

# Evaluation of Three Experimental Systems for Noncommissioned Officer Training

by

*Paul D. Hood, Morris Showel, and  
Edward C. Stewart*

Distribution of this document is unlimited.

September 1967

LIBRARY  
US ARMY WAR COLLEGE  
CARLISLE BARRACKS, PA.

*Prepared for:*

Office, Chief of Research and Development  
Department of the Army  
Contract DA 44-188-ARO-2 (DA Proj 2J024701A712 01)

HumRRO Division No. 3 (Recruit Training)  
Presidio of Monterey, California

The George Washington University, *Washington, D.C.*  
HUMAN RESOURCES RESEARCH OFFICE  
operating under contract with  
THE DEPARTMENT OF THE ARMY

Technical Report 67-12  
Work Unit NCO  
Sub-Unit III



DEPARTMENT OF THE ARMY  
OFFICE OF THE CHIEF OF RESEARCH AND DEVELOPMENT  
WASHINGTON, D.C. 20310

CRDBES

SUBJECT: Evaluation of Three Experimental Systems for Noncommissioned Officer Training

TO: LIBRARY  
ARMY WAR COLLEGE  
CARLISLE BARRACKS  
PENNSYLVANIA 17013

1. This report concerns the assessment of three different systems for training advanced basic trainees as potential noncommissioned officers: two-week and four-week leadership preparation courses given between BCT and AIT and followed by on-the-job training during AIT, and leadership preparation training integrated with AIT training.

2. In the large-scale experiment described in this report, data were collected on training by the three experimental systems, and for control groups; data bear on selection, assessment, and measurement of leadership performance. In general, performance of trainees in all of the experimental groups was better than that of control groups. Performance of those trained under the leadership preparation course was better than under the integrated course; performance of those trained under the two-week and the four-week courses did not differ in any substantial degree.

3. The research described in this report should be of interest to personnel engaged in leadership training and selection or in training methods research.

FOR THE CHIEF OF RESEARCH AND DEVELOPMENT:

*C. J. Canella*  
C. J. CANELLA  
Colonel, GS  
Chief, Behavioral  
Sciences Division

## FOREWORD

The objective of the research described in this report was to obtain information on various parameters influencing design and development of a program for identifying and preparing potential noncommissioned officers, during their basic and advanced individual training in U.S. Army Training Centers. The research was conducted under the Human Resources Research Office's Work Sub-Unit NCO III, Field Evaluation of Leadership Training Programs for Light Weapons Infantry Trainees.

The research was performed by HumRRO Division No. 3 (Recruit Training) at Fort Ord and at the Presidio of Monterey, California. During most of the period of this research, the Director of Research was Dr. Howard H. McFann.

Military support for the research was provided by Fort Ord and by the U.S. Army Training Center Human Research Unit. Military Chief of the Unit at the initiation of the research was LTC Luther L. Sexton, followed by Acting Chief MAJ Betty K. Kunert.

Work Unit leader was Dr. Paul D. Hood; Dr. Morris Showel was responsible for operations and training; Dr. Edward C. Stewart designed the Field Tactical Exercise and supervised collection of criteria. Dr. Mark Silber and Mr. Sheldon Malev assisted in the preparation of training materials and in data collection.

MSG Sidney Springer served as operations NCO, and assisted in training liaison and in data collection. LTs J. Driscoll, T.F. Wright, J.S. Boldrick, and J.O. Sullivan, and SFCs O.B. Fritts, E.A. Barnes, and W. Dixon provided military assistance. CPL W.J. Burrow, PFC Jay Coulter, and PFC Bruce Cowie served as military research assistants.

During earlier research under Work Unit NCO, Research in Support of Training of Potential Noncommissioned Officers, background information was gathered for the development of an effective and feasible Leadership Preparation Program; a series of pilot studies was conducted, dealing with assessment, training economy, motivation, leadership content, and on-the-job training environment; three alternative leadership preparation systems and appropriate criteria were developed and field-tested.

Previous Work Unit NCO publications include the following: Research on the Training of Noncommissioned Officers; Progress Report. NCO I, Research Memorandum by Paul D. Hood, July 1960; Report of the Assessment Study Area of NCO II, Research Memorandum by Paul D. Hood, February 1963; Report of the Leadership Orientation and Motivation Study Area of NCO II, Research Memorandum by Morris Showel, April 1963; Report of the Integrated and Informal Leadership Training and the Fundamental Leadership Skills Study Areas of NCO II, Research Memorandum by Samuel Sloan et al., May 1963; Leadership Climate for Trainee Leaders; The Army AIT Platoon, Research Memorandum by Paul D. Hood, August 1963; and The Effect on Training and Evaluation of Review for Proficiency Testing, Research Memorandum by Richard P. Kern and Paul D. Hood, August 1964.

Additional NCO III publications are: Automation of a Portion of NCO Leadership Preparation Training, HumRRO Technical Report 66-21 by Morris Showel, Elaine Taylor, and Paul D. Hood, December 1966; Implementation and Utilization of the Leader Preparation Program, HumRRO Technical Report 67-2 by Paul D. Hood, March 1967; and Preliminary Assessment of Three NCO Leadership Preparation Training Systems, HumRRO Technical Report 67-8, by Paul D. Hood, Morris Showel, John E. Taylor, Edward C. Stewart, and Jacklyn Boyd, June 1967.

Research in Work Unit NCO is completed with the publication of this Technical Report and its Appendix Supplement, a separate volume which contains the majority of the statistical analysis tables and related descriptions. Descriptions of instruments, sample forms, and summaries of several auxiliary studies have also been presented as appendices in the Supplement. The appendix volume will be made available for detailed technical study purposes through deposit in Defense Documentation Center and in HumRRO and depository libraries.

HumRRO research is conducted under Army Contract DA 44-188-ARO-2 and under Army Project 2J024701A712 01, Training, Motivation, Leadership Research.

Meredith P. Crawford  
Director  
Human Resources Research Office

## SUMMARY AND CONCLUSIONS

### Military Problem

There is a continuing need, especially in the event of mobilization expansion or combat attrition, to have a reserve pool of identified and prepared potential noncommissioned officers. Moreover, Army Training Centers have always depended to some extent on trainee leadership and there has been reason to believe that this trainee leadership could be improved.

### Research Problem

The objective of Work Unit NCO was to produce, through conduct of research and development, an effective and feasible leadership preparation program that would identify, motivate, and train advanced basic trainees as potential noncommissioned officers. During earlier research under NCO, background information had been gathered for the development of such a program and a series of pilot studies concerned with assessment, training economy, motivation, leadership content, and on-the-job training environment had been conducted. Three alternative leadership preparation systems had also been developed and field-tested, along with appropriate criteria.

The research described in the present report was designed to obtain decision information on a variety of parameters that would have to be considered in designing an optimal system which would be acceptable to the Army. Among these parameters were:

- (1) The level of aptitude of the leader candidate.
- (2) The level of peer rating of leader potential given by fellow trainees in basic training.
- (3) The duration of leadership preparation training.
- (4) The nature of leadership preparation training methods.
- (5) The level of leadership preparation training support.
- (6) The extent of training given to on-the-job supervisors.
- (7) Differences in military occupational specialties.
- (8) The effects of training companies and the subordinate platoons on the performance of squads considered as units and of squad leaders and their followers.

On the basis of the previous studies and U.S. Continental Army Command guidance, one leadership preparation training program to be given concurrently with Advanced Individual Training (AIT), and one two-week and one four-week course to be given between Basic Combat Training (BCT) and AIT were developed for evaluation.

### Research Design and Approach<sup>1</sup>

The specific experimental and control treatments designed were:

- (1) A concurrent course with the AIT system ("Integrated System").
- (2) A two-week leader preparation course, followed by eight weeks of on-the-job training (OJT) in AIT.
- (3) A four-week leader preparation course, followed by eight weeks of on-the-job training in AIT.
- (4) An "experimental control" treatment, using the same caliber of trainee leaders and the same requirements for their treatment as in the experimental treatments, but without leadership preparation or formal OJT.
- (5) A "normal control" treatment in which companies selected and used trainee leaders in the conventional way.

<sup>1</sup>Descriptions of instruments, sample forms, summaries of auxiliary studies, statistical tables, and other details of the study have been published as a separate volume: *Appendix Supplement to Technical Report 12*, September 1967.

Data were collected for approximately 100 trainee assistant platoon sergeants, 400 squad leaders, 4,000 followers, and more than 100 cadre who were organized in more than 80 platoons and 20 company cycles throughout the year 1961. Additional data were collected for several comparison companies outside the experimental battle group.

Over 40 separate instruments, many of which yielded several scores, were employed in selection, assessment, and measurement of collateral variables. These included ratings by peers, superiors, or followers during basic training and leader preparation, and at the end of on-the-job training in advanced individual training, as well as by superiors 1½ years later; biographical information; the Army Classification Battery (ACB), aptitude tests predicting trainability in occupational areas; an experimental selection battery of nine instruments; attitude and esprit questionnaires answered by both leaders and followers; military proficiency tests given leaders and followers at the end of AIT; descriptions by followers of leaders' behavior or activity; and performance scores on a field tactical exercise. Various data were also collected on the cadre and on company operations.

Following several interim studies, the criteria were closely examined to analyze the internal content and the correlational and factor structure of the various measures. Following this analysis, 21 criterion measures were selected for intensive examination by analysis of variance.

## Results

**Time and Unit Differences.** Some differences were found as each of the five companies progressed through four treatments. The majority of the criteria showed differences between companies or platoons, and there were a large number of unit-by-time interactions, some of which were attributable to treatment effects. There were a few time or unit differences for the two military occupational specialties represented in the sample, but there was no evidence of any difference created by the length of training given the cadre or by the contrasts of leader preparation methods or techniques.

**Control Differences.** In comparison with the experimental control trainees, the trainee leaders in the normal control treatment performed more effectively. This probably is due to the fact that more of the poorer leaders had been assigned to the experimental (control and training) treatment units, and additional requirements had been placed on cadre in their management of trainee leaders and company operations.

**Experimental-Control Differences.** When the three experimental leader training systems are contrasted with the experimental control, the majority of the criteria show significant differences favoring leader preparation training. Although their followers' attitudes were less favorable toward the Army and trainee leaders in general, the prepared leaders received higher ratings; they and their followers performed better on military proficiency tests; their squads showed higher esprit; they prepared, briefed, and controlled their men better on a field tactical exercise; and they more often "initiated structure," rewarded, and defined and gave information, according to the reports of their followers.

**Experimental Differences.** Among the three leader training treatments, there was no difference between the two-week and four-week courses; however, both were more effective than the Integrated System.<sup>1</sup> There was some evidence that the leader preparation trainees were

<sup>1</sup>The experience and results of the experiment which were in hand at the time of the U.S. Army's partial mobilization in 1961 led to the decision by Headquarters, U.S. Continental Army Command, to request that a Leader Preparation Program be designed using the two-week leader preparation course system as a model. Following a troop-use feasibility test of this system late in 1961, Leader Preparation Programs were established in all U.S. Army Training Centers. (See Paul D. Hood, *Implementation and Utilization of the Leader Preparation Program*, HumRRO Technical Report 67-2, March 1967 (1).

able to operate somewhat independently, but it was quite apparent that differences in the type of leadership and supervision in platoons and companies often had effects that exceeded those created by leadership preparation training.

The utility of the selection system, which consisted essentially of BCT Peer Ratings and ACB aptitude scores, was confirmed.

## **Conclusions**

**Leadership Selection.** The candidate for leadership training should be above average on BCT Peer Ratings and on the appropriate Aptitude Area score. Superiors' evaluations should be used to eliminate men who are obvious misfits or to recommend men who are outstanding prospects in the opinions of the cadre despite poor aptitude scores or low Peer Ratings.

**Leadership Training.** The experimental training methods led to better leadership indications on nearly all criteria, with the Leader Preparation Course system exhibiting greatest effectiveness and feasibility among the various experimental and control conditions tested.

**Training Method.** Relatively little criterion difference was found between results from specific training methods (i.e., functional context versus traditional; high cost versus low cost). However, because the time involved in presentation of each different method varied, definitive comparisons could not be made.

# CONTENTS

| Chapter  | Page |
|--|------|
| <b>1 Description of the Study</b> . . . . .                | 3    |
| Background . . . . .                                       | 3    |
| Objectives . . . . .                                       | 4    |
| Approach to and Conduct of the Research . . . . .          | 4    |
| Design . . . . .   | 4    |
| Subjects . . . . .   | 5    |
| Treatments and Controls . . . . .                          | 8    |
| The Experimental Leadership                                |      |
| Training Systems . . . . .                                 | 10   |
| Data Collection Forms and                                  |      |
| Measuring Devices . . . . .                                | 14   |
| Plan of Analyses . . . . .                                 | 16   |
| <b>2 Interim Analyses</b> . . . . .                        | 17   |
| Analyses at the End of Run II . . . . .                    | 17   |
| Leader Behavior Description                                |      |
| Questionnaire (LBDQ) and Leader Activity                   |      |
| Questionnaire (LAQ) . . . . .                              | 17   |
| Study of Predictors . . . . .                              | 17   |
| Input-Output Correlations . . . . .                        | 18   |
| Analyses at the End of Run III . . . . .                   | 19   |
| <b>3 Final Analyses</b> . . . . .                          | 20   |
| Analysis of Criteria . . . . .                             | 20   |
| Analysis of the Leader Behavior Description                |      |
| Questionnaire (LBDQ) . . . . .                             | 20   |
| Analysis of Leader Activity Questionnaire (LAQ) . . . . .  | 21   |
| Analysis of Trainee Attitude Questionnaire (TAQ) . . . . . | 23   |
| Analysis of Squad Attitude Questionnaire (SAQ) . . . . .   | 23   |
| Analysis of the Field Tactical Exercise (FTX) . . . . .    | 24   |
| Selection of Provisional Criterion Measures . . . . .      | 26   |
| Data Pertaining to the Leader . . . . .                    | 27   |
| Data Pertaining to Leader Influence . . . . .              | 28   |
| Data Pertaining to Leader Climate or                       |      |
| Training Environment . . . . .                             | 28   |
| Criterion Reduction . . . . .                              | 28   |
| The 36 Criteria Analysis . . . . .                         | 29   |
| Selection of 21 Representative                             |      |
| (Final Criterion) Measures . . . . .                       | 30   |
| Analyses of Variance of the                                |      |
| 21 Selected Criteria . . . . .                             | 31   |
| Establishing Control Over GT and                           |      |
| Peer Rating Input Variation . . . . .                      | 33   |
| The Platoon Level Analysis . . . . .                       | 33   |



| Chapter  | Page |
|--|------|
| <b>4 Treatment Comparisons</b> . . . . .   | 35   |
| Control Comparisons: Is There a Selection or<br>Experimental-Requirement Effect? . . . . .   | 36   |
| Experimental-Control Comparisons: Is There<br>a Training Effect? . . . . .   | 37   |
| Integrated Training and Preparation<br>School Comparisons: Is There a<br>Difference Between Integrated and Preparation<br>Plus OJT Training? . . . . . | 39   |
| Two-Week Versus Four-Week Preparation School<br>Courses: Does Repetition of Preparation Training<br>Make a Difference? . . . . .                       | 39   |
| Within-Treatment Contrasts. . . . .  | 40   |
| MOS Differences . . . . .  | 40   |
| Are There Cadre Orientation Differences? . . . . .   | 42   |
| Are There Training Methods Differences? . . . . .  | 42   |
| High Cost Versus Low Cost Comparisons . . . . .  | 42   |
| <b>5 Discussion</b> . . . . .  | 44   |
| Selection. . . . .   | 44   |
| Training . . . . .   | 44   |
| Training Method and Cost . . . . .   | 45   |
| Experimental Social Change Effects. . . . .  | 45   |
| Unit Effects. . . . .  | 46   |
| Overview . . . . .   | 47   |
| Literature Cited . . . . .   | 49   |
| Figure   |      |
| 1 Design Factors . . . . .   | 5    |
| 2 Social System Model. . . . .   | 6    |
| 3 Trainee Leader Input Typing . . . . .  | 8    |
| 4 Experimental Design in the 10th Battle Group . . . . .   | 34   |
| Table  |      |
| 1 Summary of Significance Levels for Analyses of Variance<br>Performed on 21 Selected Indices. . . . .   | 32   |
| 2 BCT Peer Ratings and GT Scores . . . . .   | 33   |
| 3 Summary of Treatment Comparisons for 21 Criteria . . . . .   | 35   |
| 4 Dunnett's $t$ Test of C-1 With Each<br>E-0, E-2, E-4 Treatment . . . . .   | 38   |
| 5 A-Tests of Matched Platoon Means<br>of 21 Residual Criteria, by MOS. . . . .   | 41   |

## Appendices

(Published in separate Appendix Supplement)

- A The Human Factors Research Branch (HFRB)  
BCT Peer Rating
- B AIT Leader Preparation Course Lesson Guideline
- C AIT Leader Training Program—AIT Leader Preparation  
Course (E-2 & E-4) Training Schedule
- D AIT Leader Training Course Integrated System (E-0)  
Training Schedule Information
- E AIT Cadre Orientation
- F Task NCO Measures
- G Leader Behavior and Activity Correlations
- H An Interim Study of Predictors
- I Interim Analyses, End of Run III
- J Item Factor Analysis of the LBDQ
- K Item Factor Analysis of the LAQ
- L Item Factor Analysis of the TAQ
- M Item Factor Analysis of the SAQ
- N The Field Tactical Exercise
- O FIRO Analysis
- P NCO Leadership Evaluation Report
- Q The Who Does What Questionnaire
- R Criterion Reduction
- S Factor Analysis of 36 Criteria
- T Correlations Among 21 Residual Score Criteria
- U Analysis of Raw Scores for Two Selectors and 21 Criteria

## Chapter I

### DESCRIPTION OF THE STUDY

#### BACKGROUND

The general objective of Work Unit NCO has been to improve the caliber of noncommissioned officer performance by conducting research designed to establish curricula and techniques for developing NCOs as early as possible in their military careers. To meet this objective, the staff of Work Unit NCO undertook a series of studies designed to produce a leader preparation program, capable of meeting both current and mobilization requirements, which would supply the Army with a reservoir of potential leaders.

