Technical Report 438

EVALUATOR RATING OF UNIT PERFORMANCE IN FIELD EXERCISES: A MULTIDIMENSIONAL SCALING ANALYSIS

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Statistical data analysis techniques were applied to expert judgments to explore systematic methods to incorporate expert military opinion into unit evaluation procedures. The research involved two related studies designed to define the major dimensions, or factors, that military judges use to assess unit performance in field exercises. In the first study, 15 military judges rated unit performance described in written narratives of 15 field exercises. These ratings were then analyzed using (Continued)

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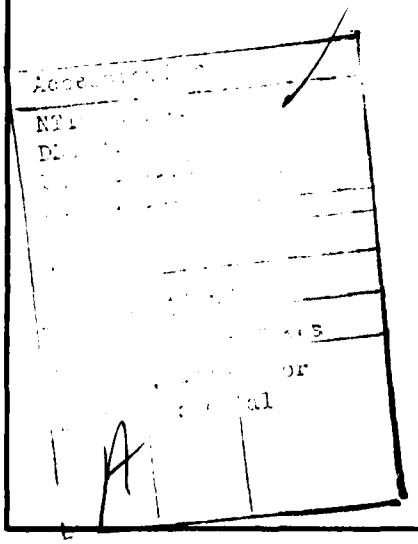
multidimensional scaling (MDS) techniques to determine how many dimensions the judges used to evaluate performance. The second study attempted to define, or label, the dimensions obtained in the first study. To do this, a list of possible dimension-defining attributes (adjectives or descriptive phrases) was composed, a new group of 30 military judges ranked the 15 narratives with respect to how much each narrative was characterized by the attributes, and these ratings were used as input to a second MDS analysis.

The results indicated that judges used only three dimensions to evaluate unit performance, and that the dominant dimension was quality of overall performance. Subsequent interpretive analyses suggested that the weaker two dimensions were use of indirect fire and use of TOWs; when the dominant quality-of-performance dimension was eliminated, however, the secondary dimensions were (a) leadership functions, including coordination of elements, command and control, and exercise of leader functions, and (b) tactical skills, including use of indirect fire, quality of tactical plan, and use of tanks.

These results may be a methodological artifact due to insufficient information in the narratives or due to biases in the writing of the narratives. Performance on all aspects of unit tactical skills may change in unison, explaining the dominance of the quality of overall performance dimension. The judges may use only a generalized quality of performance dimension because they do not know what other dimensions to consider, how to assess performance on other dimensions, or how to assimilate information from other dimensions to arrive at a single evaluation of unit performance. Further tightly controlled research is needed to provide a rigorous investigation of the judgmental decision process.



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FOREWORD

The research presented in this paper was conducted under the Training and Education Project in the Simulation Systems Technical Area of the Army Research Institute for the Behavioral and Social Sciences (ARI). The goal of this project is to provide quantitative methods for evaluating unit proficiency by means that include basic research in criterion-referenced test methodology, measurement and scaling models, and decisionmaking implications of test score interpretation.

The multidimensional scaling (MDS) analysis of evaluator ratings of unit performance in field exercises is a first attempt to determine the dimensions of unit tactical behavior on which military evaluators assess unit performance. The research is founded on several aspects of the Technical Area work program: Army Training and Evaluation Program (ARTEP) evaluator training, evaluation of small combat units in a simulated combat environment (ARTEP, REALTRAIN), methods for developing performance criteria, model tank gunnery exercises, and improved training-diagnostic feedback procedures. The concepts and results of all these research endeavors were used to develop the research idea and plan for the MDS study.

Anticipated future research under the Training and Education Project includes the development of a computer model for performance evaluation and development of models for measurement, scaling, scoring, decisionmaking, and quality control for use in evaluating performance in criterion-referenced tests.

ARI research in this area is conducted as an in-house effort, and is responsive to the requirements of Army Project 2Q762722A764.

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EVALUATOR RATING OF UNIT PERFORMANCE IN FIELD EXERCISES:
A MULTIDIMENSIONAL SCALING ANALYSIS

BRIEF

Requirement:

A basic step in developing quantitative methods to evaluate unit proficiency in tactical performance is to define the major dimensions that military evaluators actually use to assess field performance. To identify these dimensions, this project elicited and analyzed experienced military raters' evaluations in a two-step process.

Procedure:

First, 15 officers rated unit performance in each of 15 narrative descriptions of field exercises. Their ratings were analyzed using multidimensional scaling analysis techniques to find out how many dimensions they had used. Second, a different group of 30 officers rated each narrative on how well it was described by each of a set of descriptive phrases (e.g., "communicates," "uses indirect fire") developed during the first step. These ratings were also analyzed with multidimensional scaling techniques.

Findings:

Results indicated that performance appeared to be assessed along only three dimensions; the dominant factor was quality of overall performance. Use of indirect fire and use of TOWs (heavy antitank weapons) appeared to be the other two factors in evaluating the complete set of field exercises; however, when the best and worst performances were excluded from the analysis, leadership functions and tactical skills appeared as the two secondary factors in judging performance.

Utilization of Findings:

The findings should be checked by other research; if raters do assess unit proficiency on general quality instead of on specific aspects of performance, some method of insuring specific diagnostic feedback may need to be developed to meet Army training objectives.

EVALUATOR RATING OF UNIT PERFORMANCE IN FIELD EXERCISES:
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INTRODUCTION

For several years, the Army Research Institute for the Behavioral and Social Sciences (ARI) has been involved in a systematic program of research on unit evaluation. The goal of the research is to develop a criterion-referenced system for evaluating unit tactical performance. The system must be consistent with and built upon the framework provided by the Army Training and Evaluation Program (ARTEP), since the ARTEP provides an essential link to doctrine and mission requirements; yet the system must go beyond current ARTEP methodology, incorporating its strengths and correcting its deficiencies (Medlin, 1979).

As currently used, the ARTEP includes a manual, a field exercise evaluation, and a training program based on the evaluation. The ARTEP manual drives the evaluation system. Based on doctrine and military expertise, the manual is designed to be a training and evaluation guide. Evaluation requirements are stated in terms of specific unit performance objectives and focus on whether a unit can perform specified missions. Task statements are written at an integrated, functional, mission-oriented level. Conditions for performing each task are specified to allow greater standardization of the evaluation. Training and evaluation standards provide a basis on which the evaluator can judge the unit's performance on a particular task; the standards also can be used to develop training programs.

Traditionally, the ARTEP manual and the front-end analysis of behavioral objectives, performance variables, and measurements have relied heavily on expert military judgments. The current content of the Training and Evaluation Outlines (T&EOs) was selected by military experts without the benefit of available procedures for insuring consensus among different teams of experts. The lack of standardized or scientific procedures for determining the tasks, subtasks, and standards in the T&EO is a serious weakness in the ARTEP manual and evaluation system.

In order to address this weakness, ARI has been engaged in research to study the use of standardized scientific procedures based on empirical data as a way to increase experts' consensus and as a means of testing and verifying expert opinion. These methods also provide a basis for reducing expert opinions to a manageable set of the variables that are most important in assessing unit performance in field exercises.

One research effort focused on identifying variables that appear to be useful in discriminating among units differing in tactical proficiency (Scott, Meliza, Hardy, & Banks, 1979; Scott, Meliza, Hardy, Banks, & Word, 1979). Using a large data base from combined arms field exercises, critical incidents within exercises were identified, as were the causes or precipitating factors of particularly damaging or helpful tactical events. These critical events included particularly long delays between acquiring targets and delivering indirect fire, units that exposed themselves for long periods of time, and breakdowns in communications.

Based partly on these critical incidents, a prototype ARTEP T&EO was developed with a set of diagnostics (Medlin, Epstein, Wanschura, Mirabella, & Boycan, 1979). These diagnostics are "enabling behaviors"; that is, a unit that performs the behavior is more likely to complete its task or mission than a unit that does not. Evaluators also can use these diagnostics to help develop training programs based on the unit's ARTEP evaluation. By noting which tasks were not completed successfully and tracing back with the aid of the diagnostics to determine why a task was not completed, the evaluator can assess the unit's training deficiencies and develop a corrective training program.

A second research effort was directed at compiling a candidate set of concepts and objective performance measures to support evaluation of tank platoon battlerun performance (Wheaton, Allen, Johnson, Drucker, Ford, Campbell, & Boycan, 1980). Performance concepts and measures were developed using a conventional front-end mission-oriented task analysis and an inverted mission analysis. Unsatisfactory mission outcomes were traced back to identify those aspects of platoon performance that logically could be implicated as potential reasons for a unit's failure to accomplish its mission. The results of these two analyses and a compilation of all concepts and measures used in previous battleruns, or similar settings such as company/team REALTRAIN exercises, were used to specify the final set of concepts and measures. Staff familiar with armor operations and current Army doctrine used these materials to develop T&EOs for two platoon battlerun missions, one offensive and one defensive.

A third study, designed to reduce a large number of variables to a smaller, more manageable set, was conducted by Wheaton, Fingerman, and Boycan (1978). In this study, a model tank gunnery test was developed by reducing 266 tank gunnery job objectives to 16 clusters or families of job objectives, using cluster analysis. Sample activities from each of these clusters were then selected to form 28 exercises to include in the model gunnery test. The model test met three criteria considered critical to the design of an effective gunnery test.

> First, the test contained at least one highly representative objective from each major family, thereby providing a basis for inferences about the quality of performance in each family and by extension the entire gunnery domain. Second, the exercises covered the range of tactical and environmental conditions under which engagements may occur. Finally, the test exercises required the crew to perform most of the 112 crew behaviors associated with gunnery. Only 10 behaviors were not included in the model test, and of these, nine occur rarely in the domain of 266 objectives (Wheaton, Fingerman, & Boycan, 1978, p. v).

The results of the model tank gunnery test research indicate that a large number of variables can be reduced to clusters or families of variables and that by selective sampling of variables in these clusters, inferences can be drawn about the other variables in these clusters.

Each of these studies supports the premise that not all variables related to unit performance need to be measured and evaluated to assess unit tactical performance in field exercises; each study provides a logical and/or empirical basis for limiting the number of such variables. However, a common problem with the methods of these studies is that military experts must initially consider and list all the behaviors that could possibly influence unit performance. This method of generating performance constructs and measures has several disadvantages. First, the domain of constructs and measures is often quite large and unmanageable. A rough count of the T&EOs in ARTEP 71-2 suggests at least 575 separate tasks, and the two prototype battlerun T&EOs cover 30 pages of single-spaced text. Second, the behaviors listed are those that military experts suggest might possibly influence unit performance. But are they the factors, or dimensions, that evaluators actually use to assess unit performance? Do ARTEP evaluators attend to all possible constructs, measures, and their relationships, or do they pay attention to only a small subset of the domain? If they consider a subset of all the constructs and measures, which ones do they use? Do the evaluators carefully judge and weigh the individual factors, or do they use some type of heuristic or simplified judgment process to evaluate unit performance? If they use a heuristic, what is the nature of the judgment process?

The research reported in this paper used methods designed to eliminate the need for full, exhaustive listing of training objectives. The methods are also designed to identify those dimensions or variables that evaluators actually use.

The present research involved two related studies designed to define the major dimensions, or factors, that military judges use to assess unit performance in field exercises. In the first, military judges rated unit performance as described in written narratives of field exercises. These ratings were then analyzed using a data exploratory technique called multidimensional scaling (MDS) (Young, 1975; Kruskal, 1964; Funk, Horowitz, Lipshitz, & Young, 1976) to determine both the dimensionality, or number of dimensions, and the composition, or configuration, of the space that the judges used to evaluate performance.

The second study attempted to define or label the first study's dimensions. To do this, a list of possible dimension-defining attributes was composed, a new set of military judges ranked the narratives as to how much each narrative was characterized by the attributes, and these comparisons were used as input to a second MDS analysis. The set of attributes best predicted by or most related to the original space was the set that military judges considered to be important in assessing unit performance in field exercises. The result of the MDS analyses was a set of factors, dimensions, or attributes that military experts considered important in assessing unit performance in field exercises.

METHOD

Experiment 1--Multidimensional Scaling Analysis

Subjects. Fifteen Army officers, ranking from first lieutenant to major, served as subjects. The officers participated as part of their duties at the 4th Battalion of the 40th Armor, Fort Carson, Colo. All the officers had served in the Army for at least 5 years, were college graduates, and had participated in and evaluated field exercises.

Procedure. Using written narratives of 15 different armor/anti-armor field exercises (Appendix A), military judges rated each unit's performance. After an initial 4-hour introductory session in which the task was explained to each judge individually and all questions were answered as clearly and completely as possible, the judges rated the narratives at their own pace over a 2-week period. At the end of 2 weeks, the participants returned their ratings and were debriefed fully. To provide initial similarity judgments for the MDS analysis, each narrative was used as a "target," and the other narratives were compared to the target along certain specific criteria (Appendix B). For instance, the officers were asked to "judge how similar each narrative is to the target narrative with respect to the performance of the combat unit in the narratives." Each of the 15 narratives was used as the target; comparisons were made between all the other narratives and the target. A matrix composed of these ratings, called a similarity matrix, was used as input to the MDS computer program ALSCAL (Takane, Young, & de Leeuw, 1977).

Data Analysis Procedures. Multidimensional scaling is a data analysis technique used to analyze proximity, or similarity, data. A proximity is a measure of the relationship between two entities. The definition of this relationship varies and usually depends on the entities under consideration. MDS uses these proximity data to generate a space, or map, in which each datum is represented by a single point. The distances separating the points in the space represent the relationships among the proximity data. Thus, in the problem under investigation, the MDS program generated a space in which the relationships among the exercise narratives were reflected by the configuration of the points in the space.

Before obtaining the configuration, however, the dimensionality (i.e., the number of dimensions) of the space in which the configuration is to be placed must be determined. The distances between the points depend on the dimensionality of the space in which they are being placed. Given r points, these r points always uniquely determine at most an r - 1 dimensional space. Thus the 15 exercise narratives under consideration determine at most a 14-dimensional space. This extreme situation is of little interest; it is the reduction in dimensionality that can be achieved without distorting the configuration that is important.

To assess how well a particular set of stimuli is represented in a particular dimensionality, stress, a canonical correlation analysis, and the interpretability of the solution may be considered. Stress is a goodness-of-fit measure; it indicates how well the configuration of points in a space reproduces the relationships among the stimuli (Kruskal, 1964).

The lower the stress, the more similar the configuration points in space are to the observed set of relationships among the stimuli.

In the canonical correlation analysis (Kruskal & Wish, 1978), solutions with successive numbers of dimensions (such as two versus three dimensions, four versus five dimensions) are examined to determine at what dimensional space the lower-dimension solution accounts for most of the variance accounted for by the higher-dimension solution. If the lower-dimension solution accounts for most of the variance, then the higher-dimension solution contains only the variance of the less complex solution, spread out over an additional, superfluous dimension. Thus, there is no reason to retain the more complicated solution.

The final criterion for deciding the dimensionality of the solution is interpretability (Kruskal & Wish, 1978). Often stress and the canonical correlation analysis do not provide clear-cut guidance. Since one of the primary goals of an MDS analysis is an interpretable configuration, interpretability is a natural and useful way to compare solutions. The configurations are examined to determine in which one the data points have the most sensible or understandable structure.

Results. Using the MDS computer program ALSCAL (Takane, Young, & de Leeuw, 1977), solutions in one to six dimensions were obtained and analyzed as asymmetric, row-conditional data. (MDS data analysis techniques, like factor analyses, are used to determine stable configurations that represent experimental stimuli. Dimensions must be determined by at least two stimuli to be stable; and overdetermined dimensions, those that are determined by more than two stimuli, are more stable and better represent the data. Consequently, solutions in one to six dimensions were examined because they were appropriately overdetermined.) The appropriate dimensionality of the solution was decided using stress, the canonical correlation analysis, and interpretability.

First, the stress values were examined; however, since the configuration is guaranteed to fit better (i.e., have lower stress values) in a larger number of dimensions, the appropriate solution is not the one with lowest stress value per se. Rather, the stress values from all six solutions (Table 1) are plotted (Figure 1) and the number of dimensions at which the curve "breaks" or "bends" is selected as the most appropriate dimensionality. The reasoning behind this test, known as the scree test, is that the break point indicates the dimensional value required to adequately represent the data (Cattell, 1966; Kruskal & Wish, 1978). A solution with fewer dimensions than the number at the break point produces a significant increase in stress, indicating that the fit is much poorer; a solution with a greater number of dimensions does not have a stress value significantly lower than that at the break point, so little improvement in fit is gained by using additional dimensions. Since MDS is a totally descriptive technique for which no error theory exists, no significance tests for stress value, or for change in stress value, are available.

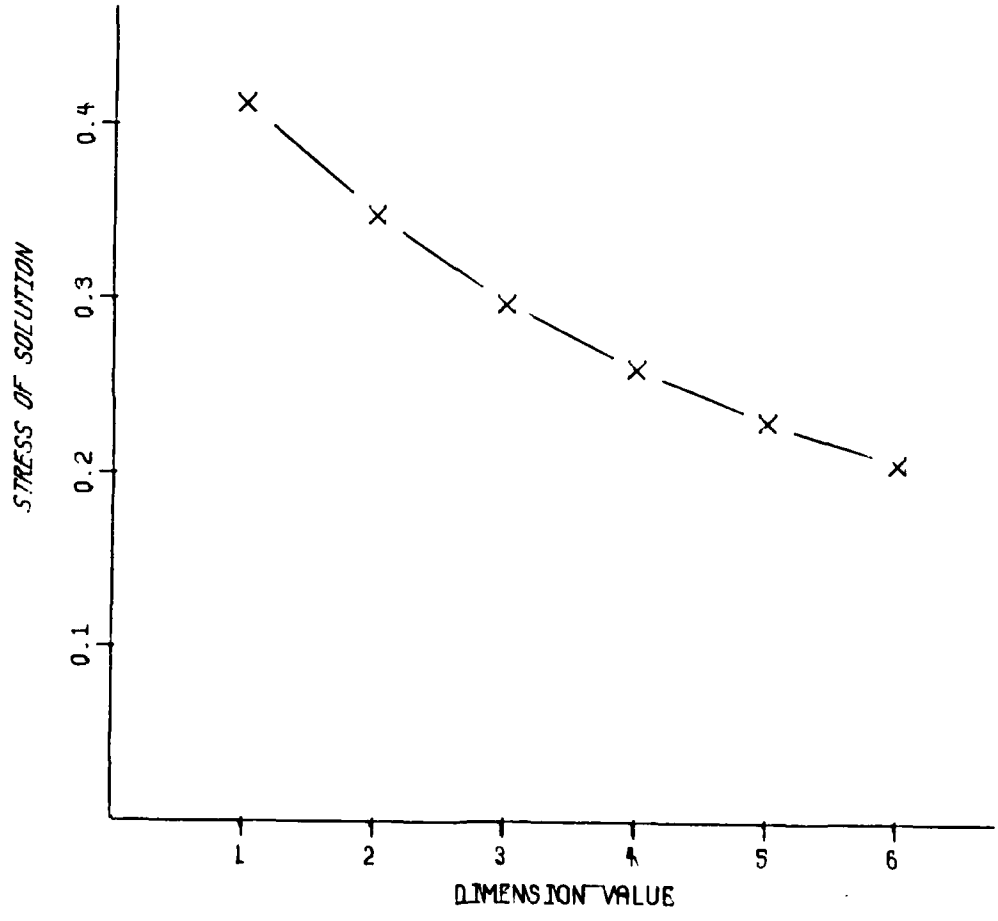


Figure 1. Stress value as a function of dimension.

Table 1

Stress Values for Solutions in One to Six Dimensions

Dimension	Stress
1	.412
2	.348
3	.296
4	.260
5	.230
6	.206

As can be seen in Figure 1, the scree test for the stress values of the six solutions is not conclusive in this case. The "break" or "elbow" in the test is not clearly identifiable; it is difficult to determine if there really is one. If a bend does occur, however, it seems to occur at three dimensions.

