Research Note 85-4

INFANTRY RIFLE SQUAD OPERATION ORDERS: THEIR CHARACTERISTICS AND ROLE IN MISSION SUCCESS

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Military teams are characterized by functions that distinguish them from collections of individuals. Two of these functions, orientation and organization, were examined in the context of the Infantry squad leader's operation order.

Operation orders given by 54 squad leaders prior to a movement to contact mission were analyzed for content. Omissions of information from the higher-level platoon order reflected a failure of the squad leader to communicate -

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20. ABSTRACT (continued)
critical orientation and organization information. However, few distortions of platoon order information occurred. Although leaders emphasized squad execution, they made few contingency plans. Leader experience was the best predictor of operation order content and quality. Leaders frequently used operation order delivery techniques that were likely to increase member confusion regarding the mission.

The movement to contact missions were conducted using the multiple-integrated laser engagement system (MILES) against an opposing force of three. The strongest correlate of mission outcome was the degree of experience the opposing force had acquired through participation in multiple missions. Squad leader experience was a secondary predictor, and operation order content had only a small relationship to mission outcome.

It was suggested that operation order content may be more strongly related to mission progresses than mission outcome, that use of operation orders as a mission planning tool should be stressed, and that operation order training should include techniques that will enhance the recall of platoon-order information. The study also demonstrated that team dimensions such as orientation and organization can be measured in a field training setting.

FOREWORD

The Fort Benning Field Unit has successfully used psychological and educational principles to solve Army training and assessment problems. The team research program of this unit focuses specifically on improving small-unit training and assessment.

The operation order is one means available to a leader for preparing his unit for its mission. At the small-unit or team level the order functions to orient and organize the team for its mission.

This report presents research conducted to describe the characteristics of Infantry rifle squad operation orders, and their relationship to squad experience and mission outcome. Quality of the operation orders varied, with leaders omitting information in the platoon order and/or failing to elaborate on orientation and organizational information that could help the squad in its mission. Operation order quality was related to leader experience, but not to mission outcome. The results indicate that squad leaders need training in both the delivery of operation orders and in using them as a planning tool.

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INFANTRY RIFLE SQUAD OPERATION ORDERS: THEIR CHARACTERISTICS AND ROLE IN MISSION SUCCESS

EXECUTIVE SUMMARY

Requirement:

Squad performance in ARTEP missions is influenced by many factors at both the individual and the squad or team level. To date, the development of training programs has focused primarily on the individual skills that impact upon squad-level performance. However, in order to develop sound training programs for small military units, there is a need to systematically examine team-level skills, in terms of the characteristics of such skills, their development, and the ways they impact upon team-level performance. Two functions that distinguish teams or squads from collections of individuals are that teams must be oriented toward the mission to be performed and must organize themselves for the mission. These functions represent team level skills that should be considered in training program development. There is a requirement to investigate the existence and characteristics of such functions with squad-level units and to examine their relationship to squad performance. Both of these functions are reflected in the squad leader's operation order which was the primary focus of the present study.

Procedure:

The operation orders for 54 squad leaders from Infantry units conducting a movement to contact mission were analyzed for content. Major variables coded were: accuracy and completeness of the statements that reflected information in the platoon order, content of additional information presented by the leader, and contingency statements. Interrater reliability on these variables ranged from .88 to .99. Data on operation order delivery such as who was briefed and use of terrain maps were also obtained. Each rifle squad conducted one movement to contact mission against an opposing force of three individuals. All individuals were equipped with MILES (multiple integrated laser engagement system). Mission outcome was measured by the algebraic difference between the percentage of survivors from the tested squad and the percentage of survivors from the opposing force, and by a military criterion which represented the percentage of survivors on either side and whether the tested squad had overtaken the objective. Experience data on the squad leaders and members were obtained.

Findings:

Squad leaders tended to omit information in the platoon order rather than distort it. Most additional information provided by the squad leaders focused on mission execution; few contingency plans were given. Low levels of orientation and organizational information were given. Squad members rarely asked questions. Approximately half the squad leaders briefed only the team leader; another quarter briefed all squad members. Few leaders took notes during the platoon order, used terrain maps when briefing, or questioned squad members on their understanding of their mission responsibilities.

Multiple regression analyses indicated that the best predictor of operation order content was the squad leader's experience, i.e., length of time he had been a squad leader and length of time he had served in other squad positions. The best predictor of mission outcome was the length of time the opposing force had participated in the study. Squad leader experience was also related to mission outcome, but operation order characteristics had only a small relationship to outcome.

Utilization of Findings:

Training in the delivery of operation orders needs to stress the purpose of the order, techniques for increasing the amount of information in higher level orders that is relayed to the squad members, procedures for insuring that all members receive the same information as well as information that is critical to mission success (this includes information that serves orientation and organizational functions), and procedures for insuring that members know their mission responsibilities. The experience acquired by the opposing force's participation in multiple missions indicates that repetition in executing complex squad missions, with equipment such as MILES, can lead to higher levels of mission success and should be stressed in squad-level training.

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INTRODUCTION

Throughout much of the team/small group literature various models have been proposed to account for team performance (Alexander & Cooperband, 1965; Boguslaw & Porter, 1962; Dieterly, 1978; Kent & McGrath, 1969; Kneer, Berger & Popelka, 1980; Lowe & McGrath, 1969; Naylor & Dickinson, 1969; Shiflett, 1979; Sorenson, 1971; Steiner, 1972; Tuckman, 1967). Although these models vary in content and level of detail, most postulate that the nature of the individual team members and the team as a whole (e.g., individual ability, team leadership, individual experience, time team has worked together), the team situation (e.g., task type, situational or environmental constraints), and the process the team uses to accomplish the task must all be considered in some interactive fashion in order to account for team performance.

For at least twenty-five years researchers (Altman, 1966; Borgatta, Lanzetta, McGrath & Stordbeck, 1959; Collins, 1977; Glanzer & Glaser, 1959; Glaser, Glanzer & Morten, 1955; George, 1977; Goldin & Thorndyke, 1980; Hackman & Morris 1975; Hood & others, 1960; Miller, 1958; Nieva, Fleishman & Reick, 1978; O'Brien, 1968) have stressed the need to develop better measures of group processes and better procedures to describe the nature of group tasks. Developments in these areas require both conceptual and psychometric efforts. Obviously, the hope is that such improvements will allow researchers to better understand and account for team output than has been the case to date. The present study focused upon the measurement of two aspects of the group process --- that of orienting the group to the task at hand and of organizing the group appropriately to accomplish the task. The extent to which these variables contributed to the prediction of group output beyond that provided by individual and team member experience was also examined.

There are many ways of characterizing the dimensions or variables that distinguish collections of individuals from teams. Concepts such as cohesion, dependency, cooperation, formal member structure, team awareness, and task-oriented come to mind. At this date there has been no agreement within the research community regarding the best way of classifying such characteristics. Nieva et al. (1978) proposed four dimensions or functions that specify what a team does interactively to accomplish its objectives or goals: orientation, organization, adaptation, and motivation. The definitions for each of these functions were as follows (p. 63-64):

- Orientation: The processes by which information necessary to task accomplishment are generated and distributed to relevant team members, including information regarding team member resources and requirements and information about the environment's resources and demands.

  Organization: Processes necessary for the group members to perform their tasks in coordination, including the processes by which the team members decide who is to do what and when.

  Adaptation: Processes which occur as team members carry out accepted strategies, make mutual adjustments, and complement each other in accomplishing the team task (e.g., cooperation).

Motivation: Processes involved in defining team objectives related to the task and energizing the group towards these objectives.

The present study examined orientation and organizational functions as reflected in the Infantry rifle squad operation order (OPORD).

Operation Orders

All military units must be given an operation order prior to conducting a specific mission. The operation order details the coordinated actions necessary to carry out the unit commander's concept of the military operation (FM 71-2). Operation orders are issued at all levels of command down to the squad or section, and differ in detail and specificity depending upon the level of command. At the squad level the order is given orally. At all levels of command it is important that the commander or individual in charge "personally explain his concept (of the operation) to subordinates in considerable detail so that there are no misunderstandings about what they are to do. Understanding how the commander envisions the battle being fought assists them in carrying out actions on their own initiative when necessary — confident that they are operating within the framework of the commander's concepts" (FM 71-2, p. B-3).

There is some evidence that both the presence and content of OPORDs are related to combat effectiveness. In a review of the combat literature of World War II and the Korean War, McKay, Gianci, Hall and Taylor (1959) found that communication and planning within small Infantry units were critical to unit success. As stated by one platoon sergeant "every man in the squad should listen to his squad leader's orders with the thought in mind that he may have to be the squad leader before the battle is over" (p. 4). In armor/anti-armor platoon attack exercises, Scott, Meliza, Hardy, and Banks (1979) found that successful units were more likely to have delivered the platoon leader's OPORD to all crew members than unsuccessful units (83% briefed in successful units vs. 59% in unsuccessful units). In addition, unsuccessful units often suffered a high number of casualties, including the leader, early in the exercise leaving crews with inadequate information on how to proceed.

All operation orders have a formal, sequential structure, consisting of five paragraphs: Situation, Mission, Execution, Service Support, and Command and Signal. Each of these paragraphs can be described briefly as follows:

Situation: Background information regarding the location, size and strength, composition, deployment, movement and weapon capabilities of the enemy and friendly forces likely to be involved in the military engagement, and information on terrain and weather.

Mission: Statements regarding the task to be accomplished by the unit.

Execution: Information on how the mission is to be accomplished; the unit's tactical plan.

Service Support: Information and instructions regarding support for the unit including transportation, rations, supply-resupply of ammunition and casualty evacuation.

Command and Signal: Information regarding unit command and the operation of signal communications.

In terms of the team functions identified by Nieva et al. (1978), each operation order paragraph provides orientation information for the team members, and the Execution and the Command and Signal paragraphs also provide organizational information. Obviously, the operation order does not include all the orientation and organizational information that may be relevant to the mission. Infantry rifle squads are not ad hoc groups; they have a history. This history, which includes all the experience that they have had as a squad as well as the training for individual team member positions experienced by each member, impacts upon the squad leader's operation order. For example, standing operating procedures (SOP) that have been established within the squad also serve orientation and organizational functions. If such SOP are well established and applicable to the specific mission, it may not be necessary for the squad leader to give a detailed Execution paragraph. However if the mission and situation are unfamiliar to the squad, the leader may devote much time to execution, thereby focusing heavily on the orientation and organizational functions of the team.

The orientation and organizational functions are particularly important for teams such as the Infantry rifle squad. Infantry squads can be classified as teams that often perform emergent or unexpected, as opposed to established or routine, tasks (Boguslaw & Porter, 1962; Dyer, Tremble, & Finley, 1980). Member actions can vary greatly from mission to mission depending upon the dynamic interaction between the enemy and the squad itself, the terrain, the weather, etc. Thus in order to perform well the squad must be informed about each situation/mission that it faces and must be organized appropriately for it. On the other hand, in some military units team member actions remain relatively constant from mission to mission (e.g., actions of a mortar crew vary little across missions). In such cases, the orientation and organization functions become less important.

What constitutes a "good" squad operation order? There would appear to be at least two important dimensions: the OPORD content and its delivery. The content of the order should relay, correctly and completely, the information given to the squad leader by the platoon leader, and should also provide additional information necessary for accomplishment of the mission. Henrikson et al. (1980) identified critical elements that should be relayed within each OPORD paragraph (e.g., Mission - what should be done, where it is to be done, and at what time it is to be done).

Content

Obviously, the squad leader does not want to give erroneous information to his squad. Frequently, squad leaders take notes while receiving the platoon order in order to reduce the likelihood of errors when giving their squad orders. Memory studies (Bartlett, 1932) have clearly shown that

distortions and omissions occur during the free recall process, although there is some evidence that fewer distortions occur when the content to be recalled is highly structured (Kintsch, 1977). Operation orders clearly have a structure and thus may be less susceptible to the failings of one's memory.

Additional information presented by the squad leader may also be crucial to mission success. The OPORD is the last chance for the squad leader to prepare his squad prior to the mission. Thus it is important that his tactical plan be clear to all members, and that contingency actions be specified. Such additional information is most likely to fall in the Execution and the Command and Signal paragraphs. The amount of such additional information may depend on the time given to prepare the OPORD, whether or not the leader has an opportunity to conduct a recon, and the squad SOP. To the extent that operation orders influence, directly and/or indirectly, squad mission success, it was expected that operation orders that correctly and completely relayed the information in the platoon order and that specified additional execution plans, including contingency actions, would contribute to success.

Henriksen et al. (1980) specified four other actions taken by the squad leader during the OPORD that could influence the conduct of the mission. The leader should ask squad members to recite their specific responsibilities, graphically display the overall operation by using visual aids (ground, sticks, rocks), ask subordinates to demonstrate their specific tasks, and conduct rehearsals of the planned execution by deploying forces in a mock exercise.

Delivery

There are many facets to the effective delivery of an operation order, and each squad leader has his own procedure for giving an order. Delivery style per se (e.g., dynamic vs. nondynamic vocal inflections, the use of pauses) was not examined in the study. However, it was possible to observe the following nonverbal aspects of the operation order delivery by some of the squad leaders: whether terrain maps were used by the squad leader, who the squad leader briefed, proximity of the leader to the individuals briefed, body orientation of the leader to the squad members, and eye contact between the leader and squad members.

Ideally, each squad member should receive the same operation order. This does occur when the leader briefs all members simultaneously and is the procedure taught by the US Army Infantry School. However, if the squad leader uses another briefing procedure all members may not receive the same order. For example, the squad leader may brief only the two team leaders and then allow each team leader to brief his team members, or the leader may brief one rifle team and then the other. In either case it is unlikely that the members within the two teams will have received the same information. Such relaying of information can lead to distortions and omissions of message content as demonstrated in free-recall memory studies (Bartlett, 1932).

Nonverbal cues may affect the effectiveness with which an OPORD is delivered and the way in which the information is received. Research on eye contact indicates that it serves as a regulator or cue for verbal responses and that it also facilitates the understanding of verbal messages (Cary, 1978; Wiener, Devoe, Rubinow & Geller, 1972). In dyad conversations, eye contact is often used by the speaker to emphasize points or to obtain a response from the listener (Kendon, 1967). Dependent individuals have been found to rely more heavily on eye contact than on other nonverbal and verbal cues in order to understand messages (Neville, 1974). Even body orientation and lean serve as important cues in conveying the interest and attitude of one individual to another (Mehrabian, 1969).

These results have implications for OPORD delivery. For instance, the very structure of the squad places members in dependent or subordinate positions in relation to the squad and team leaders, and the importance of eye contact to persons in such subordinate positions has been mentioned. Since eye contact plays a regulating role in verbal interactions, leaders should attempt to optimize the use of these cues in delivering an operation order. That is, the squad leader should position himself and the squad so that eye contact can be maintained with the squad members at all times. Aside from eye contact, squad leaders also rely on other nonverbal cues (e.g., gestures) to convey critical elements of the operation order. Whether or not eye contact and body orientation strongly affect the delivery and reception of an operation order is an empirical question which warrants investigation. Some preliminary data on this question were collected in the present study.

Relationship of Individual to Team Performance

One might expect that teams composed of highly skilled, competent, and experienced individuals would be more effective than teams composed of individuals with low skill levels and relatively little experience. Unfortunately, studies examining such relationships within military teams are few, and the typical findings have been no or weak relationships. In tank crews, low relationships have been found between crew gunnery performance and the time the tank commander and gunner have served together, the experience of the tank commander, the experience of the gunner, and past gunner performance (Eaton & Neff, 1978; Kress & McGuire, 1979). Yet Havron and McGrath (1961) found that the rifle squad leader characteristics of job knowledge and intelligence were the best predictors of squad effectiveness ($r = .35$ to $.50$).

Indirect evidence of the importance of individual skill within team/crew positions comes from studies of personnel turbulance or turnover within teams. Eaton and Neff (1978) found a reduction in tank crew performance on structured gunnery tasks when tank commanders and gunners were replaced by other personnel. In two laboratory studies (Trow, 1964; Ziller, 1963) turnover created the greatest decrease in group performance when individuals in key positions (e.g., positions with the greatest control) were replaced. In addition, Trow found that group performance declined when the replacement's level of intelli-

gence was lower than his predecessor's. In studying five-man teams over a period of six days, Morgan, Coates, Alluisi, and Kirby (1978) found that when teams were composed of 40% or more untrained individuals, team performance declined.

