

Technical Report 1072

An Examination of Training Issues Associated with the Virtual Training Program

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September 1997

19980311 045



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REPORT DOCUMENTATION PAGE

1. REPORT DATE (dd-mm-yy) 1997, September			2. REPORT TYPE Final		3. DATES COVERED (from... to) August 1996-August 1997		
4. TITLE AND SUBTITLE An Examination of Training Issues Associated with the Virtual Training Program					5a. CONTRACT OR GRANT NUMBER		
					5b. PROGRAM ELEMENT NUMBER 0603007A		
6. AUTHOR(S) Theodore M. Shlechter (ARI), Scott B. Shadrack (Western Kentucky University), David W. Bessemer (ARI), and James Anthony (University of Louisville)					5c. PROJECT NUMBER A793		
					5d. TASK NUMBER 2124		
					5e. WORK UNIT NUMBER H01		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Research Institute for the Behavioral and Social Sciences ATTN: TAPC-ARI-IK 5001 Eisenhower Avenue Alexandria, VA 22333-5600					8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Research Institute for the Behavioral and Social Sciences 5001 Eisenhower Avenue Alexandria, VA 22333-5600					10. MONITOR ACRONYM ARI		
					11. MONITOR REPORT NUMBER Technical Report 1072		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.							
13. SUPPLEMENTARY NOTES Scott B. Shadrack is a graduate student at Western Kentucky University working as a consortium fellow at the U.S. Army Research Institute's Fort Knox Research Unit. James Anthony is a graduate student at the University of Louisville who worked as a consortium fellow at the U.S. Army Research Institute's Fort Knox Research Unit.							
14. ABSTRACT (Maximum 200 words): The present research effort was designed to examine the effects of units' home-station preparation upon their Virtual Training Program (VTP) activities. Also examined were the effects of the VTP upon units and unit leaders who had previously been through this training program. This investigation involved having unit leaders from platoons complete questionnaires on their preparation and sense of confidence in their own and their unit's tactical proficiency. Also, the VTP instructors completed questionnaire items on the participants' performance and level of preparation. Findings from both assessments provided further evidence for the VTP's instructional value. The participants' questionnaire responses indicated that the VTP had a significant, though modest, impact upon VTP-experienced unit leaders' sense of confidence in their own and their unit's tactical proficiency. The instructors' data suggested that the VTP had a salient effect upon the tactical skill proficiency of the sampled unit leaders. Their data also showed that home-station preparation did have an impact upon the training participants' VTP performance, and that many units were unprepared for their VTP rotation.							
15. SUBJECT TERMS Armor Training Training Methods Simulation-Based Training Simulation Networking							
16. REPORT Unclassified			17. ABSTRACT Unclassified		18. THIS PAGE Unclassified		19. LIMITATION OF ABSTRACT Unlimited
					20. NUMBER OF PAGES 71		21. RESPONSIBLE PERSON (Name and Telephone Number)

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September 1997

**Army Project Number
2O363007A793**

Training Systems and Education

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FOREWORD

Post cold war pressures upon the U.S. military forces have led to the development of innovative instructional programs to train their personnel in a timely, cost-efficient manner. One such program is the Virtual Training Program (VTP). The VTP was established at Fort Knox, Kentucky with the intended goal of providing mounted vehicle (e.g., armor and mechanized infantry) units with intensive, time-compressed training experiences.

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI), the Advanced Research Projects Agency, the National Guard Bureau, and the U.S. Army Armor Center and Fort Knox joined efforts (Memorandum of Agreement entitled "National Guard Armor Simulation Center," April 1993) to develop and implement the VTP. The ARI Armored Forces Research Unit at Fort Knox accomplished training research and development for the VTP through a series of contract efforts as part of Research Task 2124, "Strategies for Training and Assessing Armor Commanders' Performance with Devices and Simulations (STRONGARM)."

The present research effort was designed to examine the effects of units' home-station preparation upon their VTP activities. Also examined were the effects of the VTP upon units and unit leaders who had previously been through this training program. This investigation involved having VTP participants complete questionnaires on their preparation and sense of confidence in their own and their unit's tactical proficiency. Also, the VTP instructors completed questionnaire items on their observations of participants' performance and level of preparation.

The information in this report has been provided to training developers and instructors in the 16th Cavalry Regiment at Fort Knox. It will also be useful to personnel involved in the development and implementation of structured simulation-based instructional programs for future simulation systems, such as the Close Combat Tactical Trainer (CCTT).

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ACKNOWLEDGMENTS

The authors would like to thank the following people from the Virtual Training Program's Observer Controller (OC) team-- Major Jerome Hawkins, Major Martin Leppert, Sergeant First Class Derrick Best, Sergeant First Class Richard Nulls, Sergeant First Class David Valez, Mr. David Harper, and Mr. Brady Polston--for their invaluable assistance on this project.

AN EXAMINATION OF TRAINING ISSUES ASSOCIATED WITH THE VIRTUAL TRAINING PROGRAM

EXECUTIVE SUMMARY

Research Requirement:

Post cold war pressures upon the U.S. military forces have led to the development of innovative instructional programs to train their personnel in a timely cost-efficient manner. One such program is the Virtual Training Program (VTP). The VTP has been established at Fort Knox, KY with the intended goal of providing mounted vehicle (e.g., armor and mechanized infantry) units with intensive time-compressed training experiences.

This research effort was designed to examine the following issues associated with the VTP: (a) the impact of units' home-station preparation upon their VTP performance; (b) the VTP's value for helping unit leaders to become tactically proficient; and (c) the VTP's impact on the tactical skill development of VTP participants who had previously been through it.

Procedure:

This investigation was comprised of two distinct assessments--Assessment A and Assessment B. Assessment A consisted of sampling 124 leaders (35 Platoon Leaders, 31 Platoon Sergeants, and 58 Vehicle Commanders) from units who completed their VTP training between September 1996 and January 1997. Eighty-eight (71%) participants claimed to have had prior VTP experience; thirty-two (26%) participants professed to be first-time VTP users. (Four participants did not indicate if they had previous VTP experience or not.)

Participants completed a pre-training questionnaire and post-training questionnaire. These questionnaires required the participants to provide information concerning various aspects of their unit's preparation (e.g., time spent rehearsing the missions) and the perceived instructional value of this activity. Also assessed was the participants' sense of confidence in their own and their unit's tactical proficiency.

Assessment B consisted of 28 reports by members of the VTP's instructional team (observer controllers) concerning the unit leaders and units who were sampled in Assessment A. These reports were in the form of responses to questionnaire items pertaining to the unit leaders' and units' performance on their first and last VTP exercises. This questionnaire also included items concerning other aspects of the VTP participants' rotation, such as their level of preparation and number of completed exercises.

Findings:

Findings from both assessments provided support for the VTP's instructional value. Assessment A's data showed that the VTP had a significant, though modest, impact upon VTP-experienced unit leaders' sense of confidence in their own and their unit's tactical proficiency. In Assessment B, the observer controllers indicated that the VTP had a salient effect upon the tactical skill proficiency of the sampled unit leaders. Assessment B's data also showed that home-station preparation did have an impact upon the training participants' VTP performance, and that many units were poorly prepared for their VTP rotation.

This investigation's findings thus suggest a need for fine-tuning the procedures associated with units' VTP preparation. A corresponding finding was that the sampled participants tended to prepare for their VTP tables in one of three ways (modes)--"site preparation," "general tactical preparation," and "table specific preparation." This investigation's data also suggest that units should discuss the list of critical tasks associated with their VTP rotation before coming to the VTP site.

Utilization of Findings:

This report has ramifications for military trainers, evaluators, and instructional designers. Further empirical support has been provided for incorporating structured simulation-based instructional programs (e.g., the VTP). In addition, instructional personnel need to help training participants to devise the most effective strategy for preparing at their home station to use such training programs as the VTP.