The second consideration in selecting the dimensionality appropriate for the exercise narrative data was the canonical correlation analysis (Table 2). In this analysis, there are always as many canonical variates as there are dimensions in the lower-dimension solution. Thus, in the comparison of the one- and two-dimensional solutions (section a of Table 2), there is one canonical variate. These canonical variates tend to correlate highly (close to 1.0) with a single dimension of the higher-dimension solution. In section a, the high correlation between the canonical variate and dimension 1 indicates that the first dimension in the two-dimensional solution corresponds to the single dimension in the one-dimensional solution. The low correlation between the canonical variate and dimension 2, however, indicates that the two-dimensional solution has an additional unrelated dimension.

A similar process is followed in examining the subsequent canonical correlation results. In section b of Table 2, dimension 3 is not related to the two-dimensional solution. The comparisons of the one- and two-dimensional solutions and the two- and three-dimensional solutions indicate that at least three dimensions are required for accurate representation of the data in a space. The comparison of the three- and four-dimensional solutions is not so straightforward (section c). Dimensions 1 and 2 are predicted well from the first two canonical variates, but dimensions 3 and 4 are predicted only moderately well from the third canonical variate, with the third dimension better predicted than the fourth. This result suggests that in going from a three- to a four-dimensional space, the third dimension separates into two dimensions, and that some of the fourth dimension is already accounted for in the three-dimensional solution. Thus, the canonical correlation analysis suggests that a three-dimensional space is appropriate for the configuration of points representing the narratives.

Table 2

Canonical Correlation Analysis Results

a. Correlation coefficients between two-dimensional solutions and one canonical variate (CV)

	Dimension 1	Dimension 2
CV1	.99	.01

b. Correlation coefficients between three-dimensional solutions and two canonical variates (CV)

	Dimension 1	Dimension 2	Dimension 3
CV1	.99	.02	-.12
CV2	-.04	.97	-.27

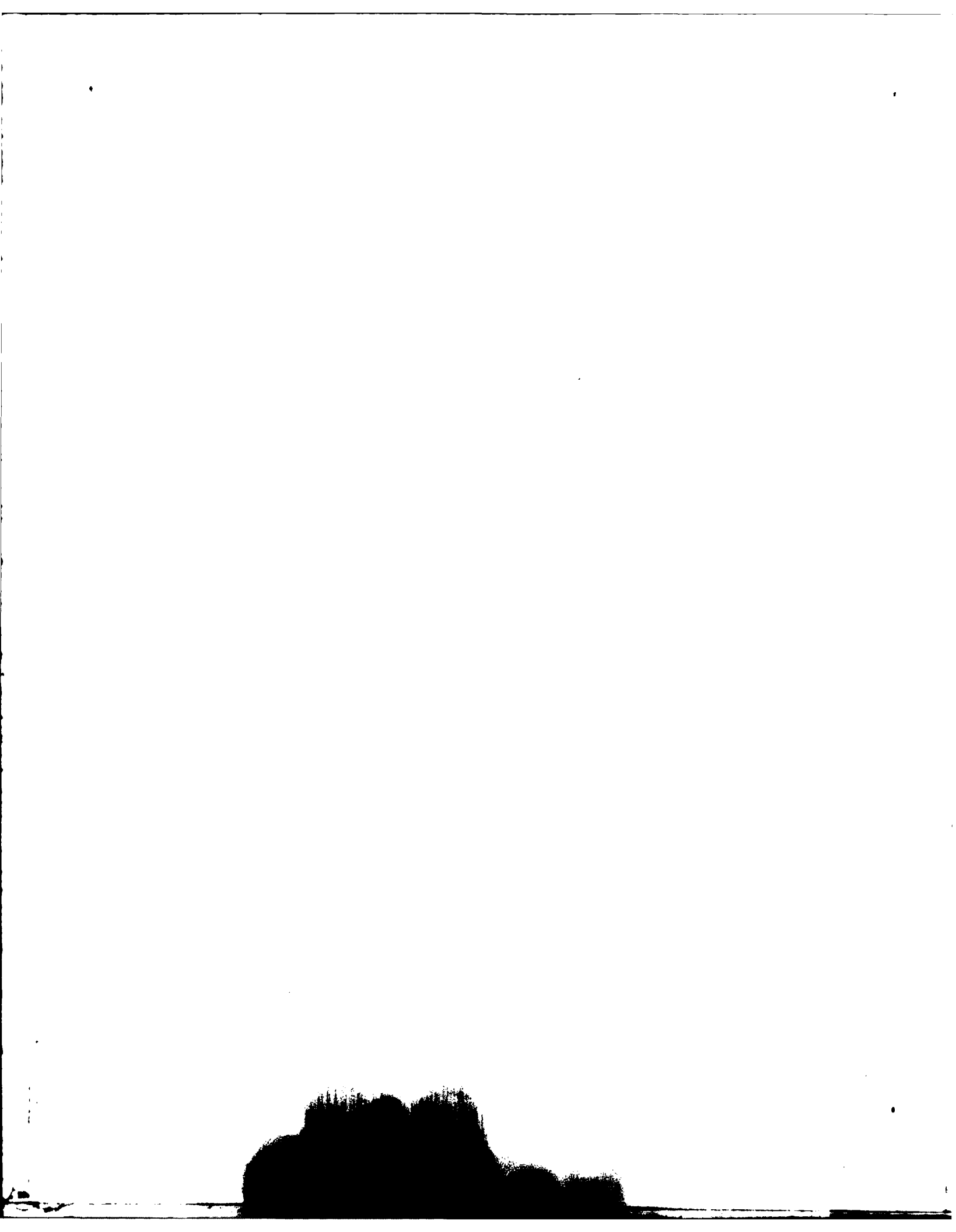
c. Correlation coefficients between four-dimensional solutions and three canonical variates (CV)

	Dimension 1	Dimension 2	Dimension 3	Dimension 4
CV1	.98	-.04	-.24	-.11
CV2	-.02	.99	-.06	-.19
CV3	.14	.09	.78	.59

The third and final criterion applied in determining the appropriate dimensionality of the solution was interpretability. Since the previous two analyses indicated that the solution should be in a three- or four-dimensional space, these two spaces were examined to assess their respective interpretations. The three-dimensional solution was selected as being most interpretable, partly because it was more parsimonious and partly because a three-dimensional space is easier to conceptualize. The three-dimensional solution is shown in Figure 2. (The letters in Figure 2 correspond to the narratives in Appendix A.) Figures 3, 4, and 5 give the three-dimensional solution in the three planes that make up the space.

Discussion. The MDS analysis of narrative rating data indicated that military judges used three dimensions, or factors, to assess unit performance. The configuration of points in the space represents the relationships between the exercise narratives and the dimensions used to evaluate the narratives. After a configuration is obtained, the interpretation process begins.

One means of interpreting an obtained configuration is to examine points from opposite edges of the space in order to suggest possible meanings for the dimensions. Thus, on dimension 1, points H, M, and D (corresponding to narratives, H, M, and D in Appendix A) and points I, J, and



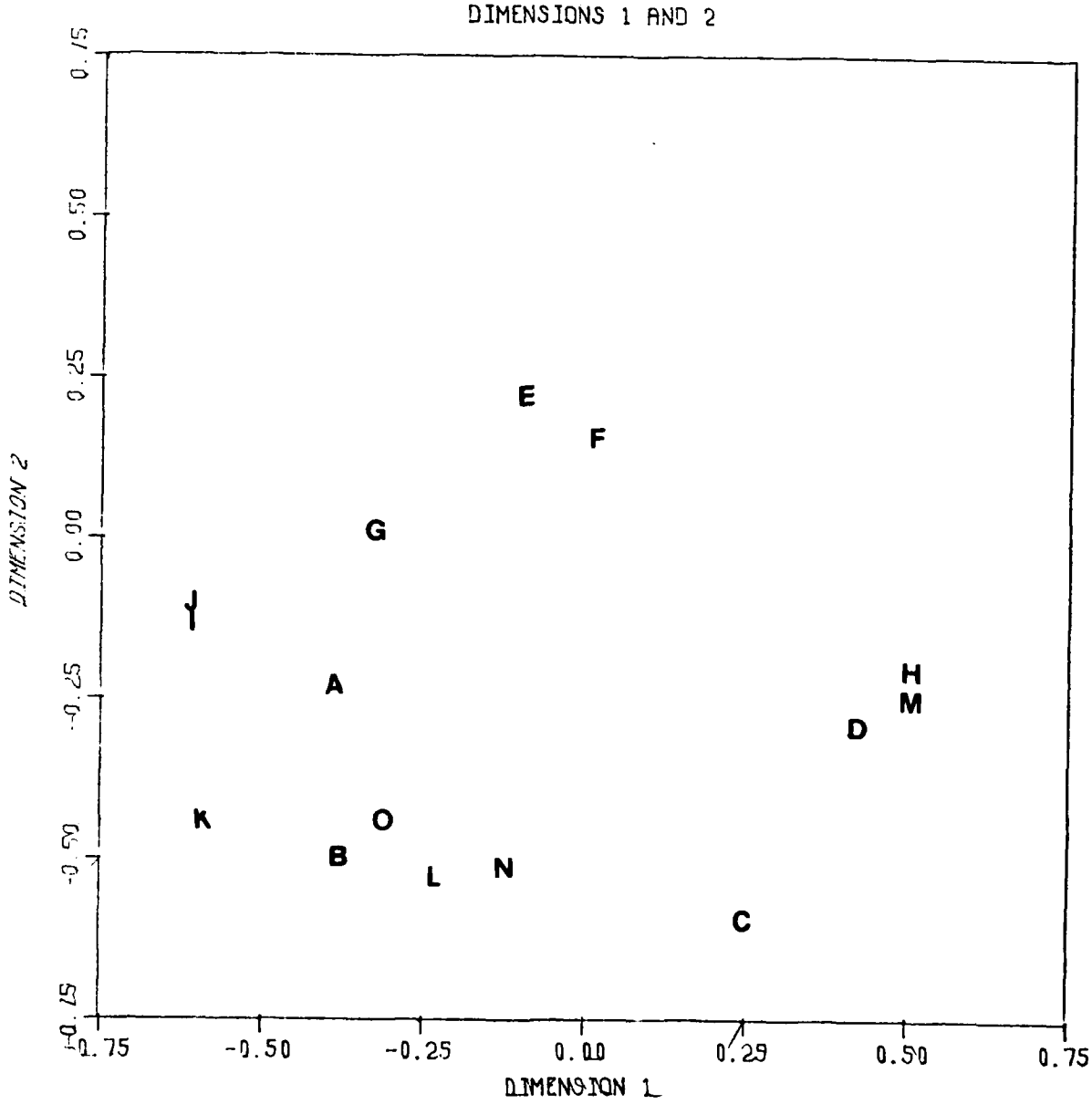


Figure 3. Dimensions 1 and 2 of the three-dimensional solution.

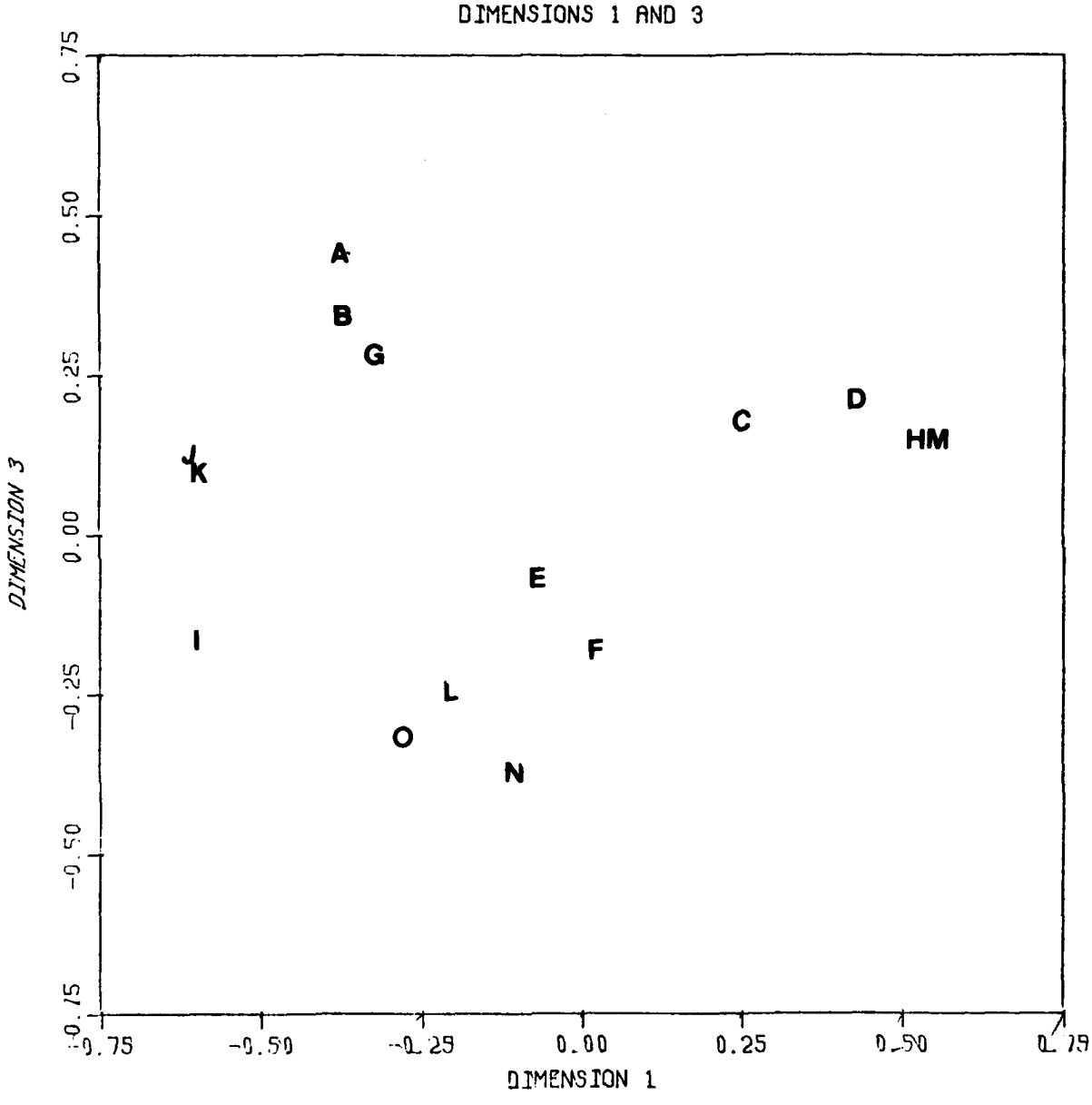


Figure 4. Dimensions 1 and 3 of the three-dimensional solution.

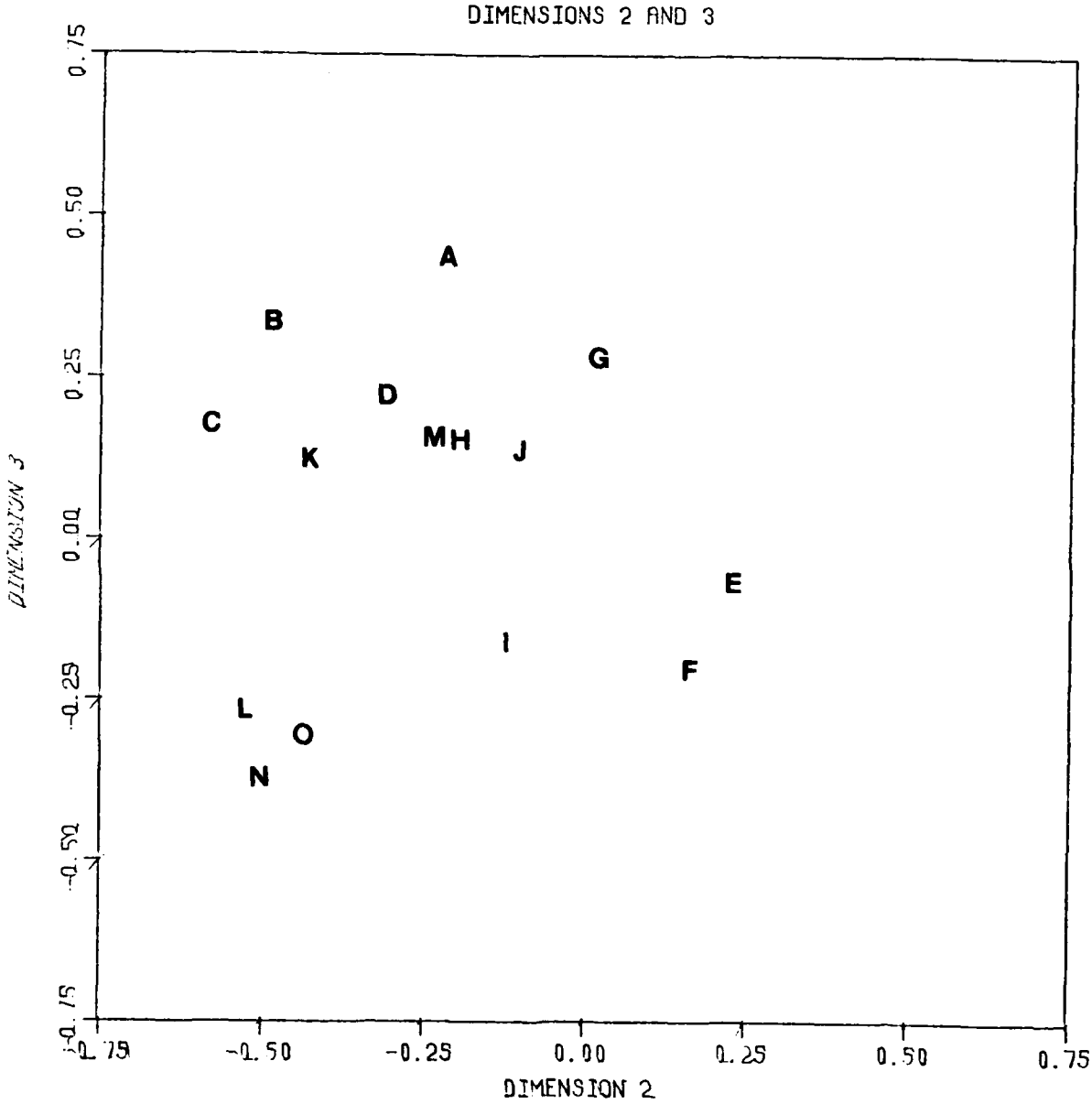


Figure 5. Dimensions 2 and 3 of the three-dimensional solution.

K (narratives I, J, and K) were at the extremes (see Figure 3). Similarly, on dimension 2, E, F, and G were at one extreme, and K, B, O, L, N, and C were at the other extreme (Figure 3). A, B, and G and O, L, and N were at the extremes of dimension 3 (Figure 4). The difficulty with using extreme points is that often no interpretation is readily apparent. Furthermore, in the extreme point method, the researcher, rather than the raters (whose data were used to generate the space), defines the dimensions.

Two other interpretation procedures are cluster analysis and the insertion of vectors corresponding to descriptive phrases into the space. To perform these analyses, however, a second experiment was necessary to collect additional data.

Experiment 2--Cluster Analysis and External Unfolding Procedures

Subjects. Thirty Army officers, ranking from first lieutenant to major, served as subjects. The officers participated as part of their course work at the Armor Officers' Advanced Course at Fort Knox, Ky. All the officers had served in the Army for at least 5 years, were college graduates, and had participated in and evaluated field exercises.

