between scores on the physical training (P.T.) test and success in the airborne course can be expressed in the following way:

<u>P.T. Score</u>	<u>Number of Trainees</u>	<u>Percent Passed</u>
300 and below	96	61%
301-340	96	70%
341-400	140	72%
401 and above	28	79%

While this relationship is evident, it is not nearly as high as that for AFQT scores or physiological reactions. It might not seem that physical proficiency scores are very important, but it must be remembered that all trainees had just completed basic training and were in good physical condition.

The sports entry on the Form 20 proved to be a more reliable measure than the P.T. score. Thirty-four percent of the failures had entries on their Form 20 for sports while 52 percent of the pass group did. A breakdown of the types of failures shows this relationship even more clearly.

<u>Category</u>	<u>Number of Trainees</u>	<u>Percent with Entry</u>
Passed	256	52%
Temporary failure	51	45%
Not adaptable (and other permanent failures)	17	29%
Refused to jump	17	29%
Refused to begin	34	24%

The reduced number of individuals in this table as compared to the one on page reflects the fact not all records could be screened.

The marked relationship expressed above is extremely interesting from a theoretical point of view. If physical ability is not as highly related to success as is sports participation, one may hypothesize that the participation in sports helps train an individual to withstand psychological stress. This means that, even in a course where physical condition is very important, sports participation appears to be more important than physical proficiency. Is it because sports participation is related to intelligence, that an opportunity for participation in sports is greater for the higher AFQT groups? Sports participation and intelligence appear to be unrelated.

Further questions on participation in sports were asked the trainees to determine whether a particular sport was more important than another, ~~one~~. The trainees were asked to mark the extent of their participation in football, baseball, softball, basketball, swimming and, also, to write down teams on which they had played and the position on the team they played.

Table 3 shows the percent of trainees who answered that they were a "regular team member" for football, baseball, softball and basketball. Since very few trainees were members of swimming teams, the swimming team members and the "very good swimmers" are treated together. From this table it would appear that team members of all sports have more of a likelihood of passing the airborne course, and that the largest difference is for football team members, swimmers, and, curiously enough, softball team members.

The question which asked trainees whether they were members of athletic teams and asked them to write down the team and the position they played showed similar results. Those that later passed wrote down more teams than the failures and, again, the results were very highly significant. Thirty-nine percent of the pass group as against 21 percent of the failures indicated that they had been members of two or more athletic teams. Another method of tabulating number of

Table 3

Team membership in various sports for those who pass and those who fail

<u>Category</u>	<u>N</u>	<u>Football</u>	<u>Baseball</u>	<u>Softball</u>	<u>Basketball</u>	<u>Swimming</u> ¹
Pass	254	35%	30%	26%	36%	40%
Temporary fail	55	27%	31%	20%	33%	35%
Not adaptable	18	10%	14%	14%	33%	29%
Refusal to jump	31	13%	23%	10%	16%	23%
Refuse to begin training	66	17%	21%	15%	17%	29%
All fail	170	19%	24%	16%	27%	30%
Probability (pass ¹⁶ or all fail)		.001	.20	.02	.10	.05

1. For swimming both team members and "very good" swimmers are included.

athletic teams is to count each of the sports listed in Table 3 as a team, including being a good swimmer, and simply sum them so that a trainee could be a member of from zero to five "teams". Table 4 shows the results of this analysis. All but the temporary failures have significantly less membership in these athletic teams than the pass group. Table 5 shows that, on the whole, each increase in team membership is accompanied by a better chance of passing the airborne course.

The apparent additive nature of sports participation (the more sports the better the chance of passing airborne) helps explain both the weakness of Table 3 and why softball occupies its ambiguous position, seemingly more highly related to pass-fail than any other sport except football. The weakness of Table 3, of course, is that sports membership is not independent, those that claim membership in one team also often claim membership in other teams. Of the men that passed, 65 claimed membership on a softball team while 90 did on a football team. But only one trainee of the 65 claimed only softball team membership along with no other sport including swimming while 13 claimed football alone. Softball is less independent of other team membership than any other sport.

The sports material has been gone into in some detail and will be further considered when performance at the mock tower is analyzed for the pass group. While sports participation appears to be a better protective against exposure to stress than physical proficiency, it can always be claimed that not sports proficiency per se is important but, rather, whatever it is that leads some men to engage in sports while others do not (those "personality factors" again). The present data cannot answer that question. It takes a controlled experiment to do that, but, perhaps, experiments outside of the airborne training situation may illuminate the problem. These will be considered in the proper context.

Table 4

Amount of sports team membership for the pass group and the groups of failures

<u>Category</u>	<u>N</u>	<u>Percent with two or more "teams"</u>	<u>Probability (pass v. fail)</u>	<u>Mean number of teams per trainee</u>
Pass	254	48	-	1.65
Temporary fail	55	38	.20	1.45
Not adaptable	17	18	.02	1.06
Refusal to jump	30	23	.01	0.93
Refused to begin training	66	29	.01	1.03

Table 5

Amount of sports membership and probability of failure
in airborne training

<u>Number of teams claimed</u>	<u>Number of trainees in this category</u>	<u>Percent failed</u>
0	134	49
1	116	46
2	81	27
3	47	38
4	26	23
5	18	22

Miscellaneous background items

A number of background questions were asked the trainees. These are not very important in differentiating those who pass and those who fail, but they are useful in describing average characteristics of the airborne trainees. These items concerned marital status, parents living or deceased, divorced parents, income level, size of community of residence, age, weight, height, amount of active military duty, and previous positions of leadership.

Almost all of the trainees were single: 94.5 percent of these who passed and 96 percent of the failures. Both parents of most of the trainees were living, of 77 percent of the pass group and 81 percent of the fail group. Only 20 percent of the men who passed came from divorced parents and 21 percent of those who failed.

The income level of both groups, as reported, was about the same. Average family income reported by the men who passed was \$4,109 and \$4,147 for the failures. Since education is correlated with income one would expect a slightly higher income for the parents of the men who passed, but the trend is in the other direction. This may reflect the unreliability of this judgment for the trainees who probably knew the family income only approximately.

Side of community of residence was not a factor in passing the course. Twenty-three percent of the failures and 22 percent of the pass group reported they came from farms. Residence can be expressed as follows:

<u>Size of Community</u>	<u>Pass</u>	<u>Fail</u>
Less than 2,500 (including farm)	35%	39%
2,500-500,000	51%	48%
Over 500,000	<u>14%</u>	<u>13%</u>
	100%	100%

There are no obvious differences here.

What of age, height, weight? The average age of the men who passed was 19.1 years and of the men who failed 19.0 years. Men over 22 years of age were reported in the American Soldier as being less likely to pass the airborne course. The same relationship was reported for men over 25 in the HumRRO study. The present sample had approximately 7 percent of both the pass and the fail groups over 21 years old and only one trainee, who failed, over 25. The composition of the sample for this study, then, was too young to verify previous research about the relationship between age and success or failure. Many of the officers and NCO's who take the airborne course are over 25, but they were not part of the composition of this sample.

Height and weight similarly gave negative results. The average height of the pass group was 69.4 inches and of the fail group 69.9 inches. Eighteen percent of the passes and 26 percent of the failures were over 6 feet in height. The average weight reported was 160.5 pounds for the men who passed and 161.4 for the men who failed.

There was also no tendency in this study for men at the extremes, for example, very tall or short, very light or heavy, to be more likely to fail than candidates nearer average height or weight.

Almost all of the trainees in this study had been in the army six months or less. Reported in the American Soldier, and again in the HumRRO study, is a tendency for length of army service to be negatively related to success in the paratrooper course. Length of service is, of course, usually highly correlated with age. Twenty-six percent of the pass group and 31 percent of the failures had been in the army over six months. While the trend is in the direction of the results reported previously, it is neither a statistically significant nor an important difference.

The trainees were asked whether they had held office in a club or at school and told to write down the office they had held. The scoring system chosen was one where a trainee was given credit for only one previous position of leadership, with high school or college offices ranked the highest, then grade school and social clubs. The number of trainees with offices in each of these categories (where all types of failures are lumped together for simplicity) is shown in Table 6. Table 7 shows the percentage of trainees in the pass group and in each type of fail group that held offices. Only two differences seem to be indicated from these tables: first, a higher number of class presidents among the pass group, and, second, only the men that refused to begin have significantly fewer previous positions of leadership than those who passed. Since the men that passed had more education the differences appear to be minimal though the high pass ratio of class presidents is interesting. A question was also asked about captaincy of sports teams. While two of the 170 failures had been captains of sports teams, 15 of the 254 pass group had held such positions. The number is too slight to assess whether this is any more sports positions of leadership than would be expected, considering the higher activity in sports in the pass group as discussed in the section on physical proficiency and sports participation.

Sociometric choice:

This section is concerned with the sociometric information, the questions on the first questionnaire where trainees were asked to write the names of two trainees they thought would pass the course and of two trainees they believed would fail.

Tabulation of the choices for IBM analysis put an upper limit of ten on the number of choices a trainee could receive. This is a minor problem since only three trainees received ten or more pass votes and four received ten or more fail votes. In all, then, less than one percent of the sample was affected by

Table 6

Previous positions of leadership of the pass and fail groups¹

<u>Office held</u>	<u>Number of trainees holding positions</u>	
	<u>Pass</u>	<u>Fail</u>
President of student council or high school or college class president	20	3
Other high school or college offices	11	8
Grade school president	9	3
Club president	15	12
Other club offices	35	18
	—	—
Total number	90	44
Total number in group	254	170

1. The scoring system only gave credit for the "highest" office held (see text).

Table 7

Previous leadership positions and pass-fail

<u>Category</u>	<u>Overall number</u>	<u>Percent holding positions</u>
Pass	254	35
Temporary fail	55	29
Not adaptable	18	44
Refusal to jump	31	35
Refused to begin training	66	15

the imposition of an upper limit. Trainees showed a certain reluctance to use fail votes. On the average 1.9 choices were used for men to pass or near the upper limit of 2.0, but only 1.0 choices were used for men to fail or 50 percent of the permissible number. This means that an "average" trainee should receive approximately two votes to pass and one vote to fail.

The most obvious result of the use of the choices is that the men who refused to begin training were apparently known to their classmates. They received very few votes to pass, only 24 percent of them were the recipient of any pass votes at all. They also received many fail choices with over 80 percent of them receiving one or more fail votes. It is interesting that one out of five of these men received pass choices and one cannot help but wonder whether some may have joined this group because of the pressure of their friends. These results are shown more completely in Table 8.

All of the other failures are much less definite than the ones who refused to begin training. For example, the men who refused to jump later seem to have been spotted by their classmates on a statistical basis, yet over half of them were the recipient of pass choices and only forty percent received fail votes. The temporary failures were the recipient of actually more fail choices than the men failed as not adaptable by the cadre.

The statistical data presented in previous parts of this section can be compared rather interestingly to the sociometric data. The statistical material shows the men who refuse to begin training as part and parcel of the other failures, but it also shows that the temporary failures were definitely superior to the group of men permanently failed. The sociometric data, on the other hand, singles out the men who refuse to begin from the other failures and, while it identifies on an average basis the other failures, it does not separate temporary failures from permanent ones, something that is obvious from the statistical comparison. The sociometric data has some strong points, but it has weaknesses, too.

Table 8

Votes to pass and votes to fail received by trainees who later passed or failed the airborne course

<u>Disposition in training</u>	<u>N</u>	<u>Pass choices</u>		<u>Fail choices</u>	
		<u>Average number of votes to pass</u>	<u>Percent with pass votes</u>	<u>Average number of votes to fail</u>	<u>Percent with fail votes</u>
Pass	254	2.26	76%	0.35	21%
Temporary failure	55	1.27	65%	0.96	42%
Not adaptable	18	1.42	67%	0.48	29%
Refusal to jump	31	1.13	58%	1.84	42%
Refused to begin training	66	0.44	24%	3.38	80%

Additional questions

The attitudinal questions are probably not as "objective" as many of the more factual questions, particularly when the group of trainees that refused to begin training is considered. These attitudinal questions are divided into several areas: toward various aspects of airborne training, toward the army, and general attitudes toward height and ones own abilities.

1. Airborne. The questions about danger in airborne training showed no marked differences in attitudes concerning danger by those who entered the training course and later failed as distinguished from the men who passed. In general, there was a slight but not significantly more apprehensive attitude among these failures as compared to the graduates. Those who refused to begin training, on the other hand, were significantly more apprehensive about danger in airborne training than the others. To be specific, as a group they felt it would be harder to jump out of a plane and that they would not do so well in a parachute jump if they had to make one "tomorrow". They estimated that more trainees were injured in training jumps and claimed to be more worried about being injured themselves.

General attitudes toward the airborne reflect much the same sort of trend. About half of all trainees felt that "all" soldiers would like to have parachutist's wings, including the men who refused to begin. As for whether it was a great accomplishment to get the parachute badge, the pass group and the other failures overwhelmingly agreed (about 85 percent) while only 56 percent of the men who refused to begin training checked this alternative. The later graduates were most certain that civilians looked up the airborne as "better than most outfits" with the men who refused to begin training much less positive ($p / _ .001$) and the other failures slightly less positive ($p < .05$) about civilian attitudes. These findings are comparisons within an airborne training population, it must be remembered.

For example, here a relative "negative" attitude is defined as a group where only 56 percent, say civilians, believe airborne is "better than most outfits". Another group of nonvolunteers found that 28 percent of them felt civilians thought of airborne as better than most organizations. This is a general finding: the men who refused to begin training were less enthusiastic about airborne than the other trainees, pass or fail, but they were far more enthusiastic than a sample of nonvolunteers. "Unfavorable" attitudes of this group are unfavorable only as against the groups with whom they are compared.

Attitudes toward airborne training reflect some interesting differences. When the trainees were asked to rate which part of training would be the hardest for them they tended to concentrate on the physical training or the discipline and to ignore the fear-invoking situations. The table below illustrates this.

<u>Category</u>	<u>Toughest part of training</u>		
	<u>Physical training</u>	<u>Discipline</u>	<u>Mock tower, free tower and parachute jumps (combined)</u>
Pass	41%	35%	24%
Refused to begin	44%	31%	25%
All other failures	54%	21%	25%

On this particular question, the men who refused to begin were similar to the men who later passed. Significantly more of the other failures concentrated on "physical training" as the most difficult part for them. The physical training-discipline split is an interesting one which will be considered in more detail later. The other questions on attitudes toward training showed no interesting differences. For example, all trainees felt that the training course should be "tough" with the exception of the men who refused to begin.