AN EXAMINATION OF TRAINING ISSUES ASSOCIATED WITH THE VIRTUAL TRAINING PROGRAM

CONTENTS

	Page
THE VTP	1
Rationale for the VTP	1
Instructional Framework	1
Instructional Effectiveness	3
Issues Associated with the VTP's Effectiveness	4
OVERVIEW OF THIS INVESTIGATION	5
Objectives	5
Research Strategy	6
ASSESSMENT A: VTP PARTICIPANTS' SELF-REPORTS	7
Method	7
Results and Discussion	9
Closing Comments about Assessment A	16
ASSESSMENT B: THE OCS' REPORTS	17
Method	17
Results and Discussion	19
Closing Comments about Assessment B	21
CONCLUSIONS AND IMPLICATIONS	22
REFERENCES	27
APPENDIX A. ACRONYMS and ABBREVIATIONS	A-1
B. GLOSSARY OF KEY TERMS ASSOCIATED WITH THE VIRTUAL TRAINING PROGRAM	B-1
C. ASSESSMENT A: DEMOGRAPHIC INFORMATION	C-1
D. ASSESSMENT A: PRE-TRAINING QUESTIONNAIRE	D-1
E. ASSESSMENT A: POST-TRAINING QUESTIONNAIRE	E-1

CONTENTS (continued)

	Page
F. ASSESSMENT A: PSYCHO-METRIC PROPERTIES OF QUESTIONNAIRES	F-1
G. ASSESSMENT A: RESULTS ASSOCIATED WITH THE PRELIMINARY FACTOR ANALYSIS	G-1
H. ASSESSMENT A: RESULTS OF DATA ANALYSES ON THE PARTICIPANTS' CONFIDENCE SCORES	H-1
I. ASSESSMENT A: FINDINGS NOT PRESENTED IN THE BODY OF THE TEXT	I-1
J. ASSESSMENT B: THE OBSERVER CONTROLLER QUESTIONNAIRE	J-1
K. ASSESSMENT B: FINDINGS NOT PRESENTED IN THE BODY OF THE REPORT	K-1

LIST OF TABLES

Table 1. Participants' scores on the pre-training, post- training, and future training confidence items	10
2. The structure of the site preparation, general tactical, and specific table modes of preparation	11
3. Summary of participants' post-training opinions about value of VTP instructional components	12
4. Summary of participants' post-training opinions about the amount of time taken for the preparatory activities	12
5. Summary of participants' pre-training estimates about the amount of time taken for preparatory activities	13
6. Summary of participants' responses to pre-training items on use of equipment	14
7. Summary of participants' scores on the confidence items by their prior VTP experience	16
8. Summary of the OCs' performance ratings	19
9. Summary of OCs' ratings about influences of different factors upon participants' performance	21

AN EXAMINATION OF TRAINING ISSUES ASSOCIATED WITH THE VIRTUAL TRAINING PROGRAM

Post cold war pressures upon the U.S. military forces have led to the development of innovative instructional programs to train their personnel in a timely cost-efficient manner. One such program is the Virtual Training Program (VTP). The VTP was established at Fort Knox, KY with the intended goal of providing mounted vehicle (e.g., armor and mechanized infantry) units with intensive time-compressed training experiences.

The VTP

Rationale for the VTP

The provision of intensive time-compressed training to mounted vehicle units is increasingly important because of the costs associated with operating equipment in the field. For example, the cost of operating a tank is increasing in terms of fuel, ammunition, and environmental impact.

In addition, some Army units have limited training time. Army National Guard (ARNG) units, for example, drill only one weekend per month, and only a portion of these hours is set aside for training. Since ARNG units have become an increasingly significant element of post cold war combat power, they need training opportunities which would help them reach a level of tactical proficiency comparable to that of an active Army unit.

Instructional Framework

To achieve the VTP's previously stated intended goal, the VTP is comprised of: (a) the available high technology training systems at Fort Knox, KY; (b) a structured set of exercises (tables); and (c) a dedicated cadre of instructors (referred to as observer controllers (OCs)). Another important aspect of the VTP is the units' home-station preparation for their VTP rotations. These instructional components are discussed in the following sections. Additional information about the VTP can be found in: (a) Burnside, Leppert, & Myers, 1996; (b) C. H. Campbell, R. C. Campbell, Sanders, & Flynn, 1995; (c) Shlechter, Nesslerode, Bessemer, & Anthony, 1995; (d) Shlechter, Kraemer, Bessemer, Burnside, & Anthony, 1996; and (e) Turecek, C. H. Campbell, Myers, & Garth, 1995.

Training systems. The VTP utilizes the Simulation Networking (SIMNET) and Janus training systems. Because the vast majority of VTP exercises are conducted on SIMNET, the VTP activities associated with this system are the focus of the present report. More detailed information about these systems can be found in Elliott, Sanders and Quinkert, 1996 and Garvey, and Radgowski, 1988.

The SIMNET system, which is used mainly to support platoon

(PLT)-level and company (CO)-level training, involves the integrated use of combat simulators (e.g., M1 tanks) with combat emulation (e.g., opposing forces) and combat support simulations. The simulators operate under constraints similar to those found in battlefield conditions. For example, fuel consumption for the M1 tank simulators approaches the consumption rates predicted for an M1 tank under actual combat conditions. The SIMNET is thus considered to be a virtual training system.

The SIMNET environment at Fort Knox also contains 13 OC workstations. These stations include a plan view display (two-dimensional electronic map), tactical radios, stealth vehicle display (three-dimensional view of the virtual battlefield), and audiovisual recording and replay equipment. The stealth vehicle, for example, provides a direct view of the battlefield from an invisible vehicle moving on or above the virtual terrain.

Instructional tables. Approximately one hundred PLT and CO training tables have been created. Each table consists of a preparation phase, an execution phase, and an after-action review (AAR), and is designed to be conducted in about two hours. The participating units should spend one-half hour on preparing for the mission, one hour on executing the mission, and another half hour on participating in an AAR of the exercise. A unit's trip to the VTP facility generally lasts two days. A rotation usually consists of practice on a familiarization (fam) course and a set of approximately four to six VTP tables.

The VTP tables have been structured so that units perform actions (critical subtasks) associated with specific training objectives and cues. Examples of critical subtasks include: (a) reaching the starting point on time; (b) executing fires when the enemy crosses the trigger line; and (c) conducting displacement as directed. Hence, the VTP tables are geared toward having the training units practice their tactical skills repeatedly.

A unit's VTP training is also designed to follow a crawl-walk-run sequence of learning. That is, the later tables for a rotation should be more difficult and demanding than the earlier ones. The OC is consequently supposed to provide less coaching/mentoring as the unit progresses through the training tables.

The OC team. The OC team is staffed with approximately 20 military personnel, ranging in rank from Sergeant First Class to Lieutenant Colonel (LTC). This team also includes approximately 11 exercise controllers (ECs), who are civilian government employees. The ECs are primarily responsible for operating the OC workstations, troubleshooting problems with the simulators, and assisting the OCs with conducting the VTP training.

An OC is responsible for: (a) providing the unit with a preview of each table; (b) monitoring the unit's table execution; and (c) facilitating the AARs. He also role-plays a unit's higher headquarters. For example, an OC for a PLT-level table

would be the unit's CO CDR. These activities occur at the OC's workstation. An OC is also responsible for completing a unit's Take Home Package (THP). This package, which is sent to the unit's home station, consists of the OC's observations concerning the unit's performance on the different critical subtasks. The THP should then be used to help the unit prepare for subsequent VTP rotation(s) or other training events.

VTP preparation. In addition to completing the THPs, the OC staff helps units to prepare for their VTP rotation by visiting them at their home station. During such visits, units are provided with all required training support materials, including overlays and operation orders (OPORDs) associated with their VTP tables. They are also provided with demonstration (demo) tapes that show fictitious units successfully performing selected tasks to a standard level of proficiency. These demo tapes have been produced so that VTP participants can acquire an understanding of the tactical scenarios before coming to the SIMNET facility.

Unit preparation is an important component of the VTP because unprepared units may have trouble with executing their assigned tables. In addition, those unprepared units who have been through the VTP may experience more decay in their tactical skills than their more prepared counterparts. Hence, unprepared units may not be able to take full advantage of this instructional program. (See Appendix B for a description of different VTP preparatory activities.)

Instructional Effectiveness

Shlechter, Nesselroade, Bessemer, and Anthony (1995) used a multimethod-multisource approach to provide empirical information regarding the VTP's instructional effectiveness. Trained observers collected data from nine units; 14 VTP instructors completed standard rating forms regarding the performance of 38 armored force units; and 280 training participants completed Likert-scale items regarding their training experience. Data from the different methods showed that the units further developed their collective tactical skills across the training period. The OCs' ratings, for example, indicated that units had a greater likelihood of becoming more proficient in critical subtasks than either not improving or becoming less proficient.

Shlechter, Kraemer, Bessemer, Burnside and Anthony (1996) obtained further support for the VTP's instructional effectiveness. Twenty-nine members (20 OCs and 9 ECs) of the VTP's original instructional team completed questionnaires and interviews concerning the VTP's instructional structure and proficiency. Most of these participants had been with the OC team for more than a year. They indicated that unit leaders and units became more proficient during the course of their VTP rotation.

The VTP seems to be an effective instructional program for

helping mounted vehicle personnel to develop the skills necessary for tactical proficiency. This conclusion, however, is tentative because of unresolved issues associated with the VTP's effectiveness, which are discussed in the next section.

Issues Associated with the VTP's Effectiveness

Possible problems with VTP preparation. Previous investigations and discussions with OCs and ECs have detected possible problems with units' preparation for their VTP rotations (Shlechter & Anthony, 1995; Schlechter et al. 1996). A majority of the OCs and ECs who were sampled by Schlechter et al. felt that most units were poorly prepared for their VTP rotations. Members of the OC team have suggested that units lose precious SIMNET time by copying overlays and asking the OCs questions about the mission. As indicated previously, units should have already copied their overlays and understood the mission prior to their VTP rotation.