The lack of clear-cut relationships between individual skill/competency/experience and group performance may be explained in terms of the unreliability, invalidity, and/or insensitivity of many individual and group performance measures. Researchers may have also failed to consider moderating variables that can influence such relationships. Gill (1979) found that the nature of the task influenced the ability-group performance relationship. In a highly cooperative motor task, group performance was dominated by the lower-ability partner; the higher-ability partner could not compensate for the other partner's performance. This relationship was not as strong on a task where less cooperation was required. In a different context Jones (1974) examined the degree to which individual performance in the professional sports of tennis, football, basketball, and baseball predicted team outcome. Multiple correlations between individual or subteam skill measures and team performance ranged from .75 to .93 for all the sports except basketball where the correlation was .58. Jones inferred that the lower relationship for basketball indicated a contribution to team performance by factors other than individual skills per se, such as coordination. Overall, the relationships between individual and team performance in Jones' study are much higher than those in the previously cited laboratory and military settings. This discrepancy may be due to the higher reliability of Jones' measures since both predictor and criterion variables were based on repeated games usually over several years of play.

In the present study the primary individual performance/skill variables used to predict squad outcome performance were the amount of time the squad leader had been a squad leader, amount of time the leader had held other rifle squad positions, time the squad members had held their present positions, and the time members had held other squad positions. Since these variables were not measures of knowledge or skills directly related to the squad mission, their association with mission outcome was not expected to be high. Another factor which could further attenuate the individual-group performance relationship was the nature of the mission --- movement to contact. The high degree of leader-subordinate interaction (e.g., teamwork, planning, communication) required on such attack missions (Shriver, Jones, Hannaman, Griffin & Sulzen, 1979) was expected to reduce the extent to which individual skills would predict mission outcome, as found in the Gill (1979) and Jones (1974) studies.

METHOD

Sample

A total of 54 Infantry squads, consisting of seven to ten men each, participated in the study. Forty-five of these squads came from a single light Infantry unit, representing the five companies in the unit. The three platoons within the five companies were randomly assigned to one of the three training conditions described below. Thus the three squads within a given platoon received the same training. The remaining nine squads came from a different light Infantry unit and served as a comparison group.

The authorized composition of an eleven-man Infantry squad is as follows:

Position	# of Individuals	Authorized Rank	Authorized Military Occupational Speciality (MOS)
Squad Leader	1	E6	11B30
Team Leader	2	E5	11B20
Automatic Rifleman	2	E4	11B10
Grenadier	2	E4	11B20
Rifleman	4	E3	11B10

Because of size variations the participating squads differed in varying degrees from this authorized structure. In addition, all squads were asked to add a machinegun to the squad simulating the attachment of a machinegun team from platoon headquarters. Some squads made use of the machinegun, while others did not.

Design: Squad Training

The OPORD data were collected as an adjunct to a study that compared different forms of squad and leader training. The design of this study is described, since it was necessary to control for possible treatment effects in the OPORD data analysis.

The experimental squads were randomly assigned by platoon to one of the three following training treatments: Leader training, MILES (multiple integrated laser engagement system) training, or Leader and MILES training. Leader training consisted of three Field Opposition Exercises (FOX) and three Battle Simulation board game plays. The FOX is an abstraction of a full field exercise in which only leaders participate. In the FOX training sessions, the squad leader and his two fire team leaders simulated a squad for a general training session, a movement to contact exercise, and a hasty defense exercise. The battle simulation training followed a similar pattern for three training sessions, however, only the squad leader and one of his fire team leaders played the game. The squads receiving MILES training practiced with MILES equipment by serving as the offensive force in a hasty defense mission. The remaining squads received both the Leader and MILES training.

The comparison squads received no form of squad or leader training. They were from a different Infantry unit and were not randomly assigned to the comparison group.

The MILES was used throughout the test as a means of realtime casualty assessment. The MILES equipment for light infantry consists of a laser transmitter for the primary weapon (rifle or machinegun) and two harnesses for the soldier (a helmet harness and torso harness). The laser transmitter attaches to the primary weapon and sends a narrow laser beam down the line of fire when a blank round is fired. The soldier harnesses detect laser beams striking detectors on the harnesses and signal the soldier by buzzing with either a short signal indicating a near miss or a continuous signal indicating a hit. To stop the hit signal, the soldier must remove a key from his laser transmitter (disabling the transmitter) and insert it into the torso harness. The key cannot be removed without starting the hit buzzer again. When soldiers are to be returned to active participation, the harness must be reset with a controller key.

Procedure and Measures

Squad Background Variables

The following demographic information was obtained on individual squad members: rank, number of months in rank and primary military occupational speciality (MOS). Combat veteran status on the squad leaders was also obtained. Squad members were asked questions regarding their experience within Infantry squads: number of weeks in present position within present squad, number of months held present position in all Infantry squads, other positions held in Infantry squads within present unit and outside of present unit, number of months held each of these positions, and whether or not they were regularly assigned to their present squad. Members also indicated the number of days all individuals in their present squad had worked together.

All squad members were asked to indicate the squad's standing operating procedures (SOP) in each of the following areas: basic load, redistribution of ammunition, assignment of equipment/weapons, prearranged signals, return of fire, shifting of fire, rate of fire, squad movement, and sequence of command. The number of individuals who agreed with the squad leader's and/or team leaders' responses (including the squad and team leaders themselves) was tabulated and used as an index of SOP agreement within the squad.

Operation Order

Content Analysis. The platoon leader read an operation order for a movement to contact mission to the squad leaders. The platoon order was the same for each squad leader, except for statements regarding platoon and squad movement that had to be tailored to the specific terrain where the mission was conducted. Leaders were given 15 minutes to prepare for the mission, including delivery of the squad OPORD, and had no opportunity to conduct a recon of the area.

Individual statements within the platoon leader's operation order were categorized according to the five standard paragraphs within an OPORD (Situation, Mission, Execution, Service Support, and Command and Signal), as well as the specific content of the paragraph. An outline of the paragraph content categories is presented in Table A-1, Appendix A. Each statement within the platoon order was given a unique number that reflected the paragraph content code. The platoon order and statement numbers are presented in Table 1.

The squad leader's OPORD was recorded on a tape recorder and then transcribed. During the transcribing process, each OPORD was divided into coding units for content analysis purposes. The coding unit employed is best described as a distinct idea or sentence. However, identification of coding units was not always automatic, since the oral operation orders did not always contain complete, formal sentences. Two raters were used to resolve any ambiguities regarding the boundaries of a coding unit.

Each unit was initially coded as reflecting either a statement given to the squad leader by the platoon leader, additional information provided by the squad leader, or a squad member statement. Each platoon order statement was also coded for its accuracy, and accurate statements were then coded for completeness. Additional statements presented by the squad leader were categorized according to the standard five operation order paragraphs, as a coordinating question, or as an additional comment. Statements within each paragraph were also given unique paragraph content codes. Additional Execution statements, provided by the squad leader were examined to determine whether they specified contingency actions. All squad leader statements that addressed a specific squad member were marked. Statements and questions by individual squad members were coded for paragraph and paragraph content. Refer to Table A-2 for definitions of these additional codes.

A complete description of the paragraph content categories is provided in Appendix B. Examples of the categories and coding guidelines are also presented.

Two raters coded each OPORD. Reliability indices were calculated on the ten variables used in the data analyses according to the agreement coefficient described by Krippendorf (1980, p. 138-140). These variables are presented in Table 2. Some of the variables were dichotomous, others involved multiple categories. Krippendorf's agreement coefficient applies to both situations. It ranges between 0 and 100%, corrects for small sample sizes, and adjusts for chance agreement; that is, a value of 65% means that the observed rater agreements are 65% above the level expected by chance.

The agreement coefficient for each variable, averaged across all squads, is presented in Table 2. In general, the coefficients were high, ranging from 88% to 99% with an over-all average of 95%. Any coding disagreements between the two raters were resolved before the data were analyzed further.

TABLE 1

MOVEMENT TO CONTACT PLATOON LEADER OPERATION ORDER

OPERATION ORDER STATEMENTS	PARAGRAPH-SENTENCE #
1. SITUATION	
The enemy has successfully conducted a withdrawal last night and has broken contact.	S1
The enemy force in our sector consists of light infantry.	S2
The enemy has not used chemical weapons so far.	S3
The enemy is believed to have left observation posts and small pockets of resistance behind in our sector.	S4
2. MISSION/EXECUTION	
(Map Orientation. Point out squad location.)	--
The platoon will move along this route to the initial checkpoint, ALPHA, located here.	E1
We will stop there and await further orders.	E2
Your squad will move as point squad.	E3
Move as quickly as possible by keeping the edge of the woodline on your (left/right) and in sight, move no further than 100 meters into the woods.	E4
Move in a traveling overwatch formation unless in contact with the enemy.	E5
Overcome all enemy resistance within your capability.	M1
Indirect fire support is not available.	E6
Report all enemy contact and intelligence items to me immediately.	E7
The other squad leaders have already been briefed and will follow your squad in a platoon column.	E8
3. SERVICE SUPPORT	
Your ammunition has been distributed.	SS1
Ammunition will be resupplied at checkpoint ALPHA if necessary.	SS2
4. COMMAND AND SIGNAL	
I will trail your squad, pass all communications to me verbally without a radio.	CS1
Move out of the assembly area and cross your line of departure in 15 minutes.	E9
The time is now _____. Do you have any questions?	--

TABLE 2

AVERAGE INTERRATER AGREEMENT COEFFICIENTS FOR OPORD VARIABLES

OPORD VARIABLE	AGREEMENT COEFFICIENT (%)	SAMPLE SIZE
OPORD Paragraph in which statement occurred: Situation, Mission, Execution, Service Support, Command & Signal plus Coordinating Questions and Other Comments	97	49
Origin of information for each statement: From platoon OPORD, additional squad leader information, squad member statement	94	49
Platoon order statements: Platoon order sentence code	99	49
Platoon order statements: Accuracy and completeness codes	90	49
Content of additional Situation statements	88	32
Content of additional Execution statements	92	49
Content of additional Service Support statements	98	13
Content of additional Command and Signal statements	92	36
Additional Execution statements: contingency versus noncontingency statements	94	49
Additional statements: Address/respond to individual squad member versus entire group	99	48
Average agreement coefficient	95	

Note. OPORDs were available on 49 of the 54 squads in the study. Agreement coefficients were calculated on each variable for each OPORD. Coefficients in this table represent the average coefficient across squads. The sample size varied across the variables due to the absence of certain types of information in some OPORDs.

Delivery. Information on who the squad leader briefed was obtained on all squads. It was possible to record other nonverbal behavior during the operation order on only the nine squads from one company. The following information was obtained: whether the squad leader used a terrain or paper map during the OPORD, whether the squad leader took notes while the platoon leader gave the platoon operation order, whether the squad leader had eye contact with the squad (i.e., OPORD recipients) during squad OPORD delivery, whether the leader faced the squad, whether the squad members maintained eye contact with the leader, whether the squad members faced the squad leader, if the squad members did not face the leader whether this action represented voluntary behavior or whether it resulted from the positions the squad leader instructed the members to assume, proximity of the leader to the squad, and whether squad security was maintained during the OPORD.

Mission Outcome

In a movement to contact mission at the squad level, the squad serves as the point squad of the advance party of a larger force. The squad (offensive force) is to make contact with the enemy within a reasonable period of time, assess the enemy situation, and take appropriate action. In the particular situation examined, the enemy had broken contact with the opposing force, but had left small forces behind to harrass it. The squad was told to eliminate any enemy resistance within its capability.

The opposition force (OPFOR) consisted of three soldiers from the reconnaissance platoon of the Infantry unit being trained, and operated from prepared defensive positions. At the beginning of the mission one member of the defensive force was placed forward of the main defensive line in an observation post. He pulled back to the main defensive position, if he survived, after engaging the offensive squad and causing the squad to deploy.

Two groups of three soldiers were used as OPFOR defenders in the study. The first set of individuals participated during the first three weeks of the study; the second during the last three weeks. The OPFOR was equipped with two claymore mines, approximately 120 rounds of ammunition for the M16 per soldier per exercise, and two hand grenades per soldier per exercise. The offensive squad members were equipped with approximately 120 rounds per soldier, 200 rounds of ammunition for the machinegun (if used) and two hand grenades per soldier.

Three lanes, approximately 500 meters long, were used for the movement to contact missions. Platoons were randomly assigned within their companies to one of the three lanes. Thus within each platoon all three squads were tested on the same lane. A total of three days were required to test each company; one day for each platoon with the three squads within each platoon tested on the same day on the same lane.

The percentage of survivors on each side was used in determining measures of squad proficiency. As described previously, MILES allows assessment of real-time casualties. Casualty assessment was as follows. When an individual was hit by either the M16 rifle or M60 machine gun the buzzer on his MILES equipment was triggered, he took himself out of action, and controller

personnel immediately radioed in the player number and the cause of the casualty. Another controller kept a chronological log of casualty data on a casualty record sheet. A data collector accompanying the squad plotted the location of the casualty on data collection maps of the specific lane and defensive positions. Casualties due to hand grenades and claymore mines were assessed immediately by controllers. Exposed soldiers (not under cover) were assessed as casualties if they were within five meters of an exploding practice hand grenade. The casualty zone for claymore mines was a triangle with the apex at the claymore and a base of 30 meters at a distance of 30 meters. Additionally, a 10 meter radius around the claymore was considered lethal. Whenever a casualty occurred, each individual examined his casualty card to determine the type of casualty. Four types of casualties existed: killed in action (KIA), litter casualty, walking wounded, and slightly wounded. Slightly wounded soldiers could continue in the exercise after a buddy administered first aid. Only one slightly wounded card per squad per exercise was used. Casualty cards were randomly distributed to members prior to the mission.

One criterion used to determine squad proficiency was whether or not the squad accomplished the mission. Mission accomplishment by the offensive squad required that the squad have a minimum of 38 percent survivors (four men in nine and ten man squads, three men in seven and eight man squads), that the defensive force have no survivors, and that the squad had taken the objective (determined by military judgment). Mission accomplishment by the OPFOR defense was defined as having at least two survivors and preventing the squad from taking the defensive position (military judgment). When neither side met these criteria, then each side failed its mission.

A continuous variable was also developed to describe the squad's accomplishment of the mission. This variable was defined as the difference between the percentage of offensive survivors and the percentage of defensive (OPFOR) survivors. It resulted in a positive number less than or equal to 100 when the percentage of offensive survivors was greater than the percentage of defensive survivors, a value of zero when the survival rates were identical for both sides, and a negative value less than or equal to 100 when the percentage of defensive survivors was greater than the percentage of offensive survivors.

RESULTS

Description of Squads

Experimental Groups

Overall, a 92% return rate was obtained on the squad member questionnaires (371 of 406 squad members). In terms of squad positions, a 96% return occurred for the squad leaders (43 of 45 leaders), an 83% return rate for the team leaders (75 of 90), and a 93% return rate for the remainder of the squad members (253 of 271). Descriptive data on the experience of the squads are presented separately for squad leaders, team leaders, and other squad members. Since the squad size varied, it was necessary to compute squad averages on each of the descriptive variables in order to make the squad member data comparable across squads (i.e., the resultant value represented the average or "typical" squad member). The frequency distributions for these averages on each variable (based on 45 squads) were then examined, and the summary statistics on squad members are based on these distributions. The only exception to this procedure was on the variable of rank. The percentage of squad members at each rank was based on individual data, not squad averages. In later analyses the team leader data were averaged with the squad member data due to the higher percentage of missing data on the team leaders and the need to minimize the number of predictor variables in regression analyses.

Rank. The majority (65%) of the squad leaders held the rank of E6 with the remainder at the E5 level (Table 3). Twelve of the squad leaders were combat veterans. The majority of the team leaders held the rank of E5 (61%) with the remainder at the E4 level. The remaining squad members were at the E4 level or below with 49% holding the rank of E4.

Figure 1 depicts the length of time squad leaders, team leaders, and the other squad members had held their present ranks. Since the distributions were skewed, medians are cited as the measure of central tendency. Additional descriptive statistics are presented in Table A-3, Appendix A. Squad leaders had held their ranks longer than team leaders, and team leaders had held their ranks longer than the other squad members. Several indices reflect this trend. For example, 78% of the squad leaders, 52% of the team leaders, and only 11% of the squad members had held their present rank for more than one year. The median time in present rank was 17 months for squad leaders, 13 months for team leaders, and seven months for the typical squad member.