In background studies conducted under NCO I (2), the Army's training system for enlisted personnel and its methods for selecting and training NCOs were examined. A detailed job description of NCO leadership functions was prepared on the basis of a review of military and research literature and an extensive interview survey dealing with performance requirements for NCOs in Combat Arms. Foundation work was accomplished during this period for a provisional textbook (3) which later evolved into an official Army publication to serve as a guide for potential noncommissioned officers (USCONARC Pamphlet 350-24).

A series of pilot studies was conducted under NCO II (4), including a longitudinal study to examine feasible methods of assessing performance and leadership potential, and a study of methods for introducing new content or modifying existing content relevant to leadership preparation. Orientation processes and motivation techniques were examined with a view toward creating interest in preparing for and assuming leadership responsibilities. Possibilities for incorporating junior NCO preparation with regular training were explored, and a set of technical and interpersonal skills for leadership preparation training appropriate to the Advanced Individual Training level was determined.

NCO III dealt with field evaluation of leadership training programs and was conducted in two phases. The first was basically developmental, experimenting with three alternative systems for accomplishing leadership preparation training. Training materials and methods, assessment techniques, and devices to support and evaluate each system were developed; general information was obtained regarding operational, training, and assessment problems in each system. It was concluded that a "Short Course System" that presented formal leadership training in a separate course between Basic Combat Training (BCT) and Advanced Individual Training (AIT), followed by practical, on-the-job leadership training in the AIT cycle showed the most value and promise as a leadership training system (5).

In the second phase of NCO III, which is the topic of this report, attention was focused on the further study of the Short Course System of presenting leadership training. In addition, attention was given to another method which had been studied in the first phase, the "Integrated System," in which leadership training and the regular military training (AIT) were presented concurrently.

The second phase of the study was designed to serve simultaneously as a training methods development, information collection, and troop use feasibility test experiment.

## OBJECTIVES

The primary objectives of the second phase of NCO III were:

- (1) To conduct a formal evaluation of the methods developed for each of the leadership preparation systems.
- (2) To complete lesson plans, training materials, and testing devices, and standardize all techniques and methods of selection, training, and assessment for the systems.
- (3) To produce at least one proven "package" for accomplishment of leadership preparation training at the AIT level for both light and heavy weapons infantrymen.
- (4) To report general guidelines for accomplishing leadership preparation training that would be suitable for adaptation to other military occupational specialties (MOSs).

## APPROACH TO AND CONDUCT OF THE RESEARCH

### Design

The general design of this research project involved three experimental groups (E-4, E-2, and E-0) and three control groups (C-1, C-2, and C-3). Five treatments were to be represented in five replications in the context of five AIT companies in a single battle group at Fort Ord, California.<sup>1</sup>

The differences and relationships among the treatment groups are presented in Figure 1. Treatment assignments followed standard form Latin square design, the order of treatments being C-2, C-1, E-0, E-4, and E-2. This sequence afforded some clear-cut comparisons between certain adjacent pairs of treatments. Other, perhaps more efficient designs were beyond the training center's scheduling capacities. Overall changes in the modification of company policies and methods (particularly as they were pertinent to maintaining control over treatment conditions) were progressively increased in number and complexity from C-2 through E-2.

The three experimental groups were alike in that each had some kind of formal leadership training prior to or during the AIT cycle. They differed in the amount of leader preparation course work received prior to AIT: The E-4 group received four weeks of formal leadership training, the E-2 group two weeks, the E-0 group none.

To achieve the stated objectives of the experiment, the following independent variables were chosen for study:

- (1) The level of intellectual aptitude of the leader candidate (as measured by the General Technical (GT) Aptitude Area score of the Army Classification Battery).
- (2) The level of interpersonal skill of the leader candidate (as measured by the BCT peer rating).
- (3) The extent of leader preparation training.

<sup>1</sup>Events following the Berlin Crisis of 1961 forced a termination of the plan at the end of the fourth replication.

- (4) The effects of leader preparation training, comparing the three experimental groups with control groups in which:
  - (a) Trainee leader selection and cadre orientation effects were held constant (C-1).
  - (b) Battle group and "participation" (Hawthorne) effects were held constant (C-2).
  - (c) Comparison with a cross section of contemporary AIT companies (C-3) was possible.
- (5) The level of training provided the platoon level cadre, measuring the effects of a short (7 to 8 hours) versus a long (35 to 40 hours) orientation course presented to platoon leaders and platoon sergeants in all groups except C-2 and C-3.
- (6) A comparison of training methods, comparing a "functional context" and a "traditional" approach to leadership training.
- (7) A comparison of instructor support requirements of leadership training.
- (8) Effects of MOS differences.
- (9) Effects of training companies and their subordinate platoons on the performance of:
  - (a) Squads considered as units.
  - (b) Squad leaders and their followers.

#### Design Factors

| Group | Treatment Factors |                   |              |                            |                                 | Assignment of Components to Treatments, by Run |              |               |              |             |
|-------|-------------------|-------------------|--------------|----------------------------|---------------------------------|--|--------------|---------------|--------------|-------------|
|       | Selected Leaders  | Trained AIT Cadre | LPC Training | Leadership Training in AIT | Knew They Were in an Experiment | Run I (Jan)                                    | Run II (Mar) | Run III (May) | Run IV (Aug) | Run V (Oct) |
| E-4   | A&P               | ½                 | 4 wks        | OJT                        | Yes                             | Co. B  | Co. D        | Hq Co.        | Co. C        | Co. A       |
| E-2   | A&P               | ½                 | 2 wks        | OJT                        | Yes                             | Co. A  | Co. B        | Co. D         | Hq Co.       | Co. C       |
| E-0   | A&P               | ½                 | None         | All                        | Yes                             | Co. D  | Hq Co.       | Co. C         | Co. A        | Co. B       |
| C-1   | A&P               | ½                 | None         | None                       | Yes                             | Hq Co.   | Co. C        | Co. A         | Co. B        | Co. D       |
| C-2   | Any               | None              | None         | None                       | Yes                             | Co. C  | Co. A        | Co. B         | Co. D        | Hq Co.      |
| C-3   | Any               | None              | None         | None                       | No                              | AITs in nine other Battle Groups               |              |               |              |             |

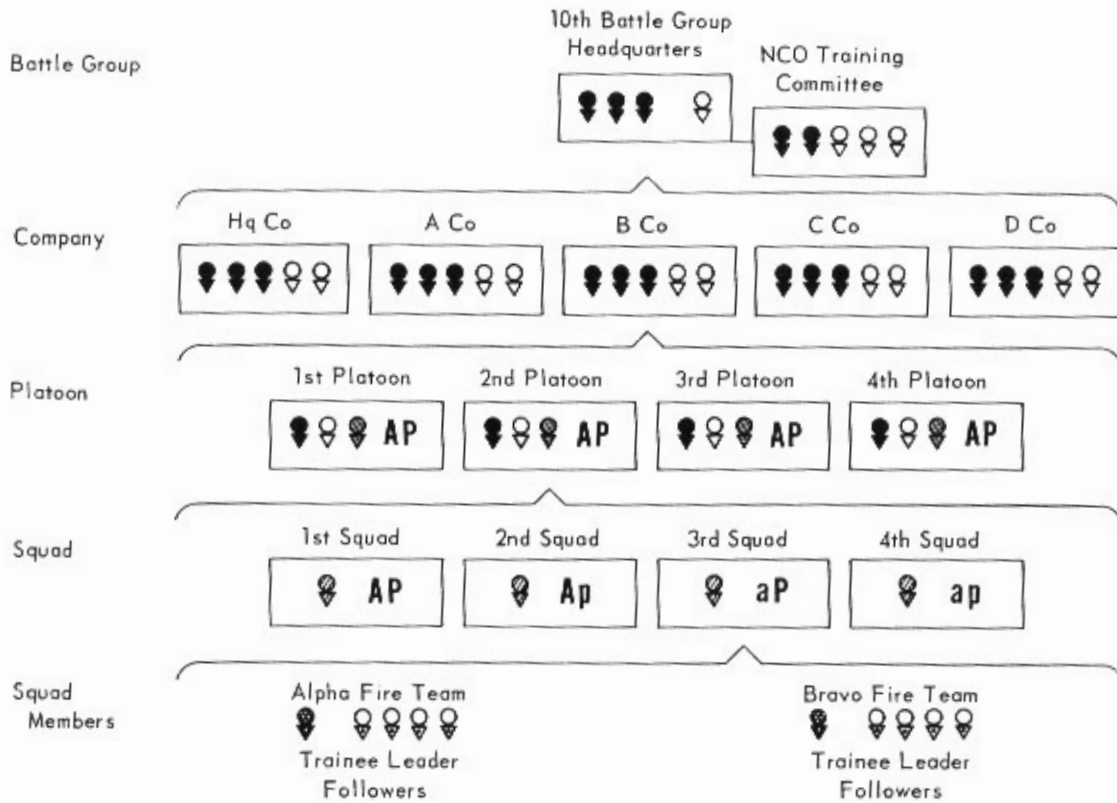
NOTE: A&P, General Technical Aptitude Area Score and BCT Peer Rating; OJT, On-the-Job Training.

Figure 1

#### Subjects

The subject population under direct study consisted of those persons considered as potential leaders who might become available for leadership preparation training in the AIT phase for the light or heavy weapons infantryman

# Social System Model



| UNIT  | Member Symbol | Sub Unit Per Unit | Men Per Unit | Number Per Replication | Total Number Cases                |
|---|---------------|-------------------|--------------|------------------------|-----------------------------------|
| Battle Group  |               | 1                 |              | 1                      | 1                                 |
| Company<br>Officers<br>Cadre NCOs                           |               | 5                 |              | 5                      | 5                                 |
| Platoon<br>Officers<br>Cadre Plt Sgts<br>Trainee Plt Sgts   |               | 4                 | 1<br>1<br>1  | 20<br>20<br>20<br>20   | 20-100<br>20-100<br>20-100<br>100 |
| Squad<br>Trainee Sqd Ldr<br>Fire Team Ldrs<br>Squad Members |               | 4                 | 1<br>2<br>8* | 80<br>160<br>640*      | 400<br>800<br>3,200*              |

NOTE: Approximate figures are marked with an asterisk.

Figure 2

MOSs in the Replacement Stream Input (RSI).<sup>1</sup> The social system structure within the battle group is diagrammed in Figure 2. As is noted in this figure, the design anticipated study of approximately 400 leaders and 4,000 followers within the 10th Battle Group.

Selection Factors. Previous Work Unit NCO research had defined three general factors that accounted for the major sources of covariance among a large number of personnel assessment measures. These factors were Aptitude (as defined by the General Technical Aptitude Area score), Superiors' Ratings of squad leader potential, and Peers' Ratings of squad leader potential. During the phase of NCO III reported here, the U.S. Army Personnel Research Office (USAPRO)<sup>2</sup> was conducting research in coordination with HumRRO NCO research, using the same population. USAPRO research purposes favored selecting subjects by use of a single, composite aptitude score that would not have been effective for HumRRO purposes. An intermediate solution was reached by means of eliminating the superiors' ratings from the selection scheme and by adopting the HFRB peer rating scale for selection in the NCO III experiment.<sup>3</sup>

Definition of Base Population. The bivariate aptitude-peer rating selection scheme permitted assignment of four "types" of squad leaders in equal numbers. These types were defined as:

- AP High  $\frac{1}{3}$  on both aptitude and peer rating.
- Ap High  $\frac{1}{3}$  on aptitude; middle  $\frac{1}{3}$  on peer rating.
- aP Middle  $\frac{1}{3}$  on aptitude; high  $\frac{1}{3}$  on peer rating.
- ap Middle  $\frac{1}{3}$  on both aptitude and peer rating.

The lower limits for the two variables for selection were set at the bottom third: a GT score of 90 and a BCT peer rating score with a cut-off between 2.8 and 2.9 (empirically established as the point at which approximately one-third of the population is excluded). For the remaining trainees, the separations between high and middle levels were established at the median for each variable (GT = 108; peer rating = 3.9). Figure 3 contains a graphic representation of the base population from which the trainee squad leaders were selected for the experiment.

Since each of the AIT companies was divided into two platoons in each of the Light and Heavy Weapons Infantryman MOSs, the leader requirement to be met in each company (except C-2 or C-3 controls) was:

Four Trainee Assistant Platoon Sergeants (TAPS) (two in each MOS, and restricted to the AP leader type to maintain consistent, high-quality leadership in this position).

Sixteen Trainee Squad Leaders (SL) (two in each MOS in each of the four leader types AP, Ap, aP, and ap).

To allow for replacement due to attrition, substitute leaders (called "runners") were trained along with the TAPS and SLs. Two runners were selected for each MOS—one of high aptitude and one of middle aptitude, both near the high-middle peer rating dividing score.

<sup>1</sup>Since Reserve Forces Act trainees (RFAs, now REPs) were available for active duty for only six months, they were not included in this experiment because of problems with regard to follow-up and differences in motivation and in other subject characteristics. The RFA trainees had been studied in previous research (6, 7) in terms of eventual implementation.

<sup>2</sup>At the time of this experiment, the agency was known as Human Factors Research Branch (HFRB).

<sup>3</sup>The HFRB scale for BCT Peer Ratings is presented in Appendix A in the *Appendix Supplement* to this Technical Report. The Supplement is published as a separate volume containing the majority of the statistical analysis tables and related descriptions. Descriptions of instruments, sample forms, and summaries of several auxiliary studies have also been presented as appendices in the Supplement. The appendix volume will be made available for detailed technical study purposes through deposit in Defense Documentation Center and in HumRRO and depository libraries.

## Trainee Leader Input Typing

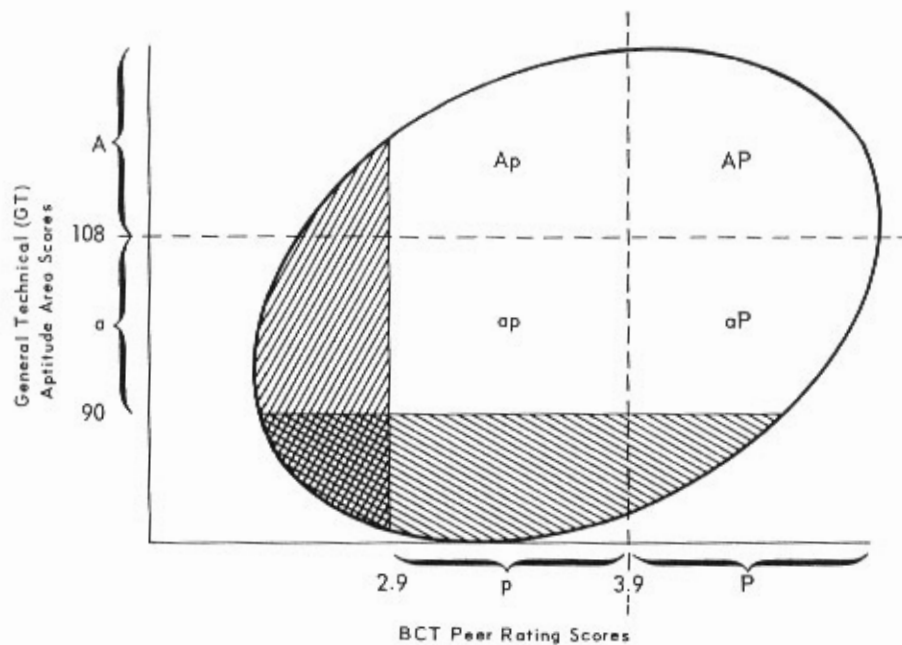


Figure 3

Assignment of Selected Leaders. Random procedures were used whenever possible in assignment of the selected leaders to platoon, squad, treatment conditions, training method, and so forth. One trainee squad leader of each leader type was assigned to lead each of the four squads in a platoon.

No attempt was made to control assignment of followers within squads and platoons.

### Treatments and Controls

Sequence of Treatments. Operational factors, including scheduling of NCO Academy classes—since the Leader Preparation Course (LPC) was to be conducted at the NCO Academy facility—and scheduling of AIT companies, had to be taken into account in accepting the fixed order of treatments (see Figure 1). In this order, a company progressed, according to its point of entry,

- (1) From treatment C-2 where the company operated normally,
- (2) To treatment C-1 where the company was constrained regarding selection and replacement of trainee leaders and where half of its cadre platoon leaders and platoon sergeants received special leadership NCO training while the other half received a much shorter orientation,
- (3) To treatment E-0 where the company was faced with the requirements of accomplishing both formal and on-the-job leadership training of its trainee leaders, in addition to fulfilling the regular AIT training requirements,
- (4) To treatment E-4 where the company received a group of trainee leader candidates who had received four weeks of AIT leader preparation training at the LPC,



- (5) To treatment E-2 where the company received a group of trainee leader candidates who had received two weeks of leader preparation training at the LPC which was identical to the four-week course in content, but not in duration.