More definitive information is thus needed concerning various aspects of the VTP participants' home-station preparation, such as the time spent rehearsing the VTP missions. Information is consequently needed about the relationship between units' home-station preparation and their VTP performance.

Lack of data concerning leadership skills. A competent mounted vehicle unit--regardless of its echelon--must include a competent leadership team. However, little is known about the VTP's impact on helping participants to develop the tactical skills associated with unit leadership. (A PLT's leadership team in an armor unit consists of a PLT Leader (LDR), a PLT Sergeant (SGT), and the Vehicle Commanders (VEH CDRs) of the two "wingman" tanks. (This designation was based on discussions with members of the OC team.)

Based on discussions with the OC team and reviews of the pertinent literature (e.g., Schlechter & Anthony; 1995; Schlechter, Bessemer, & Kolosh, 1991; Schlechter, Burnside, Anthony, Shadrack, & Zaccaro, 1997; Department of the Army, 1996), the following skills have been determined to be associated with competent PLT (and CO) leadership teams:

1. They must be able to make quick and accurate battlefield decisions.
2. They must be able to make these decisions in relationship to factors of Mission, Enemy, Terrain, Troops, and Time-available (METT-T) (Department of the Army, 1996).
3. In order to use these factors of METT-T, PLT leadership teams must be able to monitor the unit's position in a hostile situation (situational awareness).
4. They must be self-regulated leaders. Such leaders are able

to make decisions on their own, and make decisions that best suit the needs of their unit. Self-regulated PLT leadership teams would then be able to make decisions quickly about the battle situations without having to first check with their CO CDR. They would also be able to select the VTP tables that are most appropriate for their PLT's training needs.

5. Associated with self-regulatory skills comes a belief, termed self-efficacy, in one's capabilities to perform behaviors at designated levels (Bandura, 1986). Bandura has claimed that perceived self-efficacy does not deal with the skills a person has but with judgments of what one can do with one's skills, such as completing VTP tables. Effective PLT leadership teams would then have a high degree of confidence in their and their units' ability to execute tactical tasks, such as actions on contact. (The terms efficacy and confidence are used interchangeably in this report.)

6. A PLT's leadership team must be able to maintain command and control over its unit. This capability includes: (a) establishing the wingman concept; (b) reporting to a higher command; and (c) conducting proper radio-transmission procedures. (These components represent a limited subset of the components associated with this activity.)

The question thus remains--does the VTP help unit leaders to acquire or maintain the above mentioned tactical skills?

Previous VTP experience. Because of practical constraints, the previous VTP evaluations primarily sampled first-time users of this program (e.g., Shlechter, Bessemer, Nesselroade, and Anthony, 1994; Bessemer, Shlechter, Nesselroade, and Anthony, 1995). Questions thus also exist concerning the VTP's impact upon users who had already been through the program. This is an important issue because an instructional program might differentially affect first-time and experienced users (Clark, 1983; Clark & Salamon, 1985; Shlechter, 1986). Clark (1983), for example, argued that participants' enthusiasm for a training program might subside with experience. The VTP could then possibly not be effective for its experienced users, which would consequently limit its instructional effectiveness.

Overview of This Investigation

Objectives

This investigation was designed to examine the following training issues:

1. The impact of units' home-station preparation upon their VTP performance
2. The VTP's value for helping unit leaders to become tactically proficient.

3. The VTP's impact on the tactical skill development of VTP participants who had previously been through it.

As discussed, information collected during this investigation is expected to help answer questions about the VTP's training value. The collected information could then help determine the need for and ways of fine-tuning this program.

Research Strategy

These objectives were examined through VTP participants' self-reports concerning their VTP preparation and performance. This examination also included obtaining reports from OCs concerning various aspects of the participants' VTP rotation.

This research strategy was based upon the previously discussed multimethod-multisource approach used by Shlechter et al. (1995). They found that this approach circumvented problems with conducting research at the VTP. An especially salient problem was that experimental designs could not be conducted because the OCs had indicated that conducting an evaluation with experimental controls would encroach upon the training program. Data concerning the activities of VTP participants had then to be collected by such naturalistic methodologies as observations by the evaluators, self-reports by the VTP participants, and instructors' ratings of the participants' performance.

Each of these methods is potentially problematic. Observational methods are labor intensive. Questionnaires can be tainted by the participants' inability to report accurately the effects of the training device on their performance (Burnside, 1982; Herrmann, 1982). Instructor ratings may be contaminated by the expectations or biases held by the instructors (Cook & Campbell, 1979). Shlechter et al. (1995) have thus found that areas of agreement among techniques strengthens the validity of the results obtained by any single technique.

Two additional points must be made about this research effort's data collection techniques. One, Shlechter et al.'s (1995) findings suggested that sampling different sources (i.e., VTP participants and their OCs) provided an in-depth understanding of the effects of VTP preparation upon participants' performance by yielding insights into this issue from complementary perspectives. Two, resource constraints prevented the evaluation team from observing the participants' VTP activities. (See Shlechter, Nesselroade, Bessemer & Anthony, 1995 for further information about the multimethod-multisource evaluation technique.)

Assessment A: VTP Participants' Self-Reports

Method

Participants. Questionnaire data were obtained from 124 participants (35 PLT LDRs, 31 PLT SGTs, and 58 VEH CDRs) from ARNG units who completed their VTP training between September 1996 and January 1997. These participants represented 44 units--20 armor PLTs; 17 mechanized/scout PLTs; and 7 armor COs. (CO-level personnel were excluded from this sample because data were obtained from only one CO commander (CDR) and two CO executive officers.) Approximately 87% (108/124) of these participants indicated that their VTP duty position was the same as their normal duty position.

Eighty-eight (71%) participants claimed to have had prior VTP experience; thirty-two (26%) participants professed to be first-time VTP users. (Four participants did not indicate if they had had previous VTP experience or not.) The 88 experienced participants included 21 PLT LDRs, 27 PLT SGTs, and 40 VEH CDRs. (Preliminary data analysis showed that the relative proportion of VTP experienced participants was the same for the PLT LDRs, PLT SGTs, and VEH CDRs.) In addition, 90% (40/44) of the units had at least one person claiming to have had previous VTP experience. (See Appendix C for further information about the participants' background.)

Instruments. Two instruments--a pre-training questionnaire and a post-training questionnaire--were developed for this assessment. The developmental process for these instruments involved working closely with an OC and an EC. Based on their comments, items were written and--if needed--rewritten. After the OC and EC were satisfied with the instruments, the items were administered to a pilot group of VTP participants. Items found to be problematic were either rewritten or discarded. These instruments are presented in Appendixes D and E. (Appendix F contains information about their psycho-metric properties.)

The pre-training questionnaire contains sections on:

1. Unit (VTP) Preparation. This section contains four sets of items dealing with the: (a) types of equipment found at units' home stations; (b) time spent by the units on discussing or viewing preparation materials; (c) time spent by the units on rehearsing offensive and/or defensive tables; and (d) respondents' opinions about the amount of time spent at their home station, such as too little or too much time spent at their home station copying the overlays. There are also two items which deal with the participants' self-regulatory skills (i.e., their input in choosing the VTP tables).

2. Expected Improvement. This section consists of two Likert-scale items concerning a respondent's opinions about the degree of expected improvement in his leadership skills and his unit's

performance during the course of this rotation. The scale for these items ranges from 0-10 with zero representing very little improvement and 10 meaning very large improvement.

3. Confidence Items. This set is comprised of 27 items pertaining to a respondent's sense of confidence in his: (a) ability to perform unit leadership tasks; (b) unit's ability to complete basic offensive and defensive tasks--tasks with minimal enemy contact; and (c) unit's ability to perform more difficult offensive and defensive tasks--tasks associated with increased enemy contact. For each item, respondents are required to estimate their confidence level on a numerical scale ranging from 0-10 with zero equaling very little confidence and 10 representing very confident. This scale has been based on previously developed efficacy questionnaires (Pajares, 1996.)

4. Demographic Information. This section contains 14 items concerning the respondents': (a) military experience; (b) VTP experiences, including duty position(s) for their previous VTP rotations; and (c) other tactical training experiences, such as their National Training Center experience.

The post-training questionnaire contains sections on:

1. Performance Improvement Items. For these two items, a respondent is required to indicate the degree of improvement in his leadership skills and his unit's performance which occurred during the course of the rotation. The scale for these items is identical to the scale used for the expected improvement items.

2. Confidence Items. The same confidence items and scale as discussed for the pre-training questionnaire was utilized; except that these items' stems have been written in the present tense.