Experience in Squad Positions. The number of weeks that squad leaders, team leaders, and other squad members had held their present positions within their present squads is depicted in Figure 2. The median number of weeks that a squad leader had held his position was 15, with the maximum duration being 99 weeks (refer to Table A-3, Appendix A). The majority (54%) of team leaders had held their present positions within the squad for 16 weeks or less with a median of 14 and a maximum of 192 weeks. However, as indicated in Figure 2 the distributions for both the squad and team leaders were U-shaped; that is, there were two types of squad and team leaders, those who had held their positions for a relatively short period of time (inexperienced) and those who

TABLE 3

PERCENTAGE OF SQUAD MEMBERS AT DIFFERENT RANKS

GROUP	RANK	SQUAD LEADERS	TEAM LEADERS	SQUAD MEMBERS
Experimental	E1/E2	0	0	26
	E3	0	0	23
	E4	2	36	49
	E5	33	61	2
	E6	65	3	0
Comparison	E1/E2	0	0	68
	E3	0	0	15
	E4	11	87	13
	E5	89	13	4
	E6	0	0	0

Note. In the experimental group, percentages were based on 43 squad leaders, 75 team leaders, and 257 squad members; in the comparison group, 9 squad leaders, 15 team leaders, and 57 squad members.

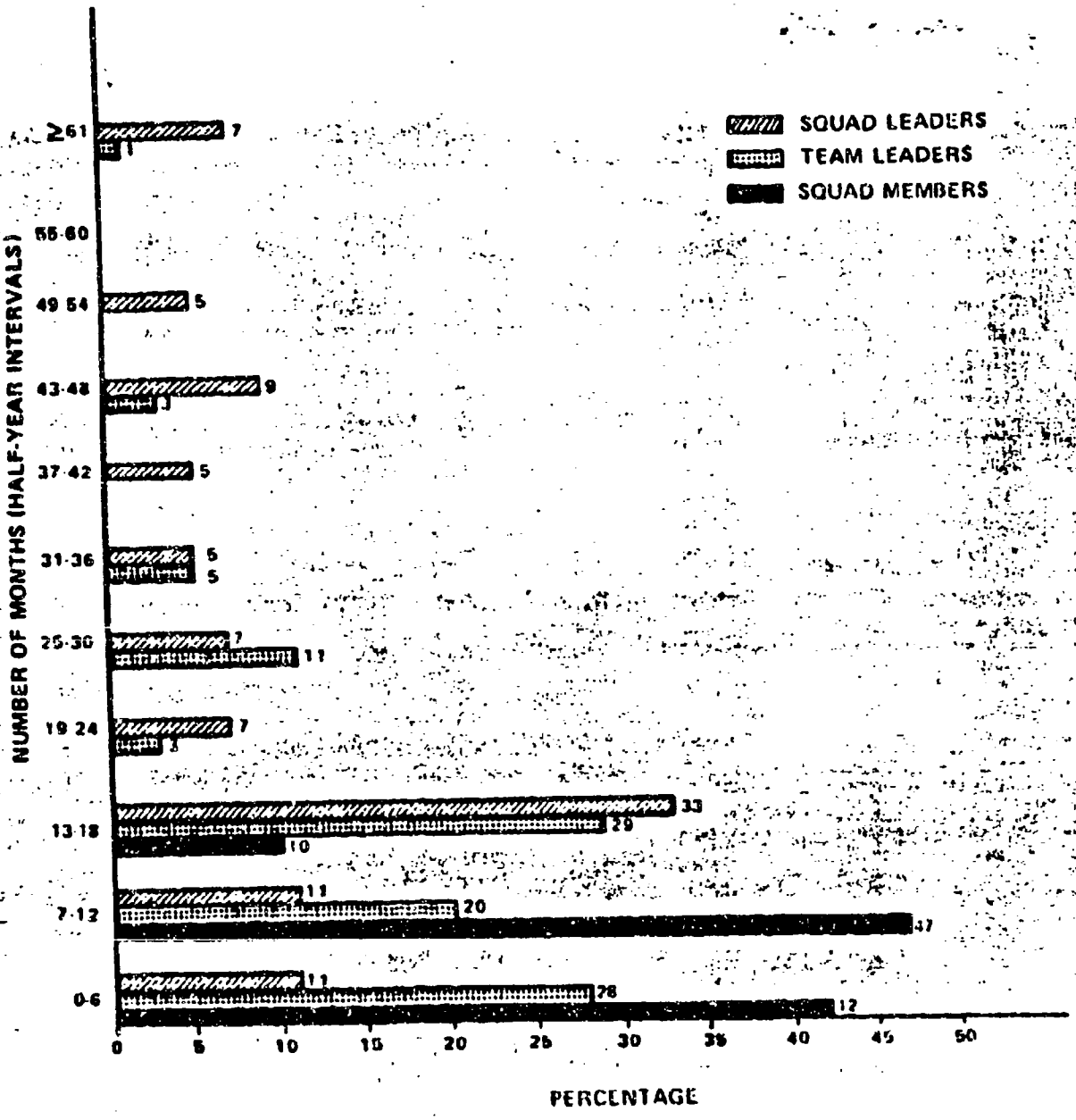

FIGURE 1. NUMBER OF MONTHS IN PRESENT RANK FOR SQUAD LEADERS, TEAM LEADERS, AND THE TYPICAL SQUAD MEMBER IN EXPERIMENTAL GROUPS.

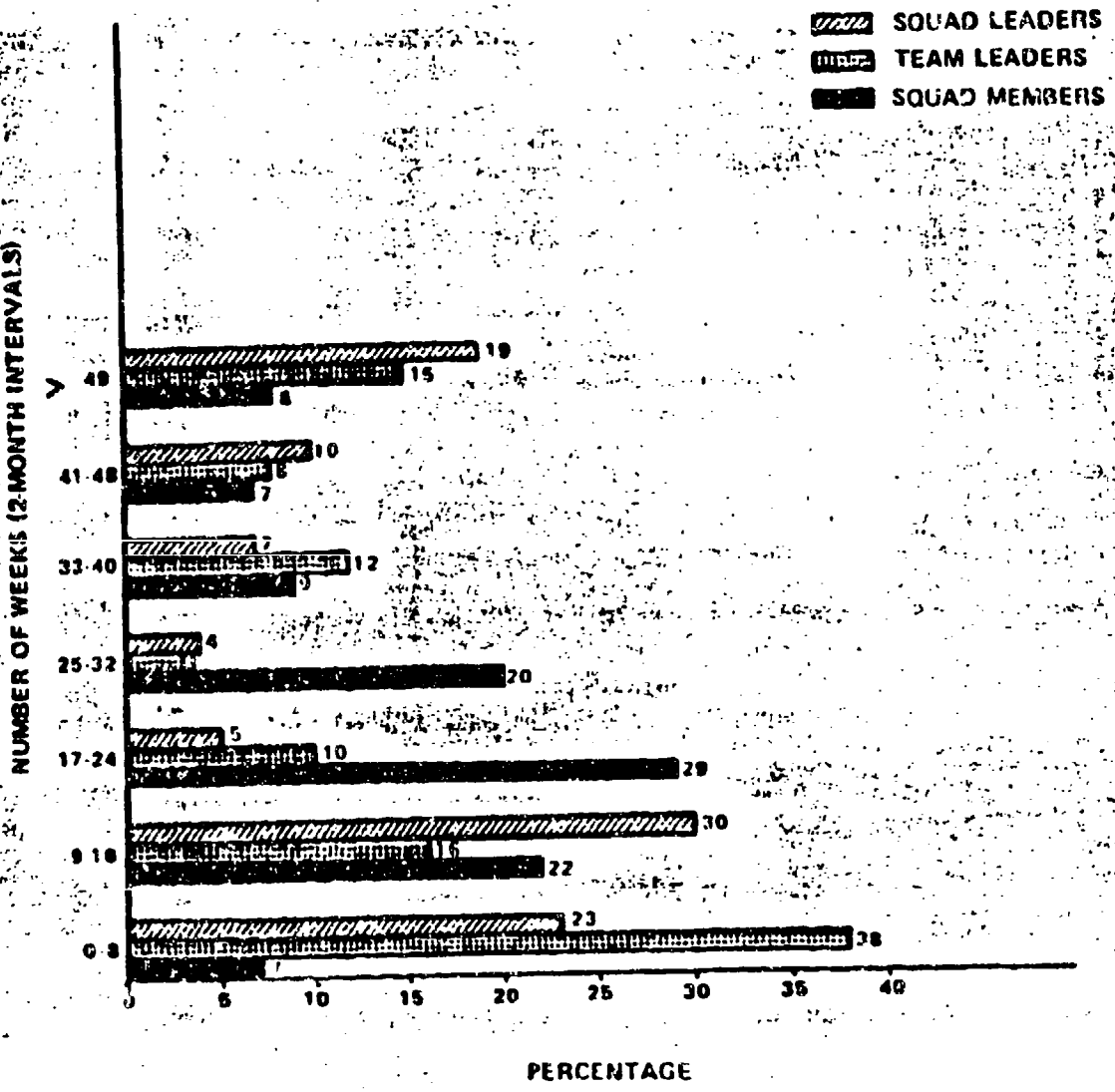

FIGURE 2. NUMBER OF WEEKS HELD PRESENT POSITION IN PRESENT SQUAD FOR SQUAD LEADERS, TEAM LEADERS, AND THE TYPICAL SQUAD MEMBER IN EXPERIMENTAL GROUPS.

had held positions for a relatively long period of time (experienced). The typical squad member generally had held his position within the squad longer than the squad leaders or team leaders (median of 23 weeks); however, the maximum value for any squad member (27 weeks) was less than the maximum for either the squad or team leaders.

Although the typical squad member had held his present position within his present squad longer than the squad or team leaders, the length of time he had held his present position across all units in which he had served did not show the same trend. The squad leaders had had the most experience in their present position (median of 24 months), with team leaders and the squad members having less, but similar periods of experience (median of 10-11 months) in their respective positions (see Figure 3 and Table A-3 in Appendix A). Squad leaders showed the most variability in experience, ranging from 0 to 100 months of experience; team leaders were less variable, ranging from 0 to 64 months; and the typical squad member's experience ranged from 4 to only 24 months.

The number of other rifle squad positions held by squad members and the length of time in these positions across all units in which members had served was also examined. On the average, squad and team leaders had held two other positions (see Table A-4, Appendix A), while the typical squad member had held less than one other position. Squad leaders had spent the most time in other squad positions (median of 28 months, maximum of 120 months); team leaders had less time (median of 21 months, maximum of 77 months); and the typical squad member had the least time (median of 5 months, maximum of 17 months). Figure 4 depicts these results.

Comparison Group

Overall there was a 92% return on squad member questionnaires (81 of 88 squad members). All the squad leaders returned their questionnaires, 83% (15 of 18) of the team leader questionnaires were returned, and a 93% return rate (57 of 61) was obtained from the remaining squad members. Computations for the descriptive variables were the same as for the experimental squads. Due to the fact that there were only nine squads in the comparison group, frequency distributions are not presented.

Rank. Eight of the nine squad leaders (89%) held the rank of E5 with the other one holding the rank of E4 (Table 3). Only one was a combat veteran. The majority of the team leaders (87%) held the rank of E4 with the remainder at the E5 level. Of the remaining squad members 68% held the rank of E1 or E2 and 28% were E3s or E4s.

The median number of months which the squad leaders had held their present rank was ten with a minimum of one and a maximum of 21 months. The team leaders and squad members had generally held their present ranks for a shorter period of time (median of 6 for team leaders; median of 7, squad members); however, the maximum duration for team leaders was 35 months (See Table A-3, Appendix A).

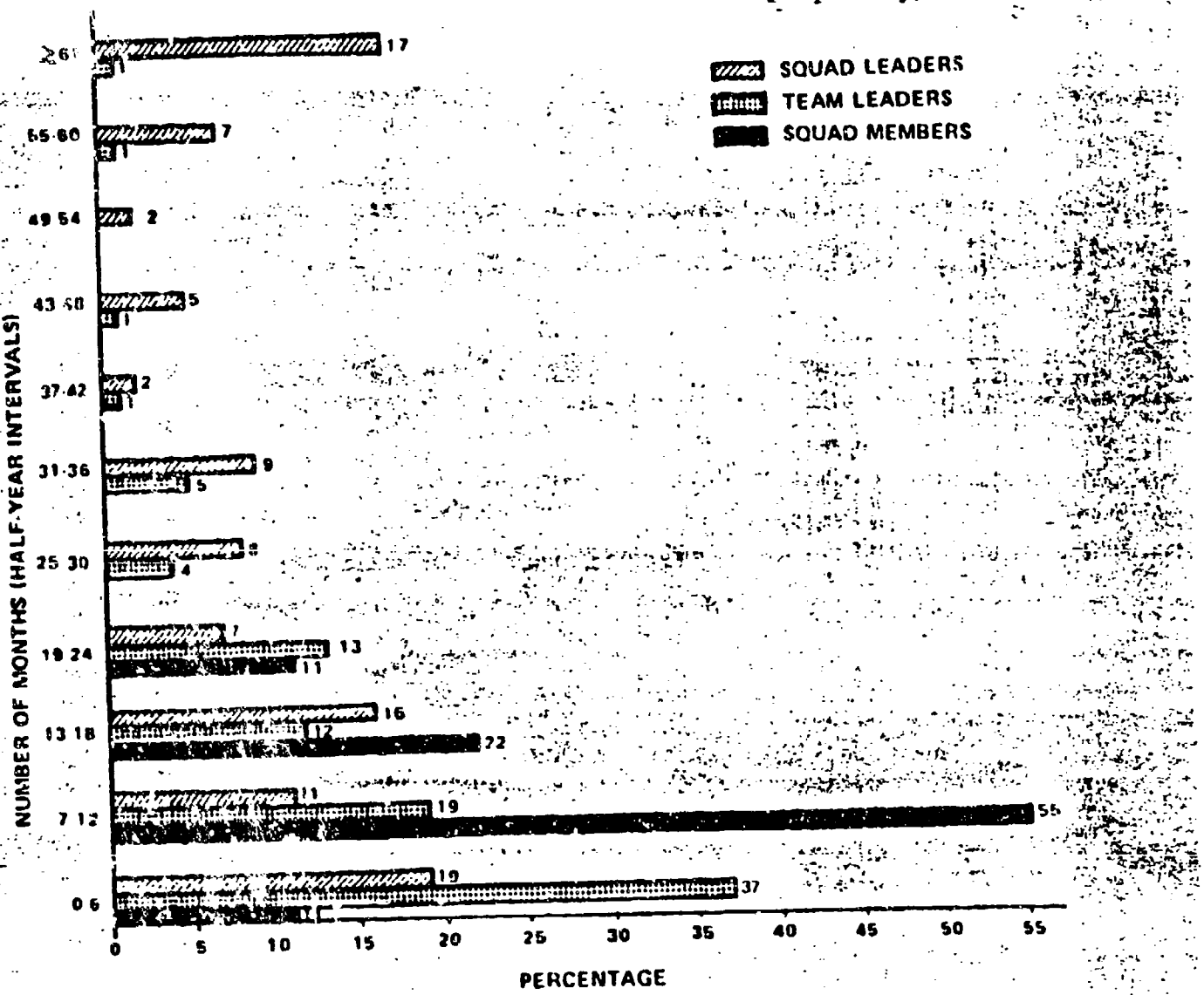

FIGURE 3. NUMBER OF MONTHS HELD PRESENT POSITION ACROSS ALL UNITS FOR SQUAD LEADERS, TEAM LEADERS, AND THE TYPICAL SQUAD MEMBER IN EXPERIMENTAL GROUPS.