The trainees were asked several questions about their feelings toward the airborne course. All were asked how ^{and} ~~sure~~ they were that they would pass and whether their feelings about airborne had changed since the end of the war in

Korea. One class (class 7) was also asked how much they wanted to pass, and how their parents felt about the fact they had volunteered for airborne. This last question was to determine whether the fail group felt they were under more "cross pressures" than the other trainees. The question about how **sure** they were about their ability to pass the airborne course sharply distinguished between the pass group and all other trainees. Whereas approximately one-half of all men that passed felt they were "very sure" they could pass the course, only about one-quarter of each of the other groups checked this alternative. But when asked how much they wanted to pass the course all fail groups with the exception of the men who refused to begin training checked predominantly "more than anything else." That is, about 10 percent of the men who refused to begin checked this alternative as against about 60 percent of all other groups, pass and fail.

The question on "cross pressures" (attitude of parents), asked only of class 7, showed that those who refused to begin training claimed to have the most pressure from home with 80 percent of them maintaining that their parents were against their participation in the airborne course as compared to 48 percent of the men who passed. The temporary failures were approximately similar to the men that later graduated while 71 percent of the other permanent failures claimed that their parents were opposed to their participation. Further, while 77 percent of the men who refused to begin training said that their feelings about being an airborne soldier had changed since the end of the Korean war, only eleven percent of the pass group mentioned any change in attitudes. The other failures, temporary and permanent showed more of a tendency to feel the end of the Korean war had changed their opinion about participation in airborne training, a significant tendency, but not such a marked one since only 26 percent of them said their feelings had changed.

How does this series of questions add up? The relatively negative attitudes of those who refused to begin training are very apparent. Some of the other questions differentiate the other failures, some do not. In many respects their attitudes are similar to those who passed, but they seem to be not quite as positive.

2. Army. Attitudes toward the army were divided into questions about combat and questions about general attitudes toward the army. The questions about combat are a contrast to similar questions about airborne training. The trainees were asked whether they worried about being killed or injured in combat and a similar question was asked concerning airborne training. They were asked how well they would do in combat and in airborne training. The airborne questions showed some differences among the fail groups, particularly for the group of trainees that refused to begin training. But there are no real differences in attitudes toward combat. Other questions about combat, such as willingness to volunteer for a secret dangerous mission, worry about whether one would be killed, suffer pain or be a coward in combat, also showed no real differences. To some extent the lack of differences here may reflect the fact these questions were somewhat unrealistic after the Korean war ended.

One question asked the trainee to estimate what sort of a soldier he would be. This showed no large differences, even for the men who refused to begin training. The men later judged not adaptable by the cadre were markedly different from the other trainees with 17 percent of them saying that they would make a "very good" soldier as against 51 percent of the other failures and 57 percent of the pass group.

The question about a possible honorable discharge only showed large differences for the men that refused to begin. While 62 percent of them said that they would definitely accept such a discharge, immediately, if offered, only 35 percent of the pass group and 45 percent of the other failures checked this alternative.

Of this group of questions, then, only the last two showed any differences. The question about a "very good soldier" may overlap with the confidence items, to be considered below, and the question about the honorable discharge undoubtedly reflects the dissatisfaction of the men that refused to begin with the airborne program and with the army.

3. Experience with height, confidence on abilities. A number of questions were asked on prior experience with height, on experience with mountain climbing, towers and scaffolds, ladders and trees, telephone poles, and airplane flights. These questions did not prove fruitful in differentiating the pass-fail groups, although there were barely significant differences comparing "mountain climbing" and airplane flights for the pass group and all failures, with the failures claiming slightly less experience in these areas. Two further questions were asked class 7 only, of fear when looking down from a high building and of fear of high places. The men that refused to begin indicated more fear here, significant only for fear of high places, but otherwise there were no pass-fail differences.

The confidence items include questions on a trainee's estimate of how well he does things (e.g., anything anyone else can do, more than the average man), an estimate of his ability to run $3\frac{1}{2}$ hours without stopping, of how often he gives a job "everything you have" and of his physical condition. The expected differences occur on the physical condition question where the men that refused to begin estimate their physical condition to be significantly worse than the pass group with the other failures not as positive about their physical condition as the pass group but not significantly less positive ($p < .10$). The three questions on ability and perseverance (give a job everything you have, run $3\frac{1}{2}$ hours, how well do things) show that the men that refused to jump and the temporary failures are more positive than the pass group, ironically enough, while the men judged not adaptable were even more pessimistic than the men that refused to begin.

The section on attitudes is somewhat confusing, particularly since the largest differences concern a markedly dissatisfied group, the men that refused to begin training. The differences observed for the other fail groups can be summarized as follows:

1. they are not as sure they will pass the airborne training course,
2. they think that the physical training is the toughest part of the training while the pass group is more likely to feel it is the discipline,
3. they feel they are under more pressure from home, that their parents are against them volunteering for airborne,
4. they are not as sure that airborne is "better than most outfits", or of participation in the training course now that the Korean war is over,
5. the men later judged not adaptable are not as sure they will "make a good soldier" or of their own ability and perseverance.

Against these questions that differentiate, often not at high levels of confidence, is a number of questions about attitudes toward danger, attitudes toward the army and experience with height that show no differences.

The small number of trainees in the two groups of permanent failures, the men that refused to jump and those that were judged not adaptable, (again ignoring those that refused to begin), makes it hard to assess just how different these groups are from one another. The men judged not adaptable seem to be less physically proficient and to have less confidence in their ability on endurance tasks. Not heretofore commented on is the fact that a small persistent number of men that later refused to jump have markedly negative attitudes on many questions while not a significant difference it probably should not be ignored.

The largest practical difference between the pass and fail groups was observed on a simple direct question: how sure are you that you will pass the airborne training course? This question will prove to be useful in subsequent analyses to be performed within the group that was successful in airborne training.

Summary and interpretation

Have the pass-fail differences illuminated the problem of fear and courage? Those that pass, by inference the most courageous, are higher in intelligence and education, they check fewer of the physiological reaction questions and may be less "anxious" or better "adjusted," they have had more experience with sports but are not markedly better in physical proficiency, and they are more sure of their ability to pass the training course. All of these factors have implications for the study of fear and courage that go beyond this study. Some, like sports participation or confidence, might be manipulated by training procedures.

The temporary failures are similar to the pass group in prior sports participation and on the physiological reaction questions. They are like the failures in intelligence and in their overall assessment of their ability to pass the airborne course although in some attitudes they are most similar to the men that passed. The men that refused to jump have the highest physiological reaction scores, but, when those that make a jump are eliminated, they become similar to the men judged not adaptable. They are similar in sports' experience to those judged not adaptable, but appear to be of better physical proficiency with more confidence in some of their abilities. A larger sample would be needed to determine just how different these groups are from one another, to what extent "emotionality" and physical proficiency differentiates these two groups.

V. Performance-at-the Mock Tower

The mock tower is a training aid designed to teach airborne trainees proper exit form from an airplane in flight, and it has been described rather completely in Section II. It will be remembered that the trainee wears a parachute harness but no parachute, that long straps are attached to his harness before he jumps from the tower which is approximately 34 feet high, that when he jumps from the tower the straps arrest his fall after a drop of approximately 8 feet, and that the straps are attached to a wheeled trolley riding on cables so that he "rides" the cables for a distance of about 50 yards before he reaches a mound and is unhooked. The mock tower is of interest because its height gives the trainee a sensation of making a free jump from a high place, even though he is, of course, hooked so that there is no actual danger. Training is concerned not only with perfecting an act requiring physical coordination, but also with extinguishing the fear engendered by the height, not the mere height itself but the requirement of jumping at a height which ordinarily, but for the straps, would result in death or serious injury.

Natives in the New Hebrides use a similar procedure to prove their manhood, a purpose not unrelated to the reason why many trainees join the paratroopers (see section III). They jump from tall trees and hurtle head first toward the ground. Vines are attached to their feet so that the fall is snubbed inches above the ground. The fearless native must keep his correct diving form, with eyes open, throughout the dive, even when his face may actually touch the ground (Johnson and Johnson, 1955) So must the airborne trainee, eyes open, learn proper jump form with a fall that is snubbed by straps. A training procedure similar to that used in airborne training was used by the Office of Strategic Services in India during World War II. It is described as "an exceedingly rigorous test which evoked marked emotional responses in all candidates" (OSS Staff, 1948, p. 370).

An avoidance of high places is apparently inborn, so far as can be determined, in man and other terrestrial animals whose movement is controlled by vision. This can be tested by placing the subject on a center board with glass on each side of it yet with a solid surface directly under the glass to one side and several feet below it on the other. The glass both safeguards the subject and guarantees that the basis of choice is exclusively visual. A human infant, 6-14 months old, will crawl to his mother across the glass as long as a surface is directly under it. He will not crawl to his mother across the glass where the surface is several feet below it. In fact, the infant often cries when his mother urges him to crawl to her across the "open" glass. Similarly, one day old chicks and baby rats descend to the "near" visual surface as distinct from the "far" one (Walk and Gibson, 1959). The airborne trainee must learn to overcome this "instinctive" avoidance.

The mock tower does make trainees afraid and they do admit it. Not only do they admit fear but they also report the physiological reactions associated with fear. This has been reported before (see Finan in The American Soldier, Vol. II.; Walk, 1956) and will be demonstrated for the present study when fear reactions are taken up in detail (see section VI). For the present, it suffices to make clear that the reason the present study is interested in the mock tower is because the mock tower is, to some extent, fearful.

What can we learn from performance at the mock tower? Since performance in airborne training is rated - men either pass, fail or are turned back - and since performance at the mock tower is also rated by the cadre in errors on each mock tower jump, we can find out if performance at the mock tower is an extension of the pass-fail criterion. By this we mean that we can find out if performance at the mock tower and pass-fail are continuous, if those who perform badly at the mock

tower are more like those who fail than are those who perform well. It was pointed out before (see section IV) that pass-fail is a complicated criterion measure since men may fail for such a variety of reasons. It is worthwhile to investigate the extent to which those who perform poorly at the mock tower have background qualities, attitudes, etc. similar to those who fail.

A second advantage of the performance rating at the mock tower on those who all ultimately pass the airborne course, is that poor performers on the mock tower can be followed throughout training. Most failures, it will be remembered, fail during the first week. Men who perform poorly at the mock tower and later pass can also be studied during the whole training cycle. There are several possibilities concerning these poor performers: one might be that the mock tower measures mainly physical coordination and hence might be unrelated to any measures that follow where fear is concerned. A second possibility would be that the mock tower does discriminate good from poor trainees in ability to master stress and that the poor trainees continue to be poorer than the good performers all through the training cycle. And a third possibility is that the mock tower elicits fear and men overcome it, that the mock tower is a training aid where men may master fear, and so these poor performers are as good or better than the other trainees once they have mastered their fear. We can keep all of these possibilities in mind as we study the relation of performance at the mock tower to other measures. For the present, however, we will be concerned with the topic of what is related to good performance at the mock tower. Is it the same measures we found related to pass-fail? Or is good performance at the mock tower predicted by still other measures?

Previous research. The earliest known study of performance at the mock tower was carried out during World War II by Finan (see the American Soldier, Vol. II, pp. 213-224). He used the mock tower as a screening device and gave a randomly

assigned group of trainees a preliminary mock tower jump before the start of regular training and compared them with trainees from the same classes given no preliminary mock tower jump. This study had two findings: those who refused to jump at the preliminary jump predominantly failed the training course (84 per cent of those who refused at the preliminary jump failed during the regular training cycle) and the rated speed of the preliminary jump could also be used to predict later success in the course. The difference was not as great as refusal at the mock tower, but of those who were rated to make a slow exit on their preliminary jump 32 per cent later failed as compared to 12 per cent of those who made a fast exit on this practice jump. He also could find no deleterious effects of this preliminary jump, the trainees performed as well in the regular training cycle as those with no preliminary jump and their performance was actually rated somewhat superior during the first few mock tower jumps compared to the members of their classes given no such preliminary jump. In another study Finan also found that men of the lower AGCT groups not only failed at a higher rate during training but those of the lower AGCT group who passed made more errors at the mock tower and during practice parachute jumps than men of the higher AGCT groups.

First Satisfactory Jump Rating

The variable considered here is the factors related to the achievement of a "satisfactory" jump rating early in training. This is a measure of ability to perform satisfactorily in a stressful situation. All of these men passed the airborne course but the jump on which a member of the cadre first gave them a satisfactory rating for a mock tower jump varied greatly. We can summarize the information on when the trainees first were given a satisfactory jump rating as follows:

	<u>Mock Tower Jump First Judged as "Satisfactory"</u>	<u>Percent</u>	<u>Cumulative Percent</u>
N = 252	1	3	3
	2-3	21	24
	4-5	25	49
	6-7	19	68
	8-9	14	82
	10-11	8	90
	12-13	5	95
	14-15	4	99
	16-17	1	100

For the purposes of comparison the trainees can be arbitrarily divided in half since 49 percent had achieved a satisfactory jump rating on their fifth jump or earlier and the remaining 51 percent received a satisfactory rating on their sixth mock tower jump or later. For the present an arbitrary division into "good" jumpers (satisfactory rating on jumps 1-5) and "poor" performers (satisfactory jump rating on jumps 6-17) seems to summarize the data well.

Intelligence and education. The same relation was observed in this study as in Finan's, that both intelligence as defined by the AFQT scores and education are highly related to good performance at the mock tower. The AFQT groups can be summarized as follows:

<u>AFQT Group</u>	<u>N</u>	<u>"Good" Performers</u>
1-2	76	66%
3	120	41%
4-5	40	40%

Education follows the same trend. After five mock tower jumps 64 per cent of the men who had attended college had received a satisfactory jump rating, 56 per cent of the high school graduates, 48 percent of those who attended high school but did not graduate and 37 percent of those with only grammar school education. Both of these results are, of course, highly significant and they show that education and intelligence are continuous with the pass and fail results,

that intelligence and education not only predict whether a trainee passes or fails the training course, but they also help predict his performance at the mock tower. This is in agreement with Finan's results.

The other aptitude tests were no better than the over-all AFQT scores in predicting performance at the mock tower. The same result holds for the c-cancellation test and the Map tack test. The trend was always for the better jumpers to obtain better scores, but the differences were not statistically reliable.

