

Research Problem Review 79-4

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**EVALUATOR ATTITUDES TOWARD T-TOE AND
H-TOE UNIT STRUCTURES IN THE MANEUVER
BATTALION PHASE OF THE RESTRUCTURING
OF THE HEAVY DIVISION TEST**

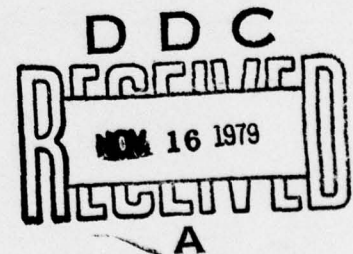
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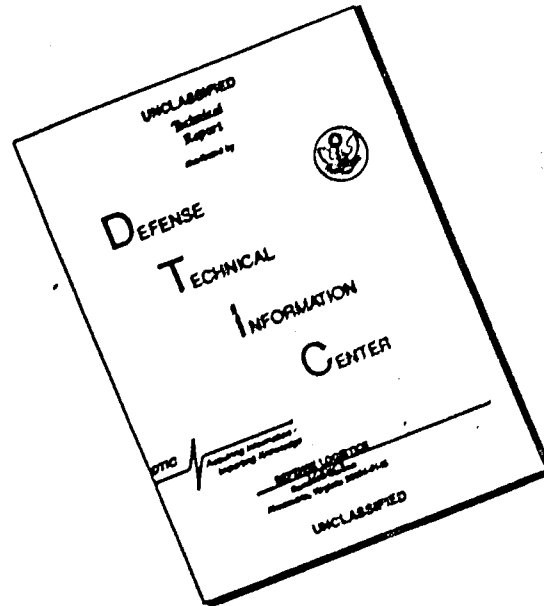


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**U. S. ARMY RESEARCH INSTITUTE
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Army Project Number
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Human Performance
in Field Assessment

Research Problem Review 79-4

6 EVALUATOR ATTITUDES TOWARD T-TOE AND H-TOE UNIT STRUCTURES
IN THE MANEUVER BATTALION PHASE OF THE RESTRUCTURING
OF THE HEAVY DIVISION TEST 3

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11 March 1979

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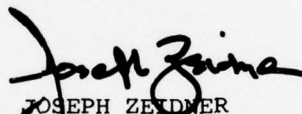
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FOREWORD

An important concern in any field test is the extent to which pretest attitudes of evaluators influence their answers in areas where subjective evaluations are required. The present report is in response to a Human Resources Need from the U.S. Training and Doctrine Command (TRADOC) Combined Arms Test Activity (TCATA), which required that this concern about pretest attitudes be investigated in the Restructuring of the Heavy Division Test, FM 382.

Research was conducted by the Army Research Institute (ARI) under Army Project 2Q263743A775, FY 78 Work Program, Human Performance in Field Assessment. It was conducted concurrently with the Maneuver Battalion Phase of the Restructuring of the Heavy Division Test, FM 382, in October-December 1977 at Fort Hood, Tex., and supplements the TCATA report from that project.


JOSEPH ZEIDNER
Technical Director

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EVALUATOR ATTITUDES TOWARD T-TOE AND H-TOE UNIT STRUCTURES
IN THE MANEUVER BATTALION PHASE OF THE "RESTRUCTURING OF
THE HEAVY DIVISION" TEST

BRIEF

Requirement:

This research was conducted in response to a request by the TRADOC Combined Arms Test Activity (TCATA) that ARI investigate evaluator bias in the Restructuring of the Heavy Division Test (FM 382). Specifically, ARI was asked to determine the extent to which pretest (pretrial) attitudes of evaluators affected their ratings of the normal TOE (table of organization and equipment) structures which were tested in the Battalion Maneuver Phase of the test.

Procedure:

A questionnaire was developed to measure the attitudes which evaluators held toward the restructured (T-TOE) and nonrestructured (H-TOE) organizations. This questionnaire was first administered just prior to Trial 1 of the battalion maneuver test, again just prior to Trial 5 of the test, and finally immediately after Trial 8 (last trial) of the test. The data from the questionnaires were then analyzed to determine to what extent evaluator attitudes changed over trials, and to determine to what extent they were associated with positive or negative evaluations of a given TOE.