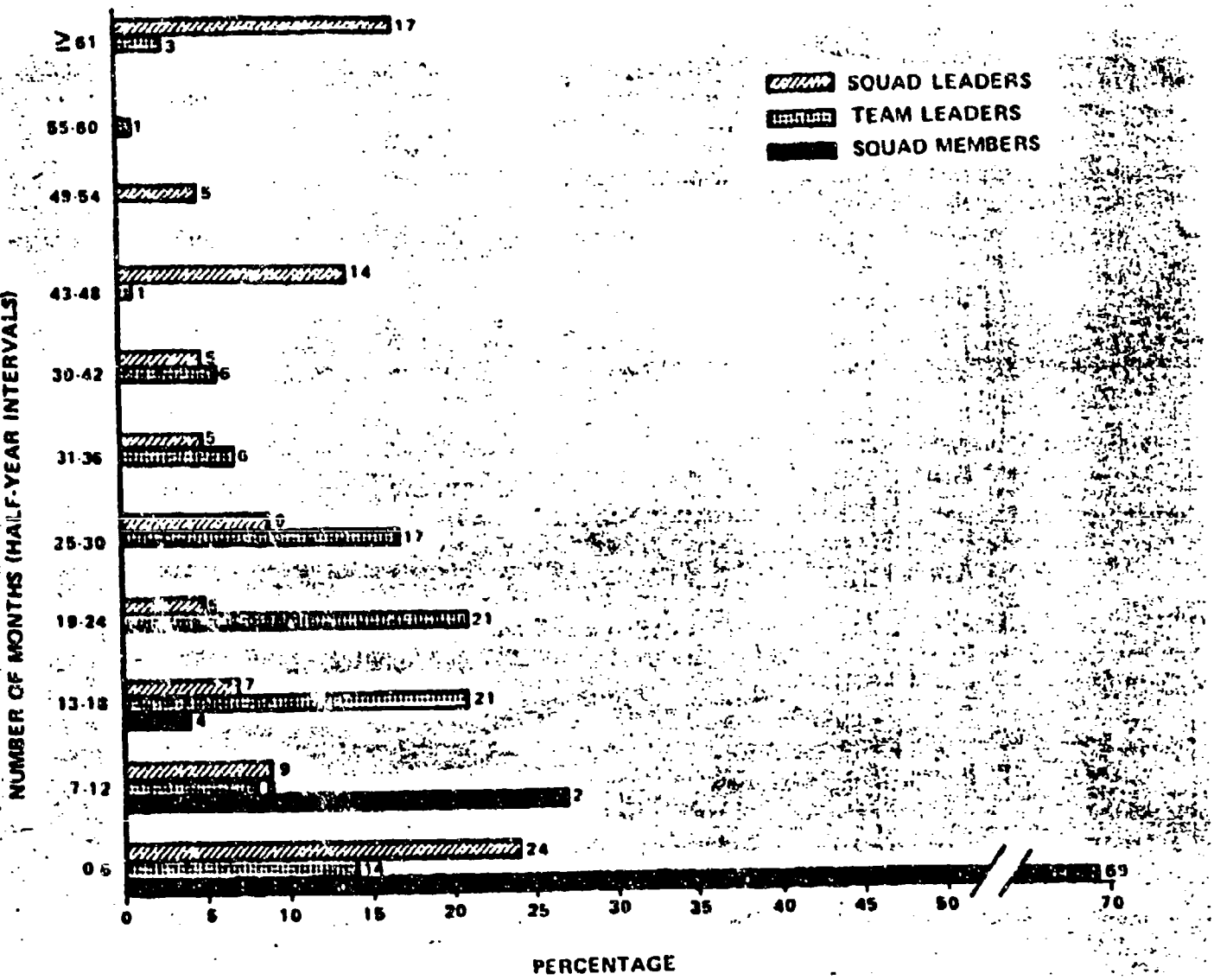

FIGURE 4. NUMBER OF MONTHS IN OTHER SQUAD POSITIONS ACROSS ALL UNITS FOR SQUAD LEADERS, TEAM LEADERS AND THE TYPICAL SQUAD MEMBER IN EXPERIMENTAL GROUPS.

Experience in Squad Positions. Squad leaders had held their present positions in their present squads for a median of seven weeks (range = 1-32), while the corresponding length of time for the team leaders and the typical squad member was 11 weeks. A similar trend was observed with regard to the median number of months individuals had held their present positions across all units; the median for squad leaders was three months while the median duration for team leaders and squad members was approximately five months. Variability among the squad leaders, however, was greater than for team leaders and squad members (range, 1-24 months vs. 0-12 and 3-11).

The number of other rifle squad positions held and the length of time which those positions were held across all units were similar for the squad and team leaders (medians = 1.7 and 2.4 respectively), with the median time in those positions being 18 months for both squad and team leaders. On the other hand, the typical squad member had held less than one other position for a median time of 2 months.

Experimental-Comparison Group Differences on Descriptive Variables

Since the experimental and comparison groups came from two different active Army units, the experimental unit being less subject to personnel turbulence, differences between the two groups on the experience variables were expected. The preceding summaries indicate such a trend and statistical tests showed such differences despite large within group variance on some variables (see Table A-4 in Appendix A for a summary of the statistical test results). In particular, the squad leaders from the experimental groups held higher ranks, had held their present rank longer, and had been squad leaders longer than the comparison group squad leaders. Experimental team leaders likewise held higher ranks and had held the position of team leader longer than the comparison group team leaders. The typical squad member from the experimental groups had held his present squad position longer than his counterpart in the comparison group.

Standing Operating Procedures (SOP)

The open-ended questions on SOP were interpreted in different ways by the squad members, resulting in little useable data. For example, it was clear that squad members often did not know what some of the SOP topics meant, e.g., return of fire, prearranged signals. In some cases, answers were incomplete, making it difficult to determine squad member agreement. Despite the fact that the SOP data were unusable they indicated that members knew relatively little about their squad SOP and that there was little agreement among members who thought they knew the SOP. In some cases, this reflected lack of time to train together, as with the squad leader who said all his squad had just come from basic training. Another possible interpretation of the SOP data is that SOP did exist within the squads, but were viewed as a "way of life" rather than "SOP." In the present study, use of open-ended questions was the only data collection option. Interviews with randomly selected squad members would probably provide useable data in future studies.

OPORD: Experimental Groups

Briefing Procedure

Data on briefing procedures were available on 42 of the 45 squad leaders. Squad leaders employed five different OPORD briefing procedures. The most common procedure of relaying the OPORD was to brief only the team leaders (50% of the squad leaders briefed the team leaders, see Table 4). The entire squad was briefed by 26% of the squad leaders. Each of the three other briefing procedures was used by 5 to 9% of the squad leaders.

The additional observations made of nonverbal behavior during the OPORDs given to nine squads from one company indicated that only one-third or fewer of these squad leaders took notes during the platoon order or used maps while giving the squad OPORD (Table A-5). On the other hand, approximately 80% of the leaders used effective briefing techniques (maintained body orientation and eye contact with members being briefed, briefed members within talking distance). Yet only half of the squad members reciprocated in kind by facing and looking at the squad leaders. In two instances such orientation was impossible since the squad leader required that the members being briefed surround him in circular fashion and face outwards in order to maintain security.

Content

In summary, the average length of an OPORD was 22 statements (ranging from 10 to 52), equally divided between information given in the platoon order and additional information provided by the squad leader. Variability did occur among the squads, however, with the number of platoon order statements ranging from 4 to 17, and the number of additional statements ranging from 2 to 37 (see Table A-6 in Appendix A). Figure 5 shows the relative emphasis given to each of the five standard OPORD paragraphs within the platoon order itself, for the platoon order information that was relayed by the squad leader, and for the additional information provided by the squad leader. In general the emphasis was similar within each of these contexts. A more detailed discussion of the content of each of these paragraphs follows.

Platoon OPORD Information. The operation order statements given to the squad leaders by the platoon leaders were not always conveyed accurately and completely by the squad leaders and there was considerable variability among the individual statements in the accuracy and completeness with which they were relayed. In addition, statements were often omitted entirely from the order. Data on the accuracy and completeness with which each statement of the platoon OPORD was relayed are presented in Table 5. The data account for 43 of the 45 squads, since rain ruined two OPORD audiotape. An overall analysis of the results showed that of the 17 statements within the original OPORD only five were relayed accurately and completely by more than 50% of the squad leaders. In contrast, 7 of the 17 statements were entirely omitted by more than 50% of the squad leaders.

TABLE 4

BRIEFING PROCEDURE: EXPERIMENTAL GROUPS

PROCEDURE	% OF SQUADS
Team Leaders Only	50
All Squad Members Simultaneously	26
Each Fire Team	9
Team Leaders then Divisions of Squad	9
Individual Squad Members	5

Note. Percentages based on a total of 42 squads.

TABLE 5

THE FIDELITY WITH WHICH THE PLATOON OPORD STATEMENTS WERE RELAYED BY THE SQUAD LEADERS: EXPERIMENTAL GROUPS

STATEMENT	ACCURATE & COMPLETE	OMITTED	ACCURATE & INCOMPLETE	INACCURATE
	% Sqd Ldr	% Sqd Ldr	% Sqd Ldr	% Sqd Ldr
Situation Paragraph				
S2: Enemy, Light Infantry	58	40	--	2
S3: Enemy, Chemical Weapons	44	21	--	35
S4: Enemy, Observation Posts	37	12	44	7
S1: Enemy Withdrawal, Broken Contact	21	14	56	9
Mission Paragraph				
M1: Overcome All Enemy Resistance	58	23	19	--
Execution Paragraph				
E9: Move Out, Time	72	28	--	--
E3: Point Squad	60	37	2	--
E6: Indirect Fire	44	51	5	--
E5: Traveling Overwatch	40	23	37	--
E7: Report Contact, Intelligence	14	65	12	9
E2: Stop, Await Orders	9	91	--	--
E4: Move Quickly, Woodline	9	5	84	2
E8: Other Leaders Briefed	7	67	23	2
E1: Platoon Route to ALPHA	5	72	21	2
Service Support Paragraph				
SS2: Ammunition Resupply	63	35	--	2
SS1: Ammunition Distributed	37	63	--	--
Command & Signal Paragraph				
CS1: Communications, Radio	2	86	5	7

Note. N=43 squad leaders. For each statement the figures represent the percentage of squad leaders who relayed that statement according to the four accuracy-completeness-omission categories. The row percentages sum to 100.

Among the Situation statements #S2 on the enemy force composition (refer to Table 2 for the platoon order) was communicated accurately and completely most often (58% of the squad leaders, Table 5). However, this statement was omitted by 40% of the leaders. Statement #S3 (regarding the probable nonemployment of chemical weapons by the enemy) was relayed appropriately in 44% of the cases. However, it should be noted that this was relayed inaccurately by 35% of the squad leaders. This inaccuracy was most commonly in the form of stating that the enemy did not have chemical weapons. The remaining two statements were distributed in a similar manner across the accuracy and completion categories with each being relayed accurately but incompletely by approximately 50% of the leaders.

Of the four Situation statements four squad leaders (7%) relayed all statements accurately and completely, while eight squad leaders (19%) did not relay any statements accurately or completely. Most squad leaders (63%) got only one or two of the statements correct. Half of the leaders omitted reference to at least one of the Situation statements. Seventy-two percent of the squad leaders accurately, but incompletely, relayed one or two of the Situation statements. Forty percent of the leaders made at least one inaccurate statement. Refer to Table A-7 in Appendix A for a complete breakdown of this information.

The Mission statement was communicated properly by only 58% of the squad leaders while about one-fourth of the leaders omitted relaying this statement.

The Execution statements displayed a large variability in the quality with which they were communicated. Only two statements (E3 and E9, on point squad and move out time respectively) were relayed correctly and accurately by more than 50% of the squad leaders (Table 5). If these two statements were not conveyed appropriately, they were absent from the order. The remaining seven statements were conveyed accurately and completely by 5 to 44% of the squad leaders. One of these statements (E4) was communicated accurately but incompletely by 84% of the squad leaders. This high incompletion rate probably occurred because this statement was the longest one in the OPORD. Statement E5 was relayed accurately but incompletely by 37% of the leaders with most of these leaders failing to indicate that traveling overwatch should not be used when in contact with the enemy.

Of the nine Execution statements, the maximum number of statements relayed accurately and completely by any squad leader was five (corresponding to 12% of the squad leaders). Only one squad leader did not relay any statements accurately and completely; most leaders (58%) relayed two to three statements correctly. Seventy-seven percent of the leaders incompletely relayed one to two statements. Most leaders (81%) never made inaccurate Execution statements. However, 82% of the leaders omitted reference to three to six of the Execution statements given by the platoon leader. A more detailed breakdown of this data is given in Table A-7 of Appendix A.

The Service Support statements showed a negative relationship to each other. SS1 was relayed accurately and completely by 37% of the leaders while being omitted by 63% (Table 5). In contrast SS2 was relayed correctly 63% of the time while being absent in 35% of the cases. Of the two Service Support

statements, 30% of the leaders relayed both statements accurately and completely while 28% omitted reference to both statements (Table A-7). The Command and Signal statement was absent in 86% of the OPORDs (Table 5).

When analyzed as a whole the quality with which the original OPORD was relayed by the squad leader was positively related to the amount of time the squad leader had held that position. The squad leaders with six months or less experience omitted an average of 64% of the statements; leaders with six to twenty-four months experience omitted about 46%; leaders with more than two years experience omitted approximately 34%. Of the platoon leader statements relayed, 45% were relayed accurately and completely by leaders with six months experience or less while approximately 63% were transmitted accurately and completely by leaders with more than six months experience.

Additional Information. Summary data on the number of additional statements relayed in each OPORD paragraph as well as the number of coordinating questions and other comments are depicted in Table A-6 (Appendix A). Approximately 50% of the additional statements occurred within the Execution paragraph (see Figure 5; an average of 5.5 statements). The variability among squad leaders in the number of additional statements was also much greater for the Execution paragraph than for the other paragraphs (ranging from 1 to 22 execution statements). About 30% of these additional Execution statements specified contingency plans.

Within the Situation paragraph general information about the weather and terrain was usually added to the OPORD (Table A-8, Appendix A). The additional statements within the Execution paragraph most often relayed information about tactical maneuvers and coordinating instructions. Within the Service Support paragraph information about rations was the most common topic of additional communication, and additional information within the Command and Signal paragraph generally centered around chain of command and password and challenge.

Statements by Squad Members. In general, squad members talked very little during the OPORD. In half of the squads no squad members talked; in 25% only one statement was made. The maximum number of squad member statements was four and this occurred in only one squad.

OPORD: Comparison Group

Briefing Procedure

OPORDs were available for analysis on six of the nine control squads. The procedure employed by the majority of the squad leaders was to brief each fire team. Four of the six leaders used this procedure (see Table 6). In contrast, the most common briefing procedure used by the experimental squad leaders was to brief just the team leaders.

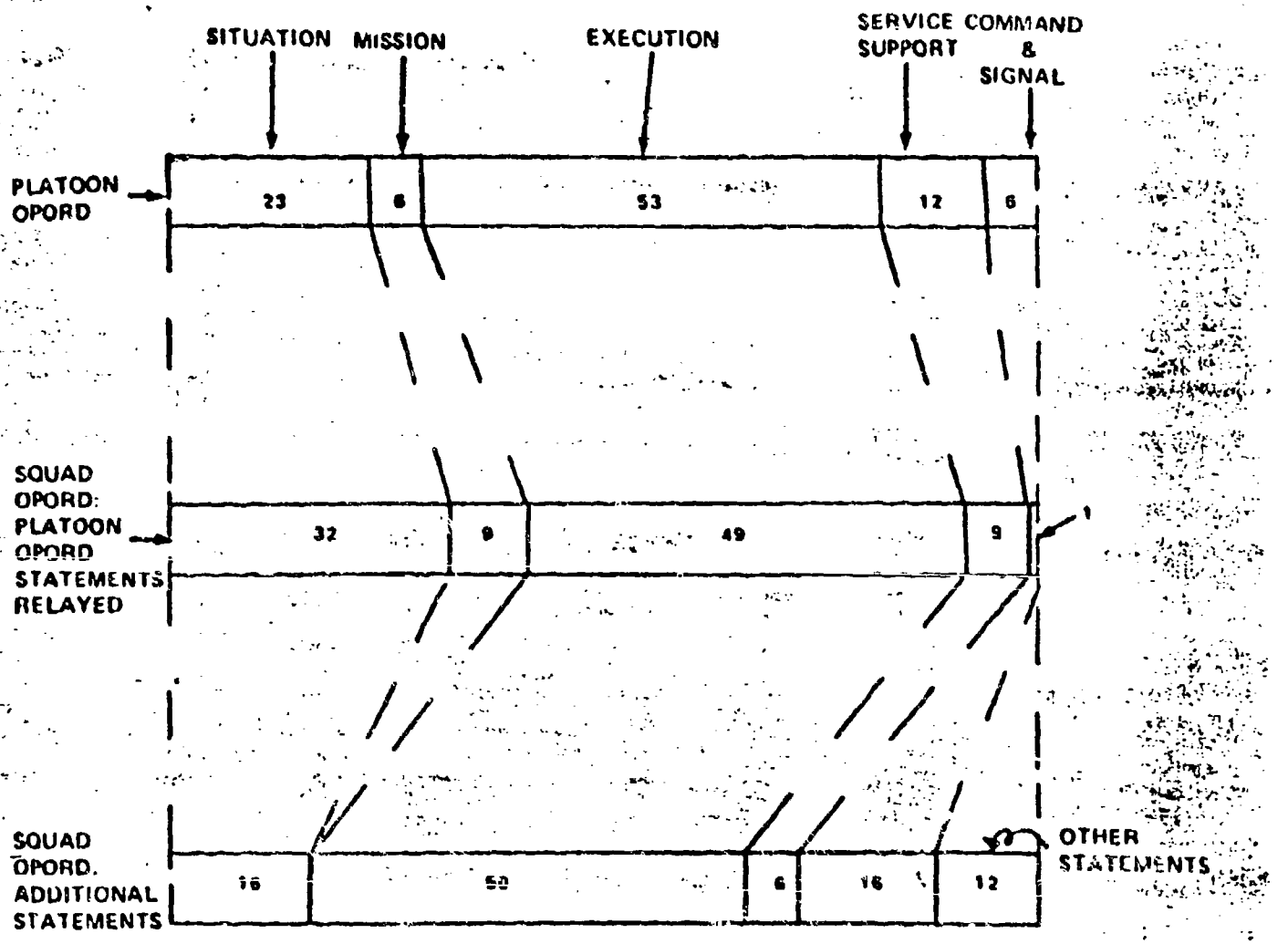

FIGURE 5. PERCENTAGE OF STATEMENTS ALLOCATED TO OPORD PARAGRAPH WITHIN PLATOON OPORD, PLATOON OPORD INFORMATION RELAYED IN SQUAD OPORD, AND ADDITIONAL INFORMATION WITHIN THE SQUAD OPORD FOR THE EXPERIMENTAL GROUPS.