3. Future VTP Performance Items. The same set of confidence items used previously, except that a respondent is to answer these items as if his next VTP rotation would be held in six months without any intervening practice.

4. Items on the VTP Instructional Process. This section contains four sets of items dealing with the participants': (a) perceived input in choosing the VTP tables; (b) opinions about the amount of time spent at their home station; (c) opinions about the instructional value of various components of the VTP (e.g., preparation at their home station); and (d) ratings of various components of the VTP, such as the AARs.

Data collection procedures. Participants completed the questionnaires during two one-half hour sessions. The pre-training questionnaires were group administered to the participants prior to their first table; the post-training questionnaires were group administered to the participants as close as possible to their last table.

The OC team was responsible for administering the questionnaires. They insisted on collecting the data so that this investigation would not interfere with the participants' VTP training. Two Army Research Institute (ARI) personnel--a research psychologist and a graduate student intern--provided detailed instructions concerning the procedures for administering the questionnaires. The research psychologist also observed the first few data collection sessions.

All ethical guidelines prescribed by ARI and the American Psychological Association (APA) were followed. Participants were informed that their responses were to be used for research purposes only. In order to match the participants' pre-training questionnaire with their post-training questionnaire, they were instructed to put the last four digits of their social security number on both questionnaires.

Data analyses. Data analyses for this assessment were computed through the use of the Statistical Package for the Social Sciences (SPSS) for Windows (Norusis, 1993a & 1993b). Two ARI personnel, working independently, entered data into the SPSS program. Data entry was based upon a pre-determined scoring scheme. The accuracy of the entered data was jointly checked by the two ARI personnel.

Three caveats must be made about the data analysis. One, the participants' confidence scores for the defensive tables were not analyzed as only one unit completed any defensive tables. Two, data for the confidence items were excluded from the analysis for participants who did not respond to: (a) five or more of the seven items for the leadership tasks set and (b) three or more of the five items for each offensive tasks set. Three, the initial analyses of these data involved deriving a composite preparation activity score(s) per participant. A factor analysis was thus computed on the participants' responses to the pre-training items on the amount of time spent per activity. (See Appendixes G and H for more information about these data analyses.)

Results and Discussion

The data presented in Table 1 show that the VTP had a modestly positive impact upon the participants' scores on the confidence items (see Table G-4). This finding is discussed in relation to the participants': (a) home-station preparation; (b) leadership skills; and (c) previous VTP experience.

Table 1

Participants' Scores on the Pre-Training, Post-Training, and Future Training Confidence Items

Tasks	Pre-Training Items	Post-Training Items	Future Training Items
Leadership			
Mean	6.30	6.87	6.94
Standard Deviation	1.19 (<u>n</u> =107) ^a	1.08 (<u>n</u> =107)	1.01 (<u>n</u> =105)
Basic Offensive			
Mean	6.25	6.75	6.96
Standard Deviation	1.17 (<u>n</u> =107)	1.11 (<u>n</u> =107)	1.08 (<u>n</u> =107)
More Difficult Offensive			
Mean	5.54	6.29	6.50
Standard Deviation	1.30 (<u>n</u> =107)	1.16 (<u>n</u> =107)	1.30 (<u>n</u> =104)

Note. Comparison of interest analyzed (Table G-4) is the participants' composite scores for their pre-training items versus their composite scores for the post-training items.

^an is less than 124 because of the rule used to handle missing data (see discussion of data analyses on page 9)

Home-station preparation. The preliminary factor analysis revealed three distinct modes of preparing for a VTP rotation-- "site preparation," "general tactical preparation," "table specific preparation." The structure of the different preparation modes is presented in Table 2. However, these preparation modes were not predictive of any statistically significant changes in the participants' scores on the confidence items (see Table G-3). Home-station preparation might not have had a salient impact upon the participants' ability to complete the VTP tables.

Table 2

The Structure of the Site Preparation, General Tactical, and Specific Table Modes of Preparation

PREPARATION ACTIVITIES	TYPES OF PREPARATION		
	Site	General	Specific
Discussing OPORDS		X	X
Discussing/Copying Overlays	X		X
Discussing Maps	X		X
Viewing Demo Tapes	X		
Discussing Simulator (Sim) Manuals	X		
Discussing Task Lists	X	X	
Discussing Unit Standard Operating Procedure (SOP)		X	
Discussing Tactical Concepts		X	
Reviewing the THPs	X		
Conducting Rock Drills	X		X

Note. See Appendix B for a description of these activities. Discussing OPORDS accounted for 32.7 of the variance associated with this graphic; copying overlays and discussing maps explained 15.8% and 11.9% of the variance, respectively.

This speculation is supported by the participants' responses to items concerning the relative instructional value of home-station preparation. Home-station preparation was viewed as useful while the fam course, table previews, table execution, OC coaching, and AARs were viewed as either very or extremely useful activities (see Table 3). Furthermore, home-station preparation was ranked lower with regards to instructional value than were the fam course, table preview procedure, table execution, and the AARs. Perhaps the cited findings concerning the negligible impact of home-station preparation were the results of the units' being poorly prepared for their VTP rotations. Poorly prepared units would probably not give much credence to the instructional value of preparing for their VTP rotation.

However, inconclusive results were obtained regarding the participants' opinions about the amount of time spent on the different preparation activities. As documented in Table 4, they tended to feel that the appropriate amount of time was spent discussing the OPORDS, copying overlays and conducting rehearsals. (The participants' pre-training questionnaire responses indicated that they did not initially feel that enough time was spent on discussing the OPORDS; see Table I-1.) They have accordingly claimed to have spent a sizable portion of their preparation time in these two activities (see Table 5).

Table 3

Summary of Participants' Post-Training Opinions about Value of VTP Instructional Components (n=124)

VTP Activities	Median ^a	Mean	Mode ^b
OC Advance Visits	1.00	1.77	1.00
Home-Station Preparation	3.00	2.72	3.00
Fam Course	3.50	3.27	4.00
THPs	1.00	1.73	1.00
Table Previews	4.00	3.40	4.00
Table Execution	4.00	3.56	4.00
OC Coaching	4.00	3.54	4.00
AARS	4.00	4.10	4.00

Note. Items were scored as follows: 1 = not received/done; 2 = not useful; 3 = useful; 4 = very useful; 5 = extremely useful.

^aMedian refers to the mid-point score; ^bMode refers to the most frequent score.

Table 4

Summary of Participants' Post-Training Opinions about the Amount of Time Taken for the Preparatory Activities

Preparation Activities	n ^a	Frequency of Not Received Responses	Median	Mean	Mode
Discussing OPORDs	123	12	2.00	1.62	2.00
Discussing/Copying Overlays	124	13	2.00	1.69	2.00
Viewing Demo Tapes	111	69	0.00	0.69	0.00
Discussing Sim Manuals	112	63	0.00	0.76	0.00
Discussing the Task List	112	23	1.00	1.39	1.00
Reviewing the THPs	107	72	0.66	0.00	0.00
Conducting Rock Drills	112	15	2.00	1.50	2.00

Note. Items scored in the following manner: 0 = not received; 1 = too little time; 2 = about right; and 3 = too much time.

^ans for this table differ from than those for other tables, because a different number of participants completed the different items.

Table 5

Summary of Participants' Pre-Training Estimates about the Amount of Time Taken for Preparatory Activities

Preparation Activities	n ^a	Frequency of Not Received Responses	Median	Mean	Mode
Discussing OPORDs	115	9	4.00	3.86	3.00
Discussing/Copying Overlays	115	2	4.00	3.75	3.00
Discussing Maps	115	11	3.00	3.29	4.00
Discussing Sim Manuals	113	26	2.00	2.23	1.00
Discussing the Task List	111	23	2.00	2.52	1.00
Discussing the Unit's SOP	113	4	4.00	3.65	3.00
Viewing the Demo Tapes	111	30	2.00	1.90	1.00
Discussing Tactical Concepts	112	1	4.00	3.90	5.00
Discussing the THPs	112	36	2.00	2.23	1.00
Doing Rock Drills	114	0	4.00	3.86	5.00

Note. Items scored in the following manner: 1 = not received; 2 = no time; 3 = less than an hour; 4 = 1-2 hrs; and 5 = more than 2 hrs. Discussing Maps, the unit's SOP, and tactical concepts were included because they were a part of the corresponding set of questions, however, they were not a part of the question set associated with Table 4.

^ans for this table differ from than those for other tables, because a different number of participants completed the different items.

However, most participants did not receive or spent little, if any, time discussing the THP(s), viewing demo tapes, and discussing task lists (see Tables 4 and 5). A closer inspection of Table 4's data revealed that 63% (54/88¹) of the experienced respondents did not receive a THP to review. An additional 20% (18/88) of them indicated that they spent too little time reviewing the THP, which might be another indication that they did not receive this material. The experienced participants should have been able to review the THP(s) of their previous VTP rotation(s). As previously noted, the THPs of all previously trained units were sent to their higher commands. Perhaps then, most of these higher-level CDRs did not send the THPs to their units.