Physiological reactions. The number of physiological reactions a trainee checks is highly predictive of whether he passes or fails the training course. But performance at the mock tower is not related to the checking of these symptoms, trainees who check many symptoms achieve satisfactory jump performance as quickly as other trainees. This substantiates a conclusion previously reported by Walk (1956) on classes 36 and 37. The relation between number of bodily symptoms checked and achievement of a satisfactory jump is expressed as follows:

<u>Number of symptoms checked</u>	<u>N</u>	<u>Average number of jumps for first satisfactory rating</u>
0	127	7.7
1	72	7.9
2	35	7.5
3 or more	32	7.5

While bodily symptoms are related to success in the airborne training course, a conclusion based on a total of four studies including this one, they are not related to performance in the sense of prolonging the number of jumps necessary to attain a satisfactory one.

Sports and physical fitness. The number of points trainees attained on the physical fitness test or PT test varied among the pass group from less than 250 to over 440 points out of a possible 500 points. The relation between PT scores and achievement of a satisfactory jump by the completion of the fifth jump from the mock tower is expressed below:

<u>PT score</u>	<u>N</u>	<u>Percent with one satisfactory jump by fifth jump from mock tower</u>
300 and below	59	37%
301-340	67	55%
341-400	101	50%
401 and above	22	59%

There seems to be a slight relationship when the trainees who make scores below 300 are considered, but even a comparison of the two extreme groups, the highest PT scores and the lowest PT scores, results in a relationship that could be found by chance once in ten times. Physical proficiency, thus, follows the relationship found for pass and fail: a slight relationship but not a large one.

Entry in the sports column of the Form 20 was also not highly related to success at the mock tower. Of the "good" performers at the mock tower, 54 percent had such an entry. The relationship to sports participation, however, became quite marked when the questionnaire responses are considered. On all the sports listed in the questionnaire men who perform well at the mock tower are more apt to say that they have been regular members of a team. For swimming, they are more apt to respond that they are "very good swimmers." This relationship is shown in Table 1 which classifies performance into three, rather than two, categories. Table 2 uses cumulative percentages to show when those claiming membership in the various sports obtained satisfactory jump ratings.

Table 1
 The Relationship Between Team Membership in Several Sports and
 Performance at the Mock Tower

N	First Satisfactory Jump Rated	Percent of Jumpers with Membership in: Swimming				Swimming: Team Members & "good" Member Swimmers	
		Football	Softball	Baseball	Basketball	Member	Swimmers
61	1-3	51%	43%	41%	46%	15%	61%
108	4-7	36%	26%	30%	40%	5%	39%
82	8 and above	24%	13%	22%	24%	4%	27%
	χ^2	10.57	15.38	5.95	7.46	5.95	15.05
	p	.01	.001	.02	.01	.02	.001

Table 2

Cumulative percent satisfactory ratings obtained by
those claiming proficiency in various sports

<u>Mock Tower Jump</u>	<u>Football</u>	<u>Softball</u>	<u>Baseball</u>	<u>Basketball</u>	<u>Swimming¹</u>
1	4%	6%	5%	5%	5%
2-3	34%	40%	33%	31%	37%
4-5	61%	66%	60%	55%	59%
6-7	78%	83%	76%	78%	79%
8-9	90%	92%	88%	91%	88%
10-17	100%	100%	100%	100%	100%
N	90	65	75	91	101

1. Team members and "good" swimmers.

Membership in each sport seems to mean rather similar mock tower performance, better performance than that of the entire sample on page , but no differences among sports. Of course, many men proficient in one sport are proficient in others: this "contamination" of the sample can be dealt with by a closer analyses of sports team membership.

Earlier, in the material on the men who pass and fail, softball was found to be more highly related than baseball to whether a person passed the course. Now, with the men who failed no longer in the sample, softball continues to be more important in jump performance than baseball, in the sense that a higher statistical relationship still prevails in Table 1 and this sport also shows a slight superiority in Table 2. As was mentioned in the section on pass-fail, this is because softball team proficiency is not independent of other sports participation. While only one trainee was proficient in softball alone, 13 only mentioned participation in football, 8 in basketball, 11 in baseball and 31 in swimming. Each of these groups was significantly superior in mock tower performance to the 68 trainees proficient in no sports, but no group (football, basketball, baseball or swimming) was superior to any other group of trainees proficient in only one sport. Likewise, no combination of two sports is significantly superior to any other combination of two sports. Table 3 shows by cumulative percents when satisfactory jump ratings were obtained by those claiming proficiency in from zero to five sports. On the whole, the more sports a trainee claimed the sooner he attained satisfactory performance at the mock tower. Sports participation per se rather than any particular type of sports participation seems to be the important variable.

The removal of the 68 trainees with no sports proficiencies from the others permits an analysis of intelligence (AFQT) scores uninfluenced, so far as is known, by sports proficiency. Table 4 shows that the men of higher intelligence performed better at the mock tower than those of lower intelligence, though all claim no athletic proficiency. This table also reveals that the more intelligent trainees seem to be held back a little but that they quickly overcome

Table 3

The relation between amount of sports participation
and satisfactory performance at the mock tower

Number of Athletic Proficiencies

<u>Mock Tower Jump</u>	<u>None</u>	<u>One</u>	<u>Two</u>	<u>Three</u>	<u>Four</u>	<u>Five</u>	<u>Overall</u>
1	0%	3%	5%	0%	10%	7%	3%
2-3	9%	22%	30%	28%	45%	50%	24%
4-5	28%	52%	54%	48%	65%	79%	48%
6-7	51%	62%	74%	79%	90%	86%	68%
8-9	74%	75%	85%	93%	95%	100%	82%
10-17	100%	100%	100%	100%	100%	100%	100%
N	68	63	59	29	20	14	253

Table 4

Satisfactory Mock Tower Performance of Those without Athletic Proficiency
by Intelligence Groups (cumulative percents)

Mock Tower Jump	AFQT Group		
	<u>1-2</u>	<u>3</u>	<u>4-5</u>
1	0%	0%	0%
2-3	10%	10%	0%
4-5	25%	33%	21%
6-7	55%	57%	36%
8-9	95%	67%	50%
10-17	100%	100%	100%
N	20	30	14

Note: AFQT scores were not available on four trainees from this group.

this deficiency. While only one in four has attained a satisfactory jump rating by the fifth mock tower jump, as compared to one in two of the men with one athletic proficiency, almost all have achieved a satisfactory jump rating by the ninth jump.

Table 5 shows that the intelligence test scores of the men with no athletic proficiency are no lower than those with athletic proficiency. The additive nature of sports proficiency and intelligence can be illustrated by using team membership in football as an example and ignoring contamination by other sports. Table 6 shows that those who are in the higher intelligence groups (AFQT groups 1 and 2) and claim previous membership on a football team obtain satisfactory jump proficiency the most rapidly on all men, those that are only of high intelligence or only with football team membership are intermediate and those with neither high intelligence nor football team membership are the worst performers of all.

So far it has been shown that both intelligence and sports participation contribute to satisfactory performance at the mock tower. Education has not been mentioned in this context. While intelligence is not related to sports participation, sports participation is related to education, the extent of the correlation being .28 (the correlation of intelligence and sports participation is $-.07$). How handle this seeming paradox in the data? Does sports participation merely reflect education? To determine the relative contribution of intelligence, sports and education to satisfactory performance at the mock tower requires multiple correlation (Guilford, 1936). The correlation of these various factors with performance at the mock tower is as follows: sports .32, intelligence .22, education .18. Using all of them to predict performance at the mock tower gives a multiple R of .40. The betas make it possible to assess the relative

Table 5

AFQT scores of athletic team members and non-team members

<u>AFQT Group</u>	<u>N</u>	<u>Team Members</u> (N = 192)	<u>Non-team Members</u> (n = 64)
1-2	81	32%	31%
3	128	51%	47%
4-5	<u>47</u>	<u>17%</u>	<u>22%</u>
	256	100%	100%

$\chi^2 = 0.72$ $p < .70$

Table 6

Percentage of trainees obtaining good satisfactory jump ratings at the mock tower among those of higher intelligence plus football experience either alone, or lower intelligence and no football team membership

	<u>N</u>	<u>Satisfactory rating on Jumps 1-5</u>
Football team members <u>and</u>		
AFQT groups 1 and 2	33	82%
AFQT groups 1-2, no football		
team membership	43	53%
Football team membership,		
AFQT groups 3-5	49	51%
No Football team membership,		
AFQT groups 3-5	110	37%

contribution of each factor: that for sports is .340, for intelligence it is .246 and for education -.004. For the total determination of satisfactory performance by the three variables combined, sports participation contributes approximately 58%, intelligence 42 percent and education nothing. While these factors seem important a multiple R of .40 means that these three factors account for approximately 16 percent of the variation concerning satisfactory performance: the nondetermination is approximately 84 percent. Of course, "nondetermination" does not necessarily mean that other factors account for the rest of the variation. Sports participation reflects a verbal estimate of proficiency, education may reflect different practices in pushing students through school in various states and communities, intelligence is, for all practical purposes, only in three groups (Group I and Group V combined contribute less than 7 percent of the trainees), and the measure used, satisfactory jump performance, may reflect unreliability of raters or unknown past experience of some men at the other training camp. The important conclusion is that sports participation and intelligence (not education) contribute more than any other known factors to satisfactory proficiency at the mock tower.

Miscellaneous background items. On the whole, of the miscellaneous background items were not significantly related to good performance at the mock tower. In particular neither height, weight nor age were of any importance in determining when the trainees would achieve satisfactory jump performance at the mock tower. Previous positions of leadership were related to satisfactory performance at the mock tower as is shown in Table 7. While this variable "leadership", is not independent of intelligence and education, it also may be considered separately.

Table 7

The Relation between Previous Positions of Leadership
and Performance at the Mock Tower

<u>First Satisfactory Mock Tower Jump</u>	<u>N</u>	<u>Held Office in Club or School</u>
1-3	62	50%
4-7	109	37%
8 and above	82	23%

Sociometric Choice. The number of times a trainee was chosen to pass or fail proved statistically reliable for the men who failed the course, particularly with regard to the men who refused to begin, and the other failures differed significantly from the men who passed. Performance at the mock tower was also related to the sociometric material. The men who performed best at the mock tower received more votes to pass than those who did not perform as well. Table 8 shows that the relationship holds for men who attracted at least three votes or more. This means that some of the trainees who performed well attracted enough votes to differentiate the best performers from the others but that most of the men who performed well at the mock tower received no more votes to pass than trainees who performed poorly. The poor performers, on the other hand, did not attract any more votes to fail than did the good jumpers. Apparently the men had identified, either in basic training or at Fort Benning before the start of training, a few men who seemed certain to pass and these men also performed well at the mock tower.

Attitudinal questions. Very few of the attitudinal questions show any significant differences between those who perform well at the mock tower and those who perform poorly. Two general areas may be named: those who perform well say they have had more experience with height and good performers seem to have more confidence in their own ability.

Two of the height questions showed significant differences: one concerning experience with high ladders and trees, the other with climbing telephone poles. The questions on "mountain" climbing and towers and scaffolds were in the same direction, but not significant differences. These results are shown in Table 9.

As for physical ability, the three questions that showed significant differences had to do with confidence in ability to pass the airborne course, in a trainee's belief he would make a "good" soldier, and in considering discipline rather than the physical training the hardest part of the training course. Other questions, such as how well a trainee would do in combat or in making a parachute

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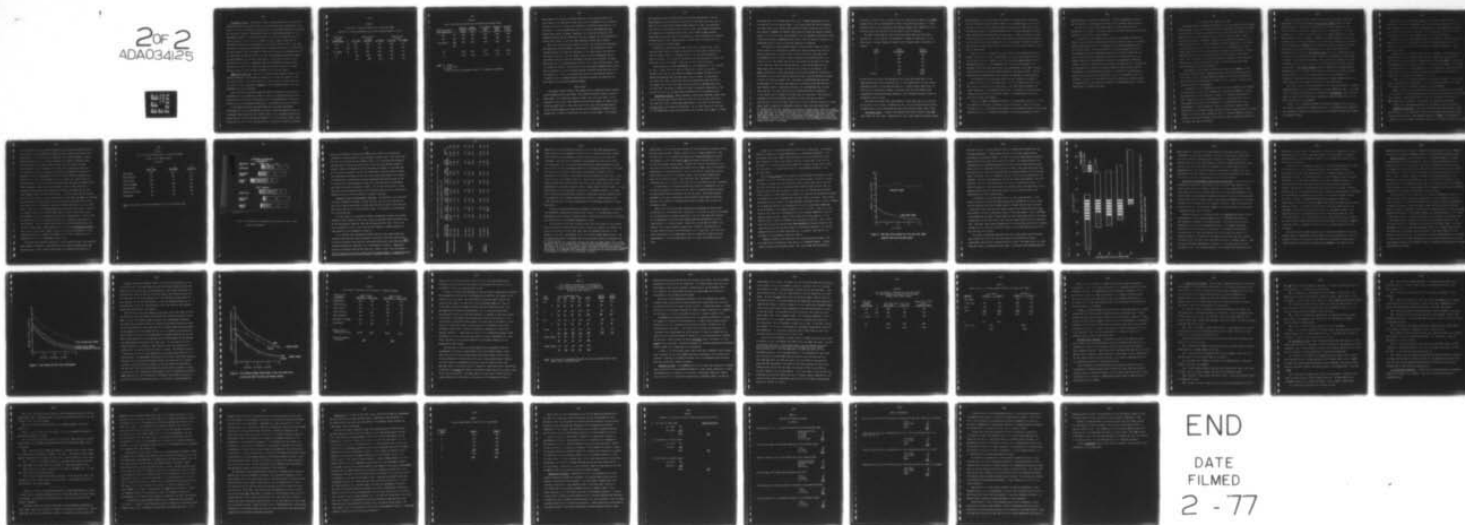
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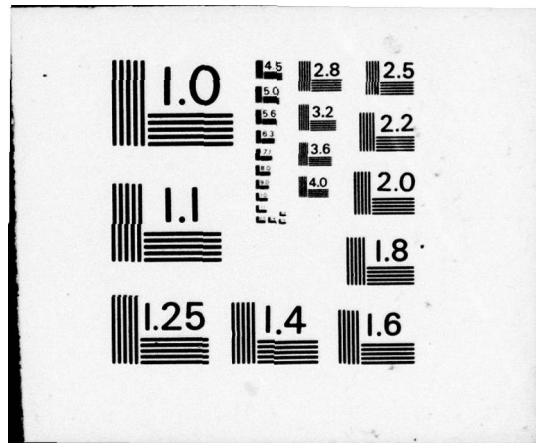
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Table 8

Sociometric Choice and Performance at the Mock Tower

(percent of various performance groups with indicated number of votes)

<u>First Jump Judged Satisfactory</u>	<u>N</u>	<u>Votes to Pass % with</u>			<u>Votes to Fail % with</u>	
		<u>2 or more</u>	<u>3 or more</u>	<u>4 or more</u>	<u>1 or more</u>	<u>2 or more</u>
1-3	73	49%	38%	29%	23%	8%
4-7	114	50%	32%	21%	20%	4%
8 & above	90	51%	22%	10%	20%	4%
χ^2	.0	.05	5.07	9.22	.24	.44
p		.90	.025	.005	.70	.50

Table 9

Prior Experience with Height and Performance at the Mock Tower

First Satisfactory Mock Tower Jump	N	Mountain Climbing (1,2)	Towers, Scaffolds (1)	High Ladders, Trees (1)	Telephone Poles (1,2)	Airplane Flights (1,2)
1-3	62	65%	39%	53%	52%	68%
4-7	109	61%	33%	42%	46%	70%
8 and above	<u>81</u>	53%	32%	33%	38%	65%
	252					
χ^2		1.98	0.64	5.68	7.42	0.12
p		< .20	< .50	< .02	< .01	< .80

Note: 1 - often
 2 - a few times
 3 - never
 -(the divisions were chosen as close to the median as possible)

jump, whether his feelings had changed about the course since the end of the Korean war, how much he wanted to pass the course, the feelings of his parents or his fear of height, all showed now significant differences between good and poor performers. In fact, significantly more good than poor performers said they worried about injury in combat. Likewise, good performers did not say their physical condition was any better than the poor performers and, from the physical training test scores, it is known their physical condition was no better.