TABLE 6

BRIEFING PROCEDURE: COMPARISON GROUP

PROCEDURE	% OF SQUADS
Each Fire Team	67
All Squad Members Simultaneously	17
Team Leaders then Divisions of Squad	17

Note. Percentages based on a total of 6 squads.

Content

The average length of the OPORD was 25.9 statements (ranging from 16 to 44). On the average, the number of additional statements and number of statements relaying information given in the platoon order were similar (12 vs. 13.9, see Table A-9, Appendix A). The number of platoon-related statements ranged from 8 to 17 and the number of additional statements ranged from 6 to 34. Figure 6 depicts the relative emphasis allotted to each of the OPORD paragraphs within the platoon order, the platoon order relayed by the squad leader, and the additional information provided by the squad leader. Generally, the emphasis given to each platoon order paragraph by the leader was similar to that in the original order. However, additional information provided by the leader made no reference to service support or the mission. A more detailed discussion of the content of each paragraph follows.

Platoon OPORD Information. The platoon OPORD statements relayed by the squad leaders illustrated a general decrease in accuracy and completeness, and variability among the individual statements in the accuracy and completeness with which they were conveyed. However, in contrast to the experimental groups, the inaccuracies and omissions were not as extensive. Qualitative descriptions of the manner in which each statement was relayed are given in Table 7.

Ten of the 17 platoon order statements were relayed accurately and completely by 50% or more of the squad leaders. This finding contrasts with the experimental groups in which only 5 of the 17 statements were communicated correctly by 50% or more of the leaders.

Each of the four Situation statements was relayed accurately and completely by 50% or more of the squad leaders. Two of the six squad leaders relayed all four Situation statements accurately and completely while two did not relay any of the statements accurately and completely. No squad leaders accurately but incompletely relayed more than two of these statements and five of the six leaders did not give any inaccurate statements. Refer to Table A-10 in Appendix A for a complete analysis of this information.

The Mission statement was relayed by all six squad leaders accurately and completely.

The Execution statements, as also exhibited by the experimental groups, displayed a wide variation in the quality with which they were relayed. Statement E6 was relayed appropriately by five of the six squad leaders. Two other statements were relayed correctly by three of the six leaders (E3 and E9) and the rest were communicated accurately and completely by only one or in one case none of the squad leaders.

Of the nine Execution statements one squad leader relayed all but one statement accurately and completely while the remaining five leaders relayed only one or two statements accurately and completely. Five of the six squad leaders relayed one to three statements accurately but incompletely. One of the leaders omitted no statements while three omitted six of the statements. A detailed description of this information is in Table A-10 of Appendix A.

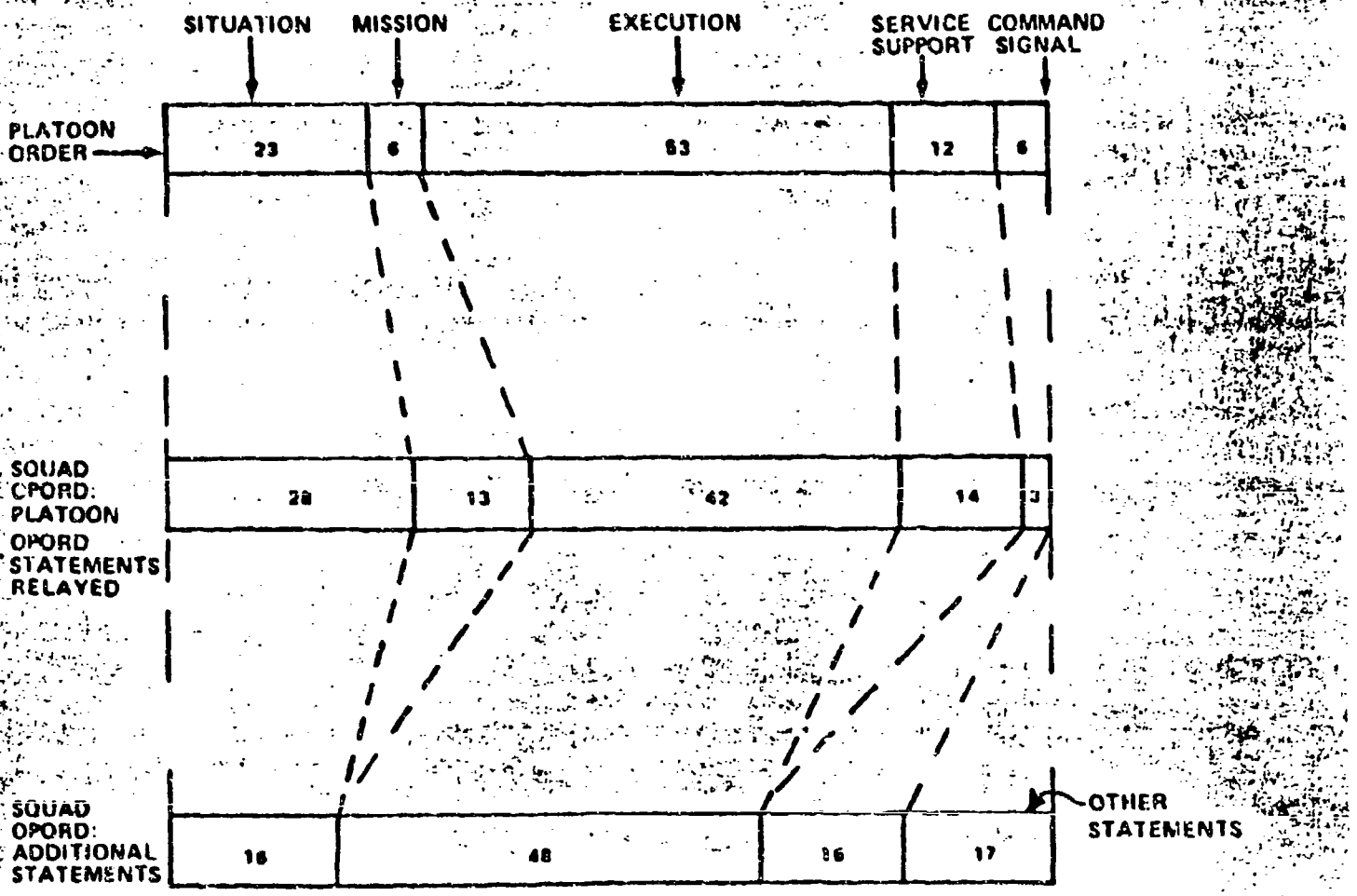

FIGURE 6 PERCENTAGE OF STATEMENTS ALLOCATED TO OPORD PARAGRAPH WITHIN PLATOON OPORD, PLATOON OPORD INFORMATION RELAYED IN SQUAD OPORD, AND ADDITIONAL INFORMATION WITHIN SQUAD OPORD FOR THE COMPARISON GROUP.

TABLE 7

THE FIDELITY WITH WHICH THE PLATOON OPORD STATEMENTS WERE RELAYED BY THE SQUAD LEADERS: COMPARISON GROUP

STATEMENT	ACCURATE & COMPLETE	OMITTED	ACCURATE & INCOMPLETE	INACCURATE
	% Sqd Ldr	% Sqd Ldr	% Sqd Ldr	% Sqd Ldr
Situation Paragraph				
S4: Enemy, Observation Posts	67	--	33	--
S1: Enemy Withdrawal, Broken Contact	50	--	50	--
S2: Enemy, Light Infantry	50	33	--	17
S3: Enemy, Chemical Weapons	50	17	33	--
Mission Paragraph				
M1: Overcome All Enemy Resistance	100	--	--	--
Execution Paragraph				
E6: Indirect Fire	83	17	--	--
E3: Point Squad	50	50	--	--
E9: Move Out, Time	50	50	--	--
E1: Platoon Route to ALPHA	17	50	33	--
E2: Stop, Await Orders	17	67	17	--
E4: Move Quickly, Woodline	17	33	50	--
E5: Traveling Overwatch	17	33	50	--
E8: Other Leaders Briefed	17	67	17	--
E7: Report Contact, Intelligence	0	50	--	50
Service Support Paragraph				
SS2: Ammunition Resupply	83	17	--	--
SS1: Ammunition Distributed	67	33	--	--
Command & Signal Paragraph				
CS1: Communications, Radio	33	67	--	--

Note. N=43 squad leaders. For each statement the figures represent the squad leaders who relayed that statement according to the four accuracy-completeness-omission categories. The row percentages sum to 100.

Both Service Support statements were correctly relayed by a majority of the leaders. However, the Command and Signal statement was relayed accurately and completely by only two of the six leaders and omitted by the remaining four.

Additional Information. Summary data for the number of additional statements communicated in each paragraph, the number of coordinating questions, and the number of other comments are presented in Table A-9 (Appendix A). The largest number of additional statements occurred within the Execution paragraph (average of 6.7). A similar finding was exhibited by the experimental groups. Among these additional Execution statements, 40% were contingency statements. The mean number of additional statements within each of the other four paragraphs ranged from 2.7 for the Situation paragraph to zero for Mission and Service Support paragraphs.

The most common additional statements in the Situation paragraph concerned general information such as weather or terrain, or the location and deployment of friendly forces. The additional information conveyed in the Execution paragraph generally concerned tactical maneuvers and coordinating instructions. The remaining supplementary information usually referred to the chain of command (Command and Signal paragraph). The content of these additional statements is detailed in Table A-11 of Appendix A.

Statements By Squad Members. Generally, squad members from the comparison group made very few statements during the OPORD. In half the squads no member talked, one statement was made in two of the six squads, and three statements were made in the remaining squad.

Prediction of OPORD Characteristics

Two variables were created to summarize the squad leader OPORDs. The first, called OPORD quality, reflected the extent to which the squad leader relayed the platoon order to his squad. If a platoon OPORD statement was relayed by the squad leader accurately and completely a score of two was assigned. If a statement was relayed accurately but incompletely a score of one was assigned, and if a statement was omitted or given incorrectly it was given a score of zero. OPORD quality was calculated by summing these weights across all platoon order statements. The second variable was the total number of additional statements provided by the leader that did not correspond to the platoon order statements.

The extent to which each of the OPORD summary variables could be predicted from the experimental treatments, squad leader experience variables, and squad member experience variables was examined. The limited number of squads available for analysis made it necessary to reduce the number of predictor variables. Two squad leader experience variables were selected as representative of the total experience of the squad leader: total time as squad leader and total time in other squad positions. The other two experience variables described previously (time in present position in present squad and number of other positions held across all units) were eliminated

since each correlated strongly with one of these two variables (see Table A-12). Corresponding measures were selected to represent squad member experience (total time in present position and total time in other squad positions). Because of the restricted sample size, results on team leaders were included in these two squad member measures (the previous discussion of the experience variables examined team leaders separately from the other squad members). Since the contrast of the experimental and comparison groups showed some substantial differences in the experience of leaders and squad members, indicating that these two groups represented different populations, only the experimental squads were included in the prediction analysis.

A hierarchical multiple regression analysis was used with the two treatment variables entered first (two categorical variables, with dummy coding), then the two squad leader experience variables, and finally the two squad member experience variables. The multiple correlation (R) between OPORD quality and the treatment variables was .13, accounting for only 1.6% of the OPORD quality variance. The most effective predictors were the two squad leader experience variables which increased the multiple R to .40 and increased the amount of variability accounted for by 14.1%. This increase was significantly greater than zero (F (2,40)=3.34, $p<.05$). The addition of the squad member experience variables increased the multiple R to .44 and increased the total variance accounted for by only 3.7%. This final prediction equation accounted for 19.4% of the variance in the OPORD quality and was not significantly different from zero. (Although the multiple R increased with each additional predictor variable, the predictor variable - sample size ratio was low which yielded a final significante test with relatively low power.)

The regression analysis results on the number of additional OPORD statements were similar. The multiple R for the treatment variables was .26. The squad leader experience variables increased the R to .52 and increased the amount of variance accounted for by 20.3% which was significantly greater than zero (F (2,40)=5.59, $p<.01$). The addition of the squad experience variables increased the multiple correlation to .55 and increased the variance accounted for by only 2.8%. This final equation accounted for 29.9% of the variance (F (6,38)=2.77, $p<.05$). Table A-13 in Appendix A summarizes the results.

Mission Outcome

The military criterion for mission accomplishment resulted in only 11 of the 54 squads (experimental and comparison groups) successfully completing the mission while 30 squads failed to accomplish the mission. For the remaining 13 squads both the offensive and defensive units failed the mission. There was no effect of treatment type upon the mission outcome (X^2 (6) = 7.27, p = .30). However, among the comparison squads, in which no treatment had been administered, none of the nine squads successfully completed the mission .

Mission accomplishment was negatively related to the length of time that the opposing force (OPFOR) had participated in the study, that is, as the number of movement to contact missions in which OPFOR participated increased the likelihood for successful mission accomplishment by the offensive squad decreased. Figure 7 depicts the mission accomplishment data for each week of

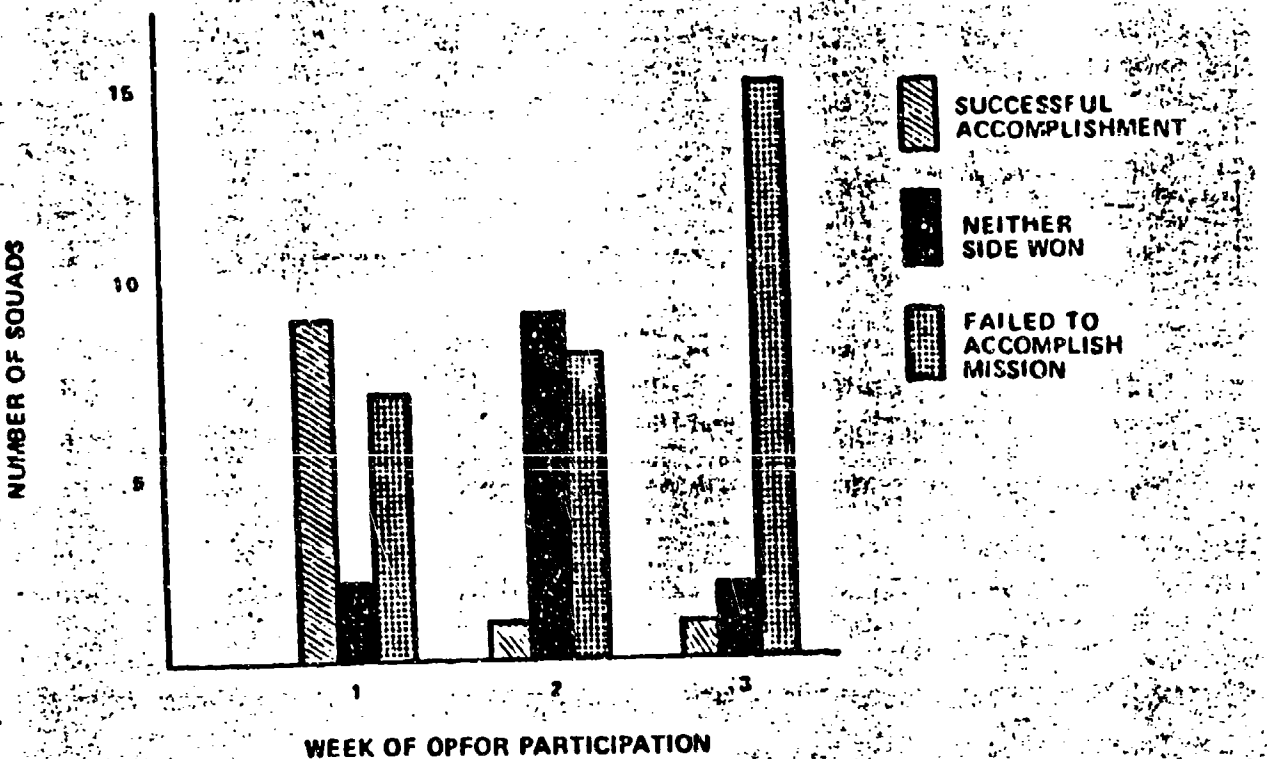

FIGURE 7. NUMBER OF SQUADS WITHIN EACH MISSION ACCOMPLISHMENT CATEGORY FOR EACH SUCCESSIVE WEEK OF THE OPPOSING FORCE'S PARTICIPATION IN THE STUDY. (TOTAL OF 54 SQUADS, 18 PER WEEK)

the OPFOR's participation in the study. Nine of the 18 squads that participated during the first week successfully accomplished the mission. In contrast, among the 18 squads participating during the final week of the OPFOR experience 15 squads failed the mission and only one succeeded. The mission accomplishment data did not differ for the two OPFOR forces. Since the comparison squads were all tested during the second OPFOR's final week of participation, the experimental-comparison group mission outcome differences were confounded with the degree of OPFOR participation. The failure of the comparison squads to successfully complete any mission apparently resulted from the OPFOR's experience rather than from the fact that the comparison squads did not receive any special leader or squad training.