The results concerning the THPs, demo tapes and task lists raise questions with the quality of the participants' home-station preparation. Reviewing the THP(s) is considered to be an integral element of the VTP's instructional process. This activity should help the sampled participants become more aware of their and their unit's tactical deficiencies. The accompanying rock drills should then be geared toward practicing

¹ The number 88 represents the total number of experienced VTP participants.

those weak points. The demo tape(s) should also be used in conjunction with the rehearsals.

The participants' responses to the items concerning materials used at their home station provided further support for the findings concerning their preparation activities. Sixty-one percent of the participants maintained that they have utilized sand tables in preparing for their VTP rotation (see Table 6). Units tended to utilize sand tables when conducting rock drills. Conducting a rock drill usually involves discussing OPORDs and discussing or copying overlays. Also, 57% of the respondents indicated that they either did not use their home station's videocassette recorder (VCR) or that their home station did not have a VCR. In either case, it seems that these respondents did not view the demo tapes.

Table 6

Summary of Participants' Responses to Pre-Training Items on Use of Equipment

Preparation Activities	n	Frequency of Do Not Have Responses	Median	Mean	Mode
Sand Tables	110	11	3.00	2.48	3.00
Terrain Board	101	26	3.00	2.33	3.00
Overhead Projectors	90	10	1.00	1.84	2.00
Video-Cassette Recorders	90	22	1.00	1.71	1.00
Computers	86	42	2.00	1.65	2.00
Other	37	3	3.00	2.38	3.00

Note. Scoring of items was as follows: 1 = Have at Home But Did Not Use; 2 = Do Not Have at Home; 3 = Used.

Leadership skills. This assessment's data also suggested that the VTP had a positive impact upon the participants' tactical leadership skills. As shown in Table 1, their scores for the leadership tasks were significantly higher for the post-training questionnaire than for the pre-training questionnaire (see Table H-1).

The VTP also helped these participants on their road to becoming self-regulated leaders. As stated, they developed a greater sense of efficacy (confidence) in their and their unit's capabilities during the course of their VTP rotation. In addition, 54% of the respondents felt that they had either a modest or substantial amount of input in choosing to repeat a VTP table; while approximately 90% of them claimed that they had minimal or no input in the initial decision regarding the tables for their VTP rotation. Fifty-eight percent of participants did not know who selected their VTP tables.

Previous VTP experience. Since 71% of these participants

had previously been through this training program, Table 1's data would then indicate that the VTP had a positive effect upon the experienced participants' confidence scores. Furthermore, the experienced and inexperienced participants manifested approximately the same amount of change in their pre-training and post-training confidence scores (see Tables 7 and H-1). The VTP thus apparently has a positive effect upon experienced participants' sense of efficacy.

A scrutiny of Table 7's data revealed that the experienced participants had higher scores on their pre-training questionnaire than did the inexperienced participants. This finding could be a function of the experienced participants' being better prepared than the inexperienced participants. However, as previously reported, unit preparation did not have a significant effect upon the participants' scores on the confidence items.

Perhaps then, the reported differences between the experienced and inexperienced participants demonstrate the VTP's impact upon the participants' skill retention. This possibility is bolstered by the finding of statistically significant positive relationships between the participants' post-training and future training confidence scores (see Table H-2). Thus, the participants are indicating that they will retain to some degree the skills practiced during this rotation for the next six months.

Table 7

Summary of Participants' Scores on the Confidence Items by Their Prior VTP Experience

Tasks	Pre-Training Items	Post-Training Items	Future Training Items
Participants with Prior VTP Experience (<u>n</u> =79)			
Leadership			
Mean	6.48	6.97	7.01
Standard Deviation	1.17	1.01	.95
Basic Offensive			
Mean	6.38	6.77	7.03
Standard Deviation	1.18	1.04	1.03
More Difficult Offensive			
Mean	5.65	6.29	6.98
Standard Deviation	1.26	1.07	1.20
Participants with No Prior VTP Experience (<u>n</u> =26)			
Leadership			
Mean	5.72	6.51	6.68
Standard Deviation	1.19	1.17	1.00
Basic Offensive			
Mean	5.77	6.56	6.55
Standard Deviation	1.52	1.21	1.02
More Difficult Offensive			
Mean	5.28	6.16	6.04
Standard Deviation	1.25	1.36	1.00

Note. Comparison of interest is the participants' composite scores for their pre-training responses versus their composite scores for the post-training items. Total n does not equal 107 (Table 1) because some participants did not indicate whether or not they had previous VTP experience.

Closing Comments about Assessment A

This assessment's data provided further support for the VTP's effectiveness. As discussed, the VTP had a significant, though modest impact, upon experienced unit leaders' sense of confidence in their own and their units' tactical proficiency. In addition, the participants' scores on the improvement items demonstrated that the VTP was more effective than they thought it would be. Means for the individual improvement measure were 6.39 for the pre-training questionnaire and 6.85 for the post-training questionnaire; means for the unit improvement measure were 6.27 for the pre-training questionnaire and 7.09 for the post-training questionnaire.

However, this assessment's data might have been

However, this assessment's data might have been problematic. The participants have, for one thing, overestimated the number of their previous VTP rotations. As shown in Table C-2, 11 participants claimed to have visited the facility more than five times. However, none of these units had been through the VTP for more than four rotations (D. Harper, personal communication, July 21, 1997). Another problem involved inconsistencies in their responses concerning the not received category. For instance, 36 respondents claimed to have not received the THP(s) when asked about the amount of time per activity, while 58 respondents made the same claim vis-a-vis the question on their opinions about the length of time for the various activities. These problems make one leery of reaching any conclusions about the VTP's effectiveness based upon this assessment's data. It must be noted that Assessment A was not intended to furnish any definitive answers concerning the VTP's effectiveness.

This assessment was also not expected to lead to any conclusions concerning the following questions:

1. Are units and their leaders adequately prepared for their VTP rotation? As discussed, this assessment has provided contradictory answers to this question.
2. Does home-station preparation then have an impact upon units' VTP performance? Assessment A's data have suggested that it would not; however, this assessment could only provide an indirect measure of the relationship between units' home-station preparation and their VTP performance.
3. Does the VTP help experienced participants to become more tactically proficient? One could be confident about his tactical abilities without being tactically proficient.

Perhaps B would furnish further insights into these research questions and would consequently provide further information about the VTP's effectiveness. (See Appendix I for information on Assessment A's data that were not described in this section.)

Assessment B: The OCs' Reports

This assessment was based on OCs' reports (sets of questionnaire responses) concerning various aspects of the VTP rotations for Assessment A's sample. Sixteen different OCs participated in this assessment.

Method

Number of reports. Twenty-eight sets of questionnaire responses were obtained for the VTP rotations of: (a) 16 Armor PLTs; (b) 8 mechanized/scout PLTs; and (c) 4 Armor COs. Nineteen of the 28 sets of questionnaire responses were from NCOs; the remaining nine were from officers. Evidently, some of the OCs

for sample A's participants provided data for more than one unit, while some of them did not participate in this assessment. (The OCs for CO-level tables are included, because a preliminary examination of the data revealed that their responses were comparable to those of the OCs for the PLT-level tables.)

Instrument. An OC questionnaire was developed for this assessment (see Appendix J). The process used to develop Assessment A's instruments was also used to develop this assessment's instrument.

This instrument is comprised of the following sections:

1. Performance. For these items, the participants completed two sets of ratings concerning the unit leaders' mastery of leadership tasks and the unit's mastery of basic and more difficult tactical tasks. One set of ratings pertained to the unit's execution of its first table, while the other set pertained to the unit's execution of its last table. Ratings were based upon a 0-10 scale with zero equaling very poor performance and 10 meaning very good performance.
2. Factors Affecting Performance. Respondents completed items regarding the influences of the following factors upon a unit's performance: (a) home-station preparation; (b) coaching by the OC to complete the tables; (c) adaptation to the SIMNET terrain data base; and (d) adaptation to the SIMNET equipment. Estimates were based upon a 0-10 point scale with zero meaning not influential and 10 meaning extremely influential. OCs were also required to make a set of estimates in relation to the observed unit's execution of its first table and its last table.
3. Follow-up Items. This section contained six items pertaining to the following aspects of each observed unit: (a) quality of its preparation; (b) extent to which it brought all the necessary materials (e.g., OPORDs); (c) number and types of tables executed; (d) number of times late for "Readiness Condition 1" (i.e., ready to go); and (e) leaders' input in the decision to repeat a VTP table. Likert-scale and open-ended items were used to examine these issues.

Data collection procedures. Participants were instructed to complete the questionnaire as soon as possible after the observed unit completed the rotation. The completed questionnaires were collected at the OCs' headquarters by an ARI person a day or two later. These procedures also complied with the ethical guidelines set forth by APA and ARI.