All in all, then, the good performers believe they have had more experience with height and feel confidence in their ability. This confidence is rather specific, however, and does not generalize to other areas such as confidence in doing well in combat. That they express worry about the "discipline" part of the airborne training course is interesting since the best performers actually worry more about the discipline than any other part of the training program. This may reflect confidence in their ability to pass the physical training (even though they do not claim to be in any better physical condition) rather than worry about the discipline. It will be remembered that relatively few trainees claimed to be worried about the fearsome aspects of airborne training, the jumps from the mock tower, free tower or the parachute jumps.

Force of Jump

The measure "force" refers to the judged amount of force with which a trainee propels himself from the mock tower. The prescribed amount of force is actually very little. The trainee is supposed to leap up and out of the tower. He is supposed to jump up about four inches and outward 12-18 inches. To jump up four inches and out a foot to a foot and a half is well within the physical ability of any airborne trainee, but this feat may seem extraordinarily difficult when leaping from a platform 34 feet above the ground out into space. It is because

the prescribed force was easily within the physical capabilities of the most inept trainee, on the ground, yet so difficult 34 feet above the ground, that it seemed to be a measure that reflected susceptibility to fear. The prescribed jump form is complex enough so that it could reflect mere physical coordination and perhaps not be related to fear at all. But if force of jump reflected coordination it was easy enough for all trainees. Thus, since lack of a forceful exit more than any other measure seemed to reflect fear in a fairly pure form it was chosen for intensive study.

Trainees, of course, know that they should make a vigorous exit. One of them, who later received his jump wings, was asked why he was not exiting with more of a forceful jump. He replied, "You go up in the tower determined to make a good jump. But, as soon as you stand in the door and see the ground, fear takes hold of you, your knees get weak and you fall out of the tower."

While force can be rated independently of other measures it is not unrelated to them. A "weak exit" is an error in itself and in making such an exit a trainee's knees are bent and usually his elbows are akimbo, he grabs the mock reserve parachute wrongly, his head stays up and so forth. An exit without much force also means a slower exit than the prescribed one since the feet of the trainee stay in the tower longer than they should as the knees bend after the "tap out." The number of errors on a jump, the amount of force used and the speed of exit are all, in other words, intercorrelated on a particular jump.

Preliminary studies.¹ Three preliminary studies were made where raters stood in the tower and rated force of exit on a scale from one to five, with "one" a very weak exit, "five" a strong one, independently of the rater who was judging the jump form of the trainee on the ground. For the first study, the first nine

1. The preliminary studies were carried out with the help of Dr. Howard H. McFann.

mock tower jumps of 42 trainees were rated while a second experimenter stood in the tower and timed the speed of exit. In the second study the first and second mock tower exits of 43 trainees were rated for amount of force and the force of exit related to whether the trainees later passed or failed the airborne training course. In the third study, one on classes 36 and 37 referred to previously, force ratings were related to questionnaire data given before the start of training and a questionair given at the end of the mock tower week of training.

The first study which observed speed of latency of exit as well as force of exit and errors was one designed to obtain some normative data on how force and latency changed over a period of time. On their first mock tower jump these 42 trainees were rated to have a mean of 4.4 errors, the force was judged at a mean of 2.0 or a very "weak" exit and the mean latency of exit was 1.1 seconds. On the ninth mock tower jump the mean errors of these same trainees were 1.3, their judged force of exit at 3.8 and the mean latency at .94 seconds. The median correlations on these nine jumps, the correlation where four observations were lower and four higher, was for errors and force - .48, for errors and latency +.37 and for force and latency -.55. This shows a significantly high relation of many errors and low force, many errors and a slow exit and of low force and a long latency of exit. Since none of the men made a satisfactory jump on their first jump from the tower, the rating of a satisfactory jump is independent of the judged force or latency on the first jump from the tower. The correlation of errors and first satisfactory jump from the tower was +.41, of force of exit and first satisfactory jump, -.53, and of latency of exit and first satisfactory jump, +.32.¹ In addition to collecting normative data, this study showed that

1. A pilot study on twenty trainees of the relation between force, latency and errors on the sixth jump from the mock tower was carried out prior to this one. The correlation of the pilot study with those of this study for the sixth mock tower jump in parentheses were: errors and force, -.71 (-.60), errors and latency, +.49 (+.37) and force and latency, -.62 (-.36). All of the correlations for both studies are significant at the 5 percent level or higher, but no correlations in the pilot study are statistically higher than those in this study.

the amount of force used by a trainee on his first jump from the tower could predict to some extent, when he would obtain his first satisfactory jump rating. It also replicated Finan's study reported in the American Soldier, that a slow exit on the first mock tower jump indicated poor performance later in training.

The second study rated the force of 443 trainees on their first mock tower jump and also on their second. The relationship between the force rating on the first jump and eventual success or failure in the airborne course is expressed as follows:

<u>Force Rating</u>	<u>Number of Trainees</u>	<u>Percent Failures</u>
1	155	33%
2	120	26%
3	100	17%
4	52	12%
5	<u>16</u>	<u>13%</u>
Totals	443	24.1%

As was pointed out before, few trainees who make their first jump from the mock tower subsequently refuse to jump from it. In this sample only 17 of the failures subsequently refused to jump from the tower and of these 12 had a force rating of "one" and 4 a force rating of "two". This shows, even with this small sample, a significant relationship between "squatting out," indicative of extreme fear, and subsequent refusal to jump.

The third preliminary study asked trainees to rate their fear as they learned to jump from the mock tower. Trainees with weak exits or low force rate themselves as experiencing more fear than those who made exits with more force, (Walk, 1956).

The present study. A total of 114 trainees were rated in force as they made their first mock tower jump. Eighty-seven of these later passed the training course

and 27 failed it. All of the seven men observed who later refused to jump from the mock tower were rated at either a force of 1, the weakest exit, or 2, a very weak exit. Even with such a small sample the rated force of these trainees was significantly lower ($p .01$) than the pass group. The other failures also exited with significantly less force than the pass group ($p .02$). Of the men who later refused to jump, 71 percent were given a force rating of "one", as were 45 percent of the other failures and 17 percent of the men who passed. The other failures had more men in the higher rated force of jump groups than the men who refused to jump from the mock tower.

Among the 87 men who passed the airborne training course the correlation of force on the first jump with a satisfactory jump rating on later jumps was $-.50$ and of force of jump with errors on the first jump $-.42$, approximately the same correlations observed on the preliminary study where 42 men were used. The trainees in this study also were rated to use significantly higher force on their first mock tower jump than the trainees studied in the spring of 1953. This may reflect previous experience at a mock tower at Ft. Campbell, of these trainees.

The force ratings in this study, therefore, seem comparable in validity to those collected in the preliminary work. The men who failed used lower force than those who passed and the force ratings on the first jump can predict the later occurrence of a satisfactory jump rating. It remains to be seen, however, whether the force ratings are a better measure of susceptibility to fear than are the mock tower jump ratings.

All of the types of information concerned with satisfactory performance at the mock tower were considered in relation to the force ratings. The most important of these, it will be remembered, were intelligence and education, sports participation, previous positions of leadership, sociometric choice and questionnaire responses

about experience with height and confidence. The^t the physiological reactions were not related to performance at the tower was an important negative finding.

Are the force ratings more highly related to these variables than the satisfactory jump ratings? Do any new findings emerge that were not significantly related to the satisfactory jump ratings?

The results of this analysis can be stated both negatively and positively. First, no new significant relationships emerge that were not found in the satisfactory performance ratings. But, second, the same relationships were found for the force ratings as that found for the performance ratings, even though the correlation of first satisfactory jump ratings and force ratings was only .50. In other words, the data does not show that the force ratings are any better a measure of susceptibility to fear than the satisfactory performance ratings, but they do show that the same factors are related to such a simple thing as exit force as are related to the whole complex of things that go into the achievement of a "satisfactory" jump rating. The extent of the relationships was, on the whole, lower for force than it was for the proficiency rating at the tower. Thus, it does not seem that the force ratings are a better measure of susceptibility to fear than is the complex of coordinations that go into the achievement of a satisfactory jump.

VI. Some of the Parameters of Fear

The trainees were asked questions concerning fear on the last two questionnaires. These concerned a rating of the fear experienced during each of the mock tower jumps and the parachute jumps, and a question on how much they had been "scared" in the previous few days. Physiological reaction questions were also asked on each of these questionnaires. Furthermore, a question on how often the trainee had been scared "in his life" and the same physiological reaction questions had been asked on the first questionnaire. These questions permit a panel-type study of fear related responses: since the same questions were asked at three stages of training the incidence of fear can be studied during the various phases of the training cycle. Also instructive will be the free answers of trainees on their own fear reactions and their comparison of which phase of training (mock tower, free tower or parachute) was the most fearful.

This section, then, will be an intensive analysis of the reports of fear during the training program. Reserved for other sections will be the relation of reports of fear to the stress-sensitive tests, to the topic of "leadership" and the background characteristics of those who admit to fear. This section is mainly an analysis of fear per se.

As background to this section is not only the long literature on the effects of fear on human beings, well represented in literature or reports of emotion, but, particularly, recent attempts to quantify the reactions associated with fear. Apparently the first quantitative study of these reactions is that of John Dollard (1943) who gave 300 veterans of the Spanish Civil War a long questionnaire on their experiences. These men were asked to check the fear symptoms they experienced in battle and they mentioned a pounding heart and a rapid pulse as the most frequent, followed in order by muscular tenseness, a sinking feeling of the stomach, dryness of the mouth and throat, trembling, sweating of the hands, cold sweats and others.

These quantitative studies of fear were continued in the second World War. Representative are studies reported in The American Soldier and the Air Force psychology series. Veterans of combat reported a number of symptoms of fear, from very common symptoms like a pounding heart and a rapid pulse to infrequent symptoms such as urinating or losing control of the bowels, findings in agreement with the earlier study by Dollard. Despite the different samples of men and the different types of combat experienced, the symptoms show a great deal of agreement. One may immediately ask whether these symptoms are specific to combat or whether they might be psychosomatic complaints also found among soldiers who never experience combat. Janis, in The American Soldier (vol. II, p. 204) asked troops to mention hand tremors prior to active combat duty as well as those experienced in combat, but the questionnaire relies on the memory of the soldiers as to their experiences prior to combat. Perhaps of more reliability is the study reported by Star, also in The American Soldier, (Vol. II, Chapter 9), of "psychoneurotic" symptoms of troops in the army where different samples of men in combat, overseas without combat, or in the United States were asked the same questions. The incidence of "psychoneurotic" symptoms was greater in troops overseas than in the United States and much greater in those who had experienced combat.

But a panel study of men over a period when they have been exposed to a fearful situation provides a more controlled study of symptoms related to fear. In addition, only by a before-after design can one determine what predisposes a man to admit to fear. By asking the same fear-related questions at three different times one may secure information on the following:

First, do the physiological reactions presumably associated with fear change as a result of exposure to the fearful situation? To be specific, there should be more physiological reactions as the trainees are confronted with mock tower jumping and parachute jumping.

Second, can these physiological reactions be related to fear? It might be possible that the rise in physiological reactions was due to something other than fear, physical training for example, so the measures of fear itself must be related to the physiological reaction questions. The direct questions on being "scared" and the rating scales are both relevant, each with its own advantages.

Third, can fear and physiological reactions be predicted? While attitudinal areas will be used in a later section to predict subsequent fear, it will be of interest to determine whether prior physiological reactions predispose to later admissions of fear.

Fourth, what is the relation between fear and behavior? Verbal responses to questionnaires are all of a piece, they might only measure some characteristic that might be named "pliability on questionnaires". The measure to be used here is performance at the mock tower, as rated by the cadre, to be related to the amount of fear expressed in mock tower jumping and to the physiological reactions reported during that time. Another measure of behavior, performance on the psychomotor tests, will be considered later (section VIII - IX).

Fifth, does the elicitation of fear in one situation, followed by mastery, help make a second situation less fearful? Do some who report fear at the mock tower report less fear to the parachute jumps than might be expected?

Sixth, what insight can be gained into the nature of fear from the free answers of the trainees? The free descriptions the trainees gave of their own fear reactions, being relatively unstructured, permit the personal experience of the trainee to add information not anticipated in the direct questions of the researcher.

Finally, some miscellaneous material on fear reactions will be considered.

Physiological reactions. The first questionnaire asked the trainees to check how often each of the physiological reactions (nervousness, hands sweating, upset stomach, heart beat hard, hands trembled, shortness of breath, cold sweats) had occurred in the "past year". This time interval, as it refers to a fairly long period

of time, undoubtedly would elicit more reactions than the time period mentioned of the last two questionnaires, the "past few days". While it would have been desirable from the point of view of comparing similar time intervals, without making any judgment of how long the subjective "past year" or "past few days" was to a particular trainee, to have the same period of time on all three questionnaires, a short interval on the first questionnaire would have made it difficult to use the same questions as indicative of "anxiety" as was done in sections 3 and 5. Consequently, it is not surprising that more reactions are admitted on the first questionnaire than on the second one. Table 1 shows the reactions listed on each of the three questionnaires, and while it emphasizes the larger incidence of reactions during the "past year", it also shows that two reactions, nervousness and heart beat hard, actually were higher for the mock tower training period than for the past year. A previous study, that of classes 36 and 37 in the spring of 1953, (Walk, 1956) had shown that only these two reactions were expressed significantly more often by trainees who expressed "high fear" to mock tower jumping as compared to those who expressed less fear on a rating scale. Table 1 also shows that all physiological reactions rise for the period expressed by parachute jumping over the mock tower training period so that "nervousness" and heart beat hard rise progressively on the three questionnaires. Figure 1 shows an exact breakdown of two symptoms over these time intervals, nervousness and upset stomach. The most frequent fear reaction to combat expressed by Army and Air Force veterans was a violent pounding of the heart (see The American Soldier, Vol. II, and Flanagan (ed.), 1948). This study shows a good incidence of fear-related physiological measures, but whether this rise can be related to other measures of fear must be determined by other means.