Procedure. As part of Experiment 1, participants had been asked to list several aspects of unit performance that they considered in rating the narratives with respect to the target narrative. The 12 most frequently cited phrases (Table 3) were then used as target adjectives or descriptors in Experiment 2. During an initial 1-hour introductory session, the task was explained to each judge individually and all questions were answered as clearly and completely as possible. The judges then rated the narratives at their own pace during a 2-week period. At the end of 2 weeks, the participants returned their ratings and were debriefed fully.

The 30 participating officers were asked to rank each narrative according to how well the unit performed each target attribute. For instance, the officers were asked to "rate these narratives on how well the unit conducts movement/uses covered and concealed routes" (Appendix C). Each officer ranked each of the 15 narratives according to how well the combat units performed for each of the 12 descriptive phrases on aspects of unit performance in field exercises. Data from these rankings were used in the following analyses, designed to aid in the interpretation of the configuration obtained in Experiment 1.

Cluster Analysis Procedures. Cluster analysis can be used to interpret a configuration by analyzing the points in the configuration. The object of the procedure is to determine if there are groups of points in the solution that are both tight and discriminable from other groups of points (Johnson, 1967). These properties are called "compactness" and "isolation," respectively (Friendly, 1977). Such compact, isolated groups can be interpreted by examining the points within and contrasting these against points in other clusters. The type of cluster analysis used here is hierarchical cluster analysis: Smaller groups are combined into larger groups in a strict manner, and no point may be a member of more than one group at any time. The technique presents the researcher with a succession

of objectively defined groups; the successive sets of groups differ from one another in that two groups will be combined into one new group for each new set. The technique is somewhat subjective; although the clusters are objectively determined, no procedure is universally accepted for objectively determining the best point to stop combining groups.

Table 3

Descriptive Phrases Used as Target Stimuli in Experiment 2

No.	Phrase
	How well the unit:
1	Conducts movement/ uses covered and concealed routes
2	Communicates
3	Coordinates its elements
4	Uses indirect fire
5	Uses its TOWs
6	Exercises command and control
7	Exercises leader functions/chain of command
8	Plans (i.e., quality of plan)
9	Executes its plan
10	Uses its tanks
11	Reacts to enemy contact
	How well the individual elements of the unit:
12	Perform

Cluster Analysis Results. A cluster analysis of the points in the three-dimensional space resulted in five clusters:

Group	Narrative
1	C, D, H, M.
2	L, N, O
3	E, F
4	A, B, G, K
5	I, J

These groups seem to be differentiated primarily on the basis of the quality of the unit's performance. The mean ratings for each narrative on each descriptor were calculated. Table 4 lists the rankings of these mean values. The standard deviations of these mean rankings were in the 2.5 to 3.0 range for all the means. An examination of this table shows that Group 1 narratives are rated highly on all 12 descriptors; Group 2,

3, and 4 narratives are in the middle ranks on all descriptors; and Group 5 narratives are rated very low on all descriptors. The variation found in the middle three groups is quite high, but their rankings are almost always below Group 1 and above Group 5.

Table 4

Ranking of the Mean Narrative Values on Each Descriptive Phrase

Descriptor	Narrative								
	C	D	H	M	O	L	N	E	F
1	6	3	1.5	1.5	12	4	5	11	7
2	5	3	2	1	11	9	4	6	8
3	7	2	3	1	8	11	4	5	6
4	9	7	4	1	12	11	6	2	3
5	2	3	4	1	7	13	8	6	10
6	5	3	2	1	6	11	4	10	8
7	4	2	3	1	10	11	6	8	5
8	4	2	1	3	10	10	5	9	7
9	5	3	2	1	14	7	4	6	8
10	4	3	2	1	10	6	5	9	7
11	4	3	2	1	9	10.5	4	6	8
12	4	3	2	1	8	7	5	6	9.5

Descriptor	Narrative					
	A	G	B	K	I	J
1	15	9	8	10	14	13
2	14	7	10	15	12	13
3	12	10	9	14	15	13
4	10	5	8	13	15	14
5	11	5	9	12	15	14
6	15	7	9	12	14	13
7	13	7	9	14	15	12
8	12	6	11	8	13	15
9	12	9	10	14	13	15
10	13	8	10	12	15	14
11	13	7	10.5	12	14	15
12	11	12	9.5	13	15	14

The descriptive phrases were used by participants in Experiment 1 for behaviors salient or important in evaluating unit performance in the field exercise narratives. Although 12 attributes were mentioned frequently, the military judges seemed to use only one major dimension to assess

performance--the quality of overall performance. The other two dimensions in the space are less variable; i.e., the points are not spread out on the dimension and thus have to be of less importance. The cluster analysis suggested five groups of narratives that varied in quality of overall performance but did not aid in identifying the other two dimensions in the space. A third interpretive analysis was needed to label these factors.

External Unfolding Procedures. A third procedure for interpreting a configuration is to insert vectors corresponding to the descriptive phrases into the solution space. This method has several advantages: It is objective because the data used to place the vector in the space are provided by subjects rather than by the researcher. The vectors are not confined to the axis which the MDS algorithm has selected but may have any orientation in the space. The possible explanations are suggested by the persons who generate the data for the space, so their perceptions are used to explain their space. This method is preferred for analysis and interpretation of configurations because it is free of observer bias and experimenter preconceptions.

The process used to incorporate these descriptive phrases or "adjectives" into the configuration is known as external unfolding. The configuration or stimuli already exist, and the points that represent the descriptive phrases are located, or placed in the space; hence, they are external to the space. The term "unfolding" is attributed to Coombs (1964). The model of the process assumes that each descriptive phrase occupies a single point in the space. The stimuli (narratives) are rated according to how much each reflects the adjective (descriptive phrase). The ratings of the stimuli in reference to the adjective reflect the distances from the stimuli to the adjective point. The original ratings are "folded" around the point that represents the adjective because one may be as close to the adjective on one side as on the other side.

To visualize this process in two dimensions, consider the configuration as plotted on a pocket handkerchief. If the cloth were lifted from the point of the adjective and carefully straightened, the distance from the points representing the stimuli to the adjective point could be measured. In this study, the distances from the points representing the stimuli to the points representing the adjectives are obtained from military judges, and the original configuration is to be recovered. To do this, one must unfold the handkerchief.

To understand the selection and testing of models in the unfolding procedure and the interpretation that the process allows, the concept of "iso-similarity contours" must be discussed. An iso-similarity contour is simply a line (or curve) through a space which has a particular relation to a point in the space. All points on one iso-similarity contour have the same similarity to the reference point. These contours may be linear, circular, or elliptical, depending on the nature of specific assumptions (Carroll, 1972).

A hierarchy of models under the general rubric of unfolding is differentiated by the assumptions made about the models. The models in this hierarchy may be examined to select the most parsimonious model that explains the data. The simplest is known as the vector model. This is the Case IV model (Carroll, 1972). In the vector model, one assumes that a vector, anchored at the origin of the space and ending at the point representing the adjective, represents the ordering of stimuli in reference to the adjective. The iso-similarity contours are drawn perpendicular to this vector, so that any point within one of these contours is seen to be as similar to the adjective as any other point in this particular band. Variation perpendicular to this line is not incorporated in the distance between a point representing a stimulus and a point representing an adjective.

In the next model (Case III), the assumptions about iso-similarity contours are modified. Rather than the linear iso-similarity contours of the Case IV model, the contours are assumed to be circular. All stimuli found equally distant in any direction from the point representing the adjective get the same value of distance and/or similarity.

The next most complicated model, Case II, is very similar to the Case III model. Additionally, an assumption that the dimensions can be weighted allows the iso-similarity contours for the adjective to be elliptical. These are the only models discussed here.

These models form an ascending hierarchy of complexity. The restrictions in the first model are formally equivalent to the assumption that the similarity between the points representing the stimuli and the points representing the adjective may be predicted using only linear terms. The second model includes a curvilinear term, the sum of the squared coordinates for each of the dimensions. The third model includes a separate curvilinear term for the square of the coordinate on each dimension. In using this procedure, each model is tested successively to determine whether the variance accounted for increases meaningfully through the addition of any new term(s). It is possible to test the models in this fashion because the terms in the simpler models are a proper subset of the terms in the more complicated models.

Each of these models provides a slightly different interpretation of the configuration. The linear model suggests a dimensional interpretation. Iso-similarity contours are perpendicular to the vector of the adjective, which is parallel to the interpretation of the points in a Cartesian plane. The second model is interpreted, again, by examining points in iso-similarity contours. The contours are circular in this case, so that points are assumed to be equally well described by the adjective if they are equally distant from the adjective, regardless of direction. Configurations with adjectives with Case III restrictions are sometimes interpreted by dividing the configuration into zones of similarity to the adjectives. This process begins by drawing lines between the adjective points. The perpendicular bisectors of each of these lines divide the space of the configuration into the parts best described by adjective A and the parts best described by adjective B. Thus, families of all points described well by the same combination of adjectives

may be formed. Interpretation in the Case II situation, with elliptical iso-similarity contours, is similar to that in the Case III situation.

The most serious problem with the general unfolding model is its instability. The use of the model frequently results in configurations which are "degenerate." Degenerate solutions are present when all stimuli and adjectives are located at the same point in the space. Another type of degenerate solution has all stimuli at one point, while the adjective points are arranged in a hypersphere around the location of the stimuli. Degenerate solutions result when there are not enough judgments by the subjects to locate both the adjective and stimulus points in the space. This problem is minimized by solving for the stimulus points first, then holding them constant and solving for the adjective points (the external unfolding procedure). Another partial solution to the problem is the choice of a good starting configuration, obtained by using multiple regression estimates. The ALSCAL program uses a successive improvement technique known as the ALSOS algorithm to improve the fit of the configuration to the data. The most attractive feature about the algorithm is that it is guaranteed to converge (a proof of this property is offered in Takane, Young, and de Leeuw, 1977).

External Unfolding Results. In the external unfolding analyses, all three models were tested. The Case IV, or vector, model assumes that similarity is parallel to the vector of the adjective, with linear iso-similarity contours. Percentages of variance accounted for (R^2) by this analysis are given in Table 5 for each of the 12 adjectives. The variance for most of the adjectives is well predicted by the configuration; all but three of the adjectives have R^2 values greater than .8. These values, computed as they are on ordinal data (rankings), should not be taken too seriously but do have heuristic value in indicating that the adjectives are well predicted.

Table 5

Percentage of Variance Accounted for (R^2) Using Case IV Model

Adjective	R^2 Value
1	.837
2	.881
3	.891
4	.642
5	.764
6	.829
7	.880
8	.738
9	.895
10	.926
11	.899
12	.933

The Case III model, in which iso-similarity contours are circular, was examined also. The R^2 values obtained (Table 6) are not much larger than those observed using the Case IV model. The table also presents the beta weights for the nonlinear fit variable of each adjective. The beta weight is a measure of the importance of the nonlinear component of the model. For most of the adjectives, the beta weight is small, less (in absolute value) than .3 on 8 of the 12 adjectives. Because of the small size of the nonlinear components and the minimal increase in R^2 values in the Case III model, it was felt that the Case IV, or linear, model was the appropriate model for these data.

Table 6

Percentage of Variance Accounted for (R^2) and Beta Weights for Case III Model

Adjective	Nonlinear coefficient	R^2 value
1	-0.42	.847
2	-0.26	.885
3	0.21	.894
4	1.11	.712
5	0.58	.789
6	-0.57	.847
7	0.15	.881
8	0.15	.741
9	-0.15	.897
10	-0.01	.926
11	0.02	.899
12	-0.13	.934

The Case IV model was used to insert the adjectives into the three-dimensional space obtained in Experiment 1. Using the ALSCAL computer program, a stable configuration with an overall stress of .11 resulted after 16 iterations (Figure 6). This stress value is low. In Figure 6, letters represent narratives, and numbers represent descriptive phrases. The solution is quite striking, as all the adjectives plotted fall on a single straight line that goes through the middle of the configuration. Adjectives 3 and 11 are not plotted in Figure 6. These adjectives had points far from the configuration and had the highest stress and lowest $\underline{R}^2$ of the set. Therefore, they were not considered to be useful explanatory variables. (These $\underline{R}^2$ values are taken from ALSCAL and are not comparable to the R^2 linear regression coefficient values in Table 6, which indicate the accuracy of the prediction of an adjective point from the stimulus points. The ALSCAL $\underline{R}^2$ values measure the correspondence between the distance values computed from the solution and the similarity values input to the program.

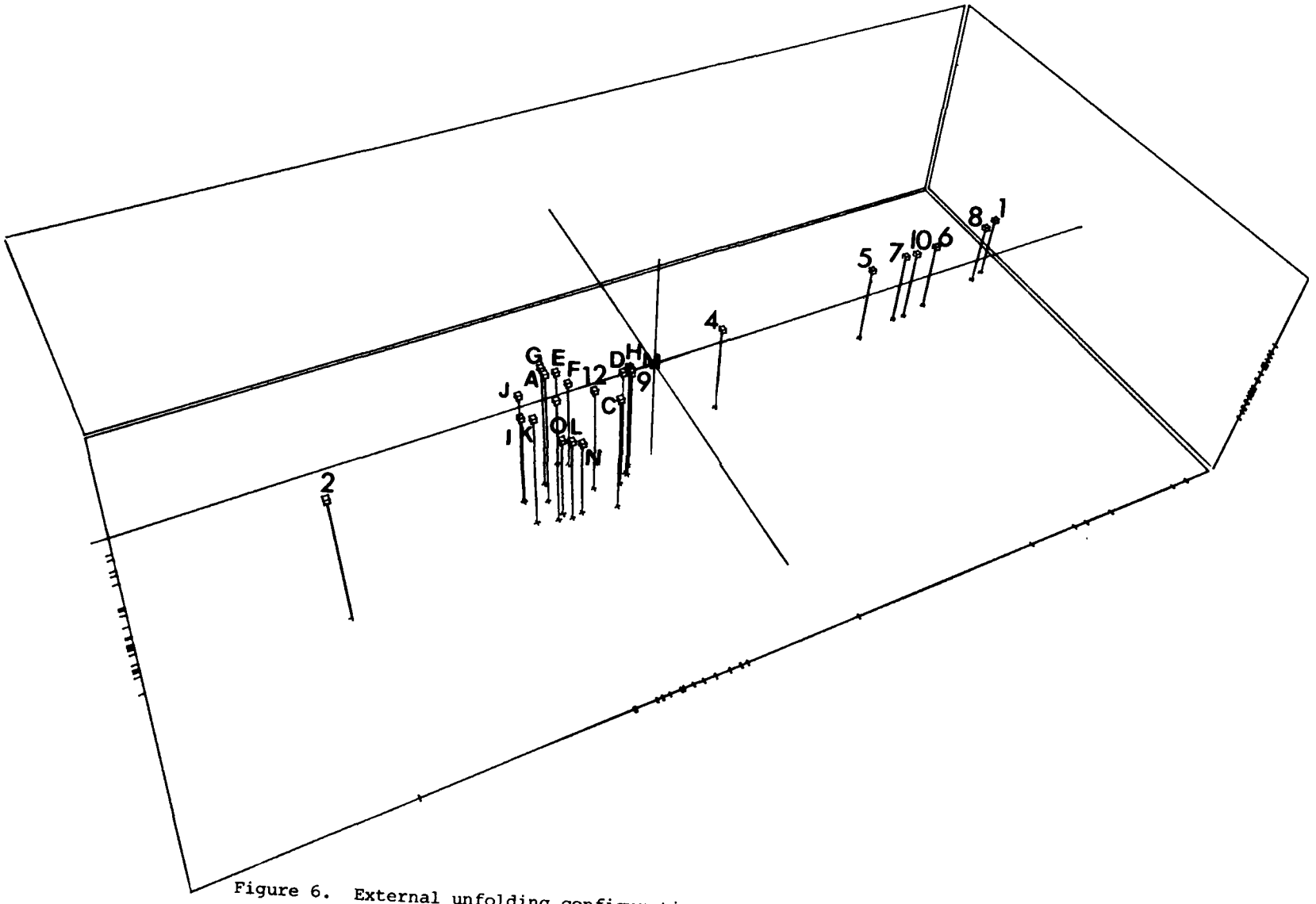


Figure 6. External unfolding configuration, with 10 of the 12 adjectives. (Letters represent narratives, numbers represent adjectives; configuration expanded for clarity.)

They are both a measure of goodness-of-fit. To minimize confusion, $\underline{R}^2$ values taken from ALSCAL will be underlined.)

The configuration was also plotted with a subset of the adjectives. Many of the adjectives were eliminated because they were highly collinear with the more strongly predicted adjectives (see Figure 7). This plot, again, reveals the clear line along which all adjectives fall. Adjectives 4, 9, and 12 were plotted because they had the highest $\underline{R}^2$ values among all 12 adjectives (see Table 7). (Not all the points were plotted, to assure the clarity of the plot.)

Table 7

$\underline{R}^2$ Value for Each Adjective

Adjective	$\underline{R}^2$
1	.938
2	.978
3	.791
4	.989
5	.964
6	.952
7	.958
8	.933
9	.997
10	.958
11	.588
12	.999

To determine which adjectives correspond to which dimension, rank-order correlations were computed between the rank of the narratives on a particular dimension and their ranks on each of the adjectives. Since quality of overall performance seemed to be a major dimension, the mean rank of each narrative averaged over all adjectives was obtained and correlated with the three dimensions. The ordering of narratives on dimension 1 correlated most highly with the overall rating (.84), use of tanks (.83), performance of individual elements (.83), and reaction to contact with the enemy (.83). This result suggests that dimension 1 is overall performance of the unit.

The ordering of narratives on dimension 2 was not significantly correlated with any of the adjectives but was marginally correlated to the use of indirect fire ($\underline{r} = .22$, $\underline{p} < .125$). Similarly, on dimension 3, there were no significant correlations, but the use of TOWs was marginally related ($\underline{r} = .17$, $\underline{p} < .185$).

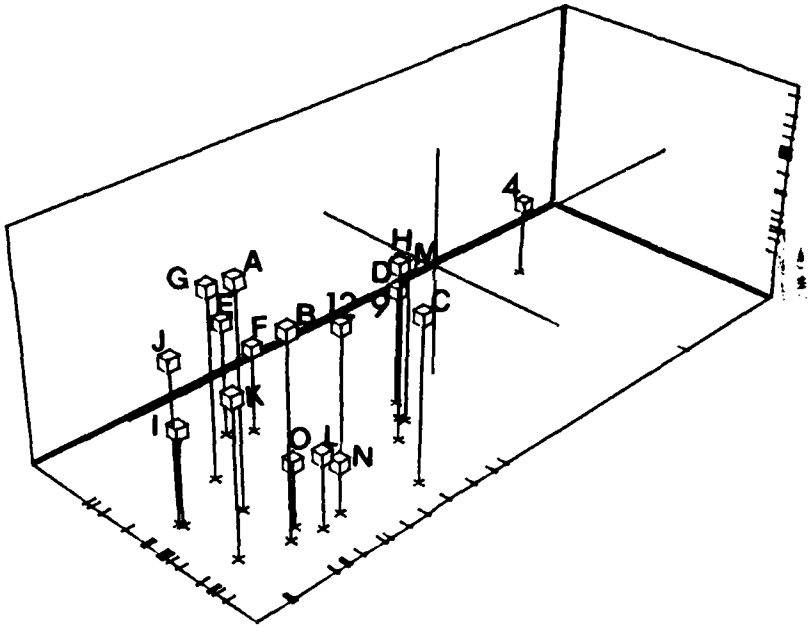


Figure 7. External unfolding configuration with three selected adjectives. (Letters represent narratives, numbers represent adjectives.)