Findings:

- With repeated observation of TOE structures in the maneuver battalion test, more and more evaluators shifted from a neutral position to a position favoring either the T-TOE or H-TOE structure.
- With repeated observation of TOE structures, most evaluators (in the attitude surveys) felt increasingly strongly in favor of the TOE structure they had favored prior to the test (for both T-TOE and H-TOE).
- Throughout the test the majority of evaluators favored the T-TOE structure (in the attitude surveys, but not necessarily in field test ratings).

- Analyses failed to show any relationship between measures of evaluator attitudes toward a given TOE and evaluators' field test ratings of the TOE.
- It was concluded that the results obtained in the battalion maneuver test were not a function of the preconceived personal attitudes that evaluators held toward or against a given TOE.

Utilization of Findings:

These findings supplement the report from the Battalion Maneuver Phase of the Restructuring of the Heavy Division Test (FM 382), and were used to help determine the validity of evaluator ratings in that test.

EVALUATOR ATTITUDES TOWARD T-TOE AND H-TOE UNIT STRUCTURES
IN THE MANEUVER BATTALION PHASE OF THE "RESTRUCTURING
OF THE HEAVY DIVISION" TEST

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EVALUATOR ATTITUDES TOWARD T-TOE AND H-TOE UNIT STRUCTURES
IN THE MANEUVER BATTALION PHASE OF THE "RESTRUCTURING
OF THE HEAVY DIVISION" TEST

INTRODUCTION

The evaluation of new concepts and procedures always involves the risk of contamination by subjective feelings that might be held by those individuals doing the evaluating. Strong positive or negative feelings toward a concept are particularly likely when the concept is as far-reaching in its implications for change as is the division restructuring study (DRS) concept.

For this reason, the Army Research Institute (ARI) attempted to determine whether or not the evaluators who participated in the Maneuver Battalion Phase of the Restructuring of the Heavy Division Test (FM 382) had positive or negative attitudes toward the division restructuring concept, and, if they did, whether or not these attitudes systematically influenced the subjective ratings that the evaluators were required to make throughout the test.

METHOD

The first step in the research involved development of a questionnaire to measure the attitudes of test evaluators toward the division restructuring concept. Form A of the questionnaire is shown in Appendix A. (Form B differed from Form A only in that the order of the multiple choice answers to each question was reversed.)

Several caveats are in order regarding this instrument. First, there was no chance to validate the questionnaire to determine whether or not it accurately measured attitudes toward the T-TOE (TOE based on the division restructuring concept) and H-TOE (current unit TOE) unit structures. This problem arose primarily because the division restructuring concept was so recent that no external criterion group was available for validating the questionnaire.

Thus, the questionnaire was developed on a purely logical basis. Since combat maneuver, combat support, combat service support, and command and control are functional elements of combat, the attitudes of evaluators toward the T series and H series TOEs would be expected to be in terms of those functions, and the overall attitude of an evaluator toward each structure would be a composite of that evaluator's feelings in each area. Thus, the questionnaire was developed by including one question relevant to each functional element, plus a question asking about overall attitude toward unit structure. The questions, therefore, were considered to have face validity.

Second, due to the time constraints involved and the lack of a relevant criterion group, it was not possible to test the reliability of the instrument over time before its implementation in the DRS test.

Considerations of both validity and reliability, therefore, must be taken into account when interpreting the results of this report.

The questionnaire was administered to evaluators for the battalion field test portion (also called the Maneuver Battalion Phase) of the Division Restructuring Test. The first date was 4 October 1977, about 2 weeks prior to the beginning of the first of eight trials of the battalion field test.

It was readministered on 28 November 1977, just prior to Trial 5, to determine whether attitudes toward the restructuring concept had changed during the four field trials in which the evaluators were judging restructured and nonrestructured units.

The questionnaire was administered for a third and final time on 16 December 1977, the last day of the field test. Only half the evaluators completed the questionnaire that time because of administrative problems involved in meeting their battalion test requirements and returning to their home stations.

For purposes of analysis, each question was scored by assigning numerical values as follows: H series is much better = -2; H series is better = -1; No difference or Don't Know = 0; T series is better = +1; T series is much better = +2. These values were then summed across each question in a given questionnaire and the mean value was calculated. This value represented the evaluator's attitude toward unit structure. If the mean value was negative, it was assumed that the evaluator favored the H series TOE; if it was positive, it was assumed that he or she favored the T series TOE; if 0, then it was assumed that the evaluator favored neither TOE structure over the other. By means of this procedure, an attitude score was calculated for each evaluator on each administration of the questionnaire.