But before this measure is taken up, a comment should be made on the questions which asked the trainees to check whether they had used the latrine before each parachute jump. Animal studies traditionally use defecation and urination as

Table 1

Physiological Reactions Listed by Airborne Trainees

on Each of the Questionnaires

(N = 254)

	<u>I</u> <u>"Past Year"</u>	<u>II</u> <u>Mock Tower</u>	<u>III</u> <u>Parachute</u>
Nervousness	12%	21%	51%
Hands sweating	33%	12%	39%
Upset stomach	19%	4%	13%
Heart beat hard	13%	19%	26%
Hands trembled	9%	3%	12%
Shortness of breath	9%	6%	11%
Cold sweats	5%	2%	9%

Note: The reactions listed were checked as occurring more than once.

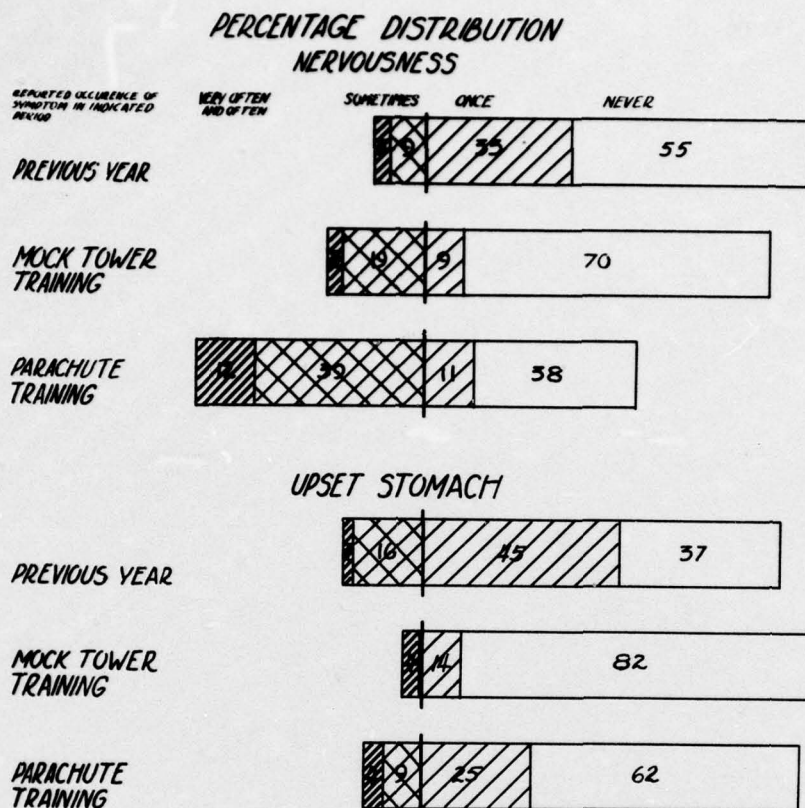


Figure 1. Incidence of two physiological reactions on each of the three questionnaires.

indices of fearfulness, and wetting or soiling ones clothes is an extreme and infrequently reported symptom of fear reported by combat troops. This study found that use of the latrine was not related to fear. It is true that both classes of trainees report going to the latrine most on the first jump (overall average 34 percent), less on the second and third jumps where an average of 27 percent went to the latrine and least on the last two jumps where 22 percent used the latrine. This progressive diminishing of the use of the latrine might appear to be related to lessened fear or anticipation and many comparisons were made relating the use of the latrine to other measures of fear, but no more significant relationships were found than could be expected by chance. Use of the latrine, while it might seem from the trend reported above to be a promising index of fear or anticipatory tension, was not a fruitful indicator of emotional reactions.

Measures of fear and physiological reactions. The measures of fear used were the direct questions on whether a trainee had been "scared" in the previous few days and the rating scale where a trainee rated his fear on each of the first five mock tower jumps and on the five parachute jumps. The questions on being scared will be analyzed next.

The first topic to be answered is whether trainees who reported being scared during the period covered by mock tower jumping or parachute jumps also report more of the physiological reactions that might be associated with fear. The do, and this is reported in Table 2, but first one must consider a related problem, one that accounts for the complexity of Table 2.

It is possible that trainees who reported that they were scared during the parachute jumps also gave more physiological reactions on the first questionnaire so that the parachute jump reactions contributed nothing new, that these same ^{men} ~~women~~ admitted physiological reactions at all three stages of training. Consequently, one must ask whether those who said they were "scared in their life" gave physiological reactions on the first, second and third questionnaires. Those who reported they were scared during mock tower jumping or parachute jumping also should be

Table 2. The relation in chi-squares between being "scared" on each of the three

questionnaires and physiological reactions

Period Scared	Physiological Reactions for:	questionnaires and physiological reactions										Median χ^2	p	
		Upset Stomach	Hands Sweating	Colds Sweats	Shortness of breath	Nervousness	Heart Beat Hard	Hands Trembled						
Scared in life	Past year	-10.57	-12.01	-2.91	-3.01	-8.28	-3.95	-4.85	-4.85	-0.05				
	Mock Tower	- .20	- 3.33	- .91	-2.04	-3.39	-2.69	-1.08	-2.04	-0.20				
	Parachute	- 5.89	- 4.01	- .14	-3.05	- .45	- .44	- .72	- .72	-0.50				
Scared mock tower	Past year	.75	.60	1.01	.30	2.89	.90	.00	.75	.50				
	Mock tower	.81	14.10	7.67	3.30	22.40	4.71	6.66	6.66	.01				
	Parachute	2.26	7.42	11.91	.95	.92	2.16	1.33	2.16	.20				
Scared Parachute	Past year	3.63	7.46	1.36	1.66	2.36	1.64	+.50	1.66	.20				
	Mock tower	5.03	2.34	2.17	1.82	1.84	9.39	+.11	2.17	.20				
	Parachute	7.19	14.22	6.57	3.11	19.03	5.31	11.84	7.19	.01				

analyzed for their physiological reactions on each of the three questionnaires. Table 2 does this and summarizes for each time when a trainee might have reported being "scared", the physiological reactions checked on each of the three questionnaires. Computations are expressed in chi-squares¹ and, since being scared for a given period may mean more or fewer physiological reactions checked, a plus sign is given for all relationships where more physiological reactions are associated with fear and a negative sign where fewer physiological reactions go with an expression of being scared. Two general conclusions follow from this table. First, those who report being afraid during mock tower jumping and parachute jumping also report physiological reactions during that period, and, second, that there is some specificity, the trainees who report fear at the mock tower do not also check *as many* physiological reactions associated with fear during parachute jumping. This same type of emotional specificity was reported by Funkenstein, King and Brolette (1957) in an experiment where college students were exposed to a stress situation once a week for three weeks and their physiological and psychological reactions studied. They report:

"...when the emotional reactions of subjects shifted from situation to situation the accompanying physiological reactions also shifted. If a subject had the same psychological pattern during the second stress situation he had in the first situation, there was no shift in accompanying physiology" (p.96).

It is interesting that being "scared in ones life" is not the same as reporting fear to a specific situation for here the relationship is negative, the trainees who report being scared "in their life" check fewer physiological reactions, on the average, on the first questionnaire and to some extent on later questionnaires. One may regard this perhaps, as bravado, that to claim previous fear is to emphasize the

1. The chi-squares are computed by a method described in Cochran (1954) which assumes linearity. The method assumes that more physiological reactions should be made by those who express each degree of being afraid, while traditional chi-square simply assumes more are in a category than expected by chance. Therefore, it is a more reliable indicator of an extent of relationship than traditional chi-square when one can reasonably assume the categories are ordered in a most to least direction.

dangerousness of ones previous life history and this is related to admission of few physiological reactions. Bravado, however, is not a general possibility, since the early study (spring, 1953) found that, on the average, trainees, who reported being "scared in their life" checked more physiological reactions while those on this questionnaire checked fewer. A possibility might be that previous experience with being scared protects one against later exposures, that it extinguishes a potentiality for fearful reactions. This does not seem to be the case, however, because these trainees seem to express neither more, nor fewer, physiological reactions to parachute jumping. This hypothesis about "extinction" will be considered later in this section where the previous experience is better controlled.

The specificity of the later physiological reactions is emphasized when one looks at the expression of fear at the mock tower or parachute jumps in relation to physiological reactions expressed for the past year. Only "hands sweating" expressed on the first questionnaire later predicted being scared in parachute jumping. The prediction of physiological reactions, rather than of fear, will be taken up later.

Table 2 has emphasized certain statistical relationships and demonstrated a great amount of specificity, that being afraid at one point in time is accompanied by the physiological reactions appropriate to fear and that these same trainees do not necessarily express the physiological reactions appropriate to fear at other points in the training cycle. Mention has not been made of whether being "scared" in mock tower training predicts being "scared" in parachute jumping. It does, statistically, but the relationship is not a high one. This point will become more relevant when performance at the mock tower will be used to predict relationships on the psychomotor tests given just prior to the first parachute jump.

A final point concerns the practical implications of these data. Significance level is no guarantee of a high relationship in a correlation coefficient. Even the largest chi-squares reflect fairly low correlations, the highest being about +38. Comparison of table 1 with table 2 will help to show this. While only two per cent of the trainees checked "cold sweats" as a reaction to mock tower jumping this was related to expressed fear during mock tower jumping at beyond the one per cent level.

From the rating scales one can obtain a numerical score of the amount of fear expressed on the five mock tower and the five parachute jumps. It would be absurd, of course, to maintain that the numbers so derived, ranging from one or "no fear" to 10 or "high fear", were in any way an exact measure of the amount of fear, or that each individual used the scale in the same way. The trainee was confronted with a sketch of a thermometer with no numbers on it and only the extremes identified. The trainee had no exact reference point for each point of the scale. Nevertheless, converting the place marked on the thermometer into numerical values, a procedure carried out by clerical helpers with no knowledge of either the questionnaire responses or the performance of the trainee, yields data that is useful. First, the average scores on each jump can be tabulated and the fear expressed toward mock tower and parachute jumps compared. Second, rating scale fear and the question on being "scared" can be compared to determine the relationship of the two. Third, rating scale fear and physiological reactions can be matched in the same manner that the questions on being scared were related to physiological reactions. And, lastly, expressed fear and mock tower performance can be compared. This last will be discussed on the subsection on fear and behavior.

Simply by converting the checkmarks into numerical scores for each of the five jumps one can compare mock tower jumping and parachute jumping. A graph, figure 2, shows these numerical scores. This figure shows that the amount of

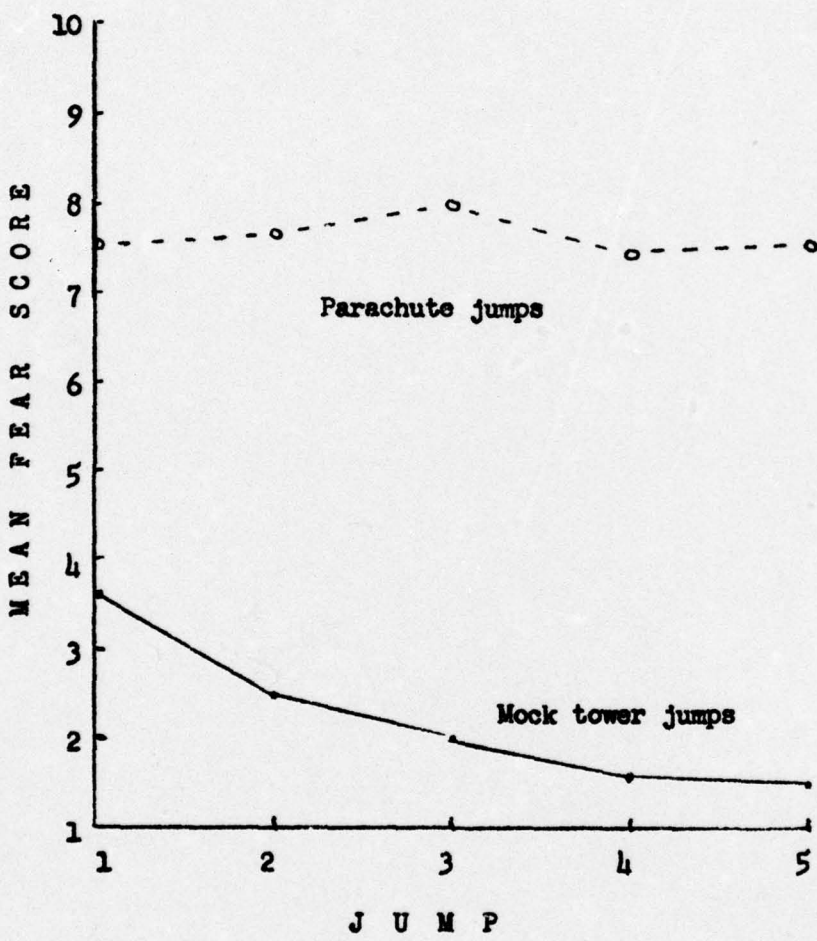


Figure 2. Mean fear score ratings for five mock tower jumps compared with five parachute jumps.

rated fear for the mock tower jumps is low and it becomes progressively less with continued experience. In other words, the fear of mock tower jumping seems to extinguish with continued practice. But there is not such effect for the parachute jumps: the rated fear stays high on all of the jumps. This finding squares with conversations with experienced jumpers who say that it takes 10-15 parachute jumps before the fear of parachute jumping begins to lessen. Also, some individuals have said that the mock tower is more fearful than the parachute jumps: this is evidently based on the large number of refusals at the mock tower and the few refusals in the airplane. While some individuals may find the mock tower more frightening than the parachute, the rating scale scores show that this is not usually the case. In a direct comparison of mock tower jumping and parachute jumping only 16 percent of the trainees checked the mock tower as the more frightening, another measure that substantiates the rating scale results.