Treatment effects on the other dependent variable, the difference in the percentage of offensive and defensive survivors, were examined using analysis of variance. Three orthogonal planned comparisons were created: the mean of the three experimental groups vs. the mean of the comparison group, the mean of the MILES and leader treatments vs. the combined MILES/leader treatment, and the MILES treatment vs. the leader treatment. The only significant contrast was the experimental vs. the comparison group ($t(50) = 2.85$, $p<.005$) with the comparison group scoring lower than the experimental groups. However, as indicated in the next paragraph, the low performance by the comparison group reflected an experienced OPFOR, rather than a treatment effect for the experimental groups.

Effects of the OPFOR force and week of OPFOR participation upon the same dependent variable were also examined using a two-way analysis of variance. There was a significant main effect for the week of OPFOR participation ($F(2,48) = 9.17$, $p<.001$), no significant effect of OPFOR force, and no significant interaction between the two variables. The means in Table 8 indicate that as the length of each OPFOR's participation increased, the OPFOR's performance also increased. These results correspond with the military criterion results mentioned previously.

A hierarchical multiple regression analysis was employed to determine the extent to which mission success could be predicted. The predictor variables and their order of presentation into the regression equation were: the week of OPFOR participation (two categorical variables, using dummy coding), the two squad leader experience variables used previously in the OPORD regression analysis (length of time as a squad leader and length of time in other squad positions), the two squad member experience variables used previously (length of time in present position and length of time in other squad positions), and the two OPORD characteristic variables (OPORD quality and number of additional statements). Treatment was omitted from this analysis since it had no effect on the criterion, and it was necessary to limit the number of predictors because of the small sample size. Only experimental squads were included.

The multiple correlation between the OPFOR participation variables and the mission outcome was .41. These variables accounted for more variance in the mission outcome (17%) than the remaining predictor variables combined and the R^2 increase was significantly greater than zero ($F(2,42) = 4.35$ $p<.05$). The squad leader experience variables increased the multiple R to .48 and increased the amount of variance accounted (R^2) for by 5.8%. The squad member

TABLE 8

MISSION OUTCOME PERCENTAGE DIFFERENCE MEANS CLASSIFIED BY EACH OPPOSING FORCE AND EACH SUCCESSIVE WEEK OF THE OPPOSING FORCE'S PARTICIPATION IN THE STUDY

		OPPOSING FORCE		
		1	2	Mean
WEEK OF PARTICIPATION	1	12.04	-.65	5.69
	2	-37.30	-23.02	-30.16
	3	-60.37	-82.22	-71.30
	Mean	-28.54	-35.30	

Note. Scores from 34 to 100 were designated as successful mission accomplishment by the offensive force, -33.99 to 33.99 were designated as both defensive and offensive failure, and -34 to -100 were designated as failure to accomplish mission.

experience variables increased the R^2 by less than 1%. The OPORD variables increased the multiple R to .51, increasing the variability accounted for by 3%. The final equation had a multiple R of .51 and accounted for 26% of the variance in the dependent variable. The final R^2 was not significantly different from zero. These results are summarized in Table A-13 in Appendix A.

DISCUSSION

The data clearly show that rifle squad operation orders for a particular mission are not alike; they differ in content and in the way in which they are delivered. A squad leader usually did not give the same information to his squad members as was given to him by his platoon leader. Such changes reflected primarily omission rather than distortion of information. Although it can be argued that each item of information in the platoon order does not need to be given to the squad members, in the present study key information was often omitted, e.g., the mission, nature of the enemy, route to the objective. Additional information provided by the squad leader focused primarily on execution of the mission, particularly squad tactical movement, and secondarily on general information about the terrain and on the chain of command. Few contingency plans were presented and/or discussed.

In terms of the team functions postulated by Nieva et al. (1978), most of the information in the platoon OPORD represented the orientation function. Thus the omissions by the squad leader indicated a failure to provide all the orientation that was probably necessary for effective squad functioning. Although most of the additional Command and Signal and Execution information, including contingency plans, represented the organization function (how to accomplish the mission and assignment of individuals to squad tasks), the total amount of organization information was low.

What can account for the tendency of leaders to omit information in the platoon order? Most relied on memory as only an estimated one-third of the leaders took notes. The more experienced leaders recalled more of the platoon order. Further analysis indicated that statements at the beginning of the platoon order were more likely to be remembered than statements in the middle, or at the end, reflecting a primacy effect. One statement (E4, squad was the point squad) in the middle of the platoon order had the lowest omission rate (5%). It was hypothesized that the perceived importance of the statements could partially account for those that were recalled. However, correlations between the omission rates and importance ratings of the platoon order statements made by two experienced Infantrymen were not significant ($r = .07$). Another factor may be selective forgetting, in that squad leaders only recall or repeat information that they think is important to their squad. Deficiencies in th platoon OPORD itself could have contributed to some confusion and forgetting by the squad leaders. The platoon OPORD was not in standard format (FM 7-11B4, FM 7-11B5), omitted much information, and did not include a "true" mission statement. However, it was not possible to measure selective forgetting factors in the study. Of the factors that were measured, the experience of the squad leader and the primacy of the platoon order statements were the best predictors of statement recall.

Although the recommended squad briefing procedure is to brief all squad members simultaneously, this was the case for only a quarter of the leaders from the experimental groups. Half briefed only the team leaders. Such procedures increase the likelihood for distortions and omissions of OPORD information as discussed in the introduction of the report. No leader asked specific individuals to describe their responsibilities, a procedure that is often recommended (FM 7-7, Henriksen et al., 1980).

The content analysis of the squad orders did not reflect what one might call the "flavor" of the orders, e.g., voice inflection, hesitations, dialects of the squad leaders, sentence fragments, the emphasis with which points were made. The orders did differ on such dimensions, but no attempt was made to quantify these dimensions nor to determine their relationship to squad leader experience or mission outcome.

The squad leader experience variables were the best predictors of the OPORD quality measure and the total number of additional statements provided by the leader. Interestingly, the number of months the leader had held his present position correlated positively and significantly with both OPORD variables, while the number of months the leader had held other squad positions correlated negatively with both variables (significantly so only for the additional statements variable, see Table A-12). The relationship between the two experience variables themselves was not significant. The reason for the negative correlation is not intuitively obvious. On the one hand, one might hypothesize that if a leader were familiar with many squad positions, he would be able to easily determine what additional information was necessary for a particular mission and thus relay this information to squad members, yielding a positive relationship. On the other hand, he might assume everyone "knows what he knows" and thus see no need to elaborate on the mission, yielding a negative relationship.

It was not expected that OPORD characteristics would be strongly related to mission outcome, since there are many factors that can have a more direct influence on the outcome. In fact, the data supported this expectation. In the present study, the primary factor was the skill acquired by the opposing force during repeated exercises. A secondary factor was the experience of the squad leader.

The lack of relationship between OPORD characteristics and mission outcome in the present study does not necessarily mean that OPORDs are irrelevant to squad missions. The restricted variance of the mission outcome measures due to the impact of the OPFOR could have reduced the relationship. The shortness of the movement to contact mission in the present study may have reduced the importance of the OPORD. OPORDs may have been related to squad actions during the mission, indirectly influencing squad outcome, but such process measures were not made. As mentioned previously, the quality of the OPORDs was restricted, in that few, if any, excellent orders occurred, although little erroneous information was given. The limited time for OPORD preparation and the lack of opportunity to conduct a recon could have accounted in part for OPORD brevity and the relatively little attention given to mission execution. Such restrictions could have also reduced the relationship with mission outcome.

An excellent, detailed OPORD by itself, however, does not insure squad success, particularly if the squad members have had little or no experience in functioning as a squad. Such training gives meaning to the squad leader's words. Although the OPORD certainly reflects the ability and knowledge of the

squad leader, it can also reflect the experience and knowledge of the squad members. For practically every squad in the present study, members were given the opportunity to ask questions and to clarify and discuss their role in the mission. However, they did not do so.

The increased effectiveness achieved by the opposing force from repeated engagements indicates the strong impact of repetition with training equipment such as MILES. It should be mentioned that increased familiarity with the terrain on the three test lanes probably also contributed to the opposing force's success. Because of the confounding of these two factors it is impossible to determine which contributed more to the opposing force's success.

What changes might occur in operation orders as squads become more experienced and combat effective? One might expect a curvilinear relationship with the levels of orientation and organizational information increasing with experience until a point is reached where squad members have worked together long enough and standing operating procedures have been sufficiently established so that such information exchange becomes less critical to mission success.

CONCLUSIONS

The study was an initial attempt to measure team functions within a military setting, specifically the dissemination of orientation and organizational information within a squad operation order, and demonstrated that such measures can be made. The low levels of orientation and organizational information that occurred suggest that both squad leaders and members do not use the operation order as a vehicle for planning a mission. The results clearly indicate that it would be a mistake to assume that squad operation orders for the same mission are alike in terms of content or delivery.

Several training needs were identified. The tendency of leaders to omit critical platoon order information also suggests that leader training should include techniques that will enhance the recall of such information. The use of operation order delivery techniques that were likely to increase member confusion regarding the mission also indicates the need to train on delivery techniques and on techniques that check members' understanding of their mission responsibilities. Use of the OPORD as a mission planning tool needs to be stressed. Finally, effect of the opposing force's experience on the tested squads indicate that repetition in executing complex squad missions, with equipment such as MILES, can lead to higher levels of mission success and should be stressed in squad-level training.

REFERENCES

Alexander, L. T., & Cooperband, A. S. System training and research in team behavior (TM-2581). Santa Monica, Calif.: System Development Corporation, August 1965. (DTIC No. AD 620 606)

Altman, L. Aspects of the criterion problem in small group research. I. Behavioral domains to be studied. Acta Psychologica, 1966, 25, 101-131. (DTIC No. AD 633 248)

Bartlett, F. Remembering: A study in experimental and Social Psychology. London: Cambridge University Press, 1932.

Boguslaw, R., & Porter, E. H. Team functions and training. In R. M. Gagne (Ed.), Psychological principles in systems development. New York: Holt, Rinehart, & Winston, 1962, pp. 387-416.

Borgatta, E. F., Lanzetta, J. T., McGrath, J. E., & Strodbeck, F. L. Report of the task group on team functions. Washington, D. C.: Smithsonian Institute, Research Group in Psychology and the Social Sciences, August 1959. (DTIC No. AD 283 329)

Cary, M. S. The role of gaze in the initiation of conversation. Social Psychology, 1978, 41, 269-271.

Collins, J. J. A study of potential contributions of small group behavior research to team training technology development. Alexandria, Va.: Essex Corporation. August 1977. (DTIC No. AD A043 911)

Department of the Army. The mechanized Infantry platoon and squad. FM 7-7. Washington, D.C.: Headquarters, Department of the Army, September 1977.

Department of the Army. The tank and mechanized Infantry battalion task force. FM 71-2. Washington, D. C.: Headquarters, Department of the Army, June 1977.

Department of the Army. Soldier's Manual 11B, Infantryman skill level 4. FM 7-11B4. Washington, D.C.: Headquarters, Department of the Army November 1978.

Department of the Army. Soldier's Manual 11B, Infantryman skill level 5. FM 7-11B5. Washington, D.C.: Headquarters, Department of the Army September 1979.

Dieterly, D. L. Team performance: A model for research. In E. J. Baise & J. M. Miller (Eds.), Proceedings of the Human Factors Society, 22nd Annual Meeting, Santa Monica, Calif.: Human Factors Society, 1978.

Dyer, J. L., Tremble, T. R., & Finley, D. L. The structural, training, and operational characteristics of Army teams (ARI Technical Report 507). Alexandria, Va.: U. S. Army Research Institute for the Behavioral and Social Sciences, June 1980.

Eaton, N. K., & Neff, J. F. The effects of tank crew turbulence on tank gunnery performance (ARI Technical Paper 350). Alexandria, Va: U. S. Army Research Institute for the Behavioral and Social Sciences, September 1978.

Gill, D. L. The prediction of group motor performance from individual member abilities. Journal of Motor Behavior, 1979, 11(2), 113-122.

Glanzer, M., & Glaser, R. Techniques for the study of team structure and behavior. Part I. Analysis of structure. Psychological Bulletin, 1959, 56, 317-332. (DTIC No. AD 135 412)

Glaser, R., Glanzer, M., & Morten, A. W. A study of some dimensions of team performance (ARI Technical Report). Pittsburgh, Pa.: American Institute for Research, September, 1955. (DTIC No. AD 078 433).

George, C. E. Testing for coordination in small units. Proceedings of the Military Testing Conference, 1977, 19, 487-497.

Goldin, S. E., & Thorndyke, P. W. (Eds.). Improving team performance: Proceedings of the RAND team performance workshop (R2606-ONR). Santa Monica, Calif.: RAND Corporation, August 1980.

Hackman, J. R., & Morris, C. G. Group tasks, group interaction process, and group performance effectiveness: A review and proposed integration. In L. Berkowitz (Ed.), Advances in experimental social psychology, Vol 8. New York: Academic Press, 1975, pp. 45-49. (DTIC No. AD 735 287)

Havron, M. D., & McGrath, J. E. The contribution of the leader to the effectiveness of small military groups. In L. Petrullo & B. M. Bass (Eds.), Leadership and interpersonal behavior. New York: Holt Rinehart & Winston, 1961, p. 167-178.

Henriksen, K. F., Jones, D. R., Hannaman, D. L., Wylie, P. B., Shriver, E. L., Hanill, B. W., & Sulzen, R. H. Identification of combat unit leader skills and leader-group interaction processes (ARI Technical Report 440). Alexandria, Va.: U. S. Army Research Institute for the Behavioral and Social Sciences, January 1980.

Hood, P. E., & others. Conference on integrated aircrew training (WADD Technical Report 60-320). Wright-Patterson Air Force Base, Ohio: Air Research & Development Command, Wright Air Development Division, July 1960. (DTIC No. AD 240 688)

Jones, M. B. Regressing group on individual effectiveness. Organizational Behavior and Human Performance, 1974, 11, 426-451.

Kendon, A. Some functions of gaze direction in social interaction. Acta Psychologica, 1967, 26, 22-63.

Kent, R. N., & McGrath, J. J. Task and group characteristics as factors influencing group performance. Journal of Experimental Social Psychology, 1969, 5, 429-440.

Kintsch, W. On comprehending stories. In M. A. Just & P. A. Carpenter (Eds.), Cognitive processes in comprehension. Hillsdale, N. J.: Lawrence Erlbaum, 1977.

Knerr, C. M., Berger, D. C., & Popelka, B. A. Sustaining team performance: A systems model (ARPA Contract No. MDA 903-79-C-0209). Springfield, Va.: Mellonics Systems Development Division, March 1980.

Kress, G., & McGuire, W. J. Implementation and evaluation of the tank crew training program for USAREUR units (ARI Research Note 79-40). Alexandria, Va.: U. S. Army Research Institute for the Behavioral and Social Sciences, September 1979.

Krippendorf, K. Content analysis: An introduction to its methodology. Beverly Hills, Calif.: Sage, 1980.

Lowe, J. H., & McGrath, J. E. Predictions of characteristics of group output from individual performance characteristics (AFORS-69-2470TR). Urbana, Ill.: University of Illinois, Department of Psychology, August 1969. (DTIC No. AD 700 103)

McKay, J. G., Gianci, S., Hall, C. E., & Taylor, J. E. Some factors which have contributed to both successful and unsuccessful American infantry small-unit actions (HumRRO Research Memorandum No. 13). Ft. Benning, Ga.: U. S. Army Infantry Human Research Unit, April 1959. (DTIC No. AD 260 994)

Mehrabian, A. Significance of posture and position in the communication of attitude and status relationships. Psychological Bulletin, 1969, 71, 359-372.