The next step involved determining whether or not evaluators' preferences for a given unit structure, as measured by the above questionnaire, influenced the subjective evaluations they rendered during the battalion field test. For example, did evaluators who had initially favored the T series TOE give higher test ratings to T-TOE structured units than did evaluators who had initially favored the H series TOE?

An attempt was made to answer such questions by measuring the association between the questionnaire attitude scores of the evaluators and the subjective evaluations they made on selected questions in the battalion field test. For those questions that required the

evaluator to rate the performance of a unit on a 5-point scale, Spearman's rank order correlation was used to compare those ratings with attitude scores. Other questions calling for a subjective evaluation in the battalion field test required only a yes-no answer from the evaluators and thus were only amenable to contingency table analysis. Fisher's exact probability test was used to determine whether the answers to this type of question varied as a function of attitude toward unit structure.

Spearman's rank order correlation coefficients were calculated for five different questions. Separate coefficients were calculated on the data from each event of each trial of the battalion field test, except in those cases where data were not available from a given event. A total of 150 correlation coefficients was calculated from the attached questionnaires and the following questions from the battalion field test evaluation forms (Appendix B): Questions 2, 3, and 4 of Form S-1-3; Question 3 of Form S-1-4; and Question 13 of Form S-4-9. Question 2 of Form S-1-3 required that evaluators determine how many heavy antitank TOWs and tanks in the unit they were evaluating did not have (a) good fields of fire, (b) good routes of ingress, (c) good routes of egress, and (d) good cover and concealment. For purposes of the present analysis, each response to subquestions 2a through 2d was converted into a percentage and then averaged across all four of the subquestions to give a single figure for each evaluator on Question 2 for each event in each trial.

Questions 3 and 4 of Form S-1-3 required that the evaluator estimate the percentage of time during an event that there was mutual support between weapons and platoons, respectively. Question 3 of Form S-1-4 was similar in that it required evaluators to estimate the percentage of time during an event that there was support between units (battalion, company, or platoon, depending upon the level to which the evaluator was assigned).

Finally, Question 13 of Form S-4-9 required that the evaluator provide a rating (using a 5-category scale) of the effect that electronic jamming had on the unit being evaluated.

Those questions which were analyzed, using Fisher's exact probability test, included Questions 2 and 6 of Form S-1-4. Question 2 required that the evaluator answer yes or no as to whether or not the unit covered the most likely avenues of approach in a given event. Question 6 asked whether or not the unit employed support/overwatch positions.

Other questions in the battalion field test called for subjective evaluations on the part of the evaluators, but the small sample size (frequently only two or three) of evaluators precluded any meaningful statistical analysis of the type required. As a result, not all of the evaluators could be studied to determine whether their attitudes

influenced their evaluations. The above analyses, however, include two-thirds (43 of 65) of the evaluators involved in the test on any given trial. This number was considered large enough to permit generalization of results to all of the evaluators as a whole.

Also, the questions that were analyzed were representative of the subjective evaluation questions used throughout the battalion field test. Hence, the assumption was made that the results obtained would also be applicable to other questions in the test.

The analysis of the questionnaire attitude scores showed that the attitudes of many evaluators changed from the first to the second administration of the questionnaire (given between Trials 4 and 5). Therefore, measures of association between evaluator attitude scores and subjective field evaluations were computed, using the attitude scores from the first questionnaire administration for Trials 1 through 4. Attitude scores from the second administration (given just before Trial 5) were used for Trials 5 through 8.

RESULTS

Attitude Change Over Time

The results from the attitude questionnaire are summarized in Table 1. Several points are of interest here. First, over half of the evaluators favored the T-TOE structure on any given administration of the questionnaire. Of more interest, however, is the pattern of responses that emerged as the battalion test progressed.

In October, just before the battalion field test began, 58% of the evaluators favored the T-TOE structure, 36% favored neither TOE structure, and only 6% favored the H-TOE structure. By November (halfway through the battalion test) only 22% of the evaluators favored neither TOE structure over the other. The number of evaluators favoring the H-TOE structure increased to 20%, while the number favoring the T-TOE structure remained constant at 58%. By the end of the battalion test in December, the number of evaluators favoring neither TOE had dropped to 9%, with 21% favoring the H-TOE structure and the majority (71%) favoring the T-TOE structure.

Thus, as evaluator observation time increased, more evaluators came to favor a given TOE over the other, with the majority eventually coming to favor the T-TOE structure over the H-TOE structure. A chi-square test on this data showed that this overall trend was statistically significant ($p < 0.001$).