A comparison of the rating scale results with the direct question on being scared is important because the rating scale refers specifically to the mock tower and the parachute while "being scared" has as reference only the "past few days". A purist might argue that when the trainees checked being scared "many times" they were referring to fear of the cadre or fear of doing many pushups. Figure 3 ^{and 4} compares the questionnaire responses of being scared for mock tower jumping week and parachute jumping week with the rated fear on the first mock tower jump and the first parachute jump. Successive rating scale intervals seem to mean more fear on the direct question. Whatever is being measured by the rating scale and the direct question, seems to be much the same sort of thing.

To compare physiological reactions with rating scale scores, the individuals were divided into "high" and "low" fear groups, with intervals 1-5 checked representing "low fear" and intervals 6-10 "high fear". The rated fear on the first jump (mock tower or parachute) only was used. The results agree substantially with

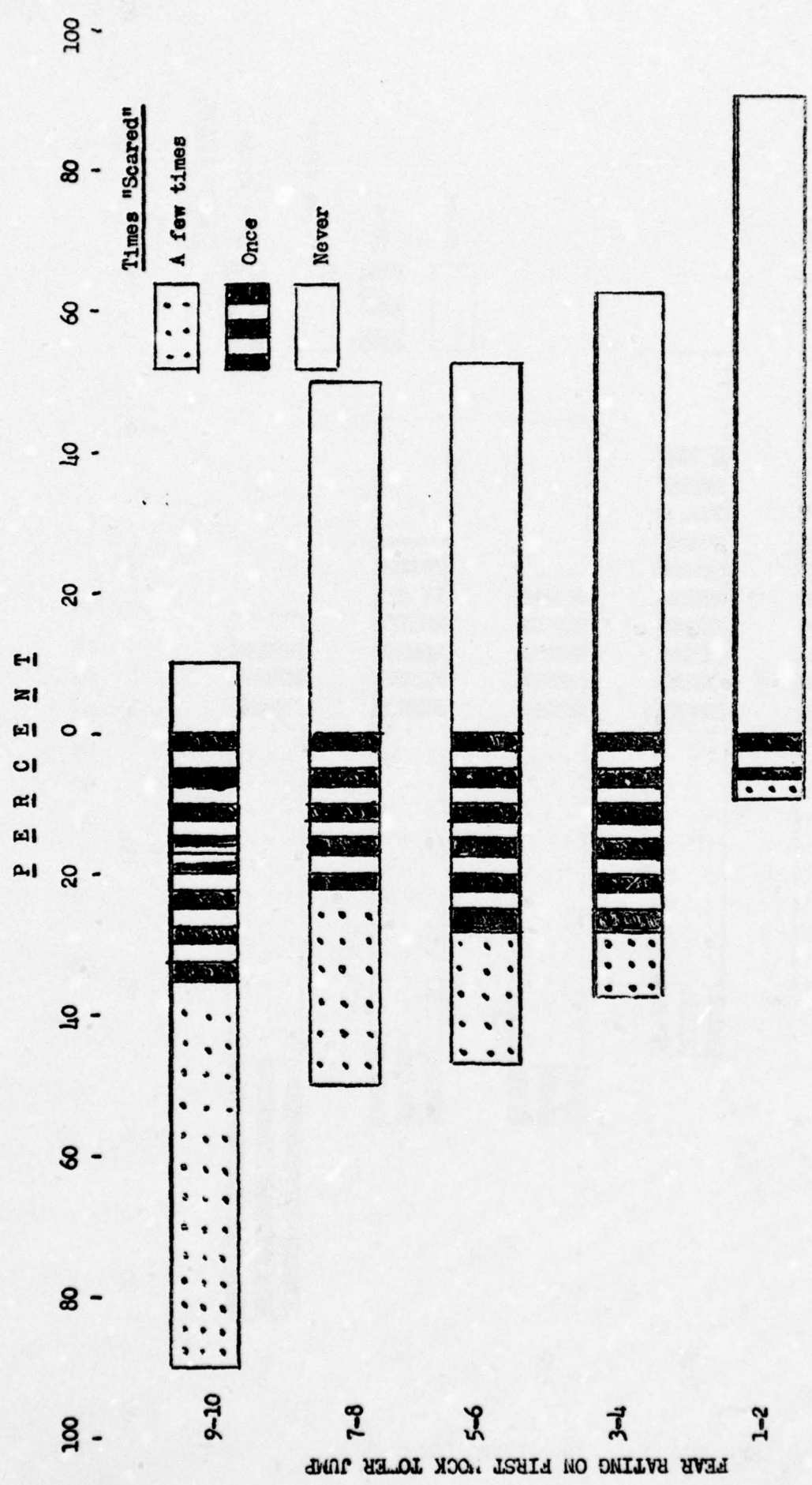


Figure 3. The relation between numerical self ratings of fear on the first mock tower jump and the direct question about being scared.

those described previously on the direct question about being scared and it is unnecessary to go into them in detail. The high fear group checks significantly more of the following reactions during the period of mock tower jumps: hands trembled, heart beat hard, nervousness and shortness of breath; for parachute jumps the high rated fear group claims to experience more of these reactions: hands trembled, heart beat hard, nervousness and cold sweats. In other words, more physiological reactions related to fear are expressed by individuals who indicate more fear on both the direct questions and on the rating scales.

Prediction of physiological reactions accompanying fear. In the subsection on physiological reactions to the training it was noted that "hands sweating" as a reaction given prior to the start of training was the only physiological reaction which later predicted that a trainee would report fear to parachute jumping. This topic stressed the specificity of fearful reactions, but it has not been determined whether a physiological reaction cited by the trainee as occurring in the past year was also one of his reactions to the training situations. Since few physiological reactions were given for the period covered by mock tower training, only reactions to parachute jumping will be covered.

The first conclusion to be noted is that every physiological reaction checked as occurring in the past year was checked again significantly higher among the same trainees as a reaction to parachute jumping. While these are significant relationships they are not necessarily large ones. For example, nervousness predicts its own recurrence at the .001 level. This means that 77 per cent of the individuals who report this reaction for the past year also report it to parachute jumping and 50 percent of the trainees who did not check this reaction for the past year reported it during the period covered by parachute jumping. There are many individuals, obviously, who reported it for the past year and yet did not report it at all for parachute jumping. Upset stomach only predicts its own

recurrence at the .05 level. In this case 43 per cent of the trainees who reported upset stomach for the previous year also reported it for the period of parachute jumping while 29 per cent who did not mention it on the first questionnaire report it for the later period.

A second method of examining the data is to ask what reactions occur in addition to the original one. Does a prior physiological reaction predict the later occurrence of many other physiological reactions to parachute jumping or does it only predict itself? Is a particular reaction itself predicted by many other prior reactions? It is instructive to examine the difference between nervousness as a reaction and heart beat hard, both of them common fear reactions to parachute jumping. The trainees who reported heart beat hard prior to the start of training also reported more than expected by chance the reactions of hands trembled, nervousness and upset stomach to parachute jumping as well as the original reaction of heart beat hard. Trainees who reported nervousness also reported, in addition to nervousness, the reactions of hands trembled, upset stomach and hands sweating during parachute jumping. But whereas the only prior reaction that later predicted the occurrence of heart beat hard was the same reaction, nervousness occurred during parachute jumping at a significantly high level in trainees who reported on the first questionnaire, not only nervousness, but also heart beat hard, hands sweating and hands trembled. While each reaction was reported prior to the start of training by the same number of trainees, about 12 per cent, the later reactions are quite different.

The questionnaire approach can only tap the surface and indicate a fascinating research area: the prediction of future reactions based on previous ones. The most accurate research on this topic of which reactions are patterned together demands better measurement techniques than questionnaire responses. For recent, better

controlled, research on the topic of physiological reactions, the reader is referred to the work of Ax (1953), Funkenstein, King and Drolette (1957), and Lacy, (1956).

Fear and behavior. Several questions are of relevant interest in an attempt to relate measures of fear to behavior. The best measure of behavior under some amount of fear is the rating given by the cadre of performance at the mock tower. Do trainees who perform poorly at the mock tower indicate that they were more afraid during mock tower jumping? Are more physiological reactions to mock tower jumping given by those who perform poorly? To analyze this topic, fear scores of the trainees with good and poor performance at the mock tower will be discussed, than fear scores and performances at the mock tower, for the spring sample and the sample mainly discussed here, the summer sample, will be compared, and, lastly, physiological reactions will be related to performance at the mock tower.

The mean estimates of how much fear was reported as experienced on each of the five mock tower jumps is shown for good, ordinary and poor performers at the mock tower in Figure 5. The "early satisfactory" group achieved satisfactory performance on jumps 1-5 inclusive, the middle group on jumps 6-11 and the late satisfactory group on jumps 12-17 inclusive. Figure 5 agrees substantially with a figure previously published (Walk, 1956) on the relation between mock tower performance and fear scores for the spring sample. For the spring sample about 25 percent of the trainees were in the "early" group, 50 percent in two middle groups that were almost identical and hence combined for this sample, and 25 percent in the "late" group. The better performance at the mock tower for the present sample can be inferred from the fact 50 percent was in the "early" group, 40 percent in the middle group and only 10 percent in the "late" group. But this figure does show significantly higher estimates of fear by those who perform more poorly at the mock tower, demonstrating a relationship between behavior and an estimate of fear, and replicating the relationship reported before ^{for} the spring sample.

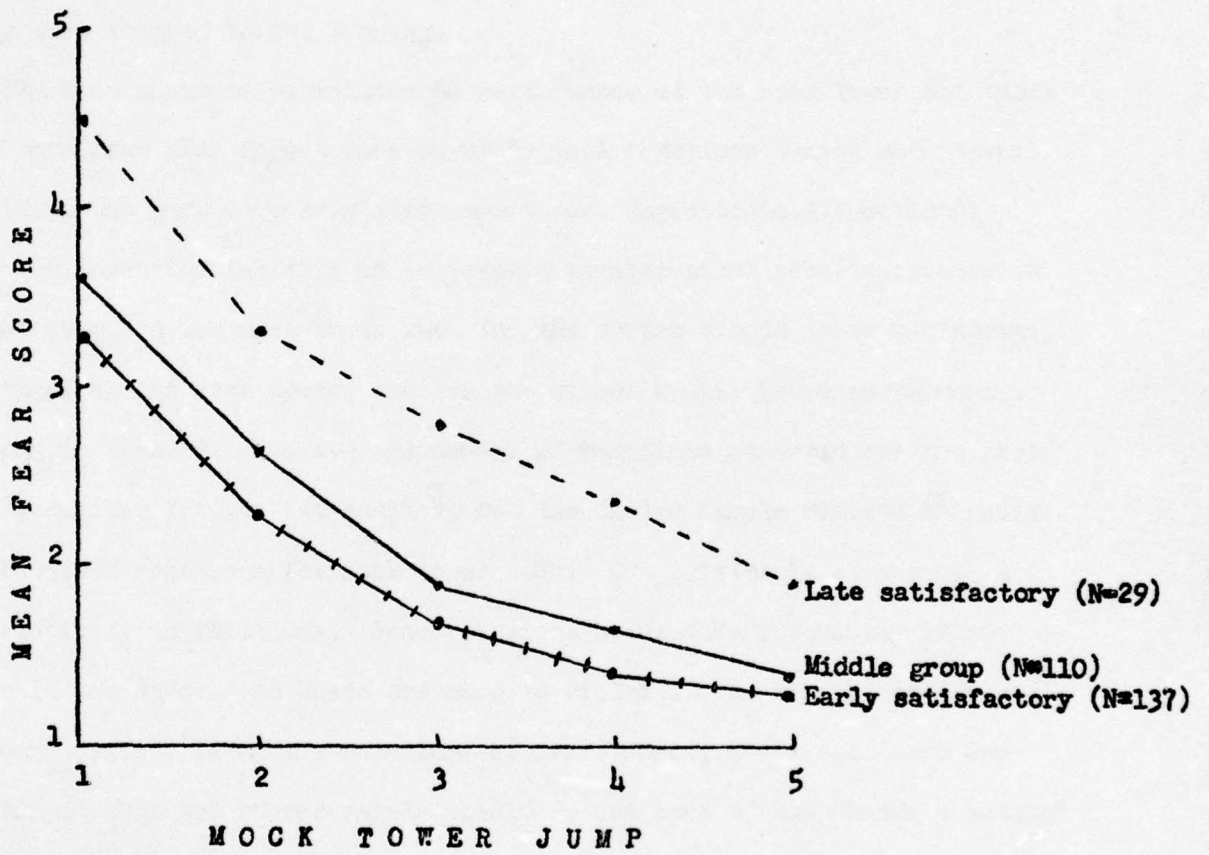


Figure 5. Fear ratings and mock tower performance.

Figure 6 carries this analysis further by comparing mean estimates of fear for the first five mock tower jumps with the average error ratings given by the cadre for both the spring and the summer samples. This figure demonstrates the higher average ratings of fear for the spring sample, the better performance at the mock tower for the summer sample, and a close agreement of mean errors and mean estimates of fear for both samples. It has been reported before (see p.) that the summer sample was given experience on the mock tower at Fort Campbell before they were shipped to Ft. Benning.

Fear has been shown to be related to performance at the mock tower and those who report more fear also report more physiological reactions during mock tower week. Do those who perform poorly also report more physiological reactions? One method for investigating this is to compare physiological reactions reported for the past year and for mock tower week for the spring sample (poor performers, on the average, at the mock tower) and for the summer sample (good performers). This is shown in Table 3. The average number of reactions reported for the past year is very similar for the two samples, but the spring sample reports slightly more physiological reactions for mock tower week. But this table also shows a certain variability in reactions. Some reactions occur more frequently in one sample than in the other, and these are hard to explain. The biggest difference in "past year" reports is on the reactions of nervousness, heart beat hard and hands sweating. That the summer sample should report more of the "hands sweating" reactions is not surprising since palmar sweating has been shown to be related to higher temperatures (Conklin, 1951), and more hot weather is experienced at the mock tower where these as fear-related reactions might be expected to occur. Of course, the prior experience of these trainees was not investigated, the spring sample may have had a high proportion of "turnbacks" from previous classes, it may have had other experiences not known, or this might be merely variability.