Miller, F. B. "Situational" interactions --- A worthwhile concept? Human Organization, 1958, 17, 37-47.

Morgan, B. B., Coates, G. D., Alluisi, E. A., & Kirby, R. H. The team training load as a parameter of effectiveness for collective training in units. Norfolk, Va.: Old Dominion University, May, 1978. (DTIC No. AD A063 135).

Naylor, J. C., & Dickinson, T. L. Task structure, work structure, and team performance, Journal of Applied Psychology, 1969, 53, 167-177.

Nevill, D. Experimental manipulation of dependency motivation and its effects on eye contact and measures of field dependency. Journal of Personality and Social Psychology, 1974, 29, 72-79.

Nieva, V. F., Fleishman, E. A., & Reick, A. Team dimensions: Their identity, their measurement and their relationships. Washington, D. C.: Advanced Research Resources Organization, November 1978.

O'Brien, G. The measurement of cooperation. Organizational Behavior and Human Performance, 1968, 3, 427-439.

Scott, T. D., Meliza, L. L. Hardy, G. D., & Banks, J. H. Armor/anti-armor team tactical performance (ARI Research Report 1218). Alexandria, Va.: U. S. Army Research Institute for the Behavioral and Social Sciences, July 1979.

Shiflett, S. Toward a general model of small group productivity. Psychological Bulletin, 1979, 86, 67-79.

Shriver, E. L., Jones, D. R., Hannaman, D. L., Griffin, G. R., & Sulzen, R. H., Development of small combat arms unit leader tactical training techniques and a model training system (ARI research Report 1219). Alexandria, Va.: U. S. Army Research Institute for the Behavioral and Social Sciences, July 1979.

Sorenson, J. R. Task demands, group interaction and group performance. Sociometry, 1971, 34, 483-495.

Steiner, I. D. Group process and productivity. New York: Academic Press, 1972.

Trow, D. B. Teamwork under turnover and succession (Technical Report No. 2, ONR contract Nonr 3679 (00), Project NR 170-331). Endicott, N.Y.: Harpur College, June 1964. (DTIC No. AD 601 816)

Tuckman, B. W. Group composition and group performance of structured and unstructured tasks. Journal of Experimental Social Psychology, 1967, 3, 25-40.

Wiener, M., Devoe, S., Rubinow, S., & Geller, J., Nonverbal behavior and nonverbal communication. Psychological Review, 1972, 79, 185-214.

Ziller, R. C. The effects of changes in group composition on group performance. Final report (Grant No. AFOSR 62-95). Newark, Del.: University of Delaware, 1963. (DTIC No. AD 413 965)

APPENDIX A

ADDITIONAL DATA ON SQUAD EXPERIENCE VARIABLES AND CONTENT ANALYSES OF OPERATION ORDERS

TABLE A-1

OPERATION ORDER PARAGRAPH DEFINITIONS AND PARAGRAPH CONTENT CATEGORIES

SITUATION PARAGRAPH (S)

The Situation paragraph concerns the location, size and strength, composition, deployment, movement, time factors and weapon capabilities of the enemy and friendly forces that are likely to be involved in a military engagement. This paragraph provides the background information needed in conducting and planning the proposed engagement. In general, friendly forces refer to the higher units of which the specific unit (unit to which the operation order is given) is a part and/or to parallel units.

Content of Situation Paragraph

a. General Information (GEN)
b. Location, Enemy or Friendly (EL, FL)
c. Size / Strength, Enemy or Friendly (ES, FS)
d. Composition, Enemy or Friendly (EC, FC)
e. Time of Activity, Enemy or Friendly (ET, FT)
f. Movement, Enemy or Friendly (EM, FM)
g. Deployment, Enemy or Friendly (ED, FD)
h. Weapons, Enemy or Friendly (EW, FW)
i. Other, Enemy or Friendly (EO, FO)

MISSION PARAGRAPH (M)

The Mission paragraph is a clear concise statement of the task to be accomplished by the unit to which the operation order is given; that is, the objective as well as when the mission/operation is to begin. This paragraph usually addresses the questions of who, what, and when. No content codes were derived for this paragraph.

EXECUTION PARAGRAPH (E)

The Execution paragraph establishes how the mission is to be accomplished by the unit receiving the operation order. It is the unit's tactical plan and includes the scheme of maneuver and plan of fire support.

Content of Execution Paragraph

a. Indirect Fire (IR)
b. Direct Fire (DF)
c. Munitions (M)
d. Preparation of Attack Zone (P)
e. Use of obstacles (OF)
f. Reaction to obstacles (OF)
g. Intelligence Reporting (IR)

TABLE A-1 continued

h. Tactical Maneuver of Entire Squad (TMSW)
i. Tactical Maneuver of Subgroups within a Squad (TMST)
j. Other Friendly Units (OUNIT)
k. Coordinating Instructions (CI)
l. Standing Operating Procedures (SOP)
m. Other Execution Statements (EO)

SERVICE SUPPORT PARAGRAPH (SS)

The Service Support paragraph normally contains information or instructions pertaining to trains (transportation), rations, supply-resupply, maintenance, and casualty evacuation.

Content of Service Support Paragraph

a. Ammunition/Munitions (A)
b. Rations (R)
c. Casualty Information (C)
d. Standing Operating Procedures (SOP)
e. Other Service Support Statements (SSO)
f. Not Specified (NS)

COMMAND AND SIGNAL PARAGRAPH (CS)

The Command and Signal paragraph contains information regarding unit command and the operation of signal communications.

Content of Command and Signal Paragraph

a. Communications Electronics Operations Instructions (CEOI)
b. Password and Challenge (PW)
c. Hand and Arm Signals (HA)
d. Verbal Signals (SV)
e. Other Signals (SO)
f. Chain of Command (C)
g. Command Post (CP)
h. Standing Operating Procedures (SOP)

TABLE A-2

OPERATION ORDER CATEGORIES OTHER THAN PARAGRAPH CONTEXT CATEGORIES

COORDINATING QUESTIONS (CQ)

Coordinating questions referred to general questions regarding the unit's understanding of the mission.

OTHER COMMENTS (OC)

Other comments included any additional comments not covered by the five paragraphs of the operation order and were not coordinating questions addressed to the squad. Such comments included introductory comments which requested the attention of the squad.

ACCURACY/COMPLETENESS OF GIVEN STATEMENTS

Each given statement was checked for accuracy. Only accurate statements were then checked for completeness. Inaccuracies reflected revisions to the original statements that included wrong information and critical omissions which in turn changed the meaning of the original statement. An incomplete statement was created by omissions of parts of the original statement which did not distort the statement's meaning.

By definition, the combination of inaccurate but complete statements did not exist (i.e., if a statement completely relayed all the original information it was accurate). On the other hand, if a statement was inaccurate, there was no referent to serve as a basis for evaluating its completeness. Thus given statements were coded into one of three accuracy/completeness categories: accurate and complete, accurate but incomplete, and inaccurate.

CONTINGENCY STATEMENTS, EXECUTION PARAGRAPH

Contingency statements were of the form, "If____, then____", indicating tactical actions to be taken by the unit (squad) dependent upon events encountered during the mission. Contingency statements also included statements that indicated a change in execution might be necessary at certain times, but did not specify the exact form of the change (e.g., "If we should come in contact with the enemy, I will give you instructions.")

MEMBER QUESTION/RESPONSE

Squad member's questions and responses were coded according to the paragraph and paragraph-content codes when the speaker's voice was audible.

SQUAD LEADER ADDRESS/RESPOND TO INDIVIDUAL

Squad leader statements or questions addressed to or in response to a specific individual were marked. These statements were coded according to the paragraph and content codes whenever the quality of the tape allowed such determination.

TABLE A-3

DESCRIPTIVE STATISTICS ON SQUAD MEMBER EXPERIENCE:
EXPERIMENTAL AND COMPARISON GROUPS

EXPERIENCE VARIABLES	STATISTICS	EXPERIMENTAL GROUPS			COMPARISON GROUP		
		Squad Leaders	Team Leaders	Typical Squad Member	Squad Leaders	Team Leaders	Typical Squad Member
Number of months in present rank	Mean	25.3	14.6	7.9	8.8	11.5	8.5
	Median	16.7	12.7	7.0	10.0	6.1	7.0
	St. Dev.	19.4	12.2	3.1	6.8	11.4	3.1
	Range	0-87	0-64	4-16	1-21	2-35	6-15
Number of weeks in present position within present squad	Mean	29.4	25.8	25.3	10.0	11.0	15.0
	Median	15.0	14.0	23.2	7.0	11.0	11.1
	St. Dev.	29.0	31.2	13.7	10.2	7.2	10.9
	Range	1-99	0-192	8-72	1-32	1-23	4-39
Number of months in present position across all units	Mean	32.2	14.7	11.3	9.1	6.1	6.2
	Median	24.0	11.0	10.1	3.0	5.0	4.8
	St. Dev.	28.9	14.0	4.8	9.9	4.1	3.2
	Range	0-100	0-64	4-24	1-24	0-12	3-11
Number of other positions held across all units	Mean	2.0	2.1	0.8	1.8	2.3	0.5
	Median	1.9	2.0	0.8	1.7	2.4	0.3
	St. Dev.	1.5	1.2	0.4	1.2	1.2	0.4
	Range	0-4	0-4	0-2	0-4	0-4	0-1
Number of months in other positions across all units	Mean	32.0	22.7	5.3	17.8	17.8	2.2
	Median	28.0	20.5	5.0	18.0	18.0	1.8
	St. Dev.	28.9	14.7	3.9	12.1	11.1	1.7
	Range	0-120	0-77	0-17	0-42	0-36	0-5

Note. Experimental groups: 43 squad leaders, 75 teamleaders, 45 squads. Comparison group: 9 squad leaders, 15 team leaders, 9 squads.

TABLE A-4

RESULTS ON STATISTICAL TESTS COMPARING EXPERIMENTAL AND COMPARISON GROUPS ON MEMBER EXPERIENCE VARIABLES

EXPERIENCE VARIABLES	SQUAD LEADERS	TEAM LEADERS	SQUAD MEMBERS
Rank	$X^2 = 14.84^{**}$	$X^2 = 22.36^{**}$	$X^2 = 11.73$
Number of Months in Present Rank	K-W = 15.18**	K-W = 1.75	K-W = 4.54
Number of Weeks In Present Position within Present Squad	K-W = 4.99	K-W = 7.19	K-W = 8.45*
Number of Months in Present Position in All Units	K-W = 9.19*	K-W = 14.68**	K-W = 9.40*
Number of Other Positions held in All Units	K-W = 2.02	K-W = 2.71	K-W = 3.58
Number of Months in Other Positions in All Units	K-W = 2.53	K-W = 2.12	K-W = 6.57

Note. Because of the skewed distributions that occurred on the continuous variables and the lack of homogeneous variances across groups, a Kruskal-Wallis test was used to compare the three experimental groups and the comparison group.

* $p < .05$

** $p < .01$

TABLE A-5

BEHAVIORAL ASPECTS OF SQUAD LEADER AND SQUAD MEMBERS DURING OPORD: EXPERIMENTAL GROUPS

BEHAVIOR/ORIENTATION	% OF SQUADS
Squad leader took notes during platoon order	33
Squad leader used map	22
Eye Contact	
Squad leader looked at squad	89
Squad members looked at leader	56
Body Orientation	
Squad leader oriented his body toward squad	78
Squad members faced leader	56
Squad members briefed were within 5 ft. of leader	89
Squad security maintained during OPORD	78

Note. N = 9 squads

TABLE A-6

SUMMARY OF OPORD STATEMENTS: EXPERIMENTAL GROUPS

TYPE OF STATEMENT	NUMBER OF STATEMENTS Mean	Median	Mode	Range	St. Dev.
PLATOON OPORD					
Situation	3.4	3.7	4.	0-7	1.3
Mission	1.0	1.0	1	0-3	0.8
Execution	5.2	5.1	3	1-9	2.1
Service Support	1.0	1.1	1	0-2	0.8
Command & Signal	0.1	0.1	0	0-1	0.3
Total	10.9	11.0	8,12	4-17	3.4
ADDITIONAL INFORMATION					
Situation	1.8	1.4	0	0-6	1.8
Mission	0.0	0.0	0	0-1	0.2
Execution	5.5	4.3	3,4	1-22	4.1
Service Support	0.7	0.3	0	0-4	1.2
Command & Signal	1.7	1.2	0	0-8	1.9
Coordinating Questions	1.1	1.0	1	0-3	0.8
Other Comments	0.2	0.1	0	0-2	0.8
Total	11.0	9.3	5	2-37	6.7
TOTAL	21.9	21.3	10,13,16 22,23	10-52	8.8
Contingency Statements in Execution Paragraph	1.6	1.3	1	0-8	1.7
SQUAD MEMBER STATEMENTS	0.9	0.5	0	0-4	1.0

Note. Results include statement repetitions. N=43 squads.

TABLE A-7

RELATIONSHIP BETWEEN THE NUMBER OF PLATOON OPORD STATEMENTS RELAYED BY THE SQUAD LEADERS AND THE FOUR ACCURACY/COMPLETENESS CATEGORIES: EXPERIMENTAL GROUPS

OPORD PARAGRAPH	# OF STATEMENTS	ACCURACY/COMPLETENESS CATEGORIES							
		Accurate & Complete		Accurate & Incomplete		Inaccurate		Omitted	
		Squad Leaders #	%	Squad Leaders #	%	Squad Leaders #	%	Squad Leaders #	%
SITUATION	0	8[a]	19	12	28	26	60	21	49
	1	12[b]	28	19	44	12	28	11	26
(Total of 4	2	15	35	12	28	4	9	9	21
statements)	3	5	12	--	--	1	2	2	5
	4	3	7	--	--	--	--	--	--
	Mean	1.6		1.0		0.5		0.9	
EXECUTION	0	1	2	2	5	35	81	--	--
	1	8	19	16	37	7	16	2	5
	2	12	28	17	40	1	2	4	9
(Total of 9	3	13	30	5	12	--	--	7	16
statements)	4	4	9	3	7	--	--	8	19
	5	5	12	--	--	--	--	9	21
	6	--	--	--	--	--	--	11	26
	7	--	--	--	--	--	--	1	2
	8	--	--	--	--	--	--	1	2
	Mean	2.6		1.8		0.2		4.3	
SERVICE	0	13	30	43	100	42	98	13	30
SUPPORT	1	17	40	--	--	1	2	18	42
(Total of 2	2	13	30	--	--	--	--	12	28
statements)									
	Mean	1.0		0.0		0.0		1.0	

Note. Data represent number of squad leaders stating indicated number of statements in the designated qualitative manner. N=43 squad leaders. Percentages based on column frequency totals within each paragraph--accuracy/completeness cell.

[a]The value of 8 means that eight squad leaders (19%) did not relay any of the four Situation statements in the platoon OPORD accurately and completely.

[b]The value of 12 means that twelve squad leaders (28%) relayed only one of the four Situation statements in the platoon OPORD accurately and completely.

TABLE A-8

NUMBER AND CONTENT OF ADDITIONAL STATEMENTS IN OPORD PARAGRAPHS: EXPERIMENTAL GROUPS

OPORD PARAGRAPH	PARAGRAPH CONTENT	NUMBER OF ADDITIONAL STATEMENTS PRESENTED			
		0 % Sqd Ldr	1 % Sqd Ldr	2 % Sqd Ldr	≥3 %Sqd Ldr
SITUATION	Friendly: Movement, Time	100	--	--	--
	Enemy: Movement, Time	95	5	--	--
	Enemy: Other	95	5	--	--
	Friendly: Other	95	5	--	--
	Friendly: Size, Strength, Composition, Weapons	93	5	2	--
	Enemy: Size, Strength, Composition, Weapons	84	12	5	--
	Enemy: Location, Deployment	84	12	2	2
	Friendly: Location, Deployment	77	23	--	--
	General Information	49	30	12	9
EXECUTION	Munitions	100	--	--	--
	Prep of Attack Zone	100	--	--	--
	Use of Obstacles	100	--	--	--
	Reaction to Obstacles	98	2	--	--
	Indirect Fire	93	7	--	--
	Other Friendly Units	91	9	--	--
	SOP	88	2	5	4
	Direct Fire	86	7	5	2
	Other Execution	84	9	2	5
	Intelligence Reporting	67	30	2	--
	Coordinating Instructions	47	33	12	9
	Tactical Maneuver: Entire Squad	40	30	16	14
	Tactical Maneuver: Coordinate Squad Elements	12	37	28	23

TABLE A-8 continued

NUMBER AND CONTENT OF ADDITIONAL STATEMENTS IN OPORD PARAGRAPHS: EXPERIMENTAL GROUPS

OPORD PARAGRAPH	PARAGRAPH CONTENT	NUMBER OF ADDITIONAL STATEMENTS PRESENTED			
		0 % Sqd Ldr	1 % Sqd Ldr	2 % Sqd Ldr	≥3 % Sqd Ldr
SERVICE SUPPORT	Not Specified	98	2	2	--
	Casualty information	95	2	2	--
	SOP	93	5	2	--
	Ammunition/Munitions	88	9	2	--
	Other	86	12	2	--
	Rations	81	19	--	--
COMMAND & SIGNAL	Command Post	100	--	--	--
	Hand & Arm Signals	95	2	2	--
	Verbal Signals	95	5	--	--
	SOP	91	9	--	--
	Other Signals	86	14	--	--
	CEOI	81	16	2	--
	Password & Challenge	70	19	7	5
	Chain of Command	56	33	5	7

Note. Numeric values refer to the percentage of squad leaders that presented a specific number of additional statements in each content category. N = 43 squad leaders. Row percentages sum to 100.