The magnitude of the preferences for a given TOE structure parallels the above results. Table 1 shows that the average attitude scores became more and more extreme with repeated experience with the two structures. In October, the evaluators who favored the T-TOE structure

Table 1

Number and Percent of Evaluators Who Favored T Series TOE, H Series TOE, or Neither, and Average Attitude Scores for Each Group

TOE structure favored	Time of questionnaire administration					
	October		November		December	
	Number of evaluators	Average attitude score	Number of evaluators	Average attitude score	Number of evaluators	Average attitude score
T-TOE	37 (58%)	+0.61	34 (58%)	+0.78	24 (71%)	+0.93
Neither	23 (36%)	0.00	13 (22%)	0.00	3 (9%)	0.00
H-TOE	4 (6%)	-0.55	12 (20%)	-0.77	7 (21%)	-0.91
Total	64		59		34	
Overall average		+0.32		+0.29		+0.47

had an average attitude score of +0.61. By November this score had increased to +0.78, and in December reached +0.93. There was a similar trend for those evaluators who favored the H-TOE structure, the figures being -0.55, -0.77, and -0.91 for October, November, and December, respectively.

An analysis of variance and test for multiple comparisons (Newman Keuls) on the data showed a statistically significant difference ($p < 0.05$) between each of the three attitude score means in the group that favored the T-TOE structure. No statistically significant differences were found between the three attitude means of the group that favored the H-TOE structure. However, since the sample size of the group favoring the H-TOE structure was very small, it was more difficult to achieve statistically significant differences, unless the obtained differences were larger. In the present situation it seems reasonable to assume that the obtained differences were representative of real differences because of the similarity in trend between the two groups of evaluators.

Finally, the overall average score for the initial (pretest) administration was .32, favoring the T-TOE series. The score for the second administration remained approximately the same (.29), while the score for the last administration was .47, still favoring the T-TOE series.

Thus, two trends emerged from the data: (a) with repeated observation of the two TOE structures in the battalion field test, more and more evaluators took a position favoring either the T-TOE or H-TOE structure, with the majority of evaluators always favoring the T-TOE structure; and (b) attitude scores became more and more extreme across time for evaluators who favored the T-TOE structure as well as for those who favored the H-TOE structure.

Relationship Between Attitudes and Field Evaluations

The Spearman rank order correlation coefficients that were calculated failed to demonstrate a significant relationship between attitude scores and subjective evaluations in the battalion field test. Only 6 of the 150 coefficients that were calculated were greater than 0.50, and not a single one achieved statistical significance at the 0.05 level of probability. The above results do not provide a basis for concluding that a relationship existed between pretest or pretrial evaluator attitudes toward a given TOE and evaluator field test subjective evaluations.

Similar results were obtained for the evaluations that were analyzed by using Fisher's exact probability test. Out of 76 such analyses that were run, only 3 reached statistical significance at the 0.05 level of probability. This figure is no more than one would

expect to obtain by mere chance alone, thus indicating a lack of association between evaluator attitudes and evaluator ratings of TOE structures.

CONCLUSIONS

The primary purpose of this project was to determine whether or not individuals who served as evaluators in the battalion field test had positive or negative attitudes toward the TOEs which they were evaluating and, if so, to determine how much these attitudes influenced their subjective ratings of the TOE structures during the battalion field test.

The first question was answered in the affirmative: Evaluators did, indeed, have positive as well as negative attitudes toward the two TOE structures being tested. A little more than half of the evaluators favored the T-TOE structure at the beginning of the test, and this proportion had increased to 71% by the time the test was terminated. At the same time, the magnitude of favor toward the T-TOE structures shown by these evaluators became greater and greater as the test progressed. The proportion of evaluators who favored neither TOE steadily declined throughout the test, while the proportion of evaluators who favored the H-TOE structure steadily increased from an initial 6% until it reached 21% at the end of the test. The magnitude of favor toward the H-TOE structure increased in this group also as the test progressed. In short, more and more evaluators came to adopt attitudes favoring one TOE over the other during the progress of the field test, and these attitudes became more and more extreme during the test.

The second question was answered in the negative: Evaluator attitudes were not shown to influence the ratings that were given in subjective areas of the test. Essentially no statistically significant relationships were found in the above analyses. Thus, any differences that might have occurred in evaluator ratings in the battalion field test cannot be said to be a function of pretest or pretrial attitudes that evaluators held toward a given TOE, at least as measured by the instrument developed for use on this project.