When possible, a one-week break was scheduled before each C-2 and E-0 cycle to allow time to train and orient key personnel in the company at these times when some of the most radical changes in operation were made. The cost of changing platoon-level cadre at the end of every cycle was prohibitive; however, those cadre who were most directly in contact with the trainee leaders were removed at the completion of E-2 so that relatively uncontaminated data could be obtained in subsequent C-2 treatments.

Approaches to Leader Preparation Training. Within the primary study of training systems, the experiment was extended to consider alternative approaches to the formal leader preparation training conducted in the Leader Preparation Course, and a comparison was made between a "traditional" and a "functional context" concept of training. While a large part of leadership training in military settings followed a traditional classroom approach, the functional context approach had been explored by the Work Unit NCO staff in the Short Course System study in earlier work of NCO III. The possible differences between the products of these two approaches could be assessed in this phase of NCO III by continued review throughout the eight-week AIT cycle when the trainee leader was required to serve in a real leadership position.

(1) The "Traditional" Approach. The Work Unit NCO traditional approach to training started with simple fundamentals, teaching the basic ideas, concepts, and skills. From this beginning, components were integrated over a period of time into larger and larger, more complex behaviors. When the trainee had acquired the necessary understanding and knowledges, he was given practical, applied, field instruction in simple general situations, first related to past knowledges and skills, then applied to simple contexts more closely related to eventual use. The formal (F) and practical (P) components were generally sequenced as:

F1 - F2 - F3 - F4 → P1 - P2 - P3 - P4 → Final integrated performance  
OR  
F1 - P1 → F2 - P2 → F3 - P3 → F4 - P4 → Final integrated performance

This approach required considerable attention to techniques for maintaining trainee motivation and interest during the early, formal stages, since there is a high level of abstraction in the training in order to achieve generality. Continual efforts had to be made to bring meaning to the situation and to keep the trainee active. Every effort was made to supply feedback and to reinforce appropriate behavior. Active learning (participation, recitation, problem solving, etc.) was stressed, but the focus was on mastery of fundamental ideas and principles. Since most of the formal training was accomplished in a setting removed from later job environment, the approach was carefully planned to facilitate the transition from school to job. The traditional approach was kept as far removed from the functional context approach as possible, except for some instances where there were unavoidably shared elements or where it became clear that undue artificiality would be imposed on either program.

(2) The "Functional Context" Approach. In contrast to the traditional approach, the functional context approach to the leadership training stressed the practical, "everyday" aspects of a job. Theories and concepts were presented only when clearly applicable to the immediate tasks, and then in the task or problem context, rather than as classroom abstractions. The trainee was introduced to a series of tasks that required him to increase his knowledge of

principles and concepts, to acquire new skills, and to improve existing skills. The instruction was presented in the same sequence of stages or phases that would be encountered by a squad leader in the leadership task context.

Considerable use was also made of the problem-instruction-application technique, a modified version of the "Muddling-modeling" method studied in the Short Course System of the first phase of NCO III. In this technique, the trainee was confronted with an experience designed to provide him with immediate, specific knowledge or information regarding his understanding or skill in dealing with particular leadership situations. This was followed by a block of instruction designed to teach specific skills and knowledges chosen in terms of their relevance to AIT squad leaders' training needs, their appropriateness to the specific tasks, and their relation to one another. This instructional phase (sometimes labelled "critique" in the program of instruction) was followed by a performance application phase in which the trainee could compare his pre- and post-training performances in dealing with the same type of task. In this method of training, the trainee can understand clearly where he has made progress, why the instruction is relevant to his needs, and how the concepts, techniques, and methods are to be applied.

(3) Comparison of Training Methods Support Costs. In addition to comparisons between the medium-cost traditional and functional context training approaches, comparisons were to be made during two of the five experimental runs on a high-cost and a low-cost basis. The training in each of these high- and low-cost programs was a mixture of the best of the traditional and functional context approaches.

The low-cost program depended heavily on use of training films, sand tables, self-study of programmed workbooks, miniaturized tactical walks, and other economies. The high-cost program employed a more favorable instructor-student ratio and emphasized individualized training, counseling, and feedback. By these methods, the effects of economizing on training and the advantages of individualizing the leadership training effort could be compared with the strictly traditional or functional context approaches to provide, roughly, a three-level estimate of support cost.

Preparation of Lesson Guidelines. In the experimental leadership training systems and in the AIT cadre orientation courses, the Work Unit NCO staff prepared lesson guidelines for every subject listed in the programs of instruction. These guidelines gave the name of the subject and its code identification, the purpose of the subject, a series of specific statements regarding skills or knowledges the trainee leader must learn to stated levels of proficiency, information regarding time allotted, when to schedule the subject, the training area, and comments on training methods and restrictions.<sup>1</sup>

From these guidelines, instructors developed their own lesson plan outlines. The instructor's outline was reviewed for content by the staff of Work Unit NCO, and each instructor presented at least one rehearsal of a subject before teaching a class. Quality of classroom and on-the-job instruction was monitored in all experimental treatment settings by the Work Unit NCO staff members and by NCO Academy personnel or Battle Group headquarters staff.

### The Experimental Leadership Training Systems

The preliminary study of alternative leadership training systems conducted in the first phase of NCO III had determined that, overall, presentation of formal

<sup>1</sup>A sample lesson guideline is presented in Appendix B in the Supplement.

leadership training in a separate course between BCT and AIT, followed by practical, on-the-job leadership training in the AIT cycle, showed the most value and promise as a leadership training system. This Short Course System was the object of primary interest in the field evaluation conducted during the second phase of NCO III.

The second alternative system studied had been defined (in terms of cost-gain factors) as intermediate in desirability, based on the results of the preliminary study undertaken in the first phase. In this Integrated System, all formal leadership training was presented during the trainee leader's regular AIT cycle, so that the trainee leader had the three concurrent requirements of assimilating formal leadership training, on-the-job leadership training (including practical applications), and the standard Army Training Program subject matter.

The conceptual scheme for training for and measuring leadership in each of these systems was based on a matrix in which rows of defined leadership functions were related to columns representing situational contexts. For example, the functions of directing performance on a specified task were analyzed in terms of preparation (determining requirements, planning, coordinating, and organizing men and materials), execution (initiating action and supervising), and motivation (setting standards, encouraging, rewarding, correcting, etc.). In this study, each of the task contexts (matrix cells) was first examined in terms of its functional requirements. Then estimates were made of the distribution of competence of BCT graduates who would enter the leadership training program, and also of the reasonable level of competence expected of leader candidates at the end of AIT. On the basis of this detailed analysis of training needs, a plan for allocation of training effort was derived.

Following the development of these specific statements of training needs, the general objectives for the experimental leadership training systems were set forth as follows:

- (1) To provide an AIT orientation. What does Advanced Individual Training include, what happens in AIT, what is the acting squad leader called on to do?
- (2) To familiarize candidates with selected AIT subjects (weapons, tactics, general subjects).
- (3) To provide experience with and understanding of simple leadership skills and knowledges (through classroom, garrison, and field training contexts).
- (4) To develop these simple, general interpersonal, and supervisory skills (through practice in garrison and field contexts).
- (5) To provide the candidates with sufficiently high standards of behavior and appearance to meet AIT cadre expectations and to provide acceptable examples for their followers.
- (6) To provide candidates with techniques and opportunities to learn how to learn.
- (7) To meet all AIT Army Training Program requirements for the MOS at acceptable levels.
- (8) To provide additional formal and OJT type training in both technical and supervisory skills and knowledges.
- (9) To provide practical experience in leadership positions.

Details of the adaptations of these two leadership training systems for the formal field evaluation in NCO III are presented here.

The Short Course System: Design of the Leader Preparation Course (Treatments E-2 and E-4). A training schedule and program of instruction

for the leader preparation courses were prepared.<sup>1</sup> The Work Unit NCO staff designed the two-week program to provide an optimal, comprehensive presentation of required subjects. Both the E-2 and E-4 treatment groups were treated as a single class for the first two weeks of the LPC. Following this, the E-2 group progressed to its AIT phase while the E-4 group remained in the LPC to repeat the two-week schedule. Although motivational elements (such as constructive variations in presentation) were introduced in the training and practice during the third and fourth weeks for the E-4 group, the work was carefully controlled to prevent introduction of new content.<sup>2</sup>

On Runs I and II, one-half of each treatment group received leadership training presented from the traditional approach, while the other half was trained from the functional context approach. On Run III the contrast was between high- and low-cost techniques. Inability to obtain a sufficient number of trainees prevented a replication of the high-low cost contrast for Run IV, which was "mixed," but primarily a traditional program.

An Observer System used in all runs was a variation of the Buddy System pilot-studied in the first phase of NCO III. In the Observer System, leaders were rotated daily, and three men in each squad were assigned to observe the performance of their leader throughout the following day. At the end of their observer tours, the observers independently completed a checklist; the observer who had served as squad leader the preceding day then prepared and delivered a critique of the performance of the observed squad leader.

Supervised study sessions were scheduled in all runs to provide the trainee leaders with a time and place to study and with a cadre resource person. Specific study assignments were made during the training day, and quizzes or work sheets were used to check on the students' work.

The Short Course System: The AIT Applicatory Phase. Following the Leader Preparation Course, the E-2 or E-4 group proceeded to an AIT company in the 10th Battle Group at Fort Ord, where their leadership training was continued in an on-the-job setting while they served as trainee squad leaders (SL), trainee assistant platoon sergeants (TAPS), or as "runners" (in the case of substitute leaders).

Responsibility for the leadership training in AIT was shifted to the company cadre—particularly to the platoon sergeants and platoon leaders, and to a Leadership Training Committee. Because of previous findings regarding the critical importance of adequate orientation and preparation of cadremen for their roles as leadership instructors in AIT, special cadre orientation courses were devised. Details of these courses are presented on page 13.

The Integrated System (Treatment E-0). The objectives for the Integrated System training were the same as those stated for the LPC and AIT phases of the Short Course System. The major difference, of course, was that in the Integrated System, all of the objectives had to be met in the eight weeks of the AIT cycle and within the context of the current Army Training Program.<sup>3</sup>

The training approach in the Integrated System was a combination of the traditional and the functional context treatments. No comparison of training methods was attempted within the E-0 treatment; efforts were directed, instead,

<sup>1</sup>The training schedule and POI for the two-week LPC (Treatment E-2) and the four-week LPC (Treatment E-4) are presented in Appendix C in the Supplement.

<sup>2</sup>The simple repetition of the basic two-week POI for the E-4 treatment was undoubtedly not the most effective plan, but it was not feasible to design and control conduct of separate two- and four-week POIs with the limited training resources available.

<sup>3</sup>The training schedule and POI are presented in Appendix D in the Supplement.

to the development of the best possible system and to the collection of cost-gain information for the system's operation. A firm schedule of training could not be established for the E-0 treatment, but the sequence of instruction generally followed the outline of the POI. Supervised study sessions, the Observer System, and review and preview sessions were utilized throughout the AIT cycle. On-the-job training was planned and administered throughout the cycle, with special emphasis placed on field tactical work. In the final week of the AIT cycle, which is in general devoted to remedial training and outprocessing procedures, the on-the-job leadership training was focused on platoon and squad management.

The AIT Cadre Orientation Courses. Throughout previous research in Work Unit NCO, evidence of the influence of AIT company cadre on the success or disruption of leadership training efforts had been encountered repeatedly. Because company cadre had found it difficult to adapt to new responsibilities involved in supervising and guiding trainee leaders, a specific Leadership NCO role had been created and utilized in previous leadership training studies. By the time the second phase of NCO III was undertaken, it had become apparent to the Work Unit staff that supervisory requirements were not inconsistent with the duties and responsibilities that a regular platoon level sergeant could and should perform. The problem was to get company cadre to recognize, understand, and perform them.

On one hand, use of the platoon sergeant as a trainee leader-supervisor was seen as a way of eliminating the problems of duality of command and divided allegiance of trainee leaders that had been encountered when a special "Leadership NCO" had been employed. On the other hand, existing structure of the social system within a training company and the ability of the platoon sergeant to perform effectively in the role relationship of supervisor to the trainee leaders were recognized as valid problems. In answer to the first problem, some changes within the company had to be made to facilitate incorporation of a "Leadership NCO" role into the realm of platoon sergeant role requirements. To examine the second problem, two cadre orientation courses were designed with the purpose of providing motivation, information, and understanding of the leadership training program and the responsibility the platoon sergeant has in its successful accomplishment. The experimental question was: Would an intensive week of instruction and discussion produce significant results?

A short orientation course of seven training hours and two assessment hours was conducted on the Monday prior to the beginning of the first AIT cycle for all platoon level cadre (commissioned and noncommissioned officers) in treatment groups E-0, E-2, E-4, and C-1. Company cadre beginning in the C-2 treatment did not receive any form of orientation regarding the leadership training program; however, orientations were scheduled after each company completed C-2, just prior to C-1.

Immediately following the short orientation course, one-half of the attending cadre (those from one platoon each of light and heavy weapons infantry) were randomly selected to remain for an extended orientation course, conducted from Tuesday through Friday of the same week. For those long orientation courses scheduled between C-2 and C-1 treatments, subject matter specific to experimental leadership training treatments (E-2, E-4, or E-0) were deleted from the schedule and then presented during the break between C-1 and E-0 treatment cycles. Both orientation courses were directly controlled and conducted by the staff of Work Unit NCO.<sup>1</sup>

<sup>1</sup>The training schedules and Programs of Instruction for the two AIT Cadre Orientation Courses are presented in Appendix E in the Supplement.

## Data Collection Forms and Measuring Devices

One of the major problems in leadership training research is that there is no simple, agreed-upon criterion or set of criteria by which a training outcome may be judged. The basic question—"What does the potential squad leader need to know and do in order to be effective?"—encompassed both the technical and the interpersonal aspects of the leader's job. Previous studies had not shown any singular comprehensive pattern of traits, behaviors, or functions by which effective leadership performance could be defined. Since generalizations were not adequate for evaluating specific elements within a reasonably comprehensive training program, a multiple criterion approach appeared to be required. Each of the output dimensions examined in connection with the NCO III experiment was chosen from several alternatives because of its relevance to some particular aspect of the study.

It was also recognized that it would be important to obtain information from more than one source and at more than one position level if a comprehensive assessment was to be accomplished. Moreover, it was felt that the trainee leader's superiors and subordinates should be included in the assessment plan, since it is a reasonably well-established concept that the leadership exercised by a particular role incumbent at one position is influenced by the much larger operational context within which the leader must perform his functions.

With these requirements in mind, the program of assessment was defined to include collection of:

- (1) Data pertaining to the leader.
- (2) Data pertaining to leader influence.
- (3) Data pertaining to leader climate or training environment.
- (4) Data pertaining to attitudes toward the training program.

Data collection forms and instruments in each of these four categories are listed below.<sup>1</sup>

Data Pertaining to the Leader: Biographical Information. From each man's Enlisted Qualification Record (Form 20), the following biographical information was drawn to be associated with other measures for relevance to selection, training, or assessment:

- (1) Age
- (2) Education
- (3) Army Classification Battery and Aptitude Area scores
- (4) Prior military experience (including leadership experience in BCT)
- (5) Army component and enlistment data (including duration and voluntary commitments)
- (6) Physical status

Data Pertaining to the Leader: Pre-Program Test Battery. This battery of nine tests was administered at the beginning of the LPC for the E-2 and E-4 treatment groups and early in the first week of AIT for the E-0, C-1, and C-2 treatment groups. No data were collected for C-3 groups. Six of the tests (those identified with PT number) were administered in support of the U.S. Army Personnel Research Office NCO Leader Task, in which their potential value for leader selection was being studied. The remaining three tests were used to obtain motivation and morale information.<sup>2</sup> These were the tests:

- (1) Squad Relations Test (PT 4032)
- (2) Leader Characteristics Inventory (PT 4011)

<sup>1</sup>Descriptions or copies of the forms are contained in Appendix F in the Supplement.

<sup>2</sup>These tests are described in Appendix F in the Supplement.

- (3) Following Directions Test (PT 4030)
- (4) Situational Judgment Test (PT 4036)
- (5) Locations Test (PT 4027)
- (6) Military Information Test (PT 4040)
- (7) Fundamental Interpersonal Relations Orientation-Behavior (FIRO-B) Test
- (8) Multiple-Choice Picture Test (TAT)
- (9) Trainee Attitude Questionnaire (Ldr Pre TAQ)

Data Pertaining to the Leader: Global Assessment of Leadership Aptitude. Ratings by peers and superiors in BCT were obtained by a rank-rating technique that employed a seven-point scale (7 = Best). Ratings obtained during LPC and at the end of AIT employed a similar technique and scale (1 = Best). The ratings were:

- (1) BCT Peer Ratings
- (2) BCT Superiors Ratings
- (3) LPC Peer Ratings (two-week and four-week)
- (4) LPC Superiors Ratings (two-week and four-week)
- (5) AIT Followers Ratings
- (6) AIT Peer Ratings (fellow leaders)
- (7) AIT Superiors Ratings

Data Pertaining to the Leader: Behavior. Specific reports were collected on trainee squad leader and trainee assistant platoon sergeant behavior (these reports were completed by cadre, peers, or followers):

- (1) Checklist for Observer
- (2) Observer Report Form
- (3) Cadre Report on Trainee Leaders (LPC)
- (4) Cadre Report: End of AIT
- (5) Leader Activity Questionnaire (LAQ)
- (6) Leader Behavior Description Questionnaire (LBDQ)
- (7) Leadership Evaluation Report (LER)
- (8) Who Does What Questionnaire

Data Pertaining to the Leader: Proficiency and Knowledge Measures

- (1) End-of-AIT-Cycle Graded Proficiency Test (Ldr AIT Test)
- (2) Field Tactical Exercise (FTX)
- (3) Leadership Principles Test (LPT)

In addition, there were regularly scheduled quizzes in the leader preparation training and short tests of specific military occupational specialty knowledge administered periodically in AIT.