The three dimensions, therefore, seem to be (a) overall quality of performance, (b) use of indirect fire, and (c) use of TOWs. The highly positively rated narratives H, M, and D and the highly negatively rated narratives I and J tended to dominate the solution, however. Thus, these points were excluded from one analysis to examine their effect on the unfolding solution. Preliminary analysis indicated that the Case III solution, with circular iso-similarity contours, was appropriate. The solution obtained, after 20 iterations through ALSCAL, is shown in Figure 8. The solution had a moderately low stress value of .16. The strong quality-of-performance dimension is still present in this reduced set of narratives. The adjectives that fit best in this space (i.e., have the highest $\underline{R}^2$ value) are adjectives 3, 4, 6, 7, 8, 10, and 12 (Table 8). When the plots of the space are examined (Figures 9, 10, and 11), it is clear that these seven best-fitting adjectives fall into two distinct groups. The first group, adjectives 3, 6, and 7, is composed of leadership functions; the second group, adjectives 4, 8, and 10, seems to be composed of tactical skills or functions.

Table 8

$\underline{R}^2$ Value for Each Adjective in the Reduced Space

Adjective	$\underline{R}^2$ value
1	.791
2	.748
3	.952
4	.928
5	.862
6	.919
7	.951
8	.931
9	.753
10	.959
11	.818
12	.980

The strategy used to interpret the space was to break the space into sections best described by each of the two groups of adjectives. This interpretation is appropriate because Carroll's Case III solution, with circular iso-similarity contours, is the best fitting solution. The space was divided into sections by determining the distance from each point to the adjective points and looking for any resulting patterns. The stimuli (narratives) divide into two groups, primarily on the basis of distances to the centroids of the adjective clusters. The first group is composed of narratives A, B, K, and O, best described by the tactical performance adjectives. The other six narratives, E, C, F, G, L, and N, are best described by the leadership adjectives.

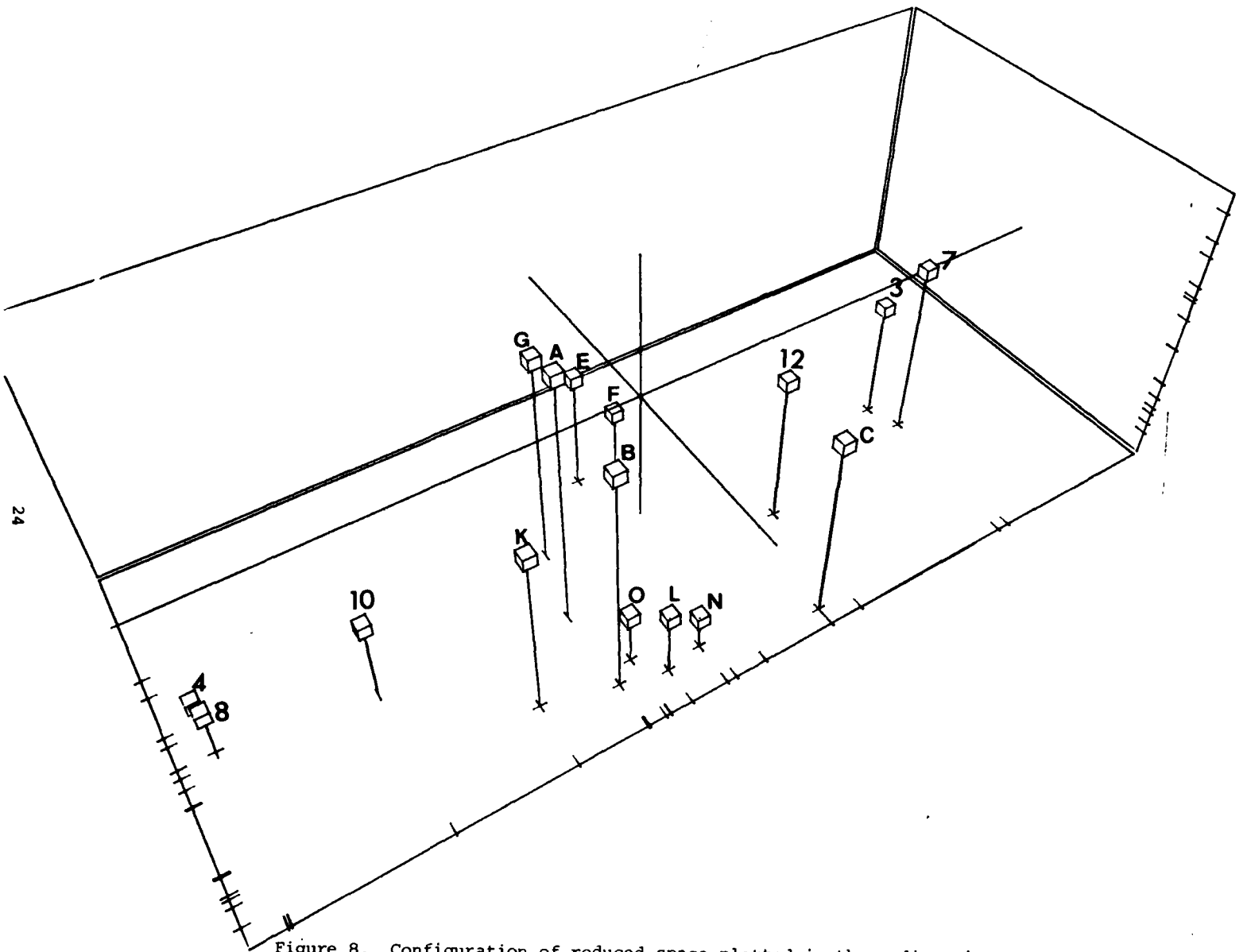


Figure 8. Configuration of reduced space plotted in three dimensions.

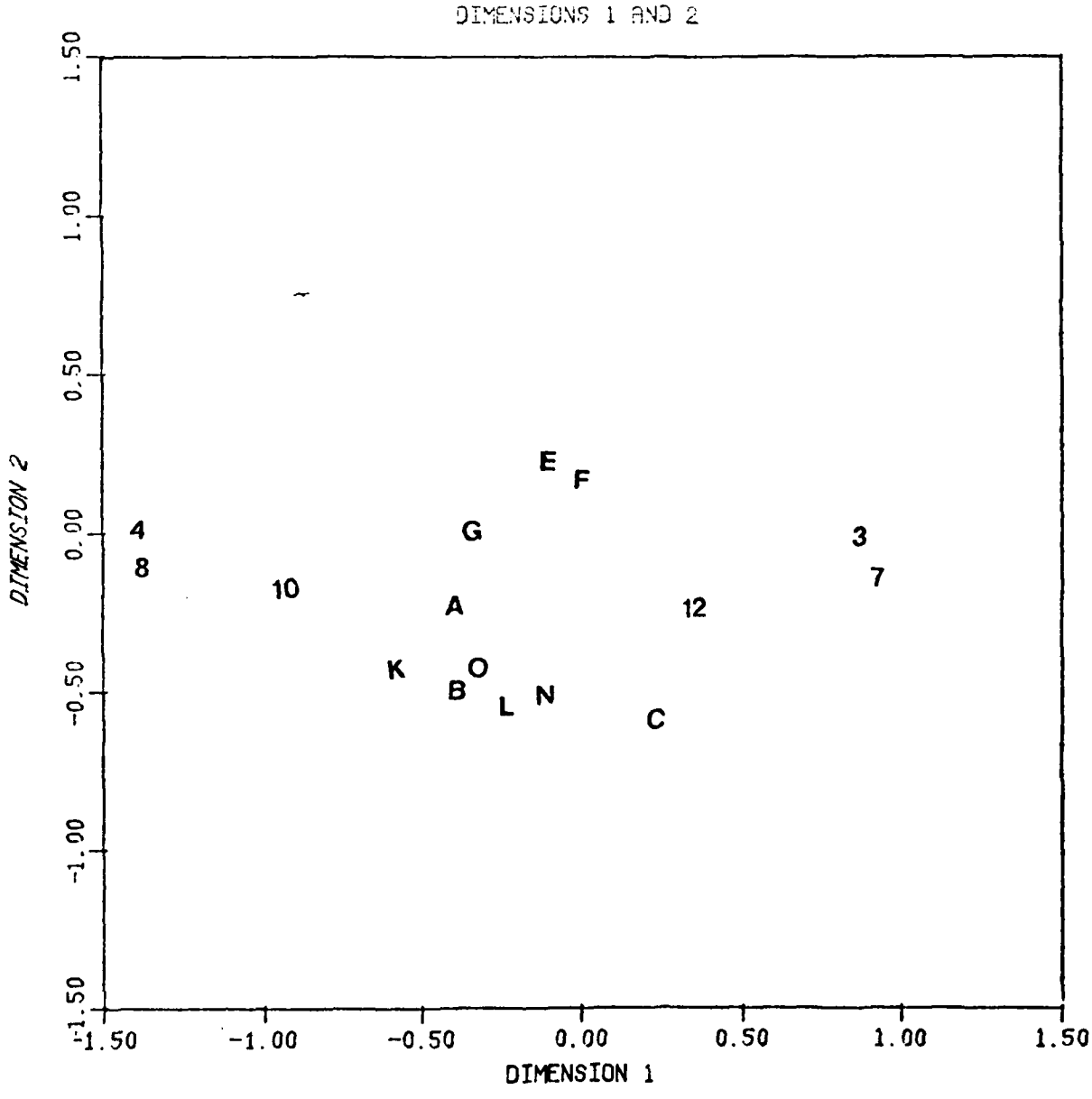


Figure 9. Dimensions 1 and 2 of reduced space.

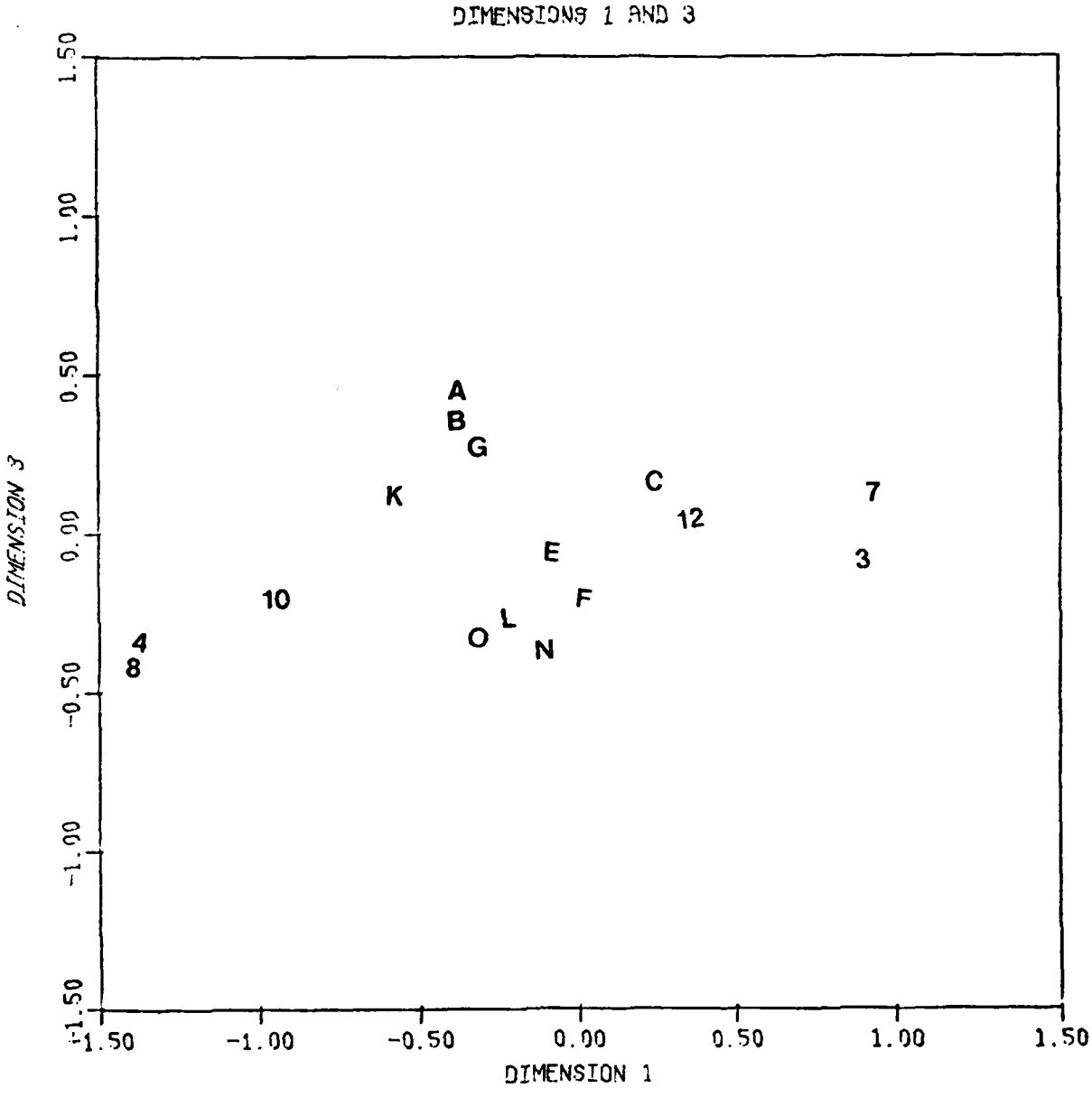


Figure 10. Dimensions 1 and 3 of reduced space.

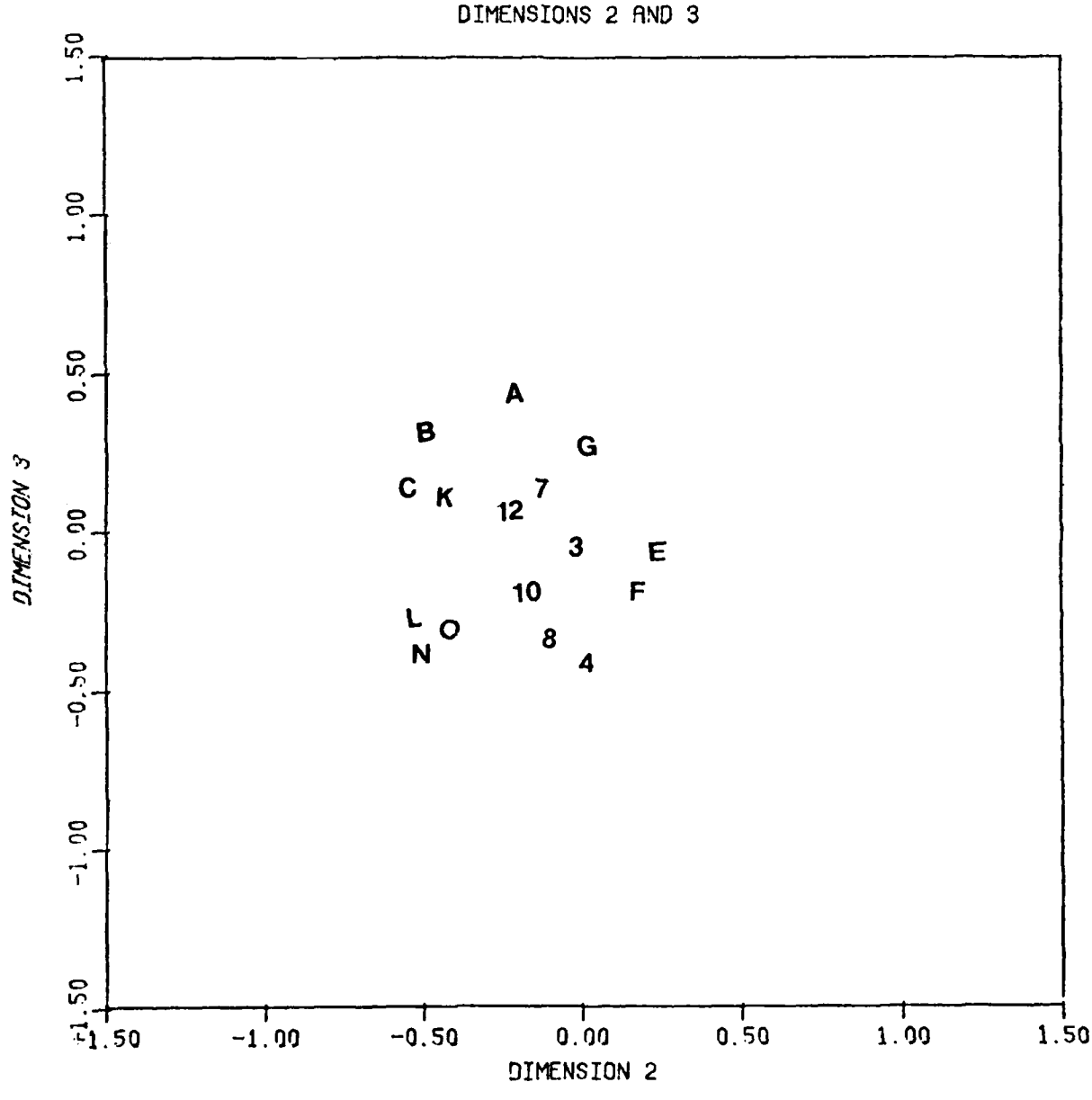


Figure 11. Dimensions 2 and 3 of reduced space.

These analyses suggest that two adjective clusters are heavily involved in unit performance evaluation--a leadership cluster and a tactical performance cluster. When extremely high- or low-rated exercises are not included in the analysis, narratives that are ranked in the upper half of the remaining exercise narratives (E, F, L, N, and O) tend to be characterized by leadership adjectives, whereas narratives in the lower half (A, B, G, and K) tend to be characterized by adjectives in the tactical performance cluster. This result suggests that relatively nonspecific aspects of leadership are important for good unit performance in field exercises.

DISCUSSION

This research consisted of two studies designed to determine the dimensions that military judges use to evaluate unit performance in field exercises. The results indicate that judges use only three dimensions to assess performance. In all of the interpretation analyses, the quality of overall performance dimension was dominant. Military judges seemed to evaluate units as good, bad, or average, without particularly attending to any of the descriptive phrases that they considered to be important in evaluating unit performance. When the extremely good and poor performances were included in the external unfolding analysis, the two weaker dimensions were use of indirect fire and use of TOWs. When the extremely good and poor performances were excluded from the analysis, the secondary dimensions were (a) leadership functions, including coordination of elements, command and control, and exercise of leader functions; and (b) tactical skills, including use of indirect fire, quality of tactical plan, and use of tanks.

The studies present a complicated and somewhat confused picture of evaluation in field exercises. Several conclusions can be drawn, however. First, military judges get a general impression of unit performance--good, bad, or average--and evaluate the units accordingly. Second, these general impressions are not based primarily on specific aspects of unit performance. Third, when no strong good or bad impressions are made, the judges differentiate performance on other dimensions.

Several interpretations of these conclusions are possible:

1. The results may be a methodological artifact. The quality-of-performance dimension may dominate the others because the narratives do not provide sufficient detail or information about other aspects of the unit's performance.

2. Since the narratives were descriptions of observed field exercises, it is possible that only those dimensions considered by the original evaluation staff, who wrote the narratives, were evident to the judges who later ranked the narratives.

3. Performance on all aspects of unit tactical skills may change in unison; that is, a unit may be uniformly good or uniformly bad on all aspects of tactical behavior.

4. Narratives from exercises involving units at various levels of training, rather than just before training and after training (as in this case), would help clarify the relationships among the many aspects of unit performance.

5. The judges may in fact use only a generalized quality-of-performance dimension. They may use this dimension because they do not know what other dimensions to consider, how to assess performance on other dimensions, or how to assimilate information from the other dimensions to arrive at a single evaluation of unit performance.

Considerable further research needs to be conducted to determine how military judges evaluate unit performance. This investigation, exploratory in nature, suggests that evaluators use some kind of simplified judgment process. The next step in the research is to study the judgment process in more detail, conducting studies that are more tightly controlled and, thus, do not provide the judges with quite so much latitude in responding. Narratives that are constructed to provide certain kinds of information will be more useful than narratives that describe actual field exercises (like those used here). One approach that might be taken is that used by Harari and Zedeck (1973) and Zedeck and Kafry (1977) to evaluate teachers and nurses.