TABLE A-9

SUMMARY OF OPORD STATEMENTS: COMPARISON GROUP

TYPE OF STATEMENT	NUMBER OF STATEMENTS Mean	Median	Mode	Range	St. Dev.
PLATOON OPORD					
Situation	3.3	3.5	4	2-4	1.0
Mission	1.5	1.5	None	1-2	0.5
Execution	5.2	4.5	4	3-9	2.1
Service Support	1.7	1.8	2	0-3	1.8
Command & Signal	0.3	0.3	0	0-1	0.5
Total	12.0	10.5	10	8-17	3.2
ADDITIONAL INFORMATION					
Situation	2.7	1.5	0	0-7	3.1
Mission	-	-	-	-	-
Execution	6.7	4.5	2	2-19	6.4
Service Support	-	-	-	-	-
Command & Signal	2.2	1.5	1	1-4	1.3
Coordinating Questions	1.8	1.5	1	1-4	1.2
Other Comments	0.5	0.5	0,1	0-1	0.6
Total	13.9	10.0	6	6-34	10.6
TOTAL	25.9	23.5	None	16-44	10.3
Contingency Statements in Execution Paragraph	2.7	1.0	0,1	0-11	4.2
SQUAD MEMBER STATEMENTS	0.8	0.5	0	0-3	1.2

Note. Results include statement repetitions. N = 6 squads.

TABLE A-10

RELATIONSHIP BETWEEN THE NUMBER OF PLATOON OPORD STATEMENTS RELAYED BY THE SQUAD LEADERS AND THE FOUR ACCURACY/COMPLETENESS CATEGORIES: COMPARISON GROUP

OPORD PARAGRAPH	# OF STATEMENTS	ACCURACY/COMPLETENESS CATEGORIES							
		Accurate & Complete		Accurate & Incomplete		Inaccurate		Omitted	
		Squad Leaders #	%	Squad Leaders #	%	Squad Leaders #	%	Squad Leaders #	%
SITUATION	0	2	33	3	50	5	83	3	50
	1	--	--	1	17	1	17	1	17
(Total of	2	1	17	2	33	--	--	2	33
4	3	1	17	--	--	--	--	--	--
Statements	4	2	33	--	--	--	--	--	--
	Mean	2.2		0.8		0.2		0.8	
EXECUTION	0	--	--	1	17	3	50	1	17
	1	2	33	2	33	3	50	--	--
(Total of 9	2	3	50	1	17	--	--	--	--
Statements)	3	--	--	2	33	--	--	1	17
	4	--	--	--	--	--	--	1	17
	5	--	--	--	--	--	--	--	--
	6	--	--	--	--	--	--	3	50
	7	--	--	--	--	--	--	--	--
	8	1	17	--	--	--	--	--	--
	Mean	2.7		1.7		0.5		4.1	
SERVICE	0	1	17	6	100	6	100	4	67
SUPPORT	1	1	17	--	--	--	--	1	17
(Total of 2	2	4	67	--	--	--	--	1	17
Statements)									
	Mean	1.5		0		0		0.5	

Note. Data represent number of squad le ders stating indicated number of statements in the designated manner. Percentages are based on column totals. N = 6 squad leaders.

TABLE A-11

NUMBER AND CONTENT OF ADDITIONAL STATEMENTS IN OPORD PARAGRAPHS: COMPARISON GROUP

OPORD PARAGRAPH	PARAGRAPH CONTENT	NUMBER OF ADDITIONAL STATEMENTS PRESENTED			
		0 % Sqd Ldr	1 % Sqd Ldr	2 % Sqd Ldr	≥3 % Sqd Ldr
SITUATION	Enemy: Size, Strength, Composition, Weapons	100	--	--	--
	Enemy: Movement, Time	100	--	--	--
	Friendly: Movement, Time	100	--	--	--
	Enemy: Other	100	--	--	--
	Friendly: Size, Strength, Composition, Weapons	83	17	--	--
	Friendly: Other	83	17	--	--
	Enemy: Location, Deployment	83	--	--	17
	Friendly: Location, Deployment	50	50	--	--
	General Information	50	33	--	17
EXECUTION	Indirect Fire	100	--	--	--
	Munitions	100	--	--	--
	Preparation of Attack Zone	100	--	--	--
	Use of Obstacles	100	--	--	--
	Reaction to Obstacles	100	--	--	--
	Intelligence Reporting	100	--	--	--
	Other Friendly Units	100	--	--	--
	Direct Fire	83	--	--	17
	Other Execution	83	17	--	--
	SOP	67	33	--	--
	Tactical Maneuver: Entire Squad	17	50	33	--
	Tactical Maneuver: Coordinate Squad Elements	17	17	33	33
	Coordinating Instructions	17	83	--	--

TABLE A-11 continued

NUMBER AND CONTENT OF ADDITIONAL STATEMENTS IN OPORD PARAGRAPHS: COMPARISON GROUP

OPORD PARAGRAPH	PARAGRAPH CONTENT	NUMBER OF ADDITIONAL STATEMENTS PRESENTED			
		0 % Sqd Ldr	1 % Sqd Ldr	2 % Sqd Ldr	> 3 % Sqd Ldr
COMMAND & SIGNAL	CEOI	100	--	--	--
	Hand & Arm Signals	100	--	--	--
	Verbal Signals	100	--	--	--
	Command Post	100	--	--	--
	Other Signals	83	17	--	--
	SOP	83	17	--	--
	Password & Challenge	67	17	--	17
	Chain of Command	33	50	--	17

Note. There were no additional statements made regarding Service Support. Numeric values refer to the percentage of squad leaders that presented a specific number of additional statements in each content category. N = 6 squad leaders. Row percentages sum to 100.

TABLE A-12

CORRELATION MATRIX AMONG OPORD, EXPERIENCE, AND MISSION OUTCOME VARIABLES

	OPORD		SQUAD LEADER EXPERIENCE					SQUAD MEMBER EXPERIENCE [1]					MISSION OUTCOME
	B	C	D	E	F	G	H	I	J	K	L	M	N
OPORD													
A Quality	30*	16	18	33*	-13	-21	14	07	-07	-06	13	11	15
B # Additional Statements		61**	36*	35*	-31*	-43**	12	15	-12	-12	10	25	07
C # Contingency Statements			32*	23	-29*	-34*	30*	17	-12	-15	-14	06	02
SQUAD LEADER EXPERIENCE													
D # Months as Squad Leader, Present Unit				47**	04	-04	22	29*	07	11	23	13	17
E # Months as Squad Leader, All Units					-09	-19	32*	27*	19	15	05	16	15
F # Other Positions held in All Units						65**	-12	-03	02	02	03	-19	20
G # Months in Other Positions in all Units							-28*	-00	07	03	03	-13	05
H # Months in Present Rank								15	21	-06	08	19	-15
SQUAD MEMBER EXPERIENCE													
I # Months in Present Position, Present Unit									73**	08	22	40**	20
J # Months in Present Position, All Units										29*	28*	32*	09
K # Other Positions held in All Units											48**	16	08
L # Months in Other Positions												40**	02
M # Months in Present Rank													-16
MISSION OUTCOME													
N Percentage Difference													-

Note. Experimental groups only. Ns for correlation coefficients ranged from 41 to 45.

1 Squad member variables include Team Leader Data

* $p < .05$

** $p < .01$

TABLE A-13

REGRESSION ANALYSIS RESULTS

CRITERION VARIABLE	PREDICTOR VARIABLES	R	R^2	% Increase in R^2	F for R^2 Increase
OPORD	Treatments	.13	.016	1.6	F(2,42) = 0.34
Quality	Sqd Ldr Exp	.40	.157	14.1	F(2,40) = 3.34*
	Sqd Member Exp	.44	.194	3.7	F(2,38) = 0.02
	Overall Regression Equation				F(6,38) = 1.53
Additional	Treatments	.26	.067	6.7	F(2,42) = 1.53
Statements	Sqd Ldr Exp	.52	.271	20.3	F(2,40) = 5.59**
	Sqd Member Exp	.55	.299	2.8	F(2,38) = 0.76
	Overall Regression Equation				F(6,38) = 2.77*
Mission	CPFOR Week	.41	.171	17.1	F(2,42) = 4.35*
Outcome:	Sqd Ldr Exp	.48	.230	5.9	F(2,40) = 1.54
Percentage	Sqd Member Exp	.48	.231	0.1	F(2,38) = 0.03
Difference	OPORD Char	.51	.262	3.1	F(2,36) = 0.76
	Overall Regression Equation				F(8,36) = 1.60

* $p < .05$

** $p < .01$

APPENDIX B

DEFINITION OF CATEGORIES USED IN CONTENT ANALYSIS OF OPERATION ORDERS

APPENDIX B

DEFINITION OF CATEGORIES USED IN CONTENT ANALYSIS OF OPERATION ORDERS

SITUATION PARAGRAPH (S)

The situation paragraph concerns the location, size and strength, composition, deployment, movement, time factors, and weapon capabilities of the enemy and friendly forces that are likely to be involved in a military engagement. This paragraph provides the background information needed in conducting and planning the proposed engagement. In general, the term friendly forces refers to the higher units of which the specific unit (unit to which the operation order is given) is a part and/or to parallel units.

General Information (GEN): General information refers to such topics as weather, nature of the terrain, specific terrain features, and the location of tactically significant landmarks. Example: "Checkpoint Charlie is located here."

The following content areas were applied to both enemy and friendly forces, with separate codes used for each.

Location (EL, FL): Location refers to where enemy and friendly forces are known to be or will be. Statements that referred to location of the squad itself were also coded as friendly location (e.g., "We are located here" as leader points to a terrain map).

Size/Strength (ES, FS): Size is a unit description like battalion, company, platoon, or squad; strength is a relative measure of the force capability (e.g., a company at half strength due to casualties). Such statements provide an account of the relative size/strength of the forces that will be involved in the impending engagement. Example: "The friendly forces are ourselves, 1st squad, 3rd platoon, and 2nd and 3rd squads."

Composition (EC, FC): Refers to military branch (e.g., Infantry, Armor, Field Artillery, Air cavalry, Engineers) or a combination of various branches, therefore composition statements describe the type of unit(s) which comprise the enemy and friendly forces. Examples: "Enemy consists of light Infantry" and "Enemy is from Motorized Rifle Regiment."

Time of Activity (ET, FT): Timing of movements by friendly or enemy forces. Both beginning and ending times as well as duration of movement are included in this definition.

Movement (EM, FM): Refers to recent, ongoing, or suspected movement of enemy and/or friendly forces.

Deployment (ED, FD): A description of how forces are distributed within a given general location; pertains to stationary, advancing or retreating forces. Example: "Enemy has left OPs and LPs" and "1st and 2nd squads are on our left flank."

Weapons (EW, FW): Information in addition to force composition that describes specific and/or special weapon capabilities such as CBR or unusual weapons. Both indirect and direct fire capabilities are included.

Other (EO, FO): Other situation statements not covered by the above categories.

MISSION PARAGRAPH (M)

The mission paragraph is a clear, concise statement of the task to be accomplished by the unit to which the OPORD is given; that is, the objective, as well as when the mission/operation is to begin. This paragraph usually addresses the questions of who, what, and when. No subcategories were employed in this paragraph. When statements began "our mission is" but the content was clearly not concerned with mission but with execution, the statements were coded for their true content. An example of such a statement is "Our mission is to be point squad for the platoon."

EXECUTION PARAGRAPH (E)

The execution paragraph establishes how the mission is to be accomplished by the unit receiving the OPORD. It is the unit's tactical plan and includes the scheme of manuever and plan of fire support.

Indirect Fire (IF): Statements referring to use of indirect fire (artillery, mortars) during the tactical operation (e.g., "81mm mortar team will provide suppressive fire as the unit approaches an enemy OP").

Direct Fire (DF): Statements referring to use of direct fire weapons during the tactical operation, e.g., use of M60, automatic rifle, Dragon, LAW.

Munitions (M): Statements referring to use of munition during the tactical operation, e.g., claymores, handgrenades.

Preparation of Attack Zone (P): Refers to actions taken prior to the tactical operation that prepare the terrain/environment for friendly assault/defense (e.g., use of indirect fire, chemicals, smoke, fire from gunships)

Obstacles, Use of (OU): Reference to use or preparation of obstacles such as minefields, bunkers, concertina wire by the unit.

Obstacles, Reaction to (OR): Reference to how unit is to react when encountering enemy obstacles (e.g., danger areas, minefields). This category excludes references to intelligence reporting of obstacle location and condition, as these are included under intelligence reporting.

Intelligence Reporting (IR): Refers to reporting of the enemy situation during the tactical operation (e.g., "Once you have spotted the OP, report its location to me.")

Tactical Maneuver of Entire Squad (TMSW): General comments that refer to the movement of the entire squad (e.g., We'll move out in that direction, keeping within 100 meters of the road." "Move out as quickly as possible.").

Tactical Maneuver of Squad with reference to coordinated movement of subdivisions within the squad such as fire teams (TMST): Such statements may include use of the terms fire and maneuver, traveling overwatch formation, and bounding overwatch formation which imply coordinated movement between fire teams. Other statements may refer explicitly to coordinated movement (e.g., "Alpha team lead out with Bravo team 50 meters behind.").

Other Friendly Units (OUNIT): Information regarding tactical plan for other friendly units at the same level or the next higher echelon. In the present study, this referred to other squads within the platoon and to the platoon as a whole.

Coordinating Instructions (CI): Coordinating instructions are instructions regarding the general behavior/demeanor of the squad. These are usually of a nontactical nature and are given prior to misson departure. Examples: "If you are ready prior to LD time, you move out." "If there are no questions, I want you to go back and brief your people right quick." "We move out in 5 minutes."

Standing Operating Procedures (SOP): Reference to use of standing operating procedures during execution of the mission.

Execution Other (EO): Any other statements not covered by the above categories, e.g., "Keep your heads down." When statements served to embellish other execution statements, they were coded in the appropriate category rather than as Execution Other.

SERVICE SUPPORT PARAGRAPH (SS)

The Service Support paragraph normally contains information or instructions pertaining to transportation, rations, supply-resupply, maintenance, and casualty evacuation.

Ammunition/Munitions (A): Reference to any ammunition/munition -- its supply, location, distribution, etc.

Rations (R): Reference to food and medical supplies

Casualty Information (C): Reference to report of casualties and plans for casualty evacuation

Standing Operating Procedures (SOP): Reference to SOP in any of the above areas

Not Specified (NS): Information inadequate - could not determine what type of service support was being referenced

Other (SSO): Other statements regarding Service Support not covered by the above categories

COMMAND AND SIGNAL PARAGRAPH (CS)

This paragraph contains information relative to command and the operation of signal communications.

Communications Electronics Operations Instructions (CEOI): Operating sanctions on use or nonuse of radio equipment (e.g., "OK, we have no radio capability")

Password and Challenge (PW): Any combination of two specific words; one is the password and the other is the challenge. The time period when a specific password/challenge is in effect may also be given.

Hand and Arm Signals (HA). Reference to use of hand and arm signals (what type of signals and when signals are to be used).

Signals, Verbal (SV): Reference to use of verbal communication within the unit, excluding radio, electronic communications e.g., CEOI.

Signals, Other (SO): Signals other than radio, verbal, and hand/arm; includes such signals as flares and gun blasts

Chain of Command (C): Reference to who is in charge should some ill fate befall the present leader(s). The responsibility for the mission then becomes this person's responsibility. The category also included reference to the location of any person involved in the chain of command (e.g., "The platoon leader, SGT Mason, will be with me.)"

Command Post (CP): Location of command posts for pertinent units. For the squad the CP would be the Company and Battalion CPs.

Standing Operating Procedures (SOP): Reference to SOP for commands and signals.