Data Pertaining to the Leader: Attitude

- (1) Trainee Attitude Questionnaire (Ldr Post TAQ) This instrument is identical in form to the Ldr Pre TAQ and Follower TAQ

Data Pertaining to Leader Influence: Effect on Follower Proficiency

- (1) End of AIT Graded Proficiency Test (Foll. AIT Test)
- (2) Weapons Qualifications Test
- (3) Weapons Information Test (WIT)

Data Pertaining to Leader Influence: Follower Evaluations of and Opinions of Trainee Leaders. In addition to the information supplied by the Who Does What Questionnaire and the Observer Reports in AIT, three opinion instruments were administered to gauge, respectively, follower morale, esprit of squads, and esprit of platoons:

- (1) Trainee Attitude Questionnaire (Foll. TAQ)
- (2) Squad Attitude Questionnaire (SAQ)
- (3) Platoon Attitude Questionnaire (PAQ)

### Data Pertaining to Leader Climate or Training Environment

- (1) Cadre Questionnaire
- (2) Cadre Military Information Test
- (3) Cadre Leadership Principles Test
- (4) Leader Behavior Description Questionnaire (Cadre LBDQ)  
(the Cadre LBDQ was completed by trainee leaders and by a random sample of platoon followers)
- (5) Leadership Climate Categories (derived from qualitative reports)
- (6) Company SOP Questionnaire

The substantial data obtained in the leadership climate area are treated in a separate report (8).

Training Program Information. Three standardized critique sheets were used:

- (1) Leader Candidate Critique Sheet
- (2) Critique Sheet for NCO Academy Cadre
- (3) Trainee Leader Critique Sheet: Post AIT

### Plan of Analyses

The following general plan was outlined:

(1) Intermediate Analyses. Several analyses, as necessary, were planned to provide guidance in decision making while the experiment was in progress, and to provide feedback to participants and to U.S. Continental Army Command.

(2) Final Analyses

(a) Analyses of Criteria. Several of the questionnaires and tests had to be keyed, and information was needed regarding empirical interrelations, in order to reduce the number of criteria to be examined in the specific, intensive analyses.

(b) Specific, Intensive Analyses

- 1) Input variables
- 2) Time trends
- 3) Organizational effects: company and platoon
- 4) MOS differences
- 5) Situational factors
  - a) Leadership climate
  - b) Follower response and demands (technical, social, morale, and esprit)
- 6) Treatments
  - a) Controls—C-1 versus C-2 (selection and cadre training)
  - b) Experimental—E-0, E-2, and E-4 (also methods; level of effort and cost)

(3) Follow-up Analyses. USAPRO assumed the responsibility for obtaining follow-up ratings and other information provided by superiors relative to leadership performance and potential.



## Chapter 2

### INTERIM ANALYSES

#### ANALYSES AT THE END OF RUN II

##### Leader Behavior Description Questionnaire (LBDQ) and Leader Activity Questionnaire (LAQ)

The LBDQ and LAQ scales were examined for mean differences among the following groups:

- (1) Leader Input Types: AP, Ap, aP, ap
- (2) Treatments: E-4, E-2, E-0, C-1, C-2
- (3) Companies: A, B, C, D, Hq
- (4) Military Occupational Specialties: Light Weapons Infantryman (LWI), Heavy Weapons Infantryman (HWI)

Among the leader types, differences were found only between the aP (moderate aptitude, high peer rating) and ap (moderate aptitude, moderate peer rating) groups which indicated that the former were more frequent in giving information, initiating structure, and showing consideration.

Among treatments, the E-4 leaders were significantly ( $p < .05$ ) more frequent than the C-1 in giving information, initiating structure, showing consideration, correcting and rewarding, supervising, emphasizing production, defining, rewarding, and using team leaders.

Several differences were found between companies, but since these differences were confounded with treatments, rigorous testing of company differences was deferred until treatments were better balanced. No substantial differences were found between the light weapons and heavy weapons infantry groups.

In addition, the intercorrelations among the ten scales of the LBDQ and the eight scales of the LAQ were studied. They showed that all LBDQ scales were highly intercorrelated; the eight LAQ scales were less interrelated.<sup>1</sup> Correlations between the LBDQ and LAQ, which were answered by separate halves of each squad, were substantially smaller.

##### Study of Predictors

Near the middle of 1961, events following the Berlin Crisis made it apparent that a partial mobilization might be imminent. If mobilization occurred, a leader preparation program would probably need to be implemented (since the Work Unit was based on a mobilization requirement) and selection of candidates would be an important element. BCT Peer and Superiors Ratings and GT Aptitude scores had been examined, but there were three other measures that might be of value: age, education, and the Classification Inventory (CI) score. It would seem that the older or better-educated enlisted man might be a more

<sup>1</sup>These results are more fully described in Appendix G of the Supplement.

effective leader. The Classification Inventory (a "fighter" personality and interest test) would undoubtedly appear in the infantry selection composite.<sup>1</sup> All six of these potential selection measures were intercorrelated with a selected set of nine output or criterion measures.<sup>2</sup>

The value of age and education as predictors was not impressive. In general, there seemed to be little value in selecting on either measure. The Classification Inventory, however, was significantly correlated with Peer Ratings and Followers Ratings and with field leadership performance.

Computation of multiple correlations between the six input measures and each of the nine output measures indicated that the BCT Peer Rating alone was almost as effective as all six measures in predicting AIT Peer Ratings, AIT Superiors Ratings, and AIT Followers Ratings. The other six criteria do profit by use of multiple predictors. The CI, along with BCT Peer Ratings, BCT Superiors Ratings, and GT Aptitude Area scores, is effective in predicting Field Tactical Exercise (FTX) leadership performance. The followers' MOS proficiency is predicted best by leaders' GT aptitude, with both CI score and education negatively weighted. Squad esprit (SAQ) is not very effectively predicted, but high esprit appears to be primarily a function of higher GT aptitude and lower education. The remaining three criteria—initiating structure, showing consideration, and squad morale (TAQ)—all show high beta weights for BCT Peer Ratings, with the other highest beta weight being GT Aptitude Area score for initiating structure, low BCT Superiors Ratings for showing consideration, and low education for squad morale.

#### Input-Output Correlations

Three input and 12 output measures were also intercorrelated, again using the data accumulated at the end of Run II. Of the three predictors, the BCT Peer Ratings were shown to be better than either GT Aptitude scores or BCT Superiors Ratings. None of the predictors showed significant relations with the several morale (TAQ) and the esprit (SAQ) measures. There were a number of significant relations among the output measures; however, few of them were high.<sup>3</sup>

The results of these three interim analyses were generally encouraging. Differences between leader types and treatment groups as well as between companies were in evidence for several of the leader behavior and activity scales. Study of the correlation among the scales had shown the LBDQ to be more highly intercorrelated than the LAQ. Correlations between the two measures were surprisingly low, but the significant results were generally reasonable. Correlations among three input and 12 output measures confirmed the value of the BCT Peer Ratings in preference to either GT Aptitude scores or Superiors Ratings in predicting the output measures. Although a number of significant relations were found among the output measures, the magnitude of the output measure intercorrelations was sufficiently low to suggest that several factors would be represented in the criterion set.

<sup>1</sup>In the event of a mobilization implementation, a leader preparation program would probably be designed for several combat specialties and a differential selection technique would be desirable. The CI, along with the Verbal Test, formed the Infantry Aptitude Area composite score, and thus was of special interest for selection of infantry leaders.

<sup>2</sup>Detailed results of this analysis are reported in Appendix H in the Supplement.

<sup>3</sup>These correlations are reported in Appendix H.

## ANALYSES AT THE END OF RUN III

The results of the correlations for the Leader Behavior Description Questionnaire and the Leader Activity Questionnaire measures (LBDQ and LAQ) had been disappointing due to the high correlations obtained. At the end of Run III, the accumulated data were reanalyzed, but this time four separate correlation matrices were computed:

- (1) Squad Leaders in Experimental Treatments (E-4, E-2, E-0)
- (2) Squad Leaders in Control Treatments (C-1, C-2)
- (3) Trainee Assistant Platoon Sergeants in Experimental Treatments
- (4) Trainee Assistant Platoon Sergeants in Control Treatments

The focus of this analysis was on "leadership style" as indexed by the LBDQ and LAQ; however, three input measures, several other criterion measures, and three LBDQ descriptions of the cadre platoon sergeant were included in the analysis.<sup>1</sup>

Among the more important findings, the following are noted:

- (1) The hope of showing lower correlations among the several LBDQ scales when experimental and control treatments and leader positions were separated was not fulfilled. The average of the LAQ scale intercorrelations was substantially lower than those for the LBDQ.
- (2) Intercorrelations between the two instruments showed some scales to be completely devoid of significant relations, while others were consistently significant.
- (3) Within the separated treatments, the correlations between the two selection measures (BCT Peer Ratings and GT Aptitude) were substantially lower for the squad leaders than in earlier analysis of mixed data. A reason for the earlier results was suggested by the fact that the correlations between ratings and aptitude were markedly high for both experimental and control trainee assistant platoon sergeants. It was also noted that the distribution of GT Aptitude Area scores among the control squad leaders was markedly wider than for the experimental group.

Study of the BCT Superiors Ratings shows that:

- (1) The experimental squad leaders received significantly lower ratings than the control squad leaders.
- (2) Superiors Ratings and Peer Ratings correlations were consistently of moderate magnitude for the groups.
- (3) The Superiors Ratings and GT Aptitude Area scores were uncorrelated for the experimental and control squad leaders, but achieved significant correlation ( $p < .05$ ) for experimental trainee assistant platoon sergeants.

<sup>1</sup>The results of these analyses are reported in Appendix I.

## Chapter 3

### FINAL ANALYSES

#### ANALYSIS OF CRITERIA

Several different kinds of analysis were undertaken to provide a clearer idea of the criterion and collateral information obtained in the study. Because of the large amount of information involved, it was planned to:

- (1) Conduct internal analyses of the Leader Behavior Description Questionnaire (LBDQ), Leader Activity Questionnaire (LAQ), Trainee Attitude Questionnaire (TAQ), Squad Attitude Questionnaire (SAQ), and Field Tactical Exercise (FTX) in order to determine how many different scales could be usefully established for each instrument, then to
- (2) Correlate and factor analyze selected measures to find a minimum representative set, which would be used as the "dependent" or criterion measures in the analysis of company and platoon differences, MOS differences, situational factors, treatment differences, and so forth.

#### Analysis of the Leader Behavior Description Questionnaire (LBDQ)

Since the LBDQ was well-known in research literature, it seemed desirable to obtain data in this study that could be related to the literature. The form contained 90 items, including 15-item versions of the Initiating Structure and the Consideration scales, and most of the Production Emphasis scale of the Ohio State University Leadership Studies LBDQ (7, 9, 10). These three scales were edited slightly to apply to infantry squads, and were augmented by items written to include behaviors emphasized in the Leader Preparation Course (3, 11). These additional scales included: Information and Communication, Supervision, Correction and Reward, Delegation (to team leaders), Representation, Setting Example, and Anticipation.

Each item was answered by the conventional LBDQ response scheme:

- (1) He always acts this way.
- (2) He often acts this way.
- (3) He occasionally acts this way.
- (4) He seldom acts this way.
- (5) He never acts this way.

The LBDQ and the SAQ were answered by half of each squad (the alternate half answered the LAQ and TAQ). These squad members described their squad leader. One randomly chosen member of each squad and all squad leaders described the behavior of their trainee assistant platoon sergeants and their platoon sergeants.

The Ohio State University Leadership Studies and those by others have indicated that most of the covariance in regard to the LBDQ is accounted for in terms of the Initiating Structure and the Consideration scales with a smaller

portion attributed (sometimes) to a Production and a Sociability dimension. The interim analyses described previously indicated that the several LBDQ scales were highly intercorrelated. A further effort was made through two small item factor analyses to determine how the instrument might be structured. These analyses were based on the descriptions of 656 squad leaders who served in all experimental and control companies in the study.

The first analysis employed 25 selected items; the second, 27 items, including eight carried over from the first analysis. In both cases the scores for each item were averaged for the several members of each squad and the item averages were then correlated over 656 squads. A principal axis factor solution was followed by a varimax rotation.<sup>1</sup> The first analysis tended to combine the LBDQ Initiating Structure and Production Emphasis item types into a single factor and to diffuse the Consideration item types among three factors with respective emphasis on example setting, defending, and making things pleasant. Inspecting and correcting were less clearly represented in one factor and motivating behavior in another.

In the second analysis, there are several relatively strong but not mutually exclusive clusters of items describing: (a) the efficient work-oriented supervisor who trains, motivates, plans, and informs; (b) the friendly, approachable leader; (c) the clear communicator; (d) the defender and supporter; (e) the work-accomplishing supervisor who assigns, explains, supplies, checks, and inspects.

The results of these two item factor analyses of the LBDQ were considered to be primarily heuristic. It was obvious that the results, although believable, did not fit into neat instructional categories.

#### Analysis of the Leader Activity Questionnaire (LAQ)

In addition to the well-known LBDQ literature, a substantial effort had been made in HumRRO's Work Unit OFFTRAIN (Studies in Leadership and Leadership Training 12), to develop a similar instrument, which was used to obtain information on platoon leaders and platoon sergeants. There were two versions of the OFFTRAIN LAQ in 1960, one of these numbering several hundred items. An attempt was made to revise the form for NCO use while maintaining the style and general content of the instrument. The result was a 91-item instrument, which was a priori scaled into six broad behavioral areas corresponding roughly to the OFFTRAIN categories:

- (1) Defining (Imparting Information and Initiating Action). Includes such behaviors as assigning tasks, instructing men as to how tasks are to be done, and indicating expected standards of performance.
- (2) Pre-Task Motivation (Promising and Threatening). Deals with inducing subordinates to do good work, both appealing for good performance (positive pre-task motivation) and warning against poor performance (negative pre-task motivation).
- (3) Post-Task Motivation (Rewarding and Punishing). Includes rewards (positive post-task motivation) and punishments (negative post-task motivation), either tangible or intangible.
- (4) Welfare of Men. Deals primarily with the leader's concern for physical welfare of men. (The OFFTRAIN items covered a broader area of behavior in which the leader "handled disruptive influences" that were not work-related but would interfere with work performance if allowed to persist.)

<sup>1</sup>The results of these two analyses are presented in Appendix J of the Supplement.

- (5) Getting Information. Includes getting information from followers and others about work performance. These behaviors in large part form the basis for actions in dispensing rewards or punishments, and in taking corrective action.
- (6) NCO Use and Support. Includes items on how the leader uses and supports subordinate leaders (fire team or gun crew) to accomplish work.

The LAQ was answered by a randomly selected half of each squad at the end of the AIT cycle. Each item describes a specific activity that a squad leader may or may not do. The squad members were asked to indicate how frequently their squad leader engaged in the activity in terms of a 5-point scale: (a) never or once, (b) two or three times, (c) four or five times, (d) several times, and (e) many times. A typical section follows:

"Think of all the times over the past eight weeks that the whole squad or some of the men in the squad have been given an important job, like a field problem or a big inspection. How often did the squad leader:

- Get the whole squad together and tell them about it.
- Tell the team leaders about it and have them tell the squad.
- Say that the men who did the best work would get passes.
- Say he would get them off a detail if they did a good job.
- Tell them exactly how he wanted it done.
- Confuse them when he told them what he wanted them to do."<sup>1</sup>

A sample of 25 items was selected for an initial intercorrelation and factor analysis.<sup>2</sup>

Seven (of ten) factors were clearly identified in the first analysis:

- (1) Threatening.
- (2) Rewarding.
- (3) Briefing before an activity, together with rewarding following an activity.
- (4) Attention to details on an important job.
- (5) Corrective action following completion of a job.
- (6) Checking and helping.
- (7) Checking, supervising, and corrective action.

The second analysis retained a number of "marker" items from the first and represented an effort to produce a "promising" factor and a "use of team leaders" factor. The first factor in this analysis involves a substantial number of items related to effective, efficient accomplishment of work. This factor is obviously closely related to the a priori scale, Defining, although it also involves elements of Rewarding and Getting Information. A second factor was the "threatening" motivation scale. "Promising" motivation items, however, came out in two factors. The "use of team leaders" items also came out in two factors, one regarding their use to pass information on to the men and to check

<sup>1</sup>The *a priori* item keys used in all LAQ analyses included in this report are found in Appendix K in the Supplement.

<sup>2</sup>The items were intercorrelated, factor analyzed, and rotated in the same manner as the LBDQ items. These results are reported in Appendix K in the Supplement.

men, the other involving preferential treatment in praising team leaders and giving them advance information.

In summary, it appeared that the majority of the LAQ items sampled could be put into a single key dealing with the efficient, effective accomplishment of work. Some discrimination among LAQ items was made with respect to those items that deal with the use of threats or promises as means of motivating and with the use and treatment of team leaders. Use of rewards (and less clearly punishments) as a means of motivation is more directly related to the general work accomplishment factor. The remaining factors are relatively singular. Hence, for this analysis, there is justification in recognizing only a large, general, efficient, and effective work accomplishment factor (which combines Defining and Rewarding) as well as two relatively independent "pre-motivation" factors, one dealing with the use of threats and the other with promises. Use and treatment of assistants (team leaders) also appear as relatively independent activities.