The evaluation of unit performance is of fundamental importance to the ARTEP. If the evaluation of a unit is faulty or inappropriate, the subsequent training program probably is, too. The Army must decide how performance should be evaluated and determine how performance currently is being evaluated, so that existing procedures can be modified to achieve the Army's goals. An understanding of the judges' evaluation process is a necessary step in accomplishing these ends.

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APPENDIX A

NARRATIVES OF ARMOR/ANTI-ARMOR FIELD EXERCISES

NARRATIVE A

PL ATTACK ORDER

Unit was to move using bounding overwatch. The first overwatch position was the covered area in front of attack position and located at 0987131. Succeeding key terrain features were to be firing positions for overwatch. These key terrain features were not identified. TOWs were to provide overwatch for tank sections from high ground in vicinity of attack postion.

Specific routes of advance were not discussed. The platoon leader ordered all sections to move in a SW position to the objective. The platoon leader ordered the unit to follow his lead during movement to contact. The heavy section was to move first followed by the light section.

Smoke screening was ordered to cover movement from attack position to the first overwatch position. The coordinates for the smoke mission were 10207160. The FO was instructed to fire this mission when the unit reported crossing the LD. The platoon leader requested H.E. to be placed on the objective at his command at coordinates 07407420. All vehicle commanders were informed of preplotted mission locations and told to contact FO and order mission using chain of command. Vehicle commanders were told to request fire directly from the FDC if the FO became a casualty. The platoon leader ordered the FO to set up an observation position on the forward edge of the first overwatch position (located at coordinates 098712).

The unit was ordered to move rapidly toward the objective. The PL noted that the unit would probably be moving too fast to set out OPs. However, use of Ops was left to the discretion of vehicle commanders.

The platoon leader emphasized that the vehicle commanders would disseminate all relevant information to crew members. The platoon leader informed vehicle commanders of phase-lines in the CTC attack order.

ATTACK

The platoon leader failed to report crossing the LD. As a result, the FO did not know when to request the smoke screening mission which the platoon leader had requested and no smoke screen was available as the unit moved into the first overwatch position.

Two tank crews were not briefed. The tank commanders were briefed by the platoon leader from a position where they could see most of their objective area. The platoon moved out of the assembly area 2-3 mins. late. The platoon leader took his entire tank platoon to the left front (East) up to high ground in the vicinity of 103704. He left his TOWs in overwatch in the vicinity of the attack position (102718). The platoon leader lost commo with TOWs immediately after leaving the attack position, although they had had a commo check prior to crossing the LD.

What was the nature of the commo problem?

They didn't have a distance commo check. They were talking to each other when they were sitting together and the minute they moved out they lost it completely. The platoon leader did not have any secondary means of control such as phase line or times to move in the event they lost communications. The PL could not talk to his TOW section the entire length of the problem. The entire tank platoon then moved by bounds up thru the high ground 103704 and at that point, the initial OPFOR observations were made. Initial observations were made by the Heavy Section.

At 1043 there was a fire mission called by the OPFOR. It came in the vicinity of that high ground where the 3 tanks were, as a matter of fact, tank 47 and 53 both had TCs and loaders killed. Within 5 mins., they were taken under fire by TOW 07 (OPFOR) fire. There was effective onset fire brought within minutes by the OPFOR after they made the initial contact on that high ground.

At that point the TU lost the three tanks, 47, 52 and 53. Then, the platoon leader and tank 80, proceeded directly across the front of the OPFOR sector from the eastern edge almost completely across the lane to the western range edge.

The platoon leader violated his CTC order. He was ordered to take at least one section along the eastern route of approach and instead the PL took his platoon along the western edge of the lane. No unit took the eastern route of approach.

When was the first indirect fire mission for the Tested Unit called?

1151 at Grid 073697. There was splash at 1156 and one tank, No. 11 was immobilized. That was their first fire mission.

There were 2 OPFOR Indirect Fire missions - one round each. No casualties.

The tank platoon leader lost control of his unit. The TOWs moved on their own as they had lost commo with the PL. They saw the trail of the tank platoon crossing the far ridge line and because they didn't have communications then, began to bound covering each other, which continued up till 1136. From the attack position they covered each other by bounds up to the vicinity of check point 32. At that point they lost sight of each other and at 1136 TOW 43 was killed. Take another problem. At that point TOW 68 did not have commo with anyone and moved, apparently almost up to the objective then backtracked and wandered around, almost lost for the rest of the problem.

At 1115 tank 80 broke down. The PL left him - he didn't have communications with him and did not know that he lost 80. At 1145 tank 80 fixed their vehicle and came back up and at that point just about the time he came back up tank 37 was hit and killed. So that left just tank 80 and TOW 68 who continued to try to talk to each other sporadically. They were never able to devise a plan of action. As the problem ended, tank 80 pulled out of the woodline and was having a conference with the FO when he was spotted by tank 11 and was taken under fire.

NARRATIVE B

PL ATTACK ORDER

The platoon leader's order was issued from a vantage point overlooking the terrain. All vehicle commanders and the FO were present when the order was issued.

The platoon leader ordered the unit to move using bounding overwatch. The heavy and light sections were ordered to form one bounding element with the TOWs forming the second bounding element. The heavy and light sections were to move out first while the TOWs provided overwatch from the ridgeline above the attack position. The approximate coordinates of the TOW positions were 092728 and 095527. The heavy and light sections were to travel together with the heavy element leading. The first overwatch position for the tank sections was to be in the vicinity of 085722. The tank sections were to travel west behind the ridgeline then move south along Highway 115. Locations of overwatch positions beyond the initial overwatch positions were not discussed.

Preplotted HE missions were given for the objective and for the suspected location of enemy vehicles in the CTC order.

ATTACK

Platoon leader planned to overwatch his initial movement from the line of departure with his TOW section and bound his tank platoon to the first ridge line. At least one tank crew was not briefed prior to leaving the line of departure. The TOW section, in selecting a route to his overwatch position, tried to climb the back of an extremely steep, rugged ridge and got one vehicle stuck. TOWs were not in a position to overwatch and the Platoon Leader did not know this prior to crossing the LD. He crossed anyway. The PL was trying to adjust a smoke mission but he did not wait for it to be delivered and crossed the LD; the entire tank platoon crossed with only a limited amount of overwatch from the light section, no communication with the TOWs and no indication that they were in trouble. The OPFOR saw TU's engine smoke crossing the LD and called the platoon leader. The initial movement by the tank platoon was bounding with light and heavy sections. The heavy section crossed over the open ground on the forward edge of that ridge line near Phase Line A and were detected and engaged by TOW 53. All three vehicles were destroyed. Two minutes later TOW 38 also crossed the same ridge line in the same vicinity with the vehicle smoking and he was engaged and killed. The Platoon Sgt. did not know that the other vehicles were casualties. TOW 54 hit the first four vehicles. The TOW section leader reported to platoon Sgt. that he could not in fact overwatch the platoon's movement from his location. The Platoon Sgt. lost communication for 45 minutes with all his elements. He did not know who was left and he did not have communication with anyone and he was merely proceeding

toward the objective. He also lost his map so he had no idea where he was. He reported being on his objective when he was about 2,000 meters north of it. The Platoon Sgt. never tried to call the FO (FO's communication was loud and clear).

The FO was working independently throughout the exercise. He had been following the heavy section and when it was hit he was just working independently. At 1036 the Platoon Sgt. finally made contact with TOW 33. He did not communicate with TOW 33. The Platoon Sgt. did not have control of the other tank in his section. Tank 55, who was also in the light section, was moving independently. So we had one TOW and two tanks moving independently. 55 was picked up as he crossed the ridge line and was killed by TOW 54 which was the TOW on the eastern most side of the objective.

The Platoon Sgt. continued down the lane for about 30 or 40 minutes before he established any contact with his other elements. Then he was trailed by TOW 33. He did finally make contact with his forward observer just as he reached the objective where the two tanks were set up. He received those rounds. Tank 51 was hit with indirect fire. At that point, 90 continued to move forward, moved around the right edge or the western most edge of the high ground at 6400 and was observed and hit by TOW 07 which had pulled back from his initial delay position.

NARRATIVE C

PL ATTACK ORDER

The order was not issued from a vantage point where the unit could observe the terrain. The vehicle commanders were talking among themselves while the order was being issued.

The TOW section was assigned to provide overwatch for the heavy and light sections from the high ground at the attack position. The light section was to provide overwatch for the heavy section as the heavy section moved west behind the attack position - then moved south next to Highway 115. The initial overwatch position for the light section was south of the attack position and next to Highway 11 (vicinity of 105705). The heavy section was to move with one tank within that section providing overwatch for the other two tanks. Once the heavy section reached the treeline (vicinity of 084723), then the heavy section would remain in place and provide overwatch for the light section as the light section moved to join the heavy section. The light section was to travel west to the position of the heavy section using the low ground south of the attack position. Once both tank sections reached the treeline (vicinity of 084723), the sections were to move toward the objective using bounding overwatch between sections. The TOW section was ordered to remain in position on the high ground throughout the attack.

The platoon leader ordered the FO to request smoke screening in the vicinity of 088727 to conceal the initial movement of the heavy section between the LD and the treeline (preplotted fire). The FO was also ordered to provide smoke screening at coordinates 090705. The purpose of this smoke screen was to make the OPFOR believe that their position was being flanked by an element maneuvering from the east. In addition, the FO was ordered to place H.E. on the objective (preplotted fire).

The platoon leader emphasized the importance of notifying him when friendly vehicles were taken under fire. In addition, the platoon leader emphasized chain of command.

The platoon sergeant contributed substantially to the order issued to the platoon.

ATTACK

The tank platoon leader gave a detailed order this morning - however most of the TCs were not paying close attention and in fact, three tanks 34, 89 and 56 crews were not briefed at all on the order prior to crossing the LD. The tested unit did employ a smoke mission as the unit was crossing the LD but it was not effective as far as the forward elements of the OPFOR were concerned.

It was in the wrong place at the crossroads right next to Hwy 11. They saw some engine smoke coming up from the ridge line at the attack postion as usual.

At least one TOW was employed in an excellent overwatch position to cover the 2500 meters of the unit's movement. That's evidenced by the fact that one of the test unit's TOWs did pick up and destroy an OPFOR TOW on the forward position. So, there is no question that they had at least one element in an excellent position to overwatch the entire movement of the tested unit. Initially, the platoon leader had good control of the tested unit. They were moving by bounds within the platoon, overwatched by the TOW. However, the PL crested the ridge in the vicinity of 088724 with two of his tanks. As he crossed over the ridge all three of his tanks from the heavy section were observed by TOW 54 and two were engaged and killed. At that point, the platoon leader was by himself in that sector. The kills were not reported to any platoon element. The platoon sergeant in the light section did not know that two tanks had been knocked out. At that point, an indirect fire mission came in the vicinity of the platoon leader's tank and he and his loader were killed and his tank lost communication. It was some time before the platoon sergeant knew that he was the only leader left. The platoon sergeant linked up with tank 31 which had the gunner as the TC (platoon leader's tank) and continued to maneuver the three remaining tanks towards the objective. The TOWs were left in position purposely, but there was no communication with them. The TOWs did not report to the platoon sergeant or the platoon leader that they had located enemy position. The FO was moving with the heavy section. He was never in a position to see to his front - he was down in the woodline moving with the tanks and was never in a position to see any rounds. He indicated that he couldn't adjust fire from the LD until he was killed. The FO was moving with the platoon sergeant and his own TOW knocked him out.

Once 34 and 89 were shot the TU continued to move. They lost sight of one another in the trees around checkpoint 10.

The platoon sergeant had excellent control and there was excellent movement of the three tanks after he took charge of it. There were hand and arm signals, good communications and he moved the tanks so that they were constantly overwatching each other. It was an exellent job of control all the way on down to the vicinity of the objective. When the OPFOR TOWs were withdrawn, the tested unit passed over their location and headed in the vicinity of the main objective. One of the TOWs called the platoon sergeant and indicated that he could not support the attack unit and requested permission to displace. The platoon sergeant told him to stay where he was. From the time that the tested unit passed over the OPFOR TOW positions, they were no longer overwatched by their TOWs. The TOWs were ineffective for the rest of that exercise. As the platoon sergeant came up in the vicinity of the high ground at 6400, another fire mission was called by the OPFOR.

I think they were observed by the tanks. They knew that they had crossed the ridge line. They were down in the gully south of checkpoint 28 and 25. They didn't know exactly where and they called a fire mission

and just got lucky.

All three tanks that were left were positioned in and around the high ground on 6400. Then tank 31 engaged tank 51 (OPFOR). Then, in his haste to pull back, he threw a track. Tank 31 was hit by indirect fire but was still operational but because all of the remaining crew (driver, gunner and loader) were out trying to fix the track, they were assessed as casualties - so that vehicle was then ineffective. The platoon sergeant had two tanks left and instructed 46 to cover him and then he moved all the way across the high ground on 6400 and as he crested that ridge in the open, the TOWs in their overwatch position, picked him up and killed him. Shortly after that, 46 realizing that the high ground was dangerous to cross, moved SW down thru the creek and the draw and then circled back to the west and came up on the objective. The two TOWs were back at the LD out of the problem and tank 31 without a crew was sitting back on top of 6400. That's how the problem ended.

NARRATIVE D

PL ATTACK ORDER

The order was not issued from a vantage point where the unit could view the terrain. All vehicle commanders were present when the order was issued.

One TOW accompanied by the FO formed the lead element. The TOW and FO were ordered to take up a position in the vicinity of 102703. The TOW was ordered to provide overwatch for the tank sections from this location. The second TOW was positioned on the high ground at the attack position (vicinity of 095725) and ordered to provide overwatch for the tank sections.

The tank sections were ordered to move out after the overwatch had been provided by the TOWs at 102703. The light section was ordered to provide overwatch for the heavy section as they crossed the LD. The tank sections were ordered to move west behind the attack position, then travel south along Highway 115 toward the objective. Tank sections were ordered to move using bounding overwatch through the grove of trees adjacent to Highway 115.

The platoon leader ordered the FO to request two preplotted smoke H.E. missions. The first coordinate was at 079708, and the purpose of this mission was to cover the initial movement of the heavy section. The heavy section was ordered not to move until the smoke screen had been provided. The FO was to notify the heavy section when the smoke screen had been provided The coordinates for the second preplot was 071697. The purpose of this mission was to suppress the OPFOR in the event they attempted to withdraw.

Vehicle commanders were instructed to inform all crew members of the content of the platoon leader's order. The unit was also ordered to maintain adequate distances between vehicles.

ATTACK

The tested team was briefed prior to crossing the LD in this operation. One vehicle controller reported the crew was not fully briefed on the mission. The platoon leader confirmed prior to crossing the LD, that his TOWs were in their initial overwatch position. Additionally, he planned fires as he crossed the LD, however, his FO did not have communication with the FDC. We verified that the FDC radio was operational when he departed. Two or three tanks attempted to contact the FDC and were unable to, however, I received them loud and clear. The tank platoons moved behind the ridge line on Hill 66 and crossed the LD close to Hwy 115 to the initial TOW positions. Was the tank platoon together? They were within a 500 meter radius of each other, moving by bounds within sections. TOW 46 was in a good position in the LD. They were dismounted and had command of the area to the south. TOW 43 was <u>not</u> in a good position during the problem according

to control, they could not overwatch any of the elements.

I want you to talk about anything that was spotted by the OPFOR in that phase.

The movement from the AA to the initial position was very good. OPFOR knew they were moving along Hwy 115 and called artillery missions but could not get a clear plot. One TOW did observe a tank for a brief moment however, he could not get a shot at that distance. The platoon moved through the trees and the OPFOR TOW withdrew, had he stayed another 30 seconds he would have gotten 3 tanks before the TU reached Checkpoint 25, three tanks broke in the open where the TOW had departed. He may have gotten one or two of the tanks. However, he would have been destroyed.

The movement was good with that tank platoon. The platoon leader and platoon sergeant maintained control of their elements, until they passed the initial OPFOR TOW positions. At that point, the platoon leader lost contact with the other two elements in his section. Tank 37 got to hill 6400, and spotted tank 11 on the objective. The platoon leader arrived on the objective, however, failed to link up with his section. His movement control broke down after he crossed the OPFOR position. At this point, someone in the platoon, (tank 37) contacted the FDC and requested indirect fire. I do not know if they were effective.

The platoon leader was killed on the objective by an overwatching TOW when he moved out of the woodline. At least one other tank could observe the platoon leader's vehicle being hit. It was not reported. However, the platoon sergeant continued to move the light section on the left flank or eastern approach to the objective. The platoon sergeant maneuvered behind the objective and arrived to the rear of 51 and destroyed him and caught the other tank as he was withdrawing. The light section moved well, after they arrived in the vicinity of the objective. I do not believe the OPFOR expected anyone behind them.

Eleven shot 80. Eighty looked as though they were lost. They moved across the open area (Checkpoint 32) and when 11 was shot by 9, 11 for some reason could not get the gun to track without firing. After 11 was shot, 51 did not receive the fact 11 had been killed.

How about the communications in the units?

They have communications between the operational elements, the problem was talking to the FDC. One point is that the platoon leader and then subsequently, the platoon sergeant made no attempt to displace the TOWs at the point where they crossed the OPFOR TOW positions. The TOW on the ridge line would have been ineffective. It was not a case of communications, they just failed to displace the TOW, causing it to become ineffective for the remainder of the mission.

One of the TOWs was destroyed on the objective.

Caualties and detections.

Negative. The detections made were reported when tank 37 arrived on the objective. They did report 51's position, (the TOW) but none of the casualties. Two personnel were killed with a dismounted TOW, the other two personnel with the vehicle and radio were alive. They did not report that their people had been killed or that the platoon leader was hit.

Before the platoon leader was hit, someone reported that 47 had observed a tank on the objective. We sat there waiting, trying to figure out who he could see and why he never fired.

It was 37. They were maneuvering to a position to engage a vehicle they had observed. They just never quite got there.

Other comments on the attack?

(Dave) They moved without being detected. Very fleeting, they move well.

I'd say the platoon leader had an excellent plan. He maintained excellent control of the movement. He just lacked commo with his FDC and lost his TOWs towards the end of the mission.

NARRATIVE E

PL ATTACK ORDER

The order was not issued from a vantage point where the vehicle commanders could view the terrain. All vehicle commanders were present when the order was issued. The PL instructed the vehicle commanders to brief all crew members on the content of the order.

The Heavy Section was ordered to move toward the objective using the route of advance in the CTC attack order. The Light Section was ordered to approach the objective via the Eastern Fork of the creekbed crossing coordinates 080686, 087690 and 085700. The TOW section was ordered to take up positions on the high ground southeast of the objective (in general vicinity of 090687). The TOW assigned to a position along Hwy 11 was ordered to travel with the Light Section until the area of the TOW overwatch position was reached.

The unit was ordered to travel behind the ridgeline south of the attack position then move north when the East Fork creekbed had been reached.

The order to the platoon included phase lines from the CTC attack order and check points. Key terrain features were referred to by letters.

Provisions for coordinating overwatch and maneuver were not included in the order issued to the platoon. However, the unit SOP does include such provisions.

The FO was positioned on high ground southwest of the attack position. Smoke - H.E. missions were preplanned for coordinates 084710 and 088702.

ATTACK

The PL briefed all elements with the exception of TOW 39.

The TU crossed the LD on time and communications between the PL and the light section was good. However, the PL was unaware that the TU TOWs were not in their initial overwatch positions.

The OPFOR FO, upon seeing the smoke of the TU as they crossed the LD, called an ineffective fire mission on the TU.

The TU FO remained behind the LD on a high hill throughout the problem and was effective communicating missions from his forward elements.