APPENDIX A
DIVISION RESTRUCTURING STUDY (DRS)
OPINION SURVEY
(FORM A)

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DATA REQUIRED BY THE PRIVACY ACT OF 1974

TITLE: DRS Opinion Survey

PRESCRIBING DIRECTIVE: AR 70-1

AUTHORITY: 10 USC Sec 4503

PURPOSE(s): The data collected with the attached form are to be used for research purposes only.

This is a data collection form developed by the U.S. Army Research Institute for the Behavioral and Social Sciences pursuant to its research mission as prescribed in AR 70-1. When identifiers (e.g., name) are requested they are to be used for administrative and statistical control purposes only. Full confidentiality of the responses will be maintained in the processing of these data.

Opinions of TOE Structures

NAME _____

RANK _____

Please answer the following questions as accurately and as honestly as you can. For each question, circle the letter in front of the answer that best represents your opinion at the present time.

Remember that Army units are currently organized according to the H series TOE, while the restructured units will be organized according to a T series TOE.

1. Which type of TOE structure (H series TOE or T series TOE) do you think has better combat maneuver capabilities?
 - a. H series is much better.
 - b. H series is better.
 - c. There is no difference between H series and T series.
 - d. T series is better.
 - e. T series is much better.
 - f. Don't know.

2. Which type of TOE structure do you think is better organized for combat support (to include mortars, artillery, ADA, engineers)?
 - a. H series is much better.
 - b. H series is better.
 - c. There is no difference between H series and T series.
 - d. T series is better.
 - e. T series is much better.
 - f. Don't know.

3. Which type of TOE structure do you think has the better combat service support system (to include administration, supply, maintenance, medical support)?
 - a. H series is much better.
 - b. H series is better.
 - c. There is no difference between H series and T series.
 - d. T series is better.
 - e. T series is much better.
 - f. Don't know.

4. Which type of TOE structure do you think provides for better command and control?
 - a. H series is much better.
 - b. H series is better.
 - c. There is no difference between H series and T series.
 - d. T series is better.
 - e. T series is much better.
 - f. Don't know.

5. Which type of TOE structure do you think is better in overall combat effectiveness?

- a. H series is much better.
- b. H series is better.
- c. There is no difference between H series and T series.
- d. T series is better.
- e. T series is much better.
- f. Don't know.

APPENDIX B

Questions from the Maneuver Battalion field test which required subjective evaluations and were included as part of the analysis of the present report.

Questions from Battalion Field Test Data Collection Form S-1-3.
(Platoon and company evaluators completed this form for each event).

1. How many weapon positions (TOW's and tanks only) did you observe during this event?

TOW's _____ Tanks _____

2. How many weapon positions (TOW's and tanks only) did you observe during this event that:

- a. Did not have good fields-of-fire?

TOW's _____ Tanks _____

- b. Did not have good routes of ingress?

TOW's _____ Tanks _____

- c. Did not have good routes of egress?

TOW's _____ Tanks _____

- d. Did not have good cover and concealment?

TOW's _____ Tanks _____

3. What was the estimated percent of time during this event that there was mutual support between weapons? (Check one)

80 - 100 percent of the time _____
60 - 79 percent of the time _____
40 - 59 percent of the time _____
20 - 39 percent of the time _____
Less than 20 percent of the time _____

4. What was the estimated percent of time during this event that there was mutual support between platoons? (Check one)

80 - 100 percent _____
60 - 79 percent _____
40 - 59 percent _____
20 - 39 percent _____
Less than 20 percent _____

Questions from Battalion Field Test Data Collection Form S-1-4.
(This form was completed by O & I, company, and platoon evaluators
for each event).

2. Did the unit cover the most likely avenues of approach?

_____ Yes _____ No

If no; explain _____

3. What was the estimated amount of time during an event that there
was support between units? (Check one)

80 - 100 percent of time _____
60 - 79 percent of time _____
40 - 59 percent of time _____
20 - 39 percent of time _____
Less than 20 percent of time _____

6. Did the unit employ support/overwatch positions?

_____ Yes _____ No

If no, explain _____

Questions from Battalion Field Test Data Collection Form S-4-9.
(Company and platoon evaluators used this form to report the effects
of jamming).

13. Provide a rating of the jamming on the unit you evaluated.

Very high interference _____

High interference _____

Moderate interference _____

Low interference _____

No interference _____