The results of these factor analyses and the previous study of LAQ scale intercorrelations suggested that the existing LAQ scales would be adequate for further analyses.

#### Analysis of Trainee Attitude Questionnaire (TAQ)

This set of items had been culled from earlier HumRRO work and had been used in previous NCO studies. The items are opinion statements about the Army and its leaders. The TAQ was administered to trainee leaders at the time they entered the program and again at the end of AIT. At the latter time, the TAQ was also administered to the half of each squad that completed the LAQ. The item scores (1 = agree completely, to 6 = disagree completely) of the several followers were then averaged and summed to provide a squad morale index.

An item correlation and factor analysis of the TAQ was run on all squad leaders' post-AIT data (N = 711 to 714).<sup>1</sup> In summarizing the results, we note that seven factors accounted for three-fourths of the total variance. Relatively separate factors were identified for trainee leaders, NCOs, and officers, despite the fact that four identically worded statements were used for each of the three leader levels.

The remaining "Army" items were separated into four distinct sets—positive statements regarding the Army; negative statements regarding the Army; statements regarding career intentions; and statements that the Army does something good for the man. For practical purposes of analysis, the Army items in the first two and the last set were combined (together with similar TAQ items not in the factor analysis) to form a single key labeled "Army Methods and Operations" (and sometimes called Army attitudes). The remaining items were separately keyed: "Trainee Leaders," "NCOs," "Officers," and "Career."

#### Analysis of Squad Attitude Questionnaire (SAQ)

The Squad Attitude Questionnaire (SAQ) and its counterpart Platoon Attitude Questionnaire (PAQ) were 30-item instruments of identical content except for reference to squad or platoon. The SAQ was answered by the half of each squad that had answered the LBDQ. The PAQ was completed by the four squad leaders and by four followers chosen randomly, one from each squad. Both instruments were designed to provide an index of unit esprit. The items had been culled

<sup>1</sup>This analysis is reported in Appendix L of the Supplement.

from a larger group of attitude items on the basis of several civilian and military judges' estimates of their relevance as indicators of small-unit esprit. A five-item response scheme was employed (1 = strongly agree, 2 = agree, 3 = undecided, 4 = disagree, 5 = strongly disagree).

Twenty-five items were intercorrelated using the squad as the unit of data (average of SAQ items for each squad) ( $N = 559$ ). The items were then factor-analyzed by a Principal axis method and rotated by the varimax method.<sup>1</sup>

Ten factors were extracted; however, several were relatively weak, developing only one or two high loadings. Three factors were especially prominent and somewhat overlapping in their item content:

Factor I described a general affiliation orientation: being able to agree, knowing others' opinions, being relaxed and natural with each other, trying to do more than just "get by," clearly understanding duties and responsibilities, enjoying being together, and so forth.

Factor IV suggests a task-oriented team that is coordinated and motivated. Top items include knowing what to expect from one another, being disappointed if anything goes wrong to spoil success, making a real effort to get a man to agree, distributing unpleasant jobs evenly, and so forth.

Factor II also suggests task orientation characterized by high motivation, evidence of coordination, understanding responsibilities, and concern with the establishment of working relationships. In this factor there is more of a suggestion of confidence and cohesion than in Factor IV.

The other factors were identified with motivation, cohesion, understanding and agreement, affiliation (especially off duty), striving for excellence, staying together in the same squad, and respect for each other's skill and ability.

After several factor plots and rotations, it appeared possible to combine the two affiliation factors and to combine the two team orientation factors. A small residual key comprising a few items involving communication and interpersonal knowledge was formed, and there were a number of other items that tended to be miscellaneous distributed over several factors but which might be combined with a label of "Motivation and Cohesion."

In summary, the factor analysis of the SAQ showed that it was possible to identify several readily interpretable factors; however, for practical purposes, it would appear that there are primarily only two dimensions that will account for a considerable portion of the covariance among the 25 items selected from the SAQ, and that, at most, four keys might be developed. The two major keys reflect an Affiliation aspect and a Task or Teamwork orientation with respect to esprit. A third key provides some information regarding Communication and Interpersonal Knowledge. There are a number of other items that appear to be relatively independent of these three dimensions and that seem to be described best as Motivation and Cohesion items. The SAQ was rescored according to these four keys.

#### Analysis of the Field Tactical Exercise (FTX)

The Field Tactical Exercise (FTX) test required a leader to prepare for and lead his squad (and a supposed "G-2 man") through a patrol course on which he encountered various situations calling for his reaction. A relatively

<sup>1</sup>The results are reported in Appendix M of the Supplement.



elaborate a priori scoring system was employed initially.<sup>1</sup> It led to a single total score derived by summing phase scores that in turn were sums of points given for observed responses. Interim analysis showed that this FTX score was significantly related to several variables, but the correlations were usually quite modest.

It seemed that it might be profitable to analyze the FTX with the intent to establish several scales. After a number of steps, 13 provisional scoring keys were developed, each dealing with some substantive or process selectivity among the approximately 150 specific items on the checklist. These keys were descriptively labeled: Mission Preparation, Getting Information (prior to mission), Briefing, Giving Information (to anyone after briefing), Control (of squad), Maintains Cover and Concealment, Maintains Security, Tactics, Obtains Information (any source during mission), Alertness, Decision Quality, Decision Making (resisting the "G-2's" adverse advice), and Attitude. These 13 scales together with three FTX ratings (Follower, "G-2," and Observer), the paper-and-pencil Leadership Principles Test, leaders GT Aptitude Area scores, Followers AIT Ratings, Superiors AIT Ratings, and the LBDQ total score were intercorrelated over the data for 505 squads, representing 25 cycles.

It is clear that the two dominant keys are Control and Attitude; correlating .66 with each other, they show moderate correlation (.3 to .5) with most other keys, and .5 to .7 correlations with the three FTX ratings. The Control, Cover and Concealment, Security, Obtaining Information, and Attitude keys form a well-defined cluster. With the exception of the Attitude key, they represent many of the "technical" skills (squad tactics and patrolling) required of a patrol leader. The items were training objectives for both the AIT light weapons infantry training program, and the leader training program in the MOS technical portions, for all experimental groups. The fact that Attitude is associated so closely with this technical cluster provides support for the idea that motivation or a "can do" spirit is an important aspect of performance.

On the other hand, three keys, Getting Information, Giving Information, and Decision Making (resisting the "G-2's" adverse advice), are relatively independent, their average correlation with the other keys being .20, .18, and .15, respectively. Alertness and Decision Quality are slightly more related to the other keys, with average correlations of .27 and .26.

There is a moderate correlation (.51, .56, and .64) among the three sets of FTX ratings. Although the observer's rating shows a consistently higher set of correlations with the 13 scales than the other two ratings, the rank order correlations between the three rater sets of 13 correlations are very high (.94 to .99). The average rankings show Attitude first, then Control, with Security and Cover and Concealment tied, Alertness and Tactics tied, followed by Briefing, Obtaining Information, Decision Quality, Giving Information, Preparation, Getting Information (prior to briefing), and in last place, Decision Making (resisting "G-2").

Among the non-FTX measures, the paper-and-pencil Leadership Principles Test is significantly related with all 13 keys and the three FTX ratings, although only the correlations with Control, Attitude, Decision Making, Followers FTX Ratings, and Observers FTX Ratings reach as much as .2. The Leadership Principles Test is consistently higher in relation to the 13 FTX keys than the GT Aptitude score (average correlations are .16 and .11,

<sup>1</sup>The development and analysis of the FTX is more completely described in Appendix N of the Supplement.

respectively). The GT is not significantly correlated with Preparation, Cover and Concealment, and Decision Quality. We note that GT and LPT correlate .42.

Concerning the remaining three measures (LBDQ) Total, Followers AIT Ratings, and Superiors Ratings), we first recall that the LBDQ and AIT Followers Ratings are from the same source as the FTX Followers Ratings; they are all overlapping samples of the same squad members, each collected in different contexts with different instruments. It is then instructive to note that the correlation for FTX and AIT ratings is .46 (moderate); FTX Rating and LBDQ Total, .28 (slight); while AIT Rating and LBDQ, .64 (substantial).

It thus seems clear that the FTX Ratings and LBDQ Total contribute substantially different contexts of information from the same population source. The FTX Rating is apparently, and reasonably, a more specific evaluation. The followers may have carried over some general bias, but it seems clear that their FTX ratings were largely situation specific. However, there is the suggestion that the LBDQ is also relatively more restricted than the Followers AIT Ratings, since only two of the LBDQ ratings correlate significantly with the 13 FTX keys, whereas five of the Followers AIT Ratings are significantly correlated.

One measure remains, and it answers the question, "What is the relation between FTX performance and the professional Army cadreman's estimate of the leader's potential at the end of AIT?" Besides the two consistently prominent keys (Control  $r = .16$  and Attitude  $r = .19$ ), there are several other significant correlations, albeit of very modest magnitude—Briefing .14; Security .13; Obtaining Information .14; and Decision Quality .10. The last three are not significantly correlated for Followers AIT Ratings; they are aspects of squad leader performance to which a platoon sergeant would conceivably be more sensitive than the squad followers.

None of the FTX measures show unusually large correlations with other measures, but there does begin to emerge a clear idea that the FTX, although drawing on many leadership qualities, places a specific premium on the capacity of the leader to set a good example and motivate (Attitude), control his men, and follow good tactical procedure in the execution of a fairly elaborate field tactical exercise.

## SELECTION OF PROVISIONAL CRITERION MEASURES

The internal analyses of the LBDQ, LAQ, TAQ, SAQ, and FTX led to the decision to consider using the following scales:

### Leader Behavior Description Questionnaire (LBDQ)

- Initiating Structure
- Consideration
- Production Emphasis
- Supervision

### Leader Activity Questionnaire (LAQ)

- Defining
- Pre-Task Positive Motivation (Promising)
- Pre-Task Negative Motivation (Threatening)
- Post-Task Positive Motivation (Rewarding)
- Post-Task Negative Motivation (Punishing)
- Handling (Physical) Welfare of Men
- Getting Information
- NCO Use and Support (Use of team leaders)

Trainee Attitude Questionnaire (TAQ)

Officers  
NCOs  
Trainee Leaders  
Army Methods and Operations  
Career

Squad Attitude Questionnaire (SAQ)

Affiliation  
Communication  
Team  
Motivation and Cohesion

Field Tactical Exercise (FTX)

Preparation  
Getting Information  
Briefing  
Giving Information  
Control  
Tactics  
Attitude

There were, of course, all of the other measures described previously (pp. 14-16). A review of their disposition appears below.

Data Pertaining to the Leader

Among biographical data, two possible measures, age and education, had been examined during the interim analyses and rejected as inconsequential. Although the entire Army Classification Battery and its derivative Army Aptitude Area scores had been recorded, experience (4) had led to the choice of the GT score (which consists of equally weighted Arithmetic Reasoning and Verbal standard scores) and of the Classification Inventory score as the most generally useful measures in the ACB.

All measures in the pre-program test battery (with the exception of Fundamental Interpersonal Relations Orientation-Behavior, (FIRO-B), the Multiple-Choice Picture Test, and the Leader Pre-TAQ and several criterion measures, were sent to U.S. Army Personnel Research Office for analysis (14, 15). (The purpose of the pre-program test battery was to collect data that might lead to new leadership selection devices.) The Multiple-Choice Picture Test (a group-administered version of the Psycho-diagnostic Murray TAT) was dropped after several cycles.

Two scores were derived from the FIRO-B data.<sup>1</sup> One was the simple sum of the six scales of FIRO-B (Expressed Inclusion, Wanted Inclusion, Expressed Control, Wanted Control, Expressed Affection, Wanted Affection), and represented a crude measure of expressed or wanted "interaction with people." Three items, taken from the FIRO-2 test, and dealing with trying, becoming or being good at leading, were summed to provide a "leadership in group" measure.

The Pre-TAQ score was retained for all selected leaders for contrast with a Post-AIT TAQ in order to provide information on attitude change.

All global ratings of leaders, BCT peers and superiors, Leader Preparation Course peers and superiors, AIT followers, peers, and superiors, were retained. The Checklist for Observer, Observer Report Form, Cadre Report on Trainee

<sup>1</sup>Results of the FIRO-B are reported in Appendix O of the Supplement.

Leaders, and Cadre Report, End of AIT, were not retained for analysis. These devices had been primarily designed for didactic or training control purposes; the information was mainly qualitative, of uneven quality, and sometimes incomplete.

The Leadership Evaluation Report (LER) (USAPRO instrument) was included in criteria sent to USAPRO. An interim analysis<sup>1</sup> provided information regarding it. The End-of-AIT Followers Rating was preferred to the LER, so this instrument was dropped.

The "Who Does What" questionnaire was an auxiliary instrument designed to study distribution of leadership functions within the squad. An attempt was made to relate the data to other measures.<sup>2</sup>

The End-of-AIT Proficiency Test scores for leaders (as well as followers) were recorded. Total scores were standardized within each MOS group and all subsequent calculations were based on standard scores ( $M = 0$ ,  $SD = 1$ ). This was necessary because the Light and Heavy Weapons Infantry AIT proficiency tests, although having some elements in common, were not comparable in raw score form.

The Written Tests of Trainee Leader Knowledge (MOS and Leadership Principles) were used primarily as teaching tools and were not employed as general criterion measures.

#### Data Pertaining to Leader Influence

Of the several measures of follower proficiency, only the MOS proficiency test (end of AIT) was employed extensively in criterion analysis. This score was computed by averaging the raw scores of all followers in each squad and then standardizing the average score on the basis of all available data for the followers' MOS group.

#### Data Pertaining to Leader Climate or Training Environment

These data have been described, analyzed, and reported previously (8). The three critique sheets (p. 16) were used primarily as feedback for improvement and control of the training program and were not used in the criterion analysis.

### CRITERION REDUCTION

Several correlational and factor analyses were undertaken to reduce the criterion measures to a reasonably minimum set. One effort was centered on the question of whether there was a difference in the correlational structure of the experimental and control groups. Twenty-seven measures were inter-correlated for the two separate groups, and then each matrix of correlations was factor-analyzed by the principal axis method and eight factors were extracted. Each set of loadings was then separately rotated by the varimax method.<sup>3</sup>

The results of the two rotations are highly similar, although differences in loadings are sometimes evident in the first six factors; the last two factors, although related, are appreciably different.

Following this analysis of the relations among data in the experimental and control groups, the data for the two groups were combined in performing several analyses. One of these combined or averaged data on a platoon basis and

<sup>1</sup>See Appendix P in the Supplement.

<sup>2</sup>The results of this study are reported in Appendix Q in the Supplement.

<sup>3</sup>The results are presented in Appendix R of the Supplement.

then computed correlations between 30 selected measures. The same set of measures (with the exception of the Platoon Attitude Questionnaire) were again intercorrelated with the squad as the unit of analysis.<sup>1</sup> The results are particularly interesting in that they suggest differences that may exist in relations among measures when different levels of analysis are employed.

### The 36 Criteria Analysis

To accomplish a major criterion dimension study, a slightly different set of 36 measures were correlated (using squad leader data) and then factor-analyzed and rotated.<sup>2</sup> It is first noted that this analysis was performed to clarify the relations among measures that appeared to be representative criteria. The set of measures included the items listed:

Squad Esprit (Squad Attitude Questionnaire—SAQ)<sup>3</sup>

Affiliation  
Team  
Motivation and Cohesion

Leader Behavior Description Questionnaire (LBDQ)<sup>4</sup>

Consideration  
Initiating Structure  
Production Emphasis

Leader Activities Questionnaire (LAQ)<sup>5</sup>

Positive Post-Task Motivation (Rewarding)  
Defining and Giving Information  
Welfare

Leaders Attitudes (Trainee Attitude Questionnaire—TAQ)<sup>6</sup>

Trainee Leaders  
Army as a Career  
Army Methods and Operations  
NCO

Followers Attitudes (TAQ)<sup>6</sup>

Trainee Leaders  
Army as a Career  
Army Methods and Operations  
NCO

Advanced Individual Training (AIT) Ratings

Peers (Fellow Leaders)  
Superiors  
Followers

<sup>1</sup>The results of this study are also reported in Appendix R in the Supplement.

<sup>2</sup>These data are reported in Appendix S in the Supplement.

<sup>3</sup>The four-item Communication scale was dropped because it appeared to be unreliable and gave no evidence of showing marked relation to other measures or of differences between various contrasts of interest.

<sup>4</sup>Preliminary analyses had shown the several LBDQ scales to be highly intercorrelated. These three Ohio State University Scales were retained to provide data for reference and comparison to other leadership research.

<sup>5</sup>These were considered to be the three most useful measures of the LAQ. The negative motivation scales had displayed an independent factor but small studies of treatment contrasts had not indicated that these measures would provide any useful discrimination.

<sup>6</sup>The TAQ Officer scale was dropped for both leaders and followers on the assumption that the NCO scale would provide more pertinent information.

### Military Occupational Specialty (MOS) Performance Tests

Leaders MOS Proficiency

Followers (squad average) MOS Proficiency

### Leadership Performance Test (Field Tactical Exercise—FTX)

Control

Tactics

Attitude

Preparation

Getting Information

Briefing

Giving Information

### Follow-up Data<sup>1</sup>

"How well does he get along with others?"

"How well does he do his job?"

"How well do you think he would do as a combat NCO Leader?"

### Auxiliary Data

Leader's GT Score

FIRO-B "Interact with People"

FIRO-2 "Leader in Group"

An examination of the factor loadings confirmed the expectation that these sets of measures would be moderately independent. The first nine factors<sup>2</sup> account for 83 percent of the total variance included in the 14 factors and involve all but the GT, FIRO, and FTX Giving Information measures.