OPFOR TOW 07, on hill 6400, killed Tanks 46 and 13, then within 10 minutes killed Tank 54 who had maneuvered alongside Tanks 46 and 13.

The TU TOWs, after being taken under ineffective fire by OPFOR artillery, displaced from their initial overwatch position on their own intiative. The TU PL failed to communicate with the TOW section hence was uncertain to their positioning throughout the problem.

The TU FO called in indirect fire on OPFOR Tank 51, which was on the objective, resulting in 2 personnel killed and loss of communications.

The TU FO and his forward elements continued to work missions and smoke in front of the TU platoon.

The TU PL became disoriented as to his location believing himself to be on the objective. After evaluating his position he realized that he was disoriented. In his attempt to backtrack across an open area his tank was fired on and killed.

TU Tank 47, who had been following the PL, backtracked across low ground to the southeast and inadvertently met the TU TOW section. TU Tank 47 devised a plan for the TOW section to overwatch his movement toward the objective. While proceeding to the objective Tank 47 was killed by OPFOR Tank 11.

NARRATIVE F

PL ATTACK ORDER

The order to the platoon was not issued from a vantage point where the vehicle commanders could view the terrain. All vehicle commanders were present when the order was issued.

The platoon leader planned to assault the objective from the south with the heavy section, while the light section and TOW section covered the objective from high ground northwest of the objective (vicinity of 083717). The unit was ordered to move south of the attack position and then east traveling south to Red Mountain. The light section was ordered to lead the movement. The heavy and light sections were ordered to move north along the East Fork creekbed. The heavy section was ordered to move toward objective in the cover of the creekbed across the following coordinates: 078680, 086690 and 085700. The light section was ordered to move to a position northeast of the objective across the following coordinates: 078680, 073690, 070700 and 078710.

ATTACK

The PL leader's plan was disseminated to all the major elements within the tank platoon. The Platoon Leader planned to split his elements. After he crossed the LD he sent his light section up close to high ground (Hill 6400) to cover his approach into the objective. Was any vehicle spotted after he crossed the LD? No. They saw smoke, however, this TU lost a vehicle track before they crossed the LD and it was replaced. Then after the elements reformed the replacement tank wouldn't move fast enough to stay up with the unit so the tested unit moved across the LD with only 4 tanks. There was only 1 TOW in overwatch as the tested unit began their movement. Soon after the heavy section split off from the light section the platoon leader discovered that he had the poorest communication of any tank in the platoon. So that soon after crossing the LD he was having to relay all of his transmissions through other stations. As a result he lost control very quickly after crossing the LD. He received occasional reports on the position of his elememts. For some reason the platoon leader led his heavy section up out of the low ground, he had selected a good route all the way into the objective, but he abandoned it about 500 meters beyond the LD, climbed up on the high ground and lost his first tank, which was spotted by the TOW position. The light section - Platoon Sgt. had a TOW moving with him also lost control of his TOW and it moved forward and came up on CINDY (Hill 6400) and was knocked out by the TOW. Subsequently, the tank platoon leader and the other TOW with the heavy section were also spotted when they moved from overwatch positions and were hit by TOWs as well. The tested platoon had good communications with the FO. The FO was in a good position to

bring fire all the way to the objective. In fact he worked fire missions for the Platoon Sgt. most of the exercise. There was no effective fire by the OPFOR on the tested unit vehicles during the initial movement.

Do you want to add the contacts of the TOW line?

We talked with TOWs this evening. They said that they moved slowly and did get closer but were moving sloppily and carelessly. For instance, one chap reported that he saw personnel of TOW 12 screwing around throwing snowballs, hitting rocks with sticks, and that sort of thing. They mentioned that TOW 38 moved particularly badly. When they got up around Checkpoint 38 up on the high ground there were a bunch of them who approached TOW 07's position after TOW 07 had already pulled out. The report was that they were moving very badly on the high ground. When TOW 54 finally did pull back he said he felt that he was pulled back late because the tanks, probably 2, that were advancing on his position should have seen him because he had to move through some open area. That was the light section. From our position it seemed like he moved through the creekbeds really well but once they got above in the open areas they decided to cross. I think this was a function of not staying on their route because the platoon leader had selected routes for them all the way into their final assault positions. Why I don't know. Trafficability was not that bad. At this point the only vehicles left in the problem were the FO and the Platoon Sgt. and the other vehicle in the light section. The Platoon Sgt. did continue on with his mission, he knew where he was, he crossed hill 6400 and he was talking to the FO. They got him fire for effect in the vicinity of the objective. Was that close at all to 51's position? No. It was half way between 11 and 51. Right in the middle of the objective. So he was working indirect fire to support his movement into the final objective. The light section did move up now as they moved across the last creek just prior to crossing the high ground of the objective. The Platoon Sgt. lost track of his other vehicles. So that both of them hit the objective separately. They were talking at each other on the radio but they were not overwatching each other. The last movement was not coordinated; if one had been overwatching likely they could have taken one of those tanks and maybe had gotten that objective, but both of them were picked off by a tank on the flank. One was remarkably inattentive to what was going on. For instance, he did not have an OP. At one point, he finally did put one out and he was a relatively inexperienced tank commander who was put in for the absent Platoon Sgt. this week. And the fact that 56 and 46 were both hit by 11 is a monument to bad movement by 56 and 46 because 56 reached the objective, crossed the big opening and Checkpoint 25 and down to the creekbed going directly east. He was open about 5 seconds and 11 didn't pick him up. He went all the way over, in fact he almost ran into 51, came all the way back, then started heading back towards 51 and that's when he got hit. Somehow 46 actually got up northwest of the objective, started fumbling around in the trees, coming out. Once again, instead of continuing through the trees he broke into the open just southwest of 17. Started booking across the open field. Additionally it was a good

plan. The Platoon Leader ended up with very poor communications. Even though he had a bad radio he could have done well had he communicated more effectively through his relays. Because of the decisions of both the Platoon Leader and the Platoon Sgt. and the TOWs at different times to leave covered, concealed routes and cross the open areas, they ended up loosing key vehicles and they just hit the objective piecemeal.

NARRATIVE G

PL ATTACK ORDER

The order was issued from a vantage point where the vehicle commanders could view the terrain, and all vehicle commanders were present when the order was issued.

The TOW section was ordered to provide overwatch from the high ground southwest of the attack position (on Butterfly Hill). The TOWs were to be in position before the tank sections crossed the LD. The light section was ordered to move towards the objective generally following the route of advance in the CTC attack order. The heavy section was ordered to move toward the objective by traveling in the vicinity of the following coordinates: 070680, 080686, 085690 and 085700. The TOW section was to move to Hill 6400 when ordered to do so by the platoon leader. The FO was ordered to move with the heavy section.

Two preplanned fires were used. The first mission was a smoke mission at coordinates 076701. The smoke screen was to be provided at 1030 hrs (the time the unit had been ordered to cross the LD). The second mission was an H.E. mission on the objective and was to be provided on call.

The platoon leader discussed possible locations of OPFOR TOWs with the members of the unit. Tanks were ordered to move using bounding overwatch within sections.

ATTACK

Tank platoon leader ordered all his TCs and the only two crews that were not briefed on the original order were the TOW section. The TOWs were in position - good position - to overwatch the movement of p toon crossing the LD up on Butterfly Hill. They could see the entire training area to the north. The plan was to leave them there until they had crossed the creek very close to the objective and displace them up in the vicinity of 6400. However, the last commo that anyone had with the TOWs was prior to crossing the LD. Both the platoon leader and platoon sergeant - once the movement got under way - made no attempt to talk to the TOWs or request status or give them any information at all. Therefore, they never moved. The FO followed the platoon leader and then the platoon sergeant movement. He was never in a position to adjust rounds although he was calling for fires at the request of either the platoon leader or the platoon sergeant. But he could not see. There was good communications within the platoon when they moved out and the PL planned to move along the western section with his entire tank platoon - moving by bounds. None of them at any time picked up the TOW position on top of 6400. In talking to the TOW controllers one TOW crew was not alert during their overwatch because 07, who engaged most

of their tank platoons, was sitting up on top of that hill using grenade simulators every time he fired and there just isn't any reason why at some point his engagements weren't picked up.

The platoon leader moved up south of 6400 and lost his tank 33 when he himself was silhouetted up on top of ridge line and so both those tanks were taken out of the action. The platoon sergeant then took charge. After about 15-20 mins of movement, he did link up with tank 46, he had the FO, however, he did not either call indirect fire or contact his TOWs to let them know what he was doing. He just proceeded on towards his objective and shortly after that got separated again from tank 46, which did not have communication. The platoon sergeant wandered almost over to the eastern boundary and surfaced up on top of checkpoint 38, just south of 6400 again and at that point he and his other light section tank and the FO were all picked off by that same TOW - TOW 07. Then TOW 07 was withdrawn. At that point tank 46 was the only maneuver element left in the action and there was still no communication with the TOWs that were left clear back on Butterfly Hill behind the LD and 46 continued moving to the objective. He moved carefully, stayed in the low ground. However, eventually as he crested out on the ridge line just south of the objective, he was picked up from the flank by TOW 54 and killed. Their platoon leader selected a good route initially, however, his overwatch just broke down and TOW 07 was able to sit up on top of the high ground and take them out one at a time.

The OPFOR reported that they moved pretty well up until they had reached the stream bed just south of Checkpoint 38. They said around that point they moved into the open. They did not use terrain, when they did use the woodline, they moved against it they didn't move in it and there was a good deal of moving out quite independently in open terrain.

Was there any indication why this breakdown might have occurred?

I think that the key was that the TOWs on top of Butterfly Hill just were not observing. That TOW could not have fired 5 times from that hilltop and not be observed unless his TOWs were not alert. And then, I guess, obviously, that the tank section that was covering the other section's movement was not in position to see that terrain.

How far was that TOW position from the 07 TOW?

About 2500 meters, closer to 3000 meters. They should have been moved out from Butterfly Hill. Part of the problem was not bounding those TOWs earlier because they were almost at maximum range looking at 6400.

The OPFOR reported that 89, 31 and FO vehicle 52, were conspicuous in their poor use of terrain, so they were just flat moving badly. They did say that 46, they felt, moved the best of any that they had seen moving that day. He was the last tank left in the heavy section - went way up into the objective. He moved carefully, he just flat stayed in low and

didn't move that slow after he got going.

.....indirect fire?

All they did was all preplanned. The FO was moving behind the platoon leader and then the platoon sergeant so he never physically observed - all he was was acting as a relay.

One thing that we haven't kept track of is misses as an index of the goodness in movement of the tested unit. There was one miss by TOW 07. So he had 5 hits and one miss. This miss was quite early sometime between 1030 and 1045...which means that they were able to see some but couldn't see far enough to identify but again they reported that they saw smoke from an engine and that the movement just really wasn't that good.

NARRATIVE H

PL ATTACK ORDER

The order was not issued from a vantage point where the vehicle commanders could view the terrain. All vehicle commanders were present when the order was issued.

The TOW section was ordered to provide overwatch for the heavy and light sections until the heavy and light sections reached phase line ALPHA. The TOWs were to be positioned on unspecified high ground west of the attack position. When Phase Line ALPHA was reached, the PL was to tell the TOW section to move forward. One TOW was to travel with the heavy section and one with the light section.

The light section was to lead the movement from the attack position by moving due north. The heavy section was ordered to move across the vicinity of the following coordinates: 070686, 080686, 085690 and 085700. The light section was ordered to move across the vicinity of the following coordinates: 070686, 080686, 082690, 080695 and 078700. The light section and one TOW were to occupy hill 6400. The light and heavy sections were to travel together until Phase Line ALPHA was reached. (vicinity of 083688).

ATTACK

The tested platoon leader gave an order and the TOW section were the only crews that were not briefed prior to crossing the LD. It showed up later in their execution.

Indicate what movements were sighted by the OPFOR during the period after they crossed the LD.

TOW 07 was knocked out the minute after the LD time, and he was the only one who could really observe the LD, and nobody saw him. He said that he couldn't see anything.

Coordingly stayed up in that position after 07 was knocked out. He said that he saw nothing of the guys coming up. In fact, there was little smoke, they didn't see anything, the guys moved along the tree lines - open area - some of the comments that came out in the OPFOR debrief were these guys really must have learned something in their training. They were the best group that they had gone against. They went around hills instead of over hills, they said that they really moved very, very well. They did say that 51 was back up on the objective - light section - that it was very, very foggy in the creekbed and they had difficulty with any kind of range. The TOWs also complained about the range that they were able to get in the heavy overcast.

The TOW section was supposed to be in overwatch as the unit crossed the LD and in fact they weren't. They followed the heavy and light sections out across the LD until overwatch positions were established. Shortly after movement began, however, one of the TOWs did go into a good overwatch position which was indicated by the fact that he saw the fire for effect come in on top of 6400 and he spotted the green smoke from the TOW so he obviously had good observations to his front. The platoon elected to move along two creekbeds in towards the objective and once they got down in the creekbeds, they moved very well. There was no overwatching element following behind the tanks. Occasionally they would come up behind the tanks, on a piece of high ground but according to controllers they were never in a position to overwatch the movement of the tanks. The TOWs were not effectively used. One thing could be said that because of the decreased visibility, it was less likely they could select positions to overwatch for very long. There was excellent communication in the tank platoon between the tank platoon and the TOWs. Every single piece of information that was available to those people that was picked up was transmitted to the platoon leader. It was the best communications that I have heard since I've been here. Both friendly information and enemy information were passed up and down the line and everyone knew exactly what was going on. There was excellent use of cover and concealment. Mainly because the routes selected by the platoon leader but - the tanks themselves moved well. What was most interesting was they didn't move slowly either. They moved rapidly yet carefully.

That was one thing that we were very impressed with. They got to the objective very quickly. That's how the first tank got killed. He got a little ahead of his section. He was 100 meters ahead and the engagements were at very close range. 51 over on the east side of the objective got 34 and then he got 33. He didn't see them until he was talking in the order of 50 feet. There was a problem of fog in the creekbed but these guys did take advantage of the terrain to move very close.

There was only the one fire mission called in. The platoon leader selected it personally because in looking at his two routes into the objective he said 6400 could overlook both of those creekbeds and instructed his FO to put a mission up there and fire as soon as they crossed the LD. This was the mission that knocked out the 07. He didn't fire anymore indirect fire. One reason, of course was he didn't make any more contact until right before he himself got killed. After that the platoon sergeant did not think to use indirect fire and 33 did not think to use indirect fire. They knew that there was a tank directly in front - in fact they had spotted general movement in that area and heard noises. I'm surprised the platoon leader continued to stick his nose out there when he got killed. They did not think to use indirect fire at that time to cover the area before they continued foreward so 33 moved and of course he was picked up and killed. Because 51 was preoccupied with 33, 46 maneuvered up on high ground and was able to knock 51 out. Just previous to that, he had bypassed the TOW position so the TOWs were forced to pull out, so he never was in a position to engage. 46 moved in on the objective

and caught 11 as he was moving. The light section tank and one TOW had moved up along the ridgeline - along the creekbed in front of TOW 54 and had just bypassed their position. So when the problem ended, 46 had crossed completely across the objective and he had a TOW overwatching him and the light section with a TOW were crossing over TOW 54's position and were heading into the objective.

Were the units moving by bounds?

Yes they were moving within the heavy section. The two sections were moving in different creekbeds but they were individually watching themselves to some extent. It broke down a little bit in front of 51. One tank should have gotten killed anyway and they should have lost the second one. The key was excellent terrain analysis by the platoon leader, both in selecting the dangerous positions in terms of TOWs, OPFOR TOWs and selecting a good covered concealed route. Excellent communication at all times except for one TOW, his radio went out, and really processing the information. The platoon sergeant took charge and moved across that objective and did an excellent job. That's all I've got on the attack mission.

NARRATIVE I

PL ATTACK ORDER

The order was not issued from a vantage point where the unit could view the terrain. All vehicle commanders were present when the order was issued.

The TOWs were to be positioned on unspecified high ground north of the attack position. The TOWs were to provide overwatch for the heavy and light sections. When the TOWs no longer had the tank sections in view, they were to move north and continue to provide overwatch for the tank sections. The second overwatch position for the TOWs was unspecified.

The light section was ordered to move towards the objective using the route of advance in the CTC attack order. The heavy section was to travel a few hundred meters east of the route of advance of the light section. Specific routes of advance were not discussed. The PL ordered the unit to move directly out of the attack position without any mention of using the ridgeline at the attack position for cover.

The platoon leader told the FO that he wanted smoke screening missions at 085704 and 073690. The smoke screening at 073690 was to be provided at 1045 to cover the initial movement of the tank sections. The platoon leader requested that H.E. be employed at the following coordinates: 072702, 080695 and 096727. No mention was made of the time when those H.E. missions were to be fired. The FO was ordered to travel with the heavy section.

ATTACK

The attack order was passed out to all the TCs, however, six of the eight tactical vehicles' crews were not briefed by their track commanders prior to crossing the LD.

As the tested unit left their AA position and crossed the LD, all elements were moving simultaneously. The platoon leader decided that his TOWs being lighter vehicles and having more maneuverability, would be an excellent point element so the TOWs led the attack this morning. Also the light and heavy sections were moving and as they crossed the LD absolutely no one was in overwatch.

Movement overall was awful. It looked like they were trying to stay in the creeks but they couldn't do it. They climbed up, they moved as a column of ducks. They didn't use cover, they stopped in the openings, put up lots of dust. 20 got six vehicles, he also saw the other two, however, he couldn't shoot them because he was firing at the six.

This was borne out by watching the movement of the tested unit from behind. Although occasionally the vehicles went into position where overwatch was possible, either observation was poor or the position was not that good. The controller on TOW 52, their track was in position before the first kill occurred. Therefore, the controller saw the TOW backblast. So, in effect, it would've been possible if that track had been doing his job, for them to have returned fire after the first vehicle was killed and eliminate 20. So, they were sitting in that location until they were killed, also, the potential was there, but, either the positions were poor or observation was nonexistant. Therefore TOW 20 stayed in the same location and fired six times and was never picked up, so it's obvious that there was no real attempt to analyze the terrain, or set the vehicles in overwatch position prior to moving. The FO, who was moved up with some of the lead elements was killed 15 minutes out of the attack position. No TC or the platoon leader ever attempted to get on the fire direction net and use indirect fire, therefore not a single mission was fired by the tested unit.

Another basic error was some of the vehicles saw vehicles in front of them be killed, moved right up into the exact same location, and were killed. In fact, the controller indicated that after the battle, he could hop to about three vehicles without touching the ground. They just didn't have any basic tactical sense about them. That TOW position, 20, was never picked up.

44 and 13 were moving fairly well, I guess, down the creekbed. They started moving out. There was a small opening in the trees. 44 moved up into it, stopped right in the middle of it, got shot. 13 moved right into the same small opening and got shot. This will show on the map, too. 44 and 13 got lost.

After all the vehicles got killed but the platoon leader and one other tank from the heavy section, he at least learned one lesson - that he should follow the route he initially selected which was through part of the low ground. However, he got to the main junction and where he should have turned then headed north to the objective, he took a right turn and he was headed for Pueblo before he stopped and turned around. He had no knowledge he was going in the wrong direction. So, after we got him reoriented, he moved carefully north up to the creek yet when the going got tough and he had to crest out, he crested right out without putting observation in front of him and was spotted, of course, by the second TOW and both vehicles were killed. It was hard to assess the use of communications because so many critical vehicles were knocked out so early that it was really hard to tell whether they knew they should be talking more often or reporting. I think it was a case of just not having a bit of sense about where the enemy might be, how you position yourself to counter him as you're moving, what kind of terrain to select, and what kind of positions.

NARRATIVE J

PL ATTACK ORDER

The order was issued from a vantage point where the unit could view the terrain. All vehicle commanders were present when the order was issued.