Data analyses. This assessment consisted of employing the following analytic procedures used in Assessment A:

1. SPSS was utilized to compute the statistical analyses, including all descriptive analyses (e.g., means).

2. Based upon a pre-determined scoring scheme, two ARI personnel, working independently, entered data into the SPSS program.

3. The accuracy of the data entry was jointly checked by the two ARI personnel.

Results and Discussion

Performance data. As shown in Table 8, the OCs' reports suggested that unit leaders experienced significant improvement in their ability to perform leadership tasks (see Table K-1). In addition, the units became more tactically proficient during the course of their VTP rotation.

The OCs also reported that these units completed 7.04 iterations of tables per rotation, which included 4.69 different types of tables. (These numbers were validated in relation to information provided in the THPs.) Bessemer et al. (1995), who documented the VTP's instructional efficiency, found that units tended to complete 5.5 tables per rotation. Bessemer et al.'s sample consisted, primarily, of first-time VTP users who were not allowed to repeat a table. Hence, this assessment augments Bessemer et al.'s findings concerning the VTP's efficiency by showing that it is efficient for training experienced participants.

Home-station preparation. Positive relationships were found between the OCs' ratings of the unit's level of preparation and Table 8's data (see Table K-2). The OCs indicated that the participants' level of home-station preparation did affect their subsequent VTP performance.

Table 8

Summary of the OCs' Performance Ratings

Tasks	First Table Ratings	Last Table Ratings
Leadership		
Mean	3.87	6.81
Standard Deviation	1.55	1.33
	(<u>n</u> =28)	(<u>n</u> =28)
Basic (Unit)		
Mean	3.59	6.43
Standard Deviation	1.28	1.47
	(<u>n</u> =28)	(<u>n</u> =28)
More Difficult (Unit)		
Mean	3.47	6.31
Standard Deviation	1.35	1.51
	(<u>n</u> =27)	(<u>n</u> =27)

Note. Means that are greater than 2 and less than 4 reflect poor performance; means that are greater than 6 and less than 8 reflect good performance.

A statistically significant positive relationship was also found between the OCs' ratings of unit preparation and the number of different tables executed by the units (see Table K-1). This finding demonstrated that the better prepared units completed more VTP tables than did the more poorly prepared units. The well prepared units were thus more likely to progress to the more difficult tables than were the poorly prepared units. Correspondingly then, further support was provided for the assumption that well prepared units are likely to gain more from their VTP training than are poorly prepared units.

The OCs, however, indicated that a unit's home-station preparation had only a modest impact upon its VTP performance. Home-station preparation received a mean rating in the moderately influential range concerning its influence upon the units' performance for their first few tables. These ratings were substantially lower than the mean ratings for the influences of OC coaching upon the units' VTP performance, which were in the very influential ranges (see Table 9 for these ratings). Coaching then had a more salient impact on the VTP performance of these participants than did their home-station preparation. Of course, an OC would think that his coaching had a salient impact upon the participants' performance.

The finding about the relative impact of coaching could have also been a function of the observed units' being poorly prepared for their VTP rotation. These OCs indicated that 64% (18/28) of the observed units were either poorly prepared or very poorly prepared for their rotation, 14% (4/28) were well prepared, and none of the units was considered to be very well prepared for their rotation. The OCs might then have provided the poorly prepared units with additional "instructions" concerning the VTP tables, such as prompting them to report to their CO CDR, which was a part of their instructional process.

The OCs, however, indicated that the units were adequately prepared with regards to bringing the necessary materials (e.g., overlays) with them to the VTP. According to these OCs, a majority of units (57%-16/28) brought either all or almost all of the necessary materials (e.g., overlays). An additional five units brought most of the requested materials. This finding suggests that the participants' higher headquarters did distribute some materials, such as overlays, to them.

Table 9

Summary of OCs' Ratings about Influences of Different Factors Upon Participants' Performance (n=28)

Factors	Mean	Standard Deviation
	For the First Few Tables	
Preparing at the Home Station	5.07	2.52
Coaching by the OC	6.67	.38
Adapting to The SIMNET Terrain	5.36	1.68
Adapting to the SIMNET Equipment	5.11	1.77
	For the Last Few Tables	
Preparing at the Home Station	4.21	2.25
Coaching by the OC	6.43	2.25
Adapting to The SIMNET Terrain	4.93	2.49
Adapting to the SIMNET Equipment	4.77	2.45

Note. Means that are between 4 and 6 reflect the slightly influential category; means that are between 6 and 8 reflect the very influential category.

Closing Comments about Assessment B

This assessment's data clarified and verified aspects of Assessment A's data. These participants' home-station preparation was found to have an impact upon their VTP performance. Also, the participating units did not seem to be adequately prepared for their VTP rotation.

In addition, the VTP was shown to have a salient effect upon the tactical skill proficiency of the unit leaders and units who were sampled in Assessment A. Regarding this last point, this assessment's data provided further support for Assessment A's findings concerning the VTP and the unit leaders' self-regulatory skill development. Over 80% (21/26 with two OCs claiming that the observed units did not repeat a table) of these OCs claimed that the unit leaders had either a modest or substantial amount of input in the decision to repeat a table.

However, this assessment's data called into question Assessment A's data concerning skill retention and the VTP. As reported, the sampled unit leaders and units received poor ratings for their performance on their first table by the OCs.

Shlechter and his colleagues (Shlechter et al. 1994; Schlechter, 1996) have suggested that most units reach an intermediate level of tactical proficiency by the end of their VTP rotation. The cited initial ratings for these (mostly) experienced VTP participants could thus represent a decay in their tactical skill capabilities since completion of their preceding VTP rotation.

Conclusions and Implications

As discussed, this investigation's data suggest the following points about the VTP:

1. Units' home-station preparation has an impact upon their subsequent VTP performance. This impact, however, may not be as obvious as other VTP components or factors, such as OC coaching.
2. The VTP has a salient impact upon unit leaders' tactical skill development. The sampled unit leaders became more tactically skillful and more confident in their tactical capabilities during the course of their VTP rotation.
3. The VTP is an effective and efficient program for training experienced VTP participants.

This investigation has thus provided further support for the VTP's instructional value.

However, there may be limits to the VTP's impact upon units' and their leaders' tactical proficiency. According to the OCs' reports, the sampled units and unit leaders improved from a poor to a modestly good level of tactical proficiency. These findings parallel those from other evaluations (e.g., Schlechter et al. 1995; 1996). Schlechter et al.'s (1996) data, for example, have suggested that units and unit leaders improved from a novice level to no more than an intermediate level of tactical proficiency during the course of their VTP rotation. Hence, units and unit leaders do not become tactically accomplished by the end of a VTP rotation. It must be emphasized that no one associated with the VTP believes that tactical expertise can be reached by any typical ARNG unit during a single rotation.

The question now becomes--can the VTP help participants to develop their tactical skills beyond an intermediate level of proficiency? This is an important question because "battle readiness" entails a high degree of tactical competence. Units and unit leaders could possibly reach higher levels of tactical proficiency with increased usage of the VTP. As shown in Appendix C, the majority of the experienced participants had only been through the VTP once before, and this experience tended to occur more than a year ago. Financial constraints, however, might have kept them from utilizing the VTP more often.

A more feasible way of maximizing the tactical skill development of VTP participants would be to optimize the

effectiveness of the units' home-station preparation for their VTP rotation. As discussed, the units' home-station preparation did have an impact upon their subsequent VTP performance. And yet, the OCs in this and Shlechter et al.'s (1996) investigations reported that most units were not adequately prepared for their VTP rotation.

The issue now becomes of how best to help units develop the most effective mode of preparing for the VTP. As reported, Assessment A's data revealed three distinct preparation modes: "site preparation," "general tactical preparation," and "table specific preparation." However, determining the most effective mode or combination of modes was beyond the scope of this investigation.

Assessment A's data also showed that the sampled participants' preparation time was spent mostly in discussing the OPORDs, discussing or copying overlays, and discussing the map. The participants, however, spent little, if any, time in discussing the task lists, reviewing the THPs, and viewing the demo tapes. Assessment B's data indicated that the participants were poorly prepared for their VTP rotations, but that they did bring such materials as overlays to the VTP. Conceivably then, discussing the task lists, reviewing the THPs, and viewing the demo tapes would have greatly enhanced the preparedness of this investigation's participants.

Two additional points must be noted about studying the task list. One, OCs have informed the senior author that VTP participants tend not to be prepared for their VTP rotations, because they may not have studied the assigned task list. Two, as discussed in Appendix B, the primary purpose of the task list is to direct the units to the appropriate training and evaluation outlines (T&EO) for the different tables. Units may then be able to enhance their VTP preparation by more thoroughly studying the T&EO that corresponds to the task list for their rotation.