### Selection of 21 Representative (Final Criterion) Measures

After examination of this last factor analysis, 21 measures were chosen for use as independent measures in several analyses of variance. These were:

- (1) Sum of the three AIT Leader Ratings (by Superiors, Peers, and Followers)<sup>3</sup>
- (2) Follow-Up Combat Leader Rating
- (3) AIT Leader Performance Test (Standard Score)
- (4) AIT Followers Performance Test (Standard Score)
- (5) Squad Esprit (Sum of SAQ Affiliation, Team, Motivation and Cohesion)
- (6) Leader Attitude (Sum TAQ Army Methods and Operations, NCOs, Officers)
- (7) Squad Attitude (Sum average TAQ Army Methods and Operations, NCOs, Officers)
- (8) Field Tactical Exercise (Sum FTX Preparation, Getting Information, Briefing)
- (9) FTX Tactics

<sup>1</sup>The follow-up data consisted of four ratings completed by the soldier's supervisor and his next immediate superior approximately 18 months after completion of AIT. Each rating was on a 10-point scale. One rating, "How much does he know about how to do his job?", was deleted. All four ratings ( $N=370$ ) were strongly intercorrelated (.62 to .75). Correlations between the two raters were .53 (for the deleted item), .60 for both "How well does he get along with others?", and "How well does he do his job?", and .58 for Combat Leader. The two ratings were averaged for each item.

<sup>2</sup>These factors are shown in Appendix S of the Supplement.

<sup>3</sup>Each set of ratings was separately converted to a standard score and then summed with equal weighting. Use of unweighted standard scores results in a score which is equally influenced by the three rating sources.

- (10) FTX Control
- (11) FTX Attitude
- (12) Leader Behavior: Initiating Structure
- (13) Leader Behavior: Consideration
- (14) Leader Activity: Rewarding (Positive Post-Task Motivation)
- (15) Leader Activity: Defining and Giving Information
- (16) Leader Activity: Welfare
- (17) AIT Superiors Ratings
- (18) AIT Fellow Leaders (Peer) Ratings
- (19) Leader Trainee Attitude Questionnaire (TAQ): Army as a Career
- (20) Followers TAQ: Army as a Career
- (21) Followers TAQ: Trainee Leaders

The No. 1 measure, sum of the three AIT ratings, was chosen to provide a rating composite. Of the four follow-up ratings, the Combat Leader Rating was preferred to forming some combination. Both AIT Performance Tests were retained. Results of the several item and measure factor analyses provided suggestions for combining or isolating the remaining measures. Three of the four SAQ scales were summed to provide a general index of squad esprit.

In similar fashion, single measures were devised to represent Leader and Squad Attitude by combining TAQ scales for Army Methods (positive and negative statements), NCOs, and Officers. The two TAQ Career scales were treated separately because of special interest in career attitudes. The Followers TAQ "Trainee Leaders" were also treated separately to provide an idea of followers' estimate of "trainee leaders." The Field Tactical Exercise (FTX) was treated as four separate scales, although the "36 criteria" analysis had shown only two major factors. The Preparation, Getting Information, and Briefing scores were summed to provide a simple "pre-mission" score. However, Control, Tactics, and Attitude were treated separately, since each was a fairly reliable and somewhat independent score. The two Leader Behavior Description Questionnaire (LBDQ) measures, Initiating Structure and Consideration, were retained as "reference standards." Three of the strongest and most promising Leader Activity Questionnaire (LAQ) measures, Rewarding, Defining and Giving Information, and Welfare were also retained.<sup>1</sup>

#### Analyses of Variance of the 21 Selected Criteria

These analyses were conducted to determine the magnitude of unit (both company and platoon) and run effects on the criteria. Initial inspection of data confirmed that there would be unit or run main effects for some variables. Interactions between unit and run, especially company-by-run, would be expected if training treatments had any effect.

A nested analysis of variance was computed in which mean squares were computed for runs, companies within runs, and platoons within companies, and finally subjects of the same platoon. Because of computer program and missing data problems, additional data reduction was accomplished by two, 2-way analyses per criterion: a runs-by-companies (4 x 5) analysis and a runs-by-platoons (4 x 20) analysis, with squads treated as within-cell replicates in both

<sup>1</sup>Since the LBDQ and LAQ scales provided five separate measures of the leader, the AIT Followers Rating was dropped.

cases.<sup>1</sup> Company effects were subtracted from platoon effects, thereby yielding estimates of the residual platoon effect. Similarly the company-by-run interaction values were subtracted from the platoon-by-run interactions.

Table 1 summarizes the results. The nested analysis of variance starts with 80 platoons. The platoons had an average (harmonic mean) of 2.7 to 3.9 squads, depending on variable. The other two analyses are of the usual factorial

Table 1  
Summary of Significance Levels for Analyses of Variance  
Performed on 21 Selected Indices<sup>a</sup>

| Description                                | Analysis I:<br>NESTED |                                 |                                | Analysis II:<br>RUNS BY<br>COMPANIES |              |                  | Analysis III:<br>RUNS BY<br>PLATOONS |         |                  | Analysis IV:<br>(III-II)         |                 |
|--|-----------------------|---------------------------------|--------------------------------|--------------------------------------|--------------|------------------|--------------------------------------|---------|------------------|----------------------------------|-----------------|
|  | Run                   | Com-<br>panies<br>Within<br>Run | Pla-<br>toons<br>Within<br>Run | Run <sup>b</sup>                     | Com-<br>pany | Inter-<br>action | Run <sup>b</sup>                     | Platoon | Inter-<br>action | Platoon<br>Minus<br>Com-<br>pany | (PxR)-<br>(CxR) |
| Sum AIT (Peer,<br>Superiors, Followers)    |                       | .01                             |                                |                                      | .05          | .01              | NS <sup>c</sup>                      | .05     |                  |                                  |                 |
| Follow-up Combat Leader                    | .05                   |                                 | .05                            | .05                                  | .05          |                  | .05                                  | .05     | NS <sup>c</sup>  |                                  | .05             |
| AIT Proficiency Leader                     |                       | .01                             | .01                            | .01                                  | .01          | .01              | .01                                  | .01     | .01              | .01                              | .01             |
| AIT Proficiency Follower                   |                       | .01                             | .01                            | .05                                  | .01          | .01              | .05                                  | .01     | .01              |                                  | .01             |
| Squad Affiliation,<br>Motivation, Cohesion |                       | .05                             | .01                            |                                      | .01          | .01              |                                      | .01     | .01              | .01                              | .01             |
| Ldr-Method & Operations,<br>NCO Officer    |                       | .01                             |                                | .01                                  | .01          | .05              | .01                                  | .01     |                  |                                  | .05             |
| Sqd-Method & Operations,<br>NCO Officer    |                       | .01                             | .01                            |                                      | .01          | .01              | .05                                  | .01     | .01              | .01                              |                 |
| FTX-Preparation, Brief,<br>Get Information |                       | .01                             |                                | .01                                  | .01          | .01              | .01                                  | .05     | .01              |                                  |                 |
| FTX-Tactics                                |                       |                                 |                                | .05                                  |              |                  | .05                                  |         |                  |                                  |                 |
| FTX-Control                                |                       |                                 |                                |                                      |              |                  |                                      |         |                  |                                  |                 |
| FTX-Attitude                               |                       | .05                             |                                |                                      |              | .01              |                                      |         | .05              |                                  |                 |
| LBDQ-Initiating<br>Structure               |                       | .01                             | .05                            |                                      | .01          | .05              |                                      | .01     |                  |                                  | .01             |
| LBDQ-Consideration                         |                       |                                 |                                |                                      |              |                  |                                      | .05     |                  |                                  | .05             |
| LAQ-Post Positive<br>Motivation            |                       | .01                             |                                |                                      | .05          | .01              |                                      |         | .05              |                                  |                 |
| LAQ-Defining, Give<br>Information          |                       | .05                             |                                | .01                                  |              | .01              | .01                                  |         | .01              |                                  | .05             |
| LAQ-Welfare                                |                       |                                 | .05                            |                                      |              | .05              |                                      |         | .01              |                                  | .05             |
| Superiors AIT Rating                       |                       | .05                             |                                | .01                                  | .05          |                  | .01                                  | .05     |                  |                                  |                 |
| Peers AIT Rating                           |                       | .05                             |                                |                                      | .01          |                  |                                      | .05     |                  |                                  |                 |
| Leader Career                              |                       | .01                             | .05                            |                                      | .01          | .01              |                                      | .01     | .01              | .05                              |                 |
| Follower Career                            |                       | .01                             | .01                            |                                      | .01          | .01              |                                      | .01     | .01              |                                  | .01             |
| Followers Estimate of<br>"Trainee Leaders" |                       | .01                             | .05                            |                                      |              | .01              | .05                                  | .05     | .01              | .05                              |                 |

<sup>a</sup>Note all Y Variables were adjusted by regression technique to partial out initial Aptitude (A) and BCT Peer Rating (P) covariance, since tight control over A and P within companies was not achieved. Unweighted means analysis of variance program was used to overcome missing data.

<sup>b</sup>Runs mean squares are identical in these two analyses, but error terms differ.

<sup>c</sup>.05 < p < .10

<sup>1</sup>The squad-level variables were ignored for these analyses, as were the cadre orientation and MOS variables for platoons. Since both aptitude and BCT peer ratings had been partialled out of each criterion measure, any effects from these sources had been removed.



design.<sup>1</sup> Analysis IV shows the results when II is subtracted from III and the within-platoon error used for  $F$ .<sup>2</sup>

#### Establishing Control Over GT and Peer Rating Input Variation

A first step in the main criterion study was to examine quality control over input. Throughout the study there had been major problems in obtaining sufficient numbers of qualified (GT and Peer Rating) leaders. One sample check proved quite disconcerting (see Table 2). It was apparent that the BCT Peer Ratings differed for treatment groups. The GT scores were more in control. Moreover, deliberate assignment had generated both GT and Peer Rating differences within each platoon of all E and C-1 companies. Both measures were known to co-vary with some of the criteria. At first, some consideration was given to accomplishing covariance analyses; however, because of the complexity of design for computer programs, a simpler approach was taken in which both GT and BCT Peer Rating scores were partialled out of each of the 21 criteria.<sup>3</sup> The resulting criterion scores are thus "equated" for GT Aptitude Area score and BCT Peer Rating.

Table 2  
BCT Peer Ratings and GT Scores

| Treatment | BCT Peer Ratings |      |                    | General Technical Aptitude Area Scores |       |                    |
|-----------|------------------|------|--------------------|--|-------|--------------------|
|           | <i>N</i>         | Mean | Standard Deviation | <i>N</i>                               | Mean  | Standard Deviation |
| E-4       | 36               | 3.51 | .75                | 52                                     | 111.0 | 14.2               |
| E-2       | 51               | 3.50 | .65                | 68                                     | 107.7 | 16.6               |
| E-0       | 71               | 3.75 | .56                | 79                                     | 111.3 | 12.5               |
| C-1       | 55               | 4.04 | .70                | 74                                     | 112.2 | 15.6               |
| C-2       | 38               | 4.14 | 1.08               | 98                                     | 114.6 | 17.2               |
| C-3       | 73               | 4.08 | .76                | 113                                    | 115.1 | 14.9               |

The problem of lost independent data was handled by use of an unweighted means analysis of variance computer program following Winer (15).

#### The Platoon Level Analysis

Excluding the C-3 treatments, there are data for 80 platoons in the 10th Battle Group, two Light and two Heavy Weapons Infantry platoons in each of the five companies for each of the four runs.

When the platoon is considered as the unit of analysis (see Figure 4), there is potentially a 5 x 4 x 2 x 2 analysis of variance design that permits examination

<sup>1</sup>A platoon-within-company-by-run analysis was not computed, since it appeared that the information that might be gained would not justify the very extensive computations that would have been required because of the unequal *N*s.

<sup>2</sup>The complete analyses are presented in Appendix T in the Supplement.

<sup>3</sup>Regressions were calculated for all 21 variables separately for each cycle (one company on one run), including all experimental and control treatments. After examining these many separate regression elements (to determine whether it was reasonable to consider them homogeneous), pooled regression coefficients were used to calculate the residual scores. Where GT or BCT data were missing for a subject, the population average was inserted to compute the residual score. See Appendix U in the Supplement.

### Experimental Design in the 10th Battle Group<sup>a</sup>

| Company | Run |   |       |   |     |   |         |   |
|---------|-----|---|-------|---|-----|---|---------|---|
|         | I   |   | II    |   | III |   | IV      |   |
| A LWI   | 1   | 2 | 1     | 2 | 1   | 2 | 1       | 2 |
|         | E-2 |   | C-2   |   | C-1 |   | E-0     |   |
| HWI     | 3   | 4 | 3     | 4 | 3   | 4 | 3       | 4 |
| B LWI   | 1   | 2 | 1     | 2 | 1   | 2 | 1       | 2 |
|         | E-4 |   | E-0   |   | C-2 |   | C-1     |   |
| HWI     | 3   | 4 | 3     | 4 | 3   | 4 | 3       | 4 |
| C LWI   | 1   | 2 | 1     | 2 | 1   | 2 | 1(C-2)2 |   |
|         | C-2 |   | (C-1) |   | E-0 |   |         |   |
| HWI     | 3   | 4 | 3     | 4 | 3   | 4 | 3(E-4)4 |   |
| D LWI   | 1   | 2 | 1     | 2 | 1   | 2 | 1       | 2 |
|         | E-0 |   | E-2   |   | E-2 |   | C-2     |   |
| HWI     | 3   | 4 | 3     | 4 | 3   | 4 | 3       | 4 |
| Hq. LWI | 1   | 2 | 1     | 2 | 1   | 2 | 1(C-2)2 |   |
|         | C-1 |   | E-0   |   | E-4 |   |         |   |
| HWI     | 3   | 4 | 3     | 4 | 3   | 4 | 3(E-2)4 |   |

<sup>a</sup>Peer rating data were not obtained for the C Co. Run II cycle; however, GT was controlled. In effect, each platoon sergeant was supplied with the names of four top one-third and four middle one-third aptitude leaders and required to choose two from each level. An insufficient number of Light Weapons Infantry trainees was available to supply other than Trainee Assistant Platoon Sergeants for Run IV to C and Hq. companies. The companies picked all LWI squad leaders.

Figure 4

of company, run, MOS, and cadre orientation differences, with platoon means for each of the 21 residual measures based on averages of the 4 squads within each of the 80 platoons.

Before examining the results of these analyses, the question arises concerning the correlation of the 21 residual measures at the platoon level.<sup>1</sup> The 21 variables are remarkably independent; among 210 correlations only 38 are significant at the .05 level. Of course, this result was anticipated, since a deliberate effort was made to select independent measures. Moreover, GT Aptitude Area score and BCT Peer Rating effects had been removed statistically. With one or two exceptions, there appears to be no justification, on the basis of highly similar or redundant information, to exclude any of the 21 measures from further analysis.

<sup>1</sup>These correlations are presented in Appendix T of the Supplement.

## Chapter 4

### TREATMENT COMPARISONS

Four comparisons of means were of particular interest:

- (1) Control comparisons—"Is there a selection or experimental-requirement effect?" (C-1 vs. C-2)
- (2) Experimental-Control comparisons—"Is there a training effect with selection and company treatment controlled?" (C-1 vs. E-0 + E-2 + E-4)
- (3) Leadership Training (Experimental) comparisons—"Is there a difference between integrated training and preparation plus on-the-job training?" (E-0 vs. E-2 + E-4)
- (4) Training Length (Experimental) comparisons—"Does repetition of preparation training make a difference?" (E-2 vs. E-4)

For each test, the residual data, after partialling for both GT Aptitude Area scores and BCT Peer Ratings, were used.<sup>1</sup> The *t* tests were computed.<sup>2</sup> Table 3 summarizes the results of the four treatment contrasts for the 21 criteria.

Table 3  
Summary of Treatment Comparisons for 21 Criteria<sup>a</sup>

| Variable | Description   | C-1 vs. C-2        | C-1 vs.<br>E-4 + E-2 + E-0 | E-0 vs.<br>E-2 + E-4 | E-2 vs. E-4 |
|----------|---|--------------------|----------------------------|----------------------|-------------|
| 1        | Sum AIT Ratings                                       | C-2 <sup>***</sup> | E*                         | NS                   | NS          |
| 2        | Follow-up Rating                                      | NS                 | NS                         | NS                   | NS          |
| 3        | Leader AIT Test                                       | C-2 <sup>***</sup> | E <sup>***</sup>           | Prep. <sup>***</sup> | NS          |
| 4        | Follower AIT Test                                     | C-2*               | E <sup>***</sup>           | Prep.*               | NS          |
| 5        | Squad Esprit  | C-2 <sup>**</sup>  | E <sup>**</sup>            | NS                   | NS          |
| 6        | Leader Attitude                                       | NS                 | NS                         | NS                   | NS          |
| 7        | Follower Attitude                                     | C-2*               | NS                         | NS                   | NS          |
| 8        | FTX (Preparing, Briefing,<br>and Getting Information) | NS                 | E <sup>***</sup>           | NS                   | NS          |
| 9        | FTX (Tactics)   | NS                 | NS                         | NS                   | NS          |
| 10       | FTX (Control)   | NS                 | E <sup>**</sup>            | NS                   | NS          |
| 11       | FTX (Attitude)  | C-2                | NS                         | NS                   | NS          |
| 12       | Leader Behavior<br>(Initiating Structure)             | C-2 <sup>**</sup>  | E                          | NS                   | NS          |

*Continued*

<sup>1</sup>Review of missing data showed five situations in which all data for a specific measure were absent for an entire company, and one in which data were very limited. In these cases, the cell mean (unit-run) was estimated by an iteration procedure suggested by Yates (16). Data missing were: Sum AIT Ratings and AIT Superior Ratings for one company on Run IV; Follow-up Combat Leader Ratings for two companies on Run IV; Leader Attitude and Leader Career for one company on Run I.