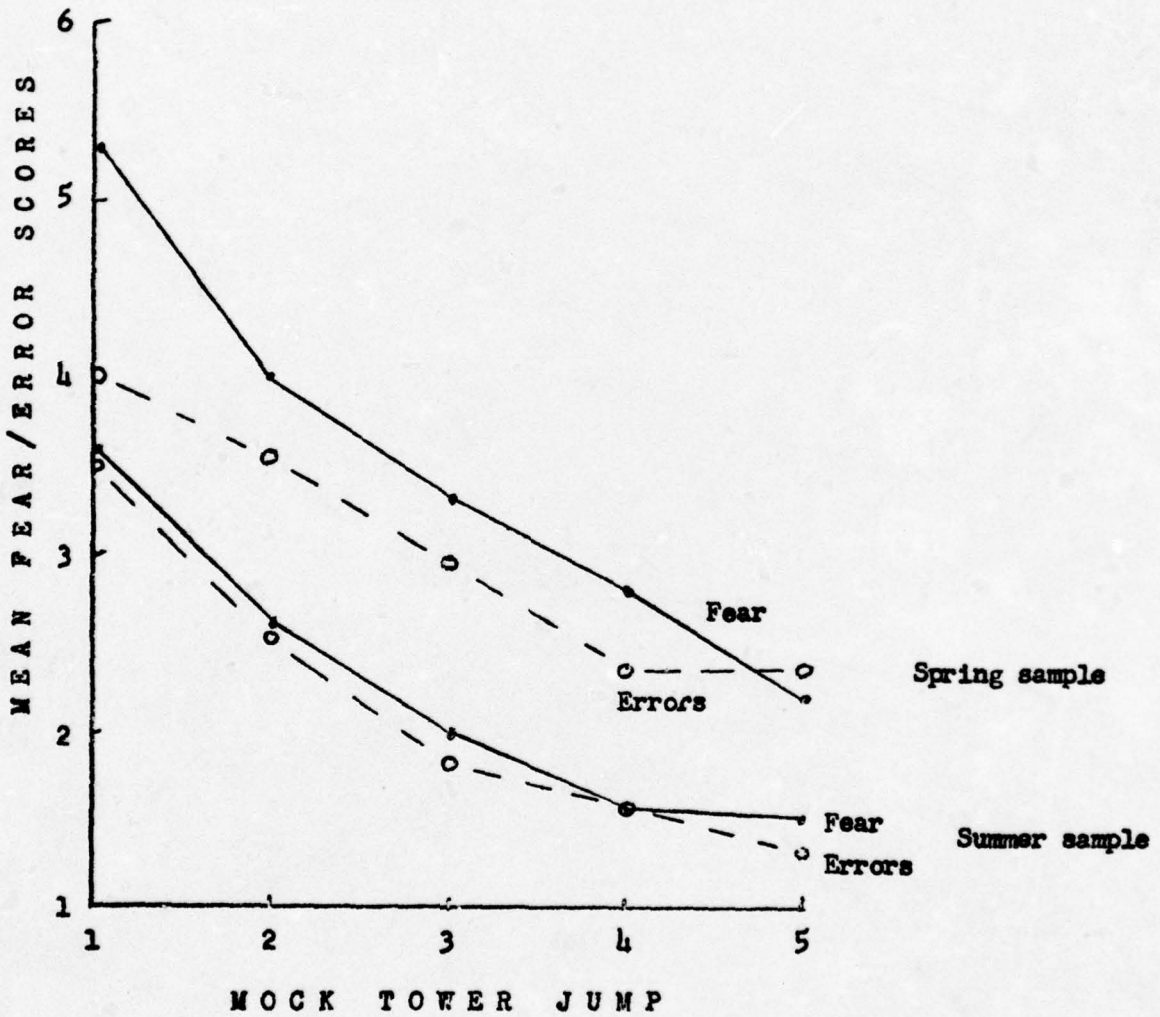


Figure 6. The relation between self-ratings of fear and rated errors at the mock tower for spring and summer samples.

Table 3

Physiological Reactions for Two Samples of Airborne Trainees

Physiological Reaction	Spring Sample		Summer Sample	
	Past Year	Mock Tower	Past Year	Mock Tower
Nervousness	20%	26%	12%	21%
Hands sweating	27%	18%	33%	12%
Upset stomach	17%	5%	19%	4%
Heart beat hard	18%	23%	13%	19%
Hands trembled	9%	10%	9%	3%
Shortness of breath	10%	5%	9%	6%
Cold sweats	5%	13%	5%	2%
Average percent reactions reported	15.1%	12.9%	14.3%	9.6%
Number of trainees in sample	<u>258</u>		<u>254</u>	

Perhaps the most interesting part of Table 3 is that for each sample the two reactions which rise over the base period are nervousness and heart beat hard, a consistency in line with their relation to fear.

To test the relation of performance at the mock tower to physiological reactions both samples were combined and the trainees were divided into four groups of performers at the mock tower. The first method of doing this was to compare two groups of poor jumpers with the rest of the sample (using jumps 1-7, 8-11, and 12 and over) since prior research on stress sensitive tests (see section VIII) had only shown differences in performance on the map tack test under stress when the worse performers of all were considered in relation to the other jumpers. By this method "nervousness" as a reaction was admitted by 29 percent of those that achieved a satisfactory jump on mock tower jumps 1-7, by 31 percent of those that had a satisfactory rating on jumps 8-11, and by 42 percent of the worst performers (jumps 12-21). This is a significant difference ($p < .05$) in the expected direction. A complication is that the more intelligent trainees, better performers at the mock tower, are more likely to admit to nervousness ($p < .01$). While the report of fear was not related to intelligence, admission of the physiological reactions is.

This may seem to offer some slight support for the hypothesis that more physiological reactions are experienced by those that perform poorly. Table 4 shows these results and also shows certain confounding factors when the group of good performers is divided more by the method usually used in prior analyses, with those achieving satisfactory ratings on jumps 1-3 separated from those that were given a satisfactory rating on jumps 4-7. Those that achieve satisfactory performance the earliest also admit to nervousness second only, for the entire group, to the very worst jumpers. This table also shows that there is little relation between satisfactory performance and the admission of nervousness for those of

Table 4

"Nervousness": its relation to performance at the mock tower and intelligence for two samples of airborne trainees on a questionnaire given at the end of mock tower training"

AFQT Group	First Satisfactory Jump				Total	Spring Sample	Summer Sample
	1-3	4-7	8-11	12+			
1-2	41%	34%	47%	42%	40%	40%	39%
N	<u>39</u>	<u>70</u>	<u>34</u>	<u>26</u>	<u>169</u>	<u>89</u>	<u>80</u>
3	26%	20%	32%	44%	30%	35%	25%
N	<u>31</u>	<u>84</u>	<u>62</u>	<u>54</u>	<u>231</u>	<u>105</u>	<u>126</u>
4-5	36%	26%	4%	37%	25%	26%	24%
N	<u>11</u>	<u>34</u>	<u>24</u>	<u>27</u>	<u>96</u>	<u>50</u>	<u>46</u>
Total	35%	27%	31%	42%	32%	35%	29%
N	<u>81</u>	<u>188</u>	<u>120</u>	<u>107</u>	<u>496</u>	<u>244</u>	<u>252</u>
Spring Sample	33%	30%	35%	41%	35%		
	<u>18</u>	<u>82</u>	<u>66</u>	<u>78</u>	<u>244</u>		
Summer Sample	35%	24%	26%	45%	29%		
	<u>63</u>	<u>106</u>	<u>54</u>	<u>29</u>	<u>252</u>		

Note: The reaction of nervousness includes all reactions except "never" (very often, often, sometimes, once).

highest intelligence (groups 1-2) but the relationship is there, and statistically significant, for Group 3 and for Groups 4-5. This table further shows that this relationship between higher admission of nervousness at the two extremes seems to be mainly in the summer sample and that both samples show the relation of intelligence to the admission of nervousness.

Since the higher physiological reactions of the two extremes has a certain interest, Table 4 shows both the percent admissions of nervousness and the number of trainees comprising the sample for each subgroup. If the reader takes a somewhat glum view of the theoretical fantasies to follow the data is there for his inspection and it offers a great deal of support for anyone of a cautious frame of mind.

Some psychological theories might use the physiological reactions as a measure of "arousal" or "motivation" and maintain that a certain amount of physiological activation would help performance while performance would be hindered when the reaction becomes too strong. While Table 4 does show that the two extremes in performance report nervousness the most frequently, it does not indicate why one group, the best performers, should be facilitated and the worst performers hindered. One also cannot infer whether some groups experience more of the reaction or only report it more frequently. Objective techniques for measuring physiological reactions would be needed for a better test of the hypothesis.

A study of Air Force combat pilots during World War II (Shaffer, 1947) reported that a moderate amount of fear helped performance supporting, to some extent, this analysis. Basowitz, et al (1955) in another study of paratroopers often speculate about the facilitative effects of anxiety.

Extinction of fear. One hypothesis about fear is that once a person has mastered fear in one situation this confidence transfers to other fearful situations. General Montgomery wrote in a foreward to a book about paratroopers, "they have 'jumped' from the air and by so doing have conquered fear," (Saunders, 1950). Can this be

demonstrated in this study? Of course, the fear of the mock tower does extinguish, as was shown, but does this transfer to another situation? All of the trainees that passed were forced, to some extent, to master fear at the mock tower. Those that performed poorly at the mock tower reported more fear during the mock tower jumps. Are they any less afraid during the parachute jumps? Table 5 shows that the worst performers at the mock tower are more likely than are other trainees, to judge the mock tower as fearful compared to the free tower or the parachute jumps, that in other words, these later experiences did not seem as frightening to them as the mock tower. They are also not quite as likely to report that they were scared "many times" during parachute jumps. The statistical analysis in Table 5 was carried out by the Cochran method that assumes linearity (see footnote p.) to be consistent with prior analyses of these three groups. If the worst jumpers are compared with the rest of the sample the statistical level becomes higher for all comparisons. The probability that being scared "many times" is less among the worst jumpers is raised from $p < .20$ to $p < .05$.

A second line of evidence, a little puzzling, is shown in Table 6 where class 6 is shown to admit significantly more fear at the mock tower than class 7 and then significantly less fear to the parachute jumps. One might expect that class 6 but both classes were rated about equal in performance at the mock tower should perform worse at the mock tower, and this makes the reason for this difference puzzling. If one maintains that it is the elicitation of fear rather than its relation to performance that is important, one might hold that the mock tower did elicit more fear for class 6 and this helped to make parachute jumps seem less frightening. If viewed in this manner the data of Table 6 does provide further support for the notion that mastery of fear in one situation may make a second situation less fearful. On the other hand, it also assumes that conditions were otherwise "equal" for the two classes: unknown conditions may have made mock tower jumping, objectively, more frightening for class 6 and parachute jumping more fearful for class 7.

Table 5

Rated Fearfulness of Training Situations and Amount
of Fear Expressed to Parachute Jumps by Three
Groups of Mock Tower Jumpers

<u>First Jump Judged Satisfactory</u>	<u>N</u>	<u>Mock Tower More Fearful Than Free Tower</u>	<u>Parachute</u>	<u>Scared "Many Times" during Parachute Jumps</u>
1-3	63	55%	10%	26%
4-7	105	59%	10%	29%
8 & above	83	71%	21%	16%
χ^2		3.94	4.23	2.44
p		< .05	< .05	< .20

Table 6

Verbal Admission of "Being Scared" Compared for Class 6 and Class 7

<u>Response</u>	<u>Mock Tower</u>		<u>Parachute</u>	
	<u>Class 6</u>	<u>Class 7</u>	<u>Class 6</u>	<u>Class 7</u>
Many times	-	-	13%	31%
A few times	18%	10%	46%	47%
Once	21%	16%	22%	15%
Never	<u>61%</u>	<u>74%</u>	<u>19%</u>	<u>6%</u>
	100%	100%	100%	100%
N	109	163		
X ² (6 v. 7)	6.09		20.60	
p	<.05		<.001	

These results, while they do support the hypothesis, must be interpreted with caution. Only a small number of trainees would contribute to the differences observed in Table 5. The significant but slight tendency of expressed fear at mock tower and parachute jumps to be related is not obviated by these results, nor is it impossible that, even though a few poor performers learn mastery at the tower, most of those that perform poorly at the mock tower are susceptible to fear in a variety of situations.

Finally, an auxiliary purpose of the mock tower and the free tower is to teach trainees to master fear with safe training equipment so that they will be better prepared to handle their own fear reactions to parachute jumps. There is no reason to doubt that the course succeeds in this function. With reference to Montgomery's statement, the "conquering" of fear does not necessarily mean that an individual's reactions are any less. As long as the individual performs the task set for him, he has "mastered" fear. His own private feelings are his own affair, of no concern to others, unless performance suffers.

Individual fear reactions. To make the sampling of fear responses richer and not bound by the formal questions a free answer question was included. The trainees were asked, "In your own words, describe some of your fear reactions during parachute jumping." Since this question was asked after the formal questions the two types of response - formal question and free answer - are not independent, the free answers easily could be influenced by the previous questions asked, but the volunteered responses are still worth studying.

About two-thirds of the free answers of the trainees concern the point in the sequence of parachute jumping when a trainee felt fear, while the remaining one-third usually concerns the feelings of the trainee, though some are not easily classified into any category. Representative answers will be given for each of these three types of answers.

1. The point where afraid. Those who chose to emphasize where they experienced fear mentioned the following: the anticipation prior to boarding the aircraft, the flight itself, the series of commands given preparatory to jumping, the actual exit from the aircraft, the opening parachute shock, the fear of malfunction or entanglement with other jumpers, and the fear concerned with landing on the ground. Free comments quoted verbatim from the trainees will better illustrate this type of fear than a mere breakdown into categories.

2. The place where fear reached its maximum was when the jump master gave 'get ready' until I was actually standing in the door. I could not actually state on what basis I had this fear. The reactions didn't show much physically, but it was a mental strain though there was heavy beathing at times. All fear immediately left upon exit from the door.

10. While in the plane, I was somewhat nervous. I was nervous about tripping in the door and bouncing off the side of the plane. As soon as I got the command 'stand up' I wasn't nervous or scared a bit.

22. The one greatest fear I had was what and how I would get my opening shock. Also, if it would open at all.

61. I worried about landing on the ground, about a good PLF (parachute landing fall) and about my fellow jumpers in the air.

62. I felt fear from the take-off until the first command. From than on it was "too much to do in too little time" to be scared.

71. The first time I jumped, I got hurt on the opening shock, so I was more afraid of the shock than anything.

166. I wasn't really afraid, I was just real nervous while I was in the plane, but when I got to the door to jump, I was calm and not afraid to jump.

214. The thing I fear most was the opening shock. I also was constantly afraid I'd freeze in the door.

255. Waiting, the fear of landing, and not making a good landing, the fear of

being giggered, the fear of standing in the door of the plane in flight, the fear of not doing well, and of flunking out of the course.

304. My second jump I was worried about malfunction. My third jump I was worried about the tail of the C-46 as it looked too close. The PLF when I got to the ground. My second jump, I hit my head in the dirt, entangled with another soldier.