One TOW was ordered to move with the heavy section, and one TOW was ordered to move with the light section. Both TOWs were to be positioned on high ground a few hundred meters north of the attack position. The TOWs were to stay in these positions until the objective had been cleared by the tank section. The platoon leader said he would bring the TOWs forward once the objective had been cleared.

The unit was ordered to move in march column from the attack position to the first overwatch position (high ground a few hundred meters north of the attack position). The PL chose to move to the first overwatch position via the road running north of the attack position.

The light and heavy sections were ordered to move towards the objective using "bounding overwatch." However, the PL's description of overwatch was for traveling overwatch. Overwatching sections were to notify maneuvering sections that overwatch had been established by sending one of the following messages over the radio: "red"or "blue". The heavy section was to provide overwatch for the light section after the first overwatch position had been reached by the entire unit.

The heavy and light sections were to move towards the objective by traveling in the general vicinity of the following coordinates: 070688, 082690 and 078700. The tank sections were to attack the objective cut of the west.

The FO was to be positioned in the vicinity of the high ground at 103705. The PL gave four sets of coordinates to the FO. The platoon leader requested HE at 090720. The latter mission was ordered in the event that the enemy attempted to withdraw from the objective. Smoke screening was ordered at 082705 and 087698. The purpose of the latter mission was to convince the enemy that the tested unit was attempting to flank the positions from the east. No mention was made of the time when missions were to be employed. The PL did not indicate which missions were to be preplotted.

The PL did not discuss the route which the FO was to use in moving to the observation position for the FO.

ATTACK

The test unit attack order was disseminated to all crews prior

to crossing the LD. The platoon leader did not plan for overwatch across the LD. His entire element moved out in a column across the top of the ridge line, and was observed by the OPFOR TOW. So, as soon as their lead elements hit the LD, the last TOW was just crossing over that ridgeline and was picked up and hit by the OPFOR TOW. The platoon leader proceeded directly to some high ground to respond and then moved virtually all his vehicles right over the top of the edge of that ridgeline where they were exposed.

LT Cisneros, who was sitting up on hill 6400, said they pulled off in column on the ridge and stopped, and it was just a turkey shoot 1, 2, 3, 4, 5.

It was a very fast exercise.

They shot them so fast it was hard to even assess communications. An indication of their not knowing the need to communicate with each other was that the platoon sergeant did not make a single transmission all day to anyone. In fact, the controller indicated he didn't even talk to his driver. Not a word was said so there was no commo between the platoon leader and the platoon sergeant light section, there was also no commo to the TOWs and there was also no commo to the FO because he got over on Timber Mountain.

He was on the wrong side of the highway.

Yes, but it didn't make much difference because the platoon leader was one of the first vehicles hit and then because the platoon sergeant didn't talk, to anyone, there just was no transmission.

Was there any indirect fire?

Not a single indirect fire mission fired on the attack.

The reason for the OPFOR not firing was that they did see dust crop all up and down the particular area, they didn't fire because the tanks were obviously moving.

They were trying to call one fire mission. However, they lost communication. He was talking with them and he lost them.

OK, one of the tank commanders took charge of the light section since the platoon sergeant didn't bother to and did move for a period of time after they indicated that they knew that they lost several vehicles up in that high ground. He pulled back around and down into the creek and actually moved pretty well into a position where he could've engaged TOW 20 but they failed to get somebody up in front of them, when they crested they pulled to the edge of that ridgeline. Of course, both those vehicles moved right out there in the open where they were spotted and taken out.

20 said that they just moved up in column.

The controllers indicated that before their tanks were killed, that they had spotted the backblast of TOW 20. So, there was obviously not just poor selection of positions but they just didn't know what to look for or they didn't know how to react. They did not or weren't observant to the front. So TOW 20 should've been picked up, at some point before they lost as many casualties as they did, and engaged.

All right, the platoon leader, to sum up, did not make a good terrain assessment or assessment of the terrain where possible OPFOR locations could've been to overlook his route of approach. He didn't even plan to deploy until he was well past the LD, assuming, I guess, that you know we always have this period of free movement (which was a poor assumption). He did not communicate. It's hard to tell about your communication simply because everything occurred so quickly. But there was no overwatch, if there was there wasn't any observation in the short period of time the people did.

Little attempt to control the unit.

He told them what he wanted to do so really they knew what they were supposed to be doing but they just made this assumption that nobody bothers them for four or five hundred meters. By the time they realized somebody could, all his people were casualties.

NARRATIVE K

PL ATTACK ORDER

The order was issued from a vantage point where the unit could view the terrain. All vehicle commanders were present when the order was issued.

The platoon leader planned to attack the objective on the eastern flank with the heavy section while the light and TOW sections provided overwatch for the attacking element. The light section and one TOW were to travel towards the objective using a route which was in the general vicinity of the following coordinates: 073690, 080686, 084690 and 085700. The light section and TOW were then to remain south of the objective and cover the attack by the heavy section. The heavy section and one TOW were ordered to travel towards the objective via a route bordering Highway 11 to a point in the vicinity of 102701. The TOW was then to provide overwatch from the high ground at 103705 while the heavy section moved towards the objective.

The heavy section and one TOW were to move out of the attack position and move to an overwatch position at a point crossing grid 690. This element was then to provide overwatch for the light section and TOW as the latter element moved to a point where their route of advance intersected grid 690. The light element was then to provide overwatch for the heavy element as the latter moved to the intersection of their route of advance and grid 700. The light element was then to move to grid 700 while the heavy element provided overwatch. From that point in time the light element was to overwatch the heavy element from the vicinity of grid 700. Overwatching elements were to notify maneuvering elements that overwatch had been provided by giving the message "set" over the radio.

The FO was assigned to travel with the heavy section. The PL order included a request for smoke screening at 092708 to cover the attack on the objective. This mission was to be registered. The PL ordered the FO to provide preplanned H.E. on the objective. No mention was made of the time when these missions were to be employed.

ATTACK

6 of the Tested Unit crews were not briefed on the attack order given by the Platoon Leader. There was some confusion in the assembly area who was going to go where as they got ready to pull out. There was no one left in overwatch. The heavy section took the low ground out of the attack position so their movement was covered and concealed. The light section and the TOWs moved across the LD moving north simultaneously with no one in overwatch position. OPFOR Point of View. Tanks moved like columns of ducks. They followed each other - came out of the woods and stopped in the center clearing and was a dead shot. The TOWs moved very well, until they were shot. The OPFOR Tank 37 saw 56 - Shot him -

he was moving well but not quite well enough. 80 moved right near where 56 got shot. He just pulled up a little too far in the woodline and they got him.

How many of the tested unit vehicles were seen crossing the LD or shortly thereafter? The only one seen near the LD was 24 - shot by 20. Then 3 minutes later 13 was shot. That was within 6 minutes they got the light section. The other vehicle they didn't see cross the LD.

They moved badly with the exception of the TOWs. Right.

It's probably significant that the TOWs 56 and 80, were hit not by the OPFOR TOWs but by the OPFOR Light Section.

The general route selected by the Platoon Leader did afford cover and concealment, that's why they weren't picked up initially as they moved out of the assembly area. The Light Section deviated from the route indicated by the Platoon Leader and they crested early and of course they were the first two to go. The light section and TOWs were moving in generally the same direction but they were not covering each other. They were moving independently. There was not a single transmission between the Platoon Leader and his Light Section, or between either section of the tanks and TOWs. Absolutely no coordination. When the Light Section bought it the TOWs were left on their own. The Heavy Section Platoon Leader had gone clear south of the Peanut Mountain and was 3 Grid squares south of that mountain before he figured where the hell he was.

Moving toward Pueblo?

He was headed to Pueblo. So the TOWs continued to move and the Controllers asked them "Where are your Tanks?" and neither one of the TOW section leaders had the foggiest idea or made any attempt to try to call them. So the TOWs - after the Light Section moved - continued to move in covered and concealed routes but they were just moving one behind the other in the attack. Why I don't know. They were very noisy in their movement. That's how they initially picked them up. They were crossing open areas. The OPFOR was occupying those areas which they were trying to get across. They could have been hurt. So for a good portion of the attack the TOW section was leading the attack and didn't know it. They both poked out of the woodline and were killed. The heavy section finally got turned around and headed back north. They got clear out of that major creek east of it, just on the other side of Tank Trail 11 and were moving right across the open, across that ridgeline and moving right in line, 1, 2, 3.

Where they went south is off of the maps, I take it.

Right - They circled back around north and then in the vicinity of 084684. Somewhere from there abouts. Right. The first tank got hit and the next two tanks continued to move and moved right up behind them and around them as they moved into the same area the TOW took them 1, 2, and 3.

So when they got hit they were just south of the ECC.

The FO elected to move with the TOWs after he had problems with his vehicles. Yet he never called any fire missions. No one in the testing unit ever detected an OPFOR vehicle of any kind. Again a couple of controllers indicated that they say OPFOR vehicles and there should have been some observation of TOW 20 and TOW 41 when they engaged the vehicles.

The Platoon Leader split his elements and then did not even attempt to communicate with them. To find out if they were on their route or if they were doing what they were suppose to do so that they had a coordinated movement. Part of the problem was he was so far south of that mountain that he couldn't talk to them. All I know is I never received any calls on the attack net indicating he was questioning people to see if they were in position or where they were or what was going on.

NARRATIVE L

PL ATTACK ORDER

The order was not issued from a vantage point where the unit could view the terrain. All vehicle commanders were present when the order was issued.

The unit was ordered to move toward the objective in two elements. One element was composed of the heavy section and the TOW section. The second element was composed of the light section and the FO. The light section was ordered to provide overwatch for the heavy and TOW sections as the latter sections crossed the LD. The light section was to provide overwatch from the area of the attack position.

The TOW section was to lead the heavy section. The routes of advance for the heavy and TOW sections crossed the vicinity of the following coordinates: 080685, 086690, 090696, 093700 and 093710. The heavy section and TOW section were to flank the objective and attack out of the east. The light section was ordered to move toward the objective using the general route of advance included in the CTC attack order. The PL ordered the light section leader to select a specific route of advance affording as much cover and concealment as possible.

No mention was made of the route of movement from the attack position to the LD.

The platoon leader's order included target registration points at 079709 and 078690. No instructions were given regarding the time when these missions were to be employed. These missions were presumably H.E. missions; however, the PL did not specify whether they were to be smoke or H.E. missions.

The PL used the same phase lines included in the CTC attack order. In addition, the PL order included checkpoints. Checkpoints were located as follows:

Blue: Between phase line alpha and phase line romeo
Yellow: Between phase line alpha and the LD.
Green: Due east of the objective.

The platoon leader emphasized the importance of a slow rate of movement towards the objective.

ATTACK

Seven of the eight crews involved with the test unit were not briefed on the operation prior to crossing the LD. The tested unit planned to move with the heavy and light section tanks moving on somewhat of a parallel

axis along the western boundary of the operation areas supported by the TOWs and overwatching. However, all vehicles were moving at once as they crossed the LD so no one was in overwatch to cover the first period movement. The visibility wasn't as much as it could've been and so they were not taken under fire on their initial move. As the platoon moved out, the platoon sergeant got completely disoriented and began heading south. At the same time he lost contact with the other tank of his light section and he never did regain contact. From the OPFOR point of view, observation was really bad. They saw a movement as shown by the fact that one tank, 40, was hit by 20 and that 91 was hit about ten minutes later. The fog was rolling in and out and it seemed like when the fog rolled out vehicles were crossing a lot of open areas.

About how many vehicles did the OPFOR see?

They didn't see anybody cross the LD. Once they got past there, they started picking up. The heavy section moved well and stayed in cover almost the entire period of movement. The TOWs moved right across into an open area, set up the initial position and that was when TOW 43 got hit initially. The light section got split up and was just wandering around back and forth in front of the TOWs and that's how they were eventually spotted. But the heavy section under the control of the platoon leader did move very well and, in fact, I don't believe were ever spotted till right just before they were hit from the flank by TOW 41. They heard the movements and that was about it. So the initial TOW was knocked out then the FO crested up on top of the hill south of 6400 and just prior to both FO 91 and 070 the second TOW were hit very close together. The reason the second TOW was hit was because they saw the FO vehicle pull up and one of the men go out and walk over to the TOW. That led to the discovery of the second TOW so early in the problem, the TOW section and FO were knocked out. There was no communication between the platoon leader and the platoon sergeant. There was no communication between the platoon leader and the TOW section leader. The TOW section leader was not even sure what direction to orient his vehicles. He just had a vague idea of even where the enemy was according to the controller. What about the commo within the heavy section?

Commo was good within the heavy section and they moved well together. The platoon leader checked them down and what was good about it was they moved well but they didn't move completely out of the objective area to try to do it. In many cases, the guys tried to get out of that one creek and they ended up going well out of the way and delaying the progress of the unit and he was able to move pretty much straight towards his objective yet stay in the cover behind the trees on a piece of high ground. Because the FO was hit early, no one else called a fire mission until the platoon leader just before he got killed and called fire in the vicinity of the objective which was basically 100 meters south of our checkpoint 17. So they were just firing based on information in the OPORDER, they were not firing based on acquiring a target. The PL was only talking to the platoon sergeant a couple of times and didn't know the platoon sergeant was not in contact with his other tank. In fact, the platoon sergeant

spent the whole morning just wandering around in circles as was indicated and finally he just came out in a big open area and was hit about 2020. Just before the platoon leader got hit, the other wandering tanks in the light section linked up with the heavy section but when they did this they were in an area about 100 meters across and they were directly flanked by TOW 41. He saw the first vehicle and he began to knock the vehicles off one by one. Two controllers of the test unit indicated they heard back blast and saw the back blast from the TOW over in the flank but nobody from the test unit did. And they were not communicating with each other in terms of casualties. They knew they had cover to their front and couldn't understand how they were getting hit, of course all they had to do was take a look right off to the left and you could see the TOW position.

Tell us, did they move very well through the trees as far as cover to their front? They should've known that they were the lead elements and that there was a possibility somebody could've been in either direction so, while they had good cover concealment in the front, they didn't from the flank and each one of the vehicles eventually exposed itself and was hit by TOW 41. About the only thing that the unit did well in the attack was pretty goddam good movement of the heavy section by the platoon leader. But he did not control the rest of his element and so they weren't effective.

Do you have any other comments on the attack? You already mentioned that at 0900 it was clear and at 1100 it was snowing, visibility was dropping and you could see Butterfly Hill or P9 hill to the south from 41's position. 1145 it got so thick that 20 couldn't see checkpoint 38, but the visibility came and went. That's right because the shots on the TOWs were a good 2000 meter shots and the one on that tank, 38, 58, had to be even further than that so I don't think it affected the problem and I don't believe that the heavy section was in jeopardy because of the way they moved.

NARRATIVE M

PL ATTACK ORDER

The order was not issued from a vantage point where the unit could view the terrain. Some vehicle commanders were not present when the order was issued.

The order did not include provisions for overwatch as the unit crossed the LD. One TOW was assigned to travel with the light section, and one TOW was assigned to travel with the heavy section. The light section was to travel along the western approach. The heavy section was to travel towards the objective across the general vicinity of the following coordinates: 102710, 100708, 090697, 086690 and 080695. The heavy section was to flank the objective from the east. The light section was to follow the general route of advance given in the CTC attack order. The heavy section was to travel south from the attack position. The light section was to move west from the attack position and travel behind the ridgeline as far as 090730 before heading south. The TOWs were to break off from the tank sections and cover the objective from high ground. Specific locations for the TOW positions were not included in the PL's order.

The PL gave coordinates for two smoke screening missions to the FO. These coordinates were 072695 and 058685. Smoke at 072695 was to be called for before the heavy section attempted to traverse an area affording poor concealment. Smoke screening at 058685 was to be provided when the heavy section reached phase line bravo. The PL gave coordinates for four H.E. missions to the FO. H.E. was to be provided at 079708 and 074704 as soon as the units started to move. H.E. was also to be provided at 072702 and 069679. The mission at 069679 was to be fired when the unit reached phase line bravo. The mission at 072702 was to be provided on call. The FO was assigned to an initial observation position in the vicinity of 100715. The PL preplotted H.E. missions at 079708 and 074704

The PL ordered that the location of enemy vehicles be given.

ATTACK

The tested unit was well briefed before they crossed the LD, it was the first one we've had that all vehicles and all crews were completely briefed on the operations order prior to moving out. The platoon leader left it to move, to split his TOWs, one with each heavy and light section. The light section pulled around behind the LD close to Highway 115, which was the western boundary in order to proceed down the western boundary as the order indicated they should. The heavy section was going to try to move pretty much down the center of the sector and then they were going to try to coordinate their movement as they went. I don't know what indications did they have after they crossed the LD.

Movement was very good, very cautious. The OPFOR saw some smoke.

Engine smoke?

Engine smoke and dust, the dust was pretty bad out there today, however, it got better as it went instead of getting worse. Saw initially smoke and then they lost it. In fact they lost the heavy section completely.

They never did spot a single vehicle around the LD?

They thought they saw a jeep or two but weren't sure if it was fire markers or what. They really didn't get an idea of any specific vehicle. The smoke in one case did give away TOW 15. They called an indirect fire mission on it_____. Even then the OPFOR never found out about it until after the problem was over.

Yeah, that was the only indication, it was along the western flank that the tested unit was spotted at all and it was, I'd say, a luck fire mission. They put the mission in the vicinity and they just happened to catch a TOW that was overwatching the light section. The heavy section for the tested unit and one TOW had the same problem that the OPFOR has, they had to cross the one ridgeline to get down into the creek and the route from thereon was going to be a good route on the way to the objective but he had to worry about crossing that ridgeline. He handled it pretty well, I thought he wasn't going to at first. He moved in behind the ridgeline with all of his tanks and his TOW. He worked a fire mission in the vicinity of where he had intelligence of where the enemy was, in fact.

Smoke or HE?

HE mission first. And then he was going to put smoke just before he moved, so he got the TOWs so it was not effective. He got his smoke working but that wasn't very effective either because the wind was so stiff out there today. At the last minute he told his TOW to follow him but at the last minute the TOW commander called him and said that he had a good overwatch position and recommended that he dismount and overwatch that movement and so the platoon leader changed his mind. It was fortunate that he did. When the tanks got ready to move they waited for the smoke to deploy and they moved very quickly over the top of that ridgeline and down into the creek. I checked with the TOW of that side and they had an OP out, they just did not see him. I don't know why_____ but they didn't see him so he kind of gambled crossing the ridgeline. But he got his entire heavy section down into the creek and moved completely past the TOWs and actually was south of the objective, and moved back up in on the flank of the objective from that creekbed. It was excellent movement the entire way. He had as good a control as I've heard of in any of the units we've had to date. He was having to relay through one of his

tanks. Tank 54 could talk to everybody and everybody else was having some problems so 54 ended up relaying. He knew where his light section was at all times. He knew where his TOWs were and he was talking to his FO. So they had better communication than any element that we've seen through any of the tests. So the heavy section moved all the way down past the TOWs and then of course the TOWs were forced to withdraw. And they never did then make contact with anyone. I think they spotted again, spotted some of the light section moving, is that right?

Yeah, the TOW 20, which was on the right, said he spotted some tanks moving through the creek down around checkpoint 10. However, by the time he got his TOW up to where it could fire, they'd gone. Even if he had it dismounted, there was no way he could've had the time. They just didn't show themselves enough time to fire.

The platoon leader continued to work his indirect fire. I found out later that he purposely left TOW 43 in the overwatch position where they were. He left him there too long. And I don't know that TOW could see the objective. He worked fire on the objective, put a mission right on where his objective was and it was effective, it hit in the vicinity of one of the tanks, knocked out the communications and killed the TC. So he had at least one good effective fire mission. As he moved them, close up in on the objective his lead tank was spotted by the OPFOR and knocked out.