<sup>2</sup>In comparing means, the mean square within platoons was used for the error estimate. If the experiment is considered fixed (i.e., no random selection) with respect to both runs and units, then the within cells mean square (M.S.) is the proper error term. Choice of the platoon M.S. rather than company M.S. removes all variance due to unit and runs, and unit by runs interactions from the error term.

Table 3 (Continued)  
 Summary of Treatment Comparisons for 21 Criteria<sup>a</sup>

| Variable | Description                                   | C-1 vs. C-2 | C-1 vs.<br>E-4+E-2+E-0 | E-0 vs.<br>E-2+E-4 | E-2 vs. E-4 |
|----------|---|-------------|------------------------|--------------------|-------------|
| 13       | Leader Behavior<br>(Consideration)            | NS          | NS                     | NS                 | NS          |
| 14       | Leader Activity<br>(Rewarding)                | C-2         | E                      | NS                 | NS          |
| 15       | Leader Activity<br>(Define, Give Information) | NS          | E**                    | NS                 | NS          |
| 16       | Leader Activity<br>(Welfare)                  | NS          | NS                     | NS                 | NS          |
| 17       | Superiors AIT Rating                          | NS          | NS                     | NS                 | NS          |
| 18       | Peers AIT Rating                              | NS          | E                      | Prep.***           | NS          |
| 19       | Leader Career                                 | C-2**       | E**                    | Prep.**            | NS          |
| 20       | Follower Career                               | C-2         | C-1**                  | NS                 | NS          |
| 21       | Follower Attitude<br>"Trainee Leaders"        | C-1         | C-1**                  | Int.               | NS          |

<sup>a</sup>The treatment group with the better score is indicated, with the significance levels of the comparison shown as follows:  $p < .001$ \*\*\*;  $p < .01$ \*\*;  $p < .05$ \*;  $.05 < p < .10$  unmarked; NS not significant.

#### CONTROL COMPARISONS: Is There a Selection or Experimental-Requirement Effect?

The C-1 to C-2 contrasts indicate ten differences favoring the C-2 group and one favoring the C-1 group. In general, it seems clear that the combined effect of forcing cadre to accept and work with a group of trainee leaders (many of whom were mediocre on one or both of the selection measures) and to comply with various experimental requirements (which specified duties, responsibilities, authority, and privileges) created a decidedly unfavorable situation that resulted in:

- (1) Poorer Sum AIT ratings (probably mostly due to low followers' estimates, since V17 and V18 are not significant whereas V12 and V14 are significant).
- (2) Lower AIT ratings for both leaders and followers.
- (3) Lower squad esprit.
- (4) Poorer followers' attitude toward the Army and its officers.
- (5) Poorer attitude in accomplishing the field tactical exercise.
- (6) Less frequent "initiating structure" and "rewarding."
- (7) Poorer career attitudes for leaders and followers.

On the other hand, for some reason, the followers held the "trainee leaders" (considered as a group) in higher esteem.

The above comparisons were possible because the experimental design provided both the C-1 and C-2 control groups, as a result of earlier pilot studies that had sensitized the researchers to the problems of securing adequate cadre cooperation. That is, negative reactions had been encountered previously and were anticipated in designing this experiment. Further, it was expected that the special leader selection design would work some hardship on every experimental platoon.<sup>1</sup> However, these many adverse results were something of a surprise.

In fact, although some C-2 versus E differences are significant and favor C-2, many are insignificant. If only the C-2 control were available, the

<sup>1</sup>It was anticipated that some cadre in the C-2 condition would pick men who were mediocre on GT Aptitude Area scores and BCT Peer Ratings and possibly a few would pick men who were poor on both, but it seemed highly unlikely that every platoon sergeant would pick three out of four who were mediocre on GT or BCT Peer Ratings.

conclusion would be that the normal (C-2) method was just about as effective as the experimental methods and obviously less costly. But, the appropriate comparison is not C-2 but C-1, since C-1 represents exactly the same selection, cadre orientation, and leader treatment,<sup>1</sup> as the three experimental treatments.

#### EXPERIMENTAL-CONTROL COMPARISONS: Is There a Training Effect?

The C-1 vs. E-4+E-2+E-0 contrast is the appropriate difference to examine when considering the average effect of all leader training efforts when leader selection and AIT treatment are "controlled."<sup>2</sup> This contrast produces 11 results ( $p < .10$ ) favoring the leadership training, and two not favoring it. Specifically, the leadership training produces:

- (1) Higher sum AIT ratings (and higher peers AIT ratings).
- (2) Higher AIT proficiency test scores for leaders and followers.
- (3) Higher squad esprit.
- (4) Better field tactical exercise performance in preparing, briefing, and getting information and in control.
- (5) More leader behavior or activity in initiating structure, rewarding, and in defining and giving information.
- (6) More favorable leader Army career attitudes.

On the other hand, the control group shows:

- (1) More favorable followers' Army career attitudes.
- (2) Higher followers' esteem for trainee leaders.

This contrast suggests that the leadership-trained squad leaders were good (variables 1, 8, 10, 12, 14, 16); they produced results (variables 3 and 4 as well as FTX scores); the squads had higher esprit (variable 5); and the leaders had a more favorable attitude toward reenlistment and advancement in rank (variable 19). However, this results in less interest in reenlistment or advancement in rank on the part of followers and in a lower estimation of the trainee leaders.<sup>3</sup> The results suggest that there is a follower reaction, as well as a cadre reaction, to the leadership-trained squad leaders. It appears that the squad leaders may have been more competent in "accomplishing the mission" but possibly less concerned with the "welfare of the men."<sup>4</sup>

The favorable results in the two objective test situations are compelling. It is clear that the trained leaders were superior on the field tactical exercise, they performed better on the AIT proficiency test, and their followers did also.<sup>5</sup> The leader behavior and activity scales, as well as the ratings, are, of course, relative to the standards of the reporters, but, taken together, the field test

<sup>1</sup>This refers to AIT company assignment, duties, privileges, and so forth, *not* to leadership training.

<sup>2</sup>The unweighted means of the three experimental groups were used and, hence, the three results are treated equally despite slight differences in sample size. The Mean Square is the within platoons estimate based on all data for all treatments.

<sup>3</sup>Four Trainee Attitude Questionnaire (TAQ) items are involved: "Trainee leaders . . . are generally understanding of the needs and problems of their men; are well-qualified for their jobs; are willing to go through anything they ask their men to go through; really understand how to get the best out of their men."

<sup>4</sup>The program of instruction places a relatively greater emphasis on, and probably is more effective in imparting, information on how to accomplish the mission. However, the "human relations" aspect of leadership is repeatedly presented in many contexts.

<sup>5</sup>Preparation for the AIT test (including making the leader aware of his responsibility for the preview and review of AIT training, accomplishment of make-up training for members of his squad who may have missed training, remedial work with slow learners, and "cramming" his squad for the exam) was a specific goal for the leadership training program. Specific attention was directed to imparting AIT technical content and to teaching the trainee leaders to teach their followers.

and leader questionnaires do suggest that the trained squad leaders were better at preparing for a mission; better at controlling their men in a field exercise (V10) and in general (V12); better motivators (more frequent use of rewards); and more frequent in their defining of the situation and giving needed information to their followers.

It also seems clear that these men were impressed with the fact that the Army was interested in them and in their potential as leaders and that they reacted to this treatment by expressing somewhat more favorable attitudes toward reenlisting or seeking higher rank.

The cost appears in the less favorable attitude of the followers toward the Army as a career and toward the "trainee leaders" (but definitely not in squad esprit and, apparently, not toward the Army in general—see variables 5 and 7).<sup>1</sup>

In each case where the control-experimental comparison was significant, comparisons were made between C-1 and each of the three experimental treatments, E-4, E-2, and E-0. Since each of the tests uses the same information on the control condition and a common estimate of experimental error (within platoons for the entire study population), the tests are not independent. Dunnett's  $t$  statistic (6, 11), which constructs a joint confidence interval on the set of all relevant comparisons, was employed. Table 4 summarizes the results.

Table 4  
Dunnett's  $t$  Test of C-1 With Each E-0, E-2, E-4 Treatment<sup>a</sup>

| Variable | Description   | C-1 vs. E-0 | C-1 vs. E-2 | C-1 vs. E-4 |
|----------|---|-------------|-------------|-------------|
| 1        | Sum AIT Ratings                                       | NS          | E-2*        | E-4*        |
| 3        | Leader AIT Test                                       | E-0***      | E-2***      | E-4***      |
| 4        | Follower AIT Test                                     | E-0**       | E-2***      | E-4***      |
| 5        | Squad Esprit  | E-0**       | E-2**       | E-4**       |
| 8        | FTX (Preparing, Briefing,<br>and Getting Information) | E-0**       | E-2**       | E-4***      |
| 10       | FTX (Control)   | E-0*        | E-2*        | E-4         |
| 12       | Leader Behavior<br>(Initiating Structure)             | E-0*        | E-2         | E-4*        |
| 14       | Leader Activity<br>(Rewarding)                        | NS          | NS          | E-4         |
| 15       | Leader Activity (Define,<br>Give Information)         | NS          | E-2         | E-4         |
| 18       | Peers AIT Rating                                      | NS          | NS          | E-4*        |
| 19       | Leader Career   | NS          | E-2**       | NS          |
| 20       | Follower Career                                       | NS          | NS          | C-1*        |
| 21       | Follower Attitude<br>"Trainee Leader"                 | NS          | C-1**       | NS          |

<sup>a</sup>The treatment group with the better score is indicated, with the significance levels of the comparison shown as follows:

$p < .001$ \*\*\*  
 $p < .01$ \*\*  
 $p < .05$ \*  
 $.05 < p < .10$  unmarked  
 NS not significant

<sup>1</sup>These negative results obviously pointed to needs for changes in the design of the training system, which were subsequently made. The changes involved selecting an appreciably higher caliber leader, permitting cadre to exercise greater freedom in appointment and use of trainee leaders, and in placing greater stress in the program of training on the need to and how to anticipate and deal effectively with followers' problems, complaints, difficulties, and so forth.

These results indicate that all experimental treatments are superior to the control for variables 3, 4, 5, 8, 10, and 12. Only the two preparation school treatments (E-2 and E-4) are superior for variables 1 and 15. In addition, only E-4 is superior for variables 14 and 18, while only E-2 is superior on variable 19. On the other hand, the contrary results (control superior) are obtained only for E-4 on variable 20 and only for E-2 on variable 21. The general impression is that the E-4 and E-2 treatments were effective for more criteria than E-0. The results for the AIT tests for leaders and followers were markedly significant. Squad esprit, the two Field Tactical Exercise scores, and the Leader Behavior Description Questionnaire initiating structure score were also consistently significant.

#### INTEGRATED TRAINING AND PREPARATION SCHOOL COMPARISONS: Is There a Difference Between Integrated and Preparation Plus OJT Training?

Returning to Table 3, we note that there are four results favoring the preparation school and one favoring the integrated system among the E-0 vs. E-2 + E-4 comparisons.

The preparation school was more effective in preparing leaders (and through them, their followers) for the end-of-AIT test. This result is easily understood, for, although effort was made to maintain comparable training content in all three experimental treatments, the integrated system was always subject to short-notice changes in the AIT training schedule, while the preparation school enjoyed three distinct advantages: (a) additional, scheduled time, for instruction in AIT subjects; (b) expert instructors (especially in weapons and tactics); and (c) better resources, in equipment and terrain, to teach the AIT subjects.

The other two criteria in which the preparation school was superior are primarily attitudinal. Preparation school leaders evaluated each other more highly (Peer AIT Rating) and were also more favorable toward reenlistment or seeking higher rank. It seems that the "separate and special" attention, which only the preparation school could manage so well, did result in higher self-evaluation of their group's leadership potential and of their own possible future in the Army.<sup>1</sup>

On the other hand, it seems that the followers were more impressed with the E-0 leaders ("understand needs and problems; are well-qualified for their jobs; willing to go through anything they ask of their men; really understand how to get the best out of their men"). The differences here are not so large, but it seems probable that the E-0 leaders were more "humble" and less able to keep a "social distance." The preparation school leaders arrived in the AIT company prepared, confident, and ready to start their on-the-job training, whereas the integrated system (E-0) leaders had to learn while they also led. Their mistakes and their development were almost entirely visible to their followers. It may be that this visibility led to higher esteem for the E-0 leaders.

#### TWO-WEEK VERSUS FOUR-WEEK PREPARATION SCHOOL COURSES: Does Repetition of Preparation Training Make a Difference?

As described earlier, the two-week course was the basic plan, and the four-week course was simply a repetition in which one-half of each preparation

<sup>1</sup>Note that leaders' attitudes toward the Army and its officers (variable 6) do not show any differences. Generally, all experimental (and the C-1) leaders had a "hard time" in the AIT companies. Despite these difficulties, those who had had the preparation school treatment had been exposed to a "different Army—the NCO Academy cadre" who had convinced them that they were leader material.

school class was retained two weeks to repeat the schedule and program of instruction of the first two weeks. A deliberate effort was made to confine the scope of instruction to the two-week program of instruction, although literal, verbatim reproductions of the exact experiences were neither desired nor accomplished. In the second two weeks there was an intensive review—virtually every hour of instruction was re-scheduled.

In the two-week to four-week contrasts, none of the criteria shows a significant difference. There were some data losses (due to inability to obtain qualified candidates for preparation schooling); however, the Ns for each treatment are usually above 40. In view of the number of criteria employed and of the sensitivity of the contrast test,<sup>1</sup> it seems clear that a simple repetition of the two-week program of instruction produced no significantly different results.<sup>2</sup>

#### WITHIN-TREATMENT CONTRASTS

There are several within-treatment contrasts that were part of the design. At the platoon level, the four platoons in all companies were divided into two platoons of light weapons infantry and two platoons of heavy weapons infantry. During much of the AIT training, these different MOS groups were separated and given different training. During the Leader Preparation Course, one-fourth of scheduled time was devoted to MOS-specific content, which was again different.

Practical work during the remainder of the course dealt primarily with leadership problems. There was no bias in garrison situations, but in field situations the problem context was decidedly biased toward light weapons infantry. This occurred because the freedom of action and variety of leader functions available at the squad leader level in AIT (planning, organizing, briefing, supervising, etc.) tends to be much greater for "rifle squads" than for "weapons crews."

The four platoons within each E treatment and the C-1 treatment were also divided (orthogonally to MOS) into two levels of cadre orientation. In fact, it became quite difficult to maintain this separation (of two platoons run by cadre who were given a one-day orientation, and two platoons run by cadre who were given a five-day orientation), due to personnel changes and "multiple" or "fractional" assignments.<sup>3</sup>

Within the preparation course treatments, E-2 and E-4, two smaller experiments were run to evaluate "traditional" and "functional context" training methods differences and also to compare "high cost" versus "low cost" training support. Finally, within each platoon in all of the E and in the C-1 treatments, there were the four leader types: AP, Ap, aP, and ap.

#### MOS Differences

Table 5 summarizes the results of A-tests (17) of matched platoons means of the 21 residual criterion scores.

<sup>1</sup>The within-platoons error term excludes (1) unit (company and platoon, as well as MOS), (2) runs, and (3) unit-by-runs interaction terms, and the four squad data within each platoon have been regressed on leader's GT Aptitude Area and BCT Peer Rating scores.

<sup>2</sup>Table 4, showing C-1 to E-2 and C-1 to E-4 comparisons, suggests a slight superiority of E-4 on leader behavior and activity and on followers' attitudes, whereas E-2 makes a somewhat better showing on the two career measures.

<sup>3</sup>For instance, one officer might be assigned to supervise both light weapons platoons, or a platoon sergeant might have an assistant, or the sergeant might be absent part of the time and a substitute would take charge.



Table 5  
A-Tests of Matched Platoon Means of  
21 Residual Criteria, by MOS

| Variable | Description   | MOS Differences |
|----------|---|-----------------|
| 1        | Sum AIT Ratings   | LWI*            |
| 2        | Follow-up, Combat Rating  | NS              |
| 3        | Leaders AIT Test  | "               |
| 4        | Followers AIT Test  | "               |
| 5        | Squad Esprit  | HWI             |
| 6        | Leaders Attitude  | LWI*            |
| 7        | Followers Attitude  | NS              |
| 8        | FTX (Preparing, Briefing, and<br>Getting Information)           | LWI             |
| 9        | FTX (Tactics)   | NS              |
| 10       | FTX (Control)   | LWI             |
| 11       | FTX (Attitude)  | NS              |
| 12       | Leader Behavior<br>(Initiating Structure)                       | HWI             |
| 13       | Leader Behavior<br>(Consideration)                              | NS              |
| 14       | Leader Activity (Rewarding)                                     | NS              |
| 15       | Leader Activity (Defining and<br>Giving Information)            | NS              |
| 16       | Leader Activity (Welfare)                                       | LWI**           |
| 17       | AIT Superiors Ratings   | LWI             |
| 18       | AIT Fellow Leaders Ratings                                      | NS              |
| 19       | Leaders Trainee Attitude<br>Questionnaire (Career)              | NS              |
| 20       | Followers Trainee Attitude<br>Questionnaire (Career)            | NS              |
| 21       | Followers Trainee Attitude<br>Questionnaire ("Trainee Leaders") | NS              |

\*Variables 3 and 4 were standardized within MOS and, hence, cannot be compared.