310. Most of your fear is when you board the plane, but once you are in the air, you seem to lose most of your fear and your mind becomes a blank. When you jump, your actions are made reflexes by what you learn.

211. I would be nervous and fidgety before the take-off and during flight but as soon as the jumpmaster said "hook up" all my nervousness was gone and I would do everything automatically.

275. I was most afraid of the opening shock of the parachute.

411. Well, everyone is afraid at different times. Some when they received the opening shock, others when they entered the plane. I was afraid when I walked to the door. It seemed to take a long time to get there.

2. The effects of fear. Other trainees described their own reactions in more detail, including many of the types of reaction tested on the questionnaire by direct questions. Some of these reports are given below, including reports which show that for some trainees, extremely intense fear reactions were experienced.

16. Feeling of high tension and nervousness while in plane - heart pounding while approaching door - muscles tightening and a seeming revolt going on inside my body, held together only by muscular and mental tautness - fear reaching peak in the door, subsiding to relief and muscle relaxation upon opening shock. Some fear of PEF.

26. I was very much afraid when I had to use my reserve. I saw that I was going into the woods and I could do nothing about it. My chute could not be controlled because of my reserve being open. I was so afraid I nearly cried.

66. Nervousness, weak legs and a mixed-up feeling.

254. I got a few cold seats especially on my third and fifth jumps when he would say "Stand in the door." That's when I would really feel scared - fear like no other fear.

255. While waiting in the plane, I had a day dream, like falling a great distance.

515. I wasn't too scared on my first and second, not knowing what to expect. I was so scared on my third jump that I couldn't even talk. "Shuffling" to the door is the hardest thing I've ever tried to do. I was very much afraid.

553. Weak knees, mixed up mind while shuffling down and standing in the door.

565. The real fear I had during my training I can't explain. It was a fear I've never felt before. My biggest fear was wondering if I could get enough courage to jump from the plane.

258. Nervousness, cold sweat, clammy hands, sensation of dry throat, needed to use latrine excessively. Otherwise it didn't bother me a bit.

362. There are really no words for that, all I can say is that I was so scared that I didn't think of the opening shock or when I hit the ground. That's all I can say, and I am glad I made it.

472. My largest fear was when I put the chute on and when I stood up. When I stood up, I was scared and weak. When I got to the door I knew nothing of what I was doing. I don't even know what made me jump out.

521. Hardly any emotion while on ground due to intense discomfort of harness. In plane, tensions build up to peak from take off time till first man leaves door. Then, the brain becomes complete blank while "stick" shuffles out up to the two thousand count or just before the opening shock.

3. Miscellaneous reactions. A fairly common reaction was that the experience could not be conveyed to an outsider. This type of reaction, and others are illustrated below:

155. It is impossible for one person to convey to another the kind of fear and emotion felt during a parachute jump. My reactions were entirely different than any feeling or fear I ever felt before.

209. You can't tell about it until you have jumped yourself. No one can explain it.

258. It would be hard to put into words, but it is a wonderful experience to jump from an aircraft in flight.

62. It was like being all by yourself in the world. When the shock of opening came you were sort of dazed for a second and then you couldn't hear anyone around. It was odd!

171. I was afraid on my first jump because I had never been in a plane before. On my third jump I was afraid I'd freeze in the door. I was scared on all my jumps because I was afraid I'd chicken out in the door. I wasn't afraid of anything else.

173. I kind of got to thinking that if my parachute didn't operate correctly and I was killed what would happen to me later, as I hadn't been close to God.

322. The only time I was in fear was in the plane on the third jump. I guess that was because it was foggy that day.

208. It wasn't mostly fear it was nervousness. On our third jump before they dropped us they flew around the DZ (drop zone) twice. I was getting awfully sick and therefore I was getting scared.

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While the reports of the trainees contribute by giving a more realistic picture of their fears of parachute jumping, how else do they contribute? Two topics emerge of interest. One concerns the conditions arousing fear and the other with the sense of "mastery".

Protocols of both men in class 6 and class 7 report something unusual on the third jump. Class 6 was bothered by a slight fog and class 7 by high winds. Figure 2 shows that the mean fear score rises on jump 3 as compared to the other jumps, but

analysis of the individual classes shows that only for class 7 was there a marked rise in the mean fear score on the third jump, class 6 remained relatively constant over jumps 2, 3, and 4. Objectively, high winds are probably more dangerous than a slight fog because of the increased risk of injury on landing, but a dense fog where the trainee could not see where to land would be also dangerous because of the risk of coming down without wa[~]ring into a tree or on an obstacle. The data are not sufficient for more than a hint, A quantitative study of which stimuli are perceived as fearful by individuals would contribute to a fuller understanding of fear. It is well known that objective danger is not necessarily highly correlated with subjective fear (see section XI).

Consistently, men report that at some point in the sequence of actions involved in jumping from an airplane they overcome their fear and are no longer afraid. The two common places where fear seems to subside before the jump has actually been made are at the command "stand up" and as the trainee stands in the door. Others report that all fear goes as they feel the opening shock. Perhaps, logically, one would expect fear until the trainee is actually on the ground, but the safe opening of the parachute seems to be another logical point for relaxation. But why should fear lessen before the danger has been faced? Here one might appeal to the fact that the anticipatory misery is relieved by the command "stand up", and the trainee from then on is no longer waiting but is engaged in action so that he has no time to dwell on his fears. But why should the sight of the door become a signal for relaxation rather than the command to stand up? Standing in the door is approximately in the middle of the sequence of movements on the way to the ground.

An interesting paper by Mowrer (1956) on fear conditioning may illuminate this topic. He writes of the "conditioned arousal of fear" and of the "conditioned relaxation", of fear. "Secondary reinforcement, decremental type, may . . . be

mediated either by the end of a stimulus which has been associated with the onset of a more primary discomfort or by the onset of a stimulus which has been associated with the end of such discomfort." Apparently, the sight of the door or the jump commands, because they are close in time to the release from tension which accompanies the opening of the parachute, become "conditioned stimuli" to relaxation, even though the period feared has not yet taken place. This finding suggests controlled experiments, perhaps with animals if a comparable experimental situation can be constructed, to investigate the emergence of this relaxation and the factors that influence it. But, whether the phenomenon of anticipatory relaxation or "mastery" is analogous to Mowrer's work or not, its repeated appearance in the questionnaire shows that it is a very real topic and one that should be investigated systematically. At what stage of parachute jumping does this anticipatory relaxation appear? After how many parachute jumps? How can men be trained to relax at the proper moment and not too soon or too late? Another study could easily determine when the anticipation relaxation appears and for what percentage of the trainees.

The dependence on free answers makes it difficult to quantify these reactions. However, nine men were identified who reported they experienced relaxation at the jump commands, nine at the door, eleven as they left the door and 17 relaxed as soon as they felt the opening shock. Using these men only to compare, on the grounds that many other men may have had the same experience but did not report it, there are few obvious differences. The men who reported relaxation at the jump commands were significantly less intelligent, as measured by the AFQT scores, than those who reported relaxation at the door or after leaving it. They also had a tendency to achieve very early satisfactory jump performance at the mock tower and to report less fear of parachute jumping. These are only hints of a relationship and a fuller investigation would be required before one could call these results any more than possible directions to be confirmed by subsequent research.

Miscellaneous. The parts of the fear material that have not been reported concern the rated fearfulness of each parachute jump, a comparison of the fearfulness of the three training situations and other reactions to parachute jumping besides the physiological reaction questions.

For the rated fear on parachute jumps each trainee was told to write down the parachute jump that made him the most afraid and also which one he "sweat out" the most. That these two responses agree, so that only the rated fearfulness will be presented, is probably a function of the fact that these are retrospective reports, taken at the conclusion of parachute training. A better measure, fear of each jump soon after it was completed, probably would not agree perfectly with these estimates. Rather this estimate of fearfulness is that of the jump which the trainee, in considering all five jumps he has made, thought was the most fearful of all. As is shown in Table 7 more members of class 6 rated the first and fifth jumps as the most fearful than they did the intermediate jumps, jumps 2-4. The responses of class 6 are probably what one would normally expect in the absence of any special circumstances. The first jump is fearful because it is a climax of training, the task that is the fulfillment of training, where the trainee finds out whether he will disgrace himself by "freezing" in the door and be unable to jump. Basowitz et al (1955) report that anticipatory tension, on a scale that they gave daily, was the highest just before the first parachute jump. The last jump, of course, also represents fulfillment for with it the trainee finishes the course and becomes a full-fledged parachutist. Class 7, on the other hand, overwhelmingly chose the third jump as the most fearful. From the verbal report of fear reactions it is known that high winds were present that day. This probably is responsible for the fear expressed on that jump since high winds can cause entanglements or can drag a jumper and cause serious injury. The high winds may also be responsible for the greater fear expressed by class 7 to parachute jumping in Table 6, but this is only an inference.

Table 7

Parachute jump rated as most fearful by each class

<u>Parachute Jump</u>	<u>Class 6</u>	<u>Class 7</u>
1	27%	14%
2	13%	13%
3	15%	43%
4	18%	14%
5	<u>27%</u>	<u>16%</u>
	100%	100%
N	<u>109</u>	<u>161</u>

Table 8 shows the rated fearfulness of the various training procedures where each one, mock tower, free tower and parachute jumps is paired with each other situation. This table documents the results previously mentioned on physiological reactions, rating scale fear and estimates of "being scared" on the relative fearfulness of these tasks. The mock tower jumps are rated as more fearful than the free tower jumps, but the parachute jumps are much more fearful than either.

Table 9 simply shows the number of trainees that checked each question of miscellaneous reactions. These questions show the distribution of responses to each question and have a certain intrinsic interest, but they are not all related to fear as defined by the question on number of times "scared" to parachute jumping. For example, worry about injury or whether the parachute would open were not related to whether the trainee was afraid, neither were the questions on amount of sleep or dreams before the first parachute jump. On the other hand, fear of entanglement, restlessness and thinking of quitting the jump program were very highly related to being afraid. The eating of a small breakfast before the first jump was slightly related ($p < .10$) to fear during the week of parachute jumping.

Summary and conclusion. Exploration of some of the parameters of the fear-related responses has served two functions. One function might be put under the heading of "reliability" and "validity." The reliability is inferred from the consistent measurement of the phenomenon under observation, fear. Examples of this reliability are the relation between self-rating scales of fear and the direct questions, and of the relation of both to physiological reactions. Validity, in this study, is helped by the consistent report of the same physiological reactions to training as those reported in combat studies and by the congruence of fear and physiological reactions with the training situations. Further support was demonstrated by the higher reports of fear made by those that performed poorly at the mock tower.

Table 8

Responses to questions on which situation elicited the most fear

		<u>Number responding</u>
1. Mock tower v. free tower		
Mock tower	62%	
Free tower	<u>38%</u>	
	100%	<u>251</u>
2. Mock tower v. parachute jumps		
Mock tower	14%	
Parachute	<u>86%</u>	
	100%	<u>267</u>
3. Free tower v. parachute jumps		
Free tower	10%	
Parachute	<u>90%</u>	
	100%	<u>266</u>

Table 9

Reactions to Parachute Jumping

(n = 270)

How much sleep did you get the night before your first parachute jump?

Hardly slept at all	1%
2-3 hours	4
4-5 hours	8
6-7 hours	50
8 hrs. or more	37
	<u>100%</u>

Did you dream very much the night before your first parachute jump?

A lot	5%
A little	21
Not at all	74
	<u>100%</u>

How big a breakfast did you eat before your first parachute jump?

Hardly any at all	5%
Less than average	9
Average	77
Very large	9
	<u>100%</u>

Did you "sweat out" whether your parachute would open?

A lot	7%
A little	34
Not at all	59
	<u>100%</u>

Did you sweat out whether you would be entangled with another parachute?

A lot	10%
A little	50
Not at all	40
	<u>100%</u>

Did you worry about being killed or injured in your parachute jumps?

A lot	6%
A little	43
Not at all	51
	<u>100%</u>

Table 9 (continued)

Did you ever feel that you would like to quit jumping and join a straight leg outfit?

Often	6%
A few times	26
Once	14
Never	54
	<u>100%</u>

During the past few days, how often did you feel that you could not stand to be with other people?

Many times	1%
A few times	13
Once	3
Never	83
	<u>100%</u>

During the past few days, how often did you feel restless (not able to sit down)?

Many times	7%
A few times	29
Once	7
Never	57
	<u>100%</u>

During the past few days, how often did you feel that you could not stand to be alone?

Many times	3%
A few times	11
Once	3
Never	83
	<u>100%</u>

A second function of the fear-related material is to contribute information on broader problems related to fear and the measurement of emotion. These can be put in five categories: the specificity of emotional reactions to a situation, the topic of patterning of physiological reactions, the relation between "arousal" and performance, the extinction of fear, and the mastery of fear.

Physiological reactions appropriate to fear were shown to be specific to the training situation that elicited them. Those that reported that they were scared for the period of mock tower jumping or parachute jumping reported the appropriate physiological reactions: the same peak of physiological reactions was not reported by those men to other situations. The specificity of the reactions to the situation supported the work of Funkenstein, King and Drolette (1957) and of Ax (1953) using more precise measurement techniques.

On the topic of "patterning" the fear material contributed a hint of relationships that could not be adequately spelled out. Each physiological reaction reported before the start of training occurred at a statistically significant level again in the same trainees during mock tower or parachute jumping. The interesting fact was that some reactions on the first questionnaire only predicted themselves while other reactions predicted several other reactions. The data was not adequate to investigate this phenomenon adequately. It was mentioned as a good topic for further research.

There seemed to be some relation between "arousal" and performance. Those trainees that were the best performers at the mock tower reported "nervousness" and "heart beat hard" second only in frequency to those that performed the worst, the "middle" group reporting the least occurrence of these reactions.

The admission of fear in one situation seemed, in some trainees, to make a later training situation less fearful. These that performed poorly at the mock tower did not report parachute jumping to be as fearful as the other trainees. Also, the class that reported the most fear to the mock tower reported the least fear to

parachute jumping, although it was pointed out that situational factors may have influenced these reports. This topic is not unrelated to "mastery" of fear.

Finally, trainees reported in the free responses that they became relaxed and less afraid at different points in the sequence of activities involved in making a parachute jump. Some relaxed at the initial jump commands, some at the plane door and others not until they felt the opening shock. This verbal report of "mastery" in the sense that fear subsides so the trainee can give full attention to the task was held to be an interesting topic for additional research.

But what predisposes a man to admit that he is afraid? The next section will investigate this predisposition.