Consequently, the participants sampled in this research effort might have then been poorly prepared for their VTP rotation because their rock drills were not based upon the standards set in the T&EO. This problem could have been compounded by their not viewing the demonstration tapes and not receiving the THP(s) for their previous rotation(s). OCs should then check with the units to see if they are receiving the needed materials. In addition, the OC who is conducting the advance visit should emphasize the need for units to study the appropriate set of T&EO items and view the demonstration tapes.

A standardized set of training support packages (TSPs) could also be developed to help VTP participants to prepare for their VTP rotation. Each package would contain the training support materials, such as T&EOs, demo tapes, THPs (for experienced units), and overlays for each set of VTP tables. Such an instructional program would help all units to prepare

equally well for their VTP rotation. Developing the TSPs would also support the Army Training and Doctrine Command's (TRADOC) desire for common standards of excellence in training across Army components (LTC Winifred Cummings, July, 1997: LTC Cummings is the representative of the TRADOC Coordinating Element for this project).

These packages could be embedded into a computer program resembling a hypermedia instructional system. This program could be designed to be completed by soldiers in a few hours at either their home or armory's/home station's computer(s). Time constraints would thus not be a major concern with utilizing these demonstration materials (see Shlechter & Anthony, 1995 for more information concerning hypermedia instructional programs). However, ARNG units may not have the computer technology needed for utilizing a hypermedia instructional program. In fact, nearly 50% (42/86--36 participants did not answer this item) of the respondents have stated that they do not even have a computer at their home station. A "low-tech" set of TSPs may then have to be created.

This investigation also demonstrated, once again, the value of a multimethod-multisource evaluation strategy for non-experimental research efforts. The sampled participants provided important data concerning the estimated amount of time spent per preparation activity that could not have been obtained vis-a-vis the OCs. Whereas, the OCs provided more definitive information concerning the participants' level of preparation. The different methodologies thus complemented each other.

However, as discussed, different conclusions concerning skill retention and the VTP can be drawn from Assessment A's and Assessment B's data. This discrepancy between methodologies might have been due to the unit leaders' overestimating their abilities on the pre-training set of items. After all, they overestimated the number of their previous VTP rotations. The initial OC set of ratings could have reflected turbulence within the units rather than any decay among VTP participants. Only 35% (12/35--data from Table C-1 of Appendix C) of the PLT LDRs served in this duty position for their unit's last VTP rotation. The cited disagreement between methodologies--regardless of the reasons--makes it impossible to reach any conclusions about the tactical skill retention of these VTP units. (Please note that the term, "experienced unit(s)," has/have not been used in this report.)

Areas of disagreement between methodologies thus lead to new research questions. One of these questions is whether or not VTP participants are experiencing significant skill decay between VTP rotations. If they are, then one research question becomes what are the reasons (e.g., units not receiving the necessary materials) for this problem with the VTP's effectiveness?

Answers to these questions would be of interest to the entire Army training community. For example, TRADOC personnel would be interested in these answers as they relate to their proposed Total Army School System (TASS) program (Cummings, 1997). The goal of TASS is to insure that Army active component units, Reserve Component (RC) units, and ARNG units are at the same high level of proficiency. This goal is to be met vis-a-vis the establishment of regional schools for RC and ARNG components, which are functionally aligned with such TRADOC schools as the U.S. Army's Armor School at Fort Knox. However, if conditions at ARNG units' home stations are not conducive to sustaining their skill proficiency at the same level as active components, then the TASS program will not be successful.

In closing, this report has the following implications for the military training community:

1. The VTP's effectiveness has been established for helping participants with previous VTP experience to become more tactically proficient.
2. The VTP's effectiveness has been established for helping unit leaders (e.g., PLT LDRs) to become more tactically proficient.
3. Home-station preparation has a modest impact upon units' and unit leaders' subsequent skill development at the VTP facility.
4. The OC who conducts the advance visit must emphasize the need for the VTP participants to more thoroughly study the appropriate T&EO items for their rotation.
5. Further research and development efforts will be required to help determine the most productive mode(s) or combination of modes in helping VTP participants to prepare for their rotation.
6. The value of employing a multimethod-multisource strategy for conducting research in a non-controlled context has once again been demonstrated. Such research efforts may become more prevalent as the resources to conduct more controlled evaluations become scarce.
7. Questions raised by this report concerning the units' VTP preparation have significance for Army instructional programs other than the VTP.

References

- Bandura, A. (1986). Social foundation of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Bessemer, D. W., Shlechter, T. M., Nesselroade, K. P. & Anthony, J. (1995). Effectiveness of structured training in simulation networking (SIMNET). Paper presented at the 17th Interservice/Industry Training Systems Conference, Albuquerque, NM.
- Burnside, B. L. (1982). Subjective appraisal as a feedback tool (Tech. Rep. No. 604). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A138 873)
- Burnside, B. L., Leppert, M. A., & Myers, W. E., (1996, October). Virtual Training Program orientation guide, (ARI Research Product No. 97-02). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.
- Campbell, C. H., Campbell R. C., Sanders, J. J. & Flynn, M. C. (1995). Methodology for development of structured simulation-based training (Research Product 95-08). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A296 171)
- Clark, R. E. (1983). Reconsidering research on learning from media. Review of Educational Research, 53(4), 445-459.
- Clark, R. E. & Salamon, G. (1985). Media in teaching. In M. C. Wittrock (Ed.), Third handbook of research on teaching, Vol. 3 (pp. 464-477). New York: Macmillan.
- Cook, T. D., & Campbell, D. T. (1979). Quasi-experimentation: Design and analyses issues for field settings. Chicago, Rand McNally.
- Cummings, LTC W. (1997, July). Total Army School System: TASS update. Briefing slides from a presentation given at the Title 11 Conference, Fort Knox, KY.
- Department of the Army (1996, April). Tank platoon: FM 17-15. Washington, DC: Author.
- Elliott, G. S., Sanders, W. S. & Quinkert, K. A. (1996). Training in a digitized battalion task force: Lessons learned and implications for future training. (Research Rep No. 1695). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

- Garvey, E. E., & Radgowski, T. (1988). SIMNET-D standing operating procedure (Report No. 6929). Cambridge, MA: BBN Systems and Technologies Corporation
- Herrmann, D. J. (1982). Know thy memory: The use of questionnaires to assess and study memory. Psychological Bulletin, 92, 343-452.
- Norusis, M. J. (1993a). SPSS for windows: Advanced statistics (Release 6.0). Chicago: SPSS Inc.
- Norusis, M. J. (1993b). SPSS for windows: Professional statistics (Release 6.0). Chicago: SPSS Inc.
- Pajares, F. (1996). Self-efficacy beliefs in academic settings. Review of Educational Research, 66(4), 543-578.
- Shlechter, T. M. (1986). An examination of the research evidence for computer-based instruction in military training (ARI Tech Rep. No. 722). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.
- Shlechter, T. M. & Anthony, J. (1995). An examination of the value of demonstration tapes for the Virtual Training Program (ARI Research Rep No, 1688). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.
- Shlechter, T. M., Bessemer, D. W., & Kolosh, K. P. (1991). The effects of SIMNET role-playing on the training of prospective platoon leaders. (ARI Tech Rep. No. 938). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A224 913)
- Shlechter, T. M., Bessemer, D. W., Nesselroade, K. P. & Anthony, J. (1994). Initial evaluation of a simulation-based training program for Army national guard units (ARI Research Rep. No. 1679). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A297 271)
- Shlechter, T. M., Burnside, B. L., Anthony, J., Shadrack, S. & Zaccaro, S. L. (1997, April). The Virtual Training Program: An illustration of a cognitive technology. Paper presented at the First Meeting of the Cognitive Technology Society, Terre Haute, IN.
- Shlechter, T. M., Kraemer, R. E., Bessemer, D. W., Burnside, B. L., & Anthony, J. A. (1996). Perspectives on the Virtual Training Program from members of its initial observer/controller team (ARI Research Rep. No. 1691). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Shlechter, T. M., Nesselroade, K. P., Bessemer, D. W., & Anthony, J. (1995). Multimethod-multisource approach for assessing high-technology training systems. Paper presented at the Annual Meeting of the Educational Research Association, San Francisco, CA.