The 80 platoons were matched on runs, companies, and cadre orientation to produce 40 pairs. Of the 19 usable criteria (leaders' AIT tests and followers' AIT tests were not comparable in raw score form, had been standardized within MOS, and, hence, were not usable to make MOS comparisons) there are 8 differences where  $p < .10$ . Two of these, V5 Squad Esprit and V12 Leader Behavior, Initiating Structure, favor the heavy weapons infantry leaders. The remaining six: V1 Sum AIT ratings; V17 AIT Superiors Ratings; V6 Leaders Attitude toward the Army and NCOs; V8 Field Tactical Exercise Preparation, Briefing and Giving Information; V10 Field Tactical Exercise Control; and V16 Leader Activity, Welfare, all favor the light weapons infantry leaders.

Better performance of light weapons infantry squad leaders on the field tactical exercise was somewhat anticipated, since these leaders (and their squads) received more practice in patrolling operations. It appears that the light weapons leaders (these MOS contrasts involve 40% control and 60% experimental platoons) had more favorable attitudes toward the Army and NCOs and were also highly rated by their NCOs. It is of interest that the heavy weapons leaders were more "structuring" but that light weapons leaders were reported as more specifically concerned with the physical welfare of their men. On

the other hand, squad esprit appears more highly developed in the heavy weapons platoons.

#### Are There Cadre Orientation Differences?

All 21 criteria were inspected for possible differences, and in each instance where one appeared, a *t* test was made.<sup>1</sup>

Of the 21 criteria, there were only two results significant at the .01 level—squad leaders serving under the five-day orientation cadre were more proficient on their end-of-AIT tests and in preparing, briefing, and giving information on the field tactical exercise.<sup>2</sup>

#### Are There Training Methods Differences?

The results for this analysis were entirely negative.<sup>3</sup> In view of the fact that approximately 50 of the 150 hours in E-2 and 100 of 300 hours in E-4 were in contrast, there can be little doubt that a sizable block of instruction was involved. However, it is noted that only three AIT cycles were included, and that the *N*s in each group were approximately 20. The experimenters encountered some frustration in accomplishing a satisfactory contrast, so there is a question regarding how great an instruction method contrast was actually effected. In any event, it is certain that no significant differences were found.

However, it should be noted that, typically, the "functional context" approach has proven effective when the trainee is prepared to perform a finite number of specific operations that are essential for the successful performance of a job. Usually, the job is analyzed in detail (and sometimes simplified by removing more difficult elements and by providing various job aids) and then the training is designed to prepare the man to perform each element.

Two factors to be considered in interpreting our findings on instructional method are that (a) the functional context method has been found most successful with lower-aptitude personnel (this might have precluded any effect in this study); and (b) the application of the functional context principle (18) in this study is open to question. In this sense, the Work Unit NCO "functional context" method was not entirely faithful, since it attempted to accomplish both training and education. Numerous situations that would be encountered in AIT were used as contexts, but the presentation and exercises were viewed more in terms of "examples" and "principles" than "this is exactly what will happen" and "here is exactly what you must do."

#### High Cost Versus Low Cost Comparisons

This contrast was accomplished for one run involving only two companies (Hq. III and D III) and a total of only 30 trainees. Moreover, only about 20 hours of instruction were actually subject to contrast. Of the 21 criteria, only the Leader Activity Questionnaire rewarding, and LAQ defining and giving

<sup>1</sup>In all cases, the mean square within platoons was used as the error estimate (for many of the criteria, run, company, MOS, and interaction terms were significant).

<sup>2</sup>If  $p < .10$  differences are considered, the squad leaders under five-day cadre also exercised greater control over their men on the field tactical exercise; however, their followers' career attitudes were less favorable.

<sup>3</sup>Each of the 21 criteria were tested by a *t* test that contrasted the average of the company means for the two groups against an error term based on the pooled mean squares of within cycles-groups and their corresponding degrees of freedom. Hence, for the two groups, each company contributed equally to the average, despite accidental loss of data (unweighted means); the error term excludes between company differences.

information show possible significant differences. Mann-Whitney U-tests (19) were computed due to heterogeneity of variances. For LAQ rewarding, p was just under .05 and for LAQ defining and giving information, it was just over .05. Recalling that these two measures show an intercorrelation of .65 and that 21 criteria were tested, the results are not impressive. The data at hand favor the "low cost" technique; "programed instruction" methods employed in this technique were possibly more novel and conceivably more efficient, and may have had more impact on the trainee that resulted in higher frequency of employment of rewards and attention to the need to define and give information in AIT.<sup>1</sup>

<sup>1</sup>A consequence of the "low cost" programing work was the design of an "automated package" for accomplishing 20 hours of leadership instruction. Test results (20) demonstrated the advantage of the package, which was subsequently reproduced and distributed to all Army Training Centers.

## Chapter 5

### DISCUSSION

Despite the fact that it was necessary to terminate the experiment before the design requirements were completed, the general objectives were accomplished.

#### SELECTION

For two input factors, BCT Peer Ratings and General Technical Aptitude Area scores, correlational analysis confirmed the value of both measures. For some criteria, the BCT Superiors Ratings or the Classification Inventory were found to have predictive value. However, age was of little value as a prediction factor, and where education was involved, the relation was negative. Although the BCT Peer Ratings were relatively expensive to obtain,<sup>1</sup> it was obvious that they were uniformly effective in predicting nearly all criteria. The scores based on the Army Classification Battery (GT and CI) were relatively less effective than Peer Ratings, but clearly useful.

In view of these results, it was concluded that (a) the candidate for leadership training should be considered only if he was above average on BCT Peer Ratings and the appropriate Aptitude Area score; and (b) the superiors' evaluations should be used, but only to delete from consideration men who were obvious misfits or to recommend men who were outstanding candidates in the opinions of the cadre despite poor aptitude scores or low Peer Ratings.<sup>2</sup>

This selection procedure was accepted by the Army and was implemented in all Basic Training Centers by the U.S. Army Personnel Research Office.

#### TRAINING

Regarding the training systems, the results were relatively clear-cut and impressive. The experimental training methods were clearly superior to the experimental control group on nearly all criteria.

Although additional cost was involved (primarily in delaying candidates in the Army Training Center), it was apparent that the Leader Preparation Course System was somewhat more effective and definitely more feasible than the Integrated System. Since the results for the Integrated System were highly variable from cycle to cycle, it was obvious that it would be extremely difficult to implement such a system on a permanent basis. The problems of scheduling and control of training quality were too difficult.

<sup>1</sup>Involving approximately one hour for each BCT trainee plus clerical time required to prepare squad rosters, collate ratings, and compute averages.

<sup>2</sup>This provision, although possibly contributing relatively little to overall predictive efficiency, does include the military superior in the selection system, probably eliminates the gross misfits, and gives the culturally disadvantaged (low aptitude) or socially less acceptable (low peer rating) enlisted man an opportunity for candidacy.

It had been acknowledged from the beginning that the two-week versus the four-week course comparison was probably not the best test of what a four-week program could accomplish. It was at least encouraging to find (for cost-conscious decision makers) that there was no criterion evidence that indicated a compelling reason to select the four-week program over the two-week program.<sup>1</sup>

#### TRAINING METHOD AND COST

Neither the Functional Context versus Traditional training methods, nor the "High Cost" versus "Low Cost" techniques comparisons produced substantial criterion differences. The experience in attempting to generate such contrasts in training methods and techniques did, however, serve to enrich the conception of possible approaches to training and resulted in the recommendation of a hybrid program that employed useful aspects of the various approaches. Further, the economies and standardization afforded through the low-cost techniques led to the development of a 20-hour "automated package."

Probably the most outstanding contributions were the "null findings" that the relatively novel "Functional Context" and "Low Cost" approaches to leadership training were at least competitive with the conventional approaches (Traditional and All Instructor). In view of the social and technical change difficulties involved in generating these less conventional procedures, it is conceivable that a greater advantage might have been demonstrated if a larger portion of the Work Unit staff's research effort had been directed to these relatively subsidiary studies.

#### EXPERIMENTAL SOCIAL CHANGE EFFECTS

The comparisons between the "experimental control" (C-1) and "normal control" (C-2) groups indicated some difficulty in imposing the various experimental conditions on the existing system. The cadre had to work with leaders not of their own choice. For the purposes of the test, some of these leaders were not the best available. Moreover, the cadre were expected to use and treat these trainee leaders in ways that sometimes were not familiar or convenient. Understanding and acceptance of the need for the research varied markedly among the cadre.<sup>2</sup>

The contrasts between C-1 and C-2 (particularly the various interpretations on the part of the cadre in the "normal control" C-2 treatment) were most compelling (unfortunately, this information is also confounded with selection). Had there not been an "experimental control" (C-1), the evidence for the utility of a leader preparation system would have been far more equivocal. A previous NCO report (5) treats some aspects of the AIT cadre effect in considerably greater detail. Neither the one-day nor the five-day cadre orientation courses, as used in this study, effected differences in cadre perception. This further

<sup>1</sup>However, the subjective judgment of instructors and near-unanimous response of trainee leaders to the program critique (for the experiment, the Troop Use Feasibility Test, and subsequent implementation populations) have indicated the opinion that a program somewhat longer than two weeks would be profitable and was desired by the trainee.

<sup>2</sup>A blind rating of qualitative information on treatment of trainees by cadre in AIT showed that there was a significantly negative response to trainee leaders during Run 1, which moved to a neutral point during the remaining three runs but never averaged in the clearly positive region.

supported the use of C-2 as a reference group for interpreting the major experimental findings.<sup>1</sup>

It was clearly implied from the data that in a field evaluation of system design involving major changes in organizational procedures and long-established institutional behavior of key participants, serious attention needs to be given to the problems of test design and analysis, as well as to operational control of the test conditions. It was further evident that in a strategy for implementing a leader preparation system, the "AIT problem" would have to be considered as a first priority challenge.

#### UNIT EFFECTS

The numerous unit (platoon or company), run, and unit-by-run interactions were, of course, useful in assessing the relative components of these various effects (relative to treatment differences, within-platoon error, and so forth).<sup>2</sup> In general, the results confirmed the need to consider such effects in making assessments. In some cases, these effects are obviously large and could obscure differences of interest if they were left in an error term.

Although no company was uniformly "good" or "poor" on all criteria for all treatments, and despite the fact that treatments were not completely balanced for companies, it was clearly evident that the companies could be rank-ordered and that there were differences among them that tended to persist throughout the several runs. The same statement holds for the platoons. Since a random sample of units is not represented, these variance components can only be considered as indications.

It is clear, however, that these five AIT companies, with four treatment cycles each, did vary significantly on the following measures: ratings by peers and superiors; ratings by other superiors approximately 18 months later; end-of-AIT tests of leaders and followers; squad esprit; attitudes of leaders and followers toward the Army, officers, and NCOs; attitudes of leaders and followers toward reenlisting or seeking rank; leader performance in preparing for a field tactical exercise; and reported frequency of trainee leaders in initiating structure and use of rewards as motivators.

When these company effects are removed from the platoon effects, we find a number of significant residuals which indicate that platoons display differences, over and above company differences, in the AIT test performance of the leaders (but not the followers); squad esprit; leaders' and followers' attitudes toward the Army, officers, and NCOs; initiating structure and consideration behavior of the leaders; leader career attitudes; and followers' estimations of "trainee leaders." These results point to obvious differential effects of units on trainee leaders and on their followers.

The company-by-run interactions are generally paralleled by significant treatment contrasts that would be anticipated considering the experimental design. However, there are also significant platoon-by-run residuals after removing company-by-run (including treatment) effects. Such residuals are in evidence for follow-up ratings, leaders' and followers' AIT test performances,

<sup>1</sup>Subsequent experiences indicated that the leaders were really accepted by cadre only as they repeatedly proved their merit to each cadremember. At first, this acceptance was slow, but as the novel aspects of the program became familiar, what had been cadre resistance and reservation gave way to support and endorsement (1).

<sup>2</sup>As shown in the complete analyses presented in Appendix T in the Supplement.

squad esprit, leader activity in defining and giving information and in welfare of men, and followers' career attitudes.

These results clearly imply that platoons interacted to treatments and runs in ways that cannot be accounted for purely in terms of the company-by-run (including treatments) effects. Neither military occupational specialty (MOS) nor cadre orientation differences can fully account for these results. It is clear that platoons (and hence platoon sergeants) were not equally uniform in their companies in their responses as they proceeded from treatment to treatment. These findings point again to the "AIT cadre problem" but focus on the platoon leader or platoon sergeant as significant agents in respect to the above criteria.

The runs' main effects are, of course, discomfiting in the sense that they imply lack of adequate control over input, training, or assessment. Where the nested analyses of variance produced only one run main effect that was significantly greater than the within-company effect (this was for follow-up ratings "combat leaders"), the run effects, when tested by either the within-company or the within-platoon error terms, were also found to be significant for the following measures: leaders' and followers' AIT tests; leaders' attitudes toward the Army, its officers and NCOs; preparation for and tactics on the field tactical exercise; LAQ defining and giving information; and superiors' AIT ratings.

The AIT test, unfortunately, was not completely stable, due to changes in the test itself and to compromise of the test over time. In all probability, the FTX was also not entirely stable. Leaders' attitudes and behavior, as well as AIT superiors ratings, were probably responsive to changes over runs (institutional and social changes) in cadre attitude and behavior. The run differences for follow-up results, which are markedly large, probably reflect a complex of conditions with respect to input, training, job assignment, and rating reference. These run differences fortunately were balanced (but not completely), due to the attempt to establish one of each type of treatment in each run. The most obvious caution is that these particular criterion scores in raw form cannot be safely compared across runs.

#### OVERVIEW

At a practical level, the experiment did produce both the decision information and the necessary elements of a selection and training system for developing potential noncommissioned leaders.

At a more fundamental level, the extensive examination of assessment devices led to a wealth of empirical information regarding leader aptitude, behavior, performance, and attitude, and their relation to some corresponding measures for followers and for superiors. The complexity of the relations and differences, and the general lack of unusually large correlations or marked main effects provide additional information on the complex and subtle nature of leadership, and help to explain the amazing paucity of positive research findings that are specifically related to leadership training.

It seems evident that while small-scale training efforts evaluated against highly proximal criteria may produce results in tightly controlled experiments, the demonstration of substantial differences in real field situations on system-relevant and valued criteria is bound to be fraught with difficulty and frustration. This large-scale study would suggest that main training effects may not be large; interactions abound. The criteria are several, sometimes independent, occasionally incompatible. Moreover, resistance and social change problems are almost inevitable if the system participants are actually involved and must accommodate to the system requirements.

1. Hood, Paul D. *Implementation and Utilization of the Leader Preparation Program*, HumRRO Technical Report 67-2, March 1967.
2. Hood, Paul D. *Research on the Training of Noncommissioned Officers Progress Report: NCO I*, Research Memorandum, HumRRO Division No. 3 (Recruit Training), July 1960.
3. Showel, Morris. *A Guide for the Infantry Squad Leader*, HumRRO Division No. 3 Working Draft, December 1958 (subsequently published as, *A Guide for the Potential Noncommissioned Officer*, USCONARBC Pamphlet No. 350-24, June 1963).
4. Hood, Paul D., Kern, Richard P., and Showel, Morris. *Research on the Training of Non-commissioned Officers: A Summary Report of Pilot Studies*, HumRRO Technical Report 65-17, December 1965.
5. Hood, Paul D., Showel, Morris, Taylor, John E., Stewart, Edward C., and Boyd, Jacklyn. *Preliminary Assessment of Three NCO Leadership Preparation Training Systems*, HumRRO Technical Report 67-8, June 1967.
6. Dunnett, Charles W. "A Multiple Comparison Procedure for Comparing Several Treatments With a Control," *J. Amer. Statistical Assn.*, vol. 50, no. 272, December 1955, pp. 1096-1121.
7. Fleishman, Edwin A. "The Description of Supervisory Behavior," *J. Appl. Psychol.*, vol. 37, no. 1, February 1953, pp. 1-6.
8. Hood, Paul D. *Leadership Climate for Trainee Leaders: The Army AIT Platoon*, Research Memorandum, HumRRO Division No. 3 (Recruit Training), August 1963.
9. Halpin, Andrew W. "The Leadership Ideology of Aircraft Commanders," *J. Appl. Psychol.*, vol. 39, no. 2, April 1955, pp. 82-84.
10. Hemphill, J.K. *Leader Behavior Description*, Personnel Research Board, Ohio State University, 1950.
11. Showel, Morris and Peterson, Christian W. *A Critical Incident Study of Infantry, Airborne, and Armored Junior Noncommissioned Officers*, Staff Memorandum, HumRRO Division No. 3 (Recruit Training), July 1958.
12. Lange, Carl J. and Jacobs, T.O. *Leadership in Army Infantry Platoons: Study II*, HumRRO Research Report 5, July 1960.
13. Johnston, Robert A. "A Methodological Analysis of Several Revised Forms of the Iowa Picture Interpretation Test," *J. Personality*, vol. 25, no. 3, March 1957, pp. 283-293.
14. Schultz, William C. *FIRO: A Three Dimensional Theory of Interpersonal Behavior*, Rinehart & Company, Inc., New York, 1958.
15. Winer, B.J. *Statistical Principles in Experimental Design*, McGraw-Hill Book Company, New York, 1962.
16. Yates, F. "Analysis of Replicated Experiments When Field Results Are Incomplete," *Empire J. of Experimental Agricultural Research*, vol. 1, 1933, pp. 129-142.

#### LITERATURE CITED