From our point of view it seemed like he got a little disoriented as he got to the objective, 'cause 41 says when he shot the first tank, I believe it was 54, he was actually moving south and actually started bypassing the objective once again. I'm not sure if he was trying to move up through those trees or what. But he put his sight out and shot them and the same thing with 18. That's how they_____they got those. They also saw other heavy section tank 55, but couldn't get a shot at him.

OK, well, they lost two tanks, they were trying to stay in the tree-line and again you're right, they were a little bit off of which way to the objective. They were staying covered and concealed in terms of where they thought the objective was but it was more off to their flank and so that allowed them to be, they weren't watching that direction and became exposed. Tank 55 reacted pretty well. As soon as he saw the green smoke from the first tank he just backed over five 200 year old trees, and got out of sight. But the communications was so good with his platoon that the platoon sergeant knew immediately that the platoon leader was hit and immediately took control even though he was on the other flank. Then the light section, he told 55 to stay where he was and try to continue to spot the enemy on the objective while he moved up. However, the light section made the mistake of coming over up across the top of 6400 and they were oriented on their objective and, not figuring I guess, that the enemy has overwatching elements, too, so they exposed themselves to the two TOWs.

And they moved right along 115, and when they got past hill 6400, they took a sharp eastern turn and put their broadside to the TOWs_____.

They were heading for the objective and they were exposed to the overwatching TOW so the tested unit lost two more tanks at that point. However, tank 55 and realizing he was the only one left, pulled back down around out of the line of fire of the tanks that had engaged him and started to move towards the objective. At this point, the OPFOR tanks began to move around and I don't know whether they were moving, reacting to try to get 55 or whether they were just trying to get a better position or what.

Yeah, 37 was moving to get 55. I thought he was actually pulling off the objective. For some reason we got some green smoke on the objective. I had the impression at first that might've , you know, that 37 had thought that 40 had been killed. I think it was just the wind blowing smoke from the other tanks that had been killed. Anyway, 37 was actually moving around to 40's flank but he ended up exposing himself in the exact same manner that 40 was exposed. So when 43 hit 40 he had the exact same shot at 37.

The TOW that we thought had been forgotten about was at least 2500 meters away from the objective but he was in a position to see the top of that hill and they were doing a damned good job. 2500 meters they spotted 37, hit him, and then could of course continue to watch in that area and as the other tank maneuvered around, hit him. So, then the overwatch TOW eliminated both tanks on top of the objective which allowed tank 55 to move into the high ground and actually occupy his objective. So the tested unit, although they suffered four tank casualties and one TOW did accomplish their mission. They occupied the objective.

I'd just say in the way of summary that I think it was a good plan on the part of the platoon leader, it was well executed up until right at the end. Excellent control, excellent use of terrain and then they just bumped in on the objective and were a little bit homing in on one point instead of continuing to make it. You know, the enemy can be completely across their front and overwatching completely their front.

So it was excellent control.

NARRATIVE N

PL ATTACK ORDER

The order was issued from a vantage point where the unit could view the terrain. All vehicle commanders were present when the order was issued.

The TOW section was assigned to provide overwatch for the tank sections from the high ground at the attack position. One TOW was to be positioned in the vicinity of 093728, and one was to be positioned in the general vicinity of 107715. No mention was made of moving the TOWs forward at a later point in time.

The light and heavy sections were to travel towards the objective using the route of advance in the CTC attack order. The tank sections were to move using bounding overwatch between sections. The PL told the tank commanders to make short bounds and to maintain visual contact between sections.

Tank sections were to move out of the attack position and travel west behind the ridgeline before turning south in the vicinity of 090730. The PL noted that crews should move toward the objective using the cover provided by the creekbed.

The platoon order included two preplotted smoke and HE missions at 075707 and 078705. These missions were to be registered. The PL also gave the following coordinates for HE missions: 073705 and 078702.

ATTACK

The four tactical vehicles of the tested unit crews were not briefed prior to the platoon leader crossing the LD. The platoon leader I think made a fairly decent terrain reconnaissance, he intended to put his TOWs in the vicinity of the LD to overwatch his initial movement and move his entire tank platoon north behind the LD and kick off close to his western flank which he did do. He failed to let his TOW section set up and dismount, and neither one of them left anybody with their radio. The entire crew was forward with the weapons system and so that none of them were monitoring the net, so the platoon leader then could not talk to them and displace them. And his initial position for the TOWs he could not support his final objective so it would have been necessary for them to move for him to support his final objective. But neither crew was in a position to monitor the radio so he effectively lost contact with them.

But their radios were OK?

17 was shot by 20, 39 was shot by 20, then they got the word to withdraw and at that time, 41 was just dismounting, maybe they were trying to get out of some of the smoke. Dismounting, they saw 15, shot it and then withdrew.

At this time the tank platoon leader was killed, there was not communication with TOWs, one of them was dead and one of them was not monitoring his radio and no one was aware that the platoon leader was having to contact the FO on the FDC net. So, at that point there was no more communication even with the FO. The platoon sergeant was still left alive. This is the platoon sergeant that has been through the entire pre-test without making one transmission. Today we got a couple of sets and a couple of rogers out of him. He was lost, he continued to move south because I pushed him. He stayed down in the low ground because the platoon had gotten down in the low ground after they'd lost two or three tanks and he moved past the objective and was continuing south when I finally got him reoriented and to head back to the west towards the objective. As he headed back to the west then both tanks remaining in the light section were exposed themselves to tank 40 and were hit by tank 40.

How was the commo up until the time the platoon leader got killed?

It was good, excellent. There was excellent communications within the tank platoon and the tank platoon leader was on top of their movement and was controlling it. Until he got killed. The only people he didn't have commo with were his TOW section and they just flat got away from the radio. One of them got killed and the other one was away from his radio. So up until that point where the platoon leader was lost, he had, I would say, very effective control and communications. His only problem was electing to stay up on that high ground because he had good tree cover and it just ran out on him and he was forced to cross that open area.

Any other comments on the attack?

Might indicate the FO continued to call indirect fire, even when he lost communication with the platoon leader. But other than the slight effectiveness of that one smoke mission, none of the tested unit missions were anywhere close to it at all.

Did the FO know where the rest of the platoon was? Or was he calling indirect fire just to.....

He was not in communication in any way, he was just calling preplanned and from his own observations, and he was not reacting to contacts from the platoon.

Anything else on the attack?

Yeah. They were out of the track and nobody was back there monitoring. The FO had some communication problems on the tactical net after they crossed the LD but the platoon leader got down on the FDC net and he then did begin to coordinate with his FO after he failed to contact him for a few minutes. As the platoon leader started to move across the LD he kept his entire tank platoon under his control. He was using overwatch between the sections but very, very short bounds so that he controlled the movement of the entire platoon as they started south.

What did the OPFOR see as they moved up?

Just before they crossed the LD, they watched 34 set up so they shot 34 just right after the problem started. First they got the track and then they got the TOW. They moved in the open with a ground bound_____
_____.

The movement was not too good and not too bad. They moved nice in the woods but then they crossed open areas and their cover was better to the front than it was to the side. 41, which was sitting more or less directly in front of them said he had a hard time spotting them at all. 21, which was off to the side sort of had a right front or their left front view could see them most of the time moving. Like, for example, one time they saw three of them crossing the LD all at once that was when we had the_____.

What other clues, did you see lots of dust or smoke or anything like that?

There wasn't any dust because it was so wet out there today and smoke, they didn't need to see the smoke they just saw the tanks all the time.

OK, tank platoon leader did have good control of the tank platoon for the initial movement and they were overwatching each other and he kept close rein on them and their movement was good for the first three or four hundred meters. However, he stayed on the high ground. He had the opportunity once he passed the first ridgeline south of the LD to move down into that creekbed that runs right into forward of the TOW position which is a good cover and conceal route. He didn't take it, he elected to remain up on the high ground where initially you've got good cover from the trees and then the trees start to peter out and it started to be harder and harder for him to conceal himself and of course that treeline just flat runs out on the high ground with open terrain to his front and the only way to get out of it is to cross down into that creekbed but he's exposed in doing so. Now at this point is when he got contact back with his FO. He did get a smoke mission but all the smoke missions were right behind the OPFOR except the one which cut off the FO but he didn't cut off 41. OK, so a portion of the high ground where the TOWs were was smoked. The platoon leader made the assumption that because he had smoke out that everybody's vision would be obscured and he gave the order when he saw the smoke come up to go ahead and move, all of them moved down in the open area. And that's where he lost his own tank and two others. Total of three tanks were lost to TOW 20. At that particular location.

NARRATIVE O_

THE ATTACK

My understanding from our good Dr. Meliza was that the tested unit platoon leader gave very, very vague orders both missions. Most of the tank commanders were really unclear as to what they were really doing on both particular missions. Also, at least four of the combat crews on the tested unit were not briefed prior to crossing the LD on the attack mission. Platoon leader planned to move from his attack position to the west and come down the western side of his operational area. So I think he made a good estimate of the terrain and the enemy situation. He selected a good route to move initially. He was going to move his entire tank platoon and TOW section over into that location, set up his TOWs initially in overwatch and move the entire tank platoon on one axis. When he got to the LD, he left his FO, however, in the attack position which was a fairly good place to observe but he lost communication with him so while the FO could see a lot, the indirect fires essentially were not coordinated with the movement of the platoon.

He did make attempts to establish.....

Yeah, he occasionally was trying to talk to him but the FO was off his vehicle moving around with a short antenna and so at times he lost communication with him and later that was a critical problem they had. When they set up initial TOW overwatch, they could only cover the bounding of the tank platoon to the first ridgeline south of the LD. In fact, the TOW section leader called the tank platoon leader and indicated to him that he couldn't see any further than that and so the platoon leader then indicated he wanted the TOWs to follow the platoon in the attack. So he crossed the LD. Was there any observation?

Yeah, what did the OPFOR see?

As they crossed the ridge by checkpoint 5 and checkpoint 6, they topped the ridge in the open and came one at a time in a line of ducks and were shot up. 25 was hit first, 13 a minute later, 19 a minute later and 50 two minutes later.

That's right close to the LD then.

Right. They were between checkpoint 5 and checkpoint 6.

Yeah, it's the first ridgeline south of the LD. OK, a couple of things happened just prior to that. In the operations order one of the TOW positions is given to the tested unit; in other words, there is an indication that there is an enemy vehicle in that vicinity. The platoon leader had plotted fire to be fired on that position and you know looking where the guy sets up, it's exactly there so he told his FO that as he crossed the LD he wanted to fire smoke and HE on that particular target.

Both at once?

Yes, when he got to the LD, the one time that he did get ahold of the FO, he indicated he wanted to cancel the smoke. The FO understood to cancel the whole mission. So there was no mission fired at all and that, it turns out, may have been a key element because that TOW ended up picking a lot off or hitting several vehicles later so he missed a chance to put effective indirect fire on one of the TOW positions. As he moved to the first ridgeline south of the LD, he told his light section to go into overwatch while his heavy section moved. One of the vehicles in the light section did move into a position where they had effective observation of the TOW position. The controller on that tank reported that he saw the backblast of both TOWs. Crew didn't see it. So he had a tank in a position to engage the TOWs that had engaged his heavy section and yet they didn't, they failed to be observing their front. Another tank from the heavy section, also the controller observed the TOW position as they were firing. So there was opportunity within the tank platoon to engage these TOWs as soon as they engaged and probably have limited some of their casualties. But they just flat weren't observant or observing to their fronts so, the platoon leader then was killed, the platoon sergeant was killed almost immediately because he poked his nose out of the woodline and one other tank and then within just minutes after that the two remaining tanks moved around on the ridgeline were also picked up by the TOWs and destroyed. As was one of the TOWs, he got across that ridgeline south of the LD and just exposed himself up on the high ground. There's two places up along that ridgeline to cross unobserved. One is close to Highway 15 and one is through the treeline south of checkpoint 5 and they just didn't do it, they poked out, I guess they didn't realize how far they could be seen crossing that ridgeline. The platoon - there was almost no communication within the platoon, casualties were there, the tanks could talk to each other - they just were not reporting important information back and forth. As I said, there was really poor control of the FO. He was left in a position where he could see but his activities were not controlled by the platoon leader and the indirect fire was not effective in the attack mission.

How tightly was the platoon leader controlling the rest of his elements?

He had good control of his platoon. They didn't last very long, but he made a bound about twice to get to the point where he started taking casualties. And he was clearly controlling the movement, he had all his tanks under his control where he could observe; he was waiting to get people set in position before he would move another element. So, in terms of his personal control, it was good. But, that's about the only information that ever came across the net was the platoon leader's instructions to the rest of the platoon. They were not talking to each other and they weren't observing very well to their front when they were in overwatch.

N to S
10
09
08
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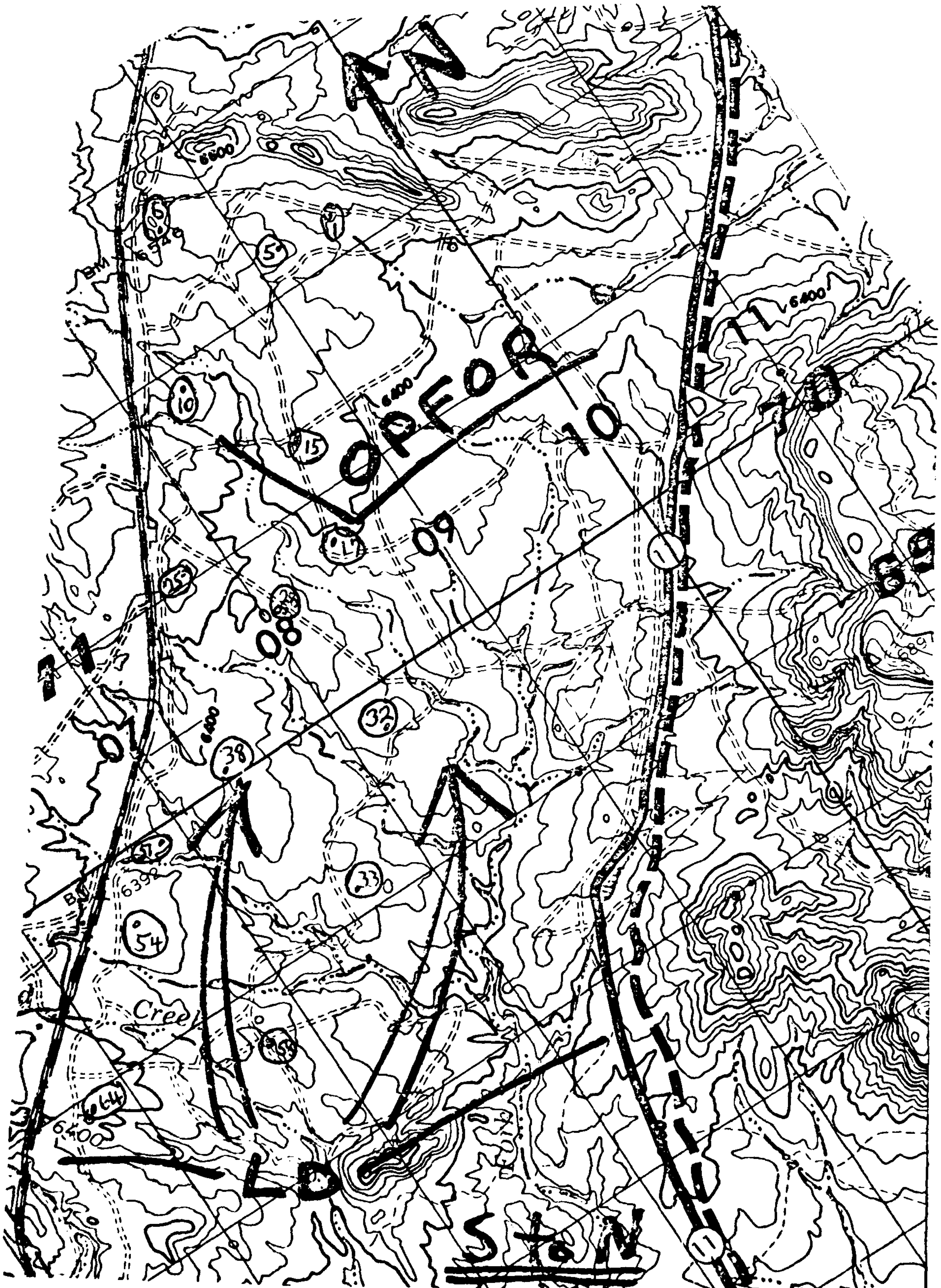
6600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APPENDIX B

RESPONSE SHEET FOR COMPARISONS OF NARRATIVES TO TARGET NARRATIVE

Target Narrative: _____

Instructions: These narratives differ with respect to the extent to which they reflect how well a small combat unit performs in an engagement simulation field exercise. A number of factors are considered important in determining the performance of a combat unit. Order the narratives according to their similarity to the target narrative with regard to these factors; that is, judge how similar each narrative is to the target narrative with respect to the performance of the combat unit in the narratives.

		Narrative Number	Factors you consider important in assessing unit performance
Most similar	1.		
	2.		
	3.		
	4.		
	5.		
	6.		
	7.		
	8.		
	9.		
	10.		
	11.		
	12.		
	13.		
	14.		
Least similar	15.		

APPENDIX C

SAMPLE RESPONSE SHEET FOR COMPARISONS OF NARRATIVES
TO DESCRIPTIVE PHRASES/ADJECTIVES

Adj.1

The purpose of this study is to determine what factors or variables military judges use to assess unit performance in an FTX environment. These narratives describe fifteen different Armor/Anti-Armor REALTRAIN field exercises conducted at Ft Carson from January to March 1978. The narratives differ with respect to how well each unit performed, and the factors that were used to assess these exercises probably differ from narrative to narrative. What we would like you to do is to order these narratives along a particular dimension.

RATE THESE NARRATIVES ON HOW WELL THE UNIT CONDUCTS MOVEMENT/USES COVERED AND CONCEALED ROUTES.

	Narrative Number
Best	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
Worst	_____

Adj. 2

The purpose of this study is to determine what factors or variables military judges use to assess unit performance in an FTX environment. These narratives describe fifteen different Armor/Anti-Armor REALTRAIN field exercises conducted at Ft Carson from January to March 1978. The narratives differ with respect to how well each unit performed, and the factors that were used to assess these exercises probably differ from narrative to narrative. What we would like you to do is to order these narratives along a particular dimension.

RATE THESE NARRATIVES ON HOW WELL THE UNIT COMMUNICATES

	Narrative Number
Best	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____
Worst	_____

Remaining dimensions rated on separate response sheets:

Adj. 3

RATE THESE NARRATIVES ON HOW WELL THE UNIT COORDINATES ITS ELEMENTS.

Adj. 4

RATE THESE NARRATIVES ON HOW WELL THE UNIT USES INDIRECT FIRE.

Adj. 5

RATE THESE NARRATIVES ON HOW WELL THE UNIT USES ITS TOWs.

Adj. 6

RATE THESE NARRATIVES ON HOW WELL THE UNIT EXERCISES COMMAND AND CONTROL.

Adj. 7

RATE THESE NARRATIVES ON HOW WELL THE UNIT EXERCISES LEADER FUNCTIONS/ CHAIN OF COMMAND.

Adj. 8

RATE THESE NARRATIVES ON HOW WELL THE UNIT PLANS (i.e., QUALITY OF THE PLAN).

Adj. 9

RATE THESE NARRATIVES ON HOW WELL THE UNIT EXECUTES ITS PLAN.

Adj. 10

RATE THESE NARRATIVES ON HOW WELL THE UNIT USES ITS TANKS.

Adj. 11

RATE THESE NARRATIVES ON HOW WELL THE UNIT REACTS TO ENEMY CONTACT.

Adj. 12

RATE THESE NARRATIVES ON HOW WELL THE INDIVIDUAL ELEMENTS OF THE UNIT PERFORM.

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