Turecek, J. L. Campbell, C. H., Myers, W. E., & Garth, T. H. (1995). The Reserve Component Virtual Training Program (RCVTP) orientation guide. (ARI Research Product No. 95-07). Alexandria, Va: U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A292 885)

Appendix A

ACRONYMS AND ABBREVIATIONS

AAR	After-Action Review
ANOVA	Analysis of Variance
APA	American Psychological Association
ARI	U.S. Army Research Institute
ARNG	Army National Guard
ARPA	Advanced Research Projects Agency
BP	Battle Position
CCTT	Close Combat Tactical Trainer
CDR	Commander
CO	Company
Demo	Demonstration
EC	Exercise Controller
Fam	Familiarization
LTC	Lieutenant Colonel
METT-T	Mission, Enemy, Terrain, Troops, and Time- available
NGB	National Guard Bureau
OC	Observer Controller
OPORD	Operation Order
PLT	Platoon
PLT LDR	Platoon Leader
PLT SGT	Platoon Sergeant
RC	Reserve Component
SFC	Sergeant First Class
SIMNET	Simulation Networking
SOP	Standard Operating Procedure
SPSS	Statistical Package for the Social Sciences
STRONGARM	Strategies for Training and Assessing Armor Commanders' Performance with Devices and Simulations
T&EO	Training and Evaluation Outline
TASS	Total Army School System
THP	Take Home Package
TRADOC	Training and Doctrine Command
TSP	Training Support Package
USAARMC	U.S. Army Armor Center
VCR	Video Cassette Recorder
VEH CDR	Vehicle Commander
VTP	Virtual Training Program

Appendix B

Glossary of Key Terms Associated with the Virtual Training Program

1. Demonstration (Demo) Tapes.* These tapes show fictitious units successfully performing selected tasks to a standard level of proficiency. The following tapes were created for the Virtual Training Program (VTP): (a) Introduction to the VTP; (b) Armor Platoon Offense and Defense; (c) Mechanized Platoon Offense and Defense; (d) Scout Platoon Offense and Defense; (e) Armor Company Offense and Defense; and (f) Armor Battalion Offense and Defense. These tapes, excluding the introductory tape, last approximately 30 minutes. The introductory tape lasts about 15 minutes. A VTP inexperienced unit should view the introductory plus the appropriate "mission tape(s)"; whereas a VTP experienced unit should view only the "mission tape(s)." (Portions of this paragraph were taken from Shlechter & Anthony, 1995).
2. Discussing Tactical Concepts. This activity involves discussing such tactical principles as the one-third/two-third rule for planning and preparation.
3. Exercise Controllers (ECs). ECs are a dedicated cadre of civilian government employees who assist the observer controllers (OCs) by operating the workstation at the Simulation Networking (SIMNET) facility.
4. Familiarization (fam) Course. The goal of this course is to help VTP participants to become familiar with operating a SIMNET vehicle. A vehicle's crew is thus required to: (a) locate the SIMNET switches and knobs; (b) navigate in the SIMNET terrain database; (c) identify friendly and enemy vehicles in this database; and (d) engage enemy vehicles with direct and indirect fire.
5. Maps and Overlays. Maps and overlays are important in helping platoons (PLTs) to visualize the battlefield. Military maps include grid lines and icons/contour lines that represent such topological features as hilly and heavily forested terrain. Overlays are acetate copies of the graphic control measures (e.g., a battle position [BP]) that are found on the map of a PLT's Company Commander. These acetate copies are placed on the maps of the PLT's leadership team (e.g., the PLT leader's [LDRs] map).

* Terms are arranged alphabetically. Acronym in parentheses relate to text usage.

6. Operation Orders (OPORDs). For each mission, a unit is given a five paragraph field order. These paragraphs depict the:

1. Situation (e.g., weather).
2. Mission (e.g., occupy a particular battle position, BP by 1100).
3. Execution (e.g., wedge formation to the BP).
4. Service Support (i.e., availability of and location for getting supplies).
5. Command and Signal (e.g., radio frequency for reporting to a higher command, such as the CO CDR).

7. Observer Controllers (OCs). The OCs are a dedicated cadre of military personnel who are responsible for: (a) providing units with a preview of their VTP tables; (b) overseeing the unit's execution of their VTP tables; and (c) facilitating the After-Action Reviews (AARs) associated with each table.

8. Rock Drills. Rock drill consists of units' rehearsing their VTP missions by "walking through" them on a terrain board or sand table. A unit may, for example, on the terrain board have its PLT leadership team walk through its possible actions and reactions to enemy fire.

9. The SIMNET system. The SIMNET system is the primary training device for PLT-level and company-level VTP training. This device consists of the integrated use of training simulators with combat and combat support simulations operating under constraints similar to those found in battlefield conditions.

10. Simulator (Sim) Manuals. These manuals are associated with operating the SIMNET simulators.

11. Table. This term is used in reference to the short structured exercises which have been developed for the VTP.

12. Table Execution. In this activity, the unit completes a VTP table.

13. Table Preview. This activity, which occurs just before the unit executes a table, involves the OC in giving the unit an operation order, providing it with a quick overview of the battlefield situation, and answering its questions about the mission.

14. Task List. This material delineates the tasks which the units will execute during their VTP rotation. The tasks are documented in the Army's Training and Evaluation Outlines (T&EO).

15. T&EO. As indicated, this material contains a description of each tactical task, standards for task mastery, and conditions (e.g., type of available ammunition) associated with the different tasks.

16. Unit Standard Operating Procedures (SOPs). Each unit should have a set of SOPs for responding to different situations. Practicing the SOPs would help a unit to respond quickly to battlefield situations. For example, a unit should have a set of reporting procedures when contact with the enemy has occurred.

(Information for this appendix came from the field manual on Tank Platoon--FM 17-15; Department of the Army, 1996; previous reports on the VTP (e.g., Shlechter, Kraemer, Bessemer, Burnside, & Anthony, 1996), and discussions in July 1997 with members of the OC team.

Appendix C

Assessment A: Demographic Information

Table C-1

Participants' Reports Concerning Duty Positions for Current VTP Rotation, Previous VTP Rotation, and Current Assignment

ROTATION	CURRENT VTP ROTATION	PREVIOUS VTP ASSIGNMENT	CURRENT POSITION
Company Commander	0	0	1
Company Executive Officer	0	3	0
Platoon Leader	35	12	29
Platoon Sergeant	31	23	28
VEHICLE Commander	58	27	58
OTHER ^a	0	21	6
Totals	124	86	122

^aParticipants claiming two or more duty positions.

Table C-2

Participants' Reports Concerning Time Spent in Armor/Infantry, Current Unit, and Current Duty Assignment (n=124)

	ARMOR/ INFANTRY		CURRENT UNIT		CURRENT DUTY	
	Years	Months	Years	Months	Years	Months
Average Duration	10	4	8	9	2	10
Maximum Duration	24	5	22	8	14	0
Minimum Duration	0	2	0	1	0	2

Table C-3

Participants' Reports Concerning Duration of Last Previous Training Experience at a SIMNET Facility, Live Field Environment, and a Combat Training Center (n=124)

Training Sites	MORE THAN 2 YRS AGO	1-2 YRS AGO	7-11 MOS AGO	1-6 MOS AGO	NEVER BEEN
SIMNET ^a	11	44	22	22	0
Live Field	13	23	16	60	6
Combat Training Center	27	16	8	7	48

^aMore than likely these visits were in connection with a participant's VTP rotation.

Table C-4

Participants' Reports Concerning Number of Previous Times at a SIMNET Facility for a VTP Rotation

Number of Previous Visits	Frequencies
None	2
1-2	52
3-4	15
5-6	8
7-8	1
9-10	2
11 or more	3

Appendix D

Assessment A: Pre-Training Questionnaire

DATA REQUIRED BY THE PRIVACY ACT OF 1974

AUTHORITY: Title 10, USC, Sec 2358.

PRINCIPLE PURPOSE: The purpose of this form is to help examine the experiences of platoon leaders, platoon sergeants, vehicle commanders, company commanders and company XOs prior to their Virtual Training Program (VTP) rotation. The data collected from this form are to be used for **research purposes only**. Also, the data will not be released to anyone in your unit's chain of command.

DISCLOSURE: Your participation in this research is strictly voluntary. Individuals are encouraged to provide complete and accurate information in the interest of the research, but there will be no effect on individuals who do not provide all or any part of the information requested.

Please provide the information requested below to indicate that you have agreed to participate in this data collection effort. This page will be removed from the rest of the form before responses are examined.

Last Four Digits of Your Social Security Number: _____

Date: _____ Unit: (BN-BDE): _____ (CO): _____ (PLT): _____ STATE: _____

CAREFULLY ANSWER ALL REQUESTED ITEMS AS YOUR ANSWERS WILL HELP THE ARMY TO BETTER UNDERSTAND THE VTP TRAINING PROCESS. WE THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE.

I. Unit Preparation Items. Answers must apply to your unit's preparation for this VTP rotation (Note: Check the appropriate boxes for items 1-7.)

1. Indicate the materials used at your home station to prepare for this rotation.

	Used	Don't have at home station	Have at home station but did not use
Sand Table(s)	☐	☐	☐
Terrain Board(s)	☐	☐	☐
Overhead Projector(s)	☐	☐	☐
VCR(s)	☐	☐	☐
Computer(s)	☐	☐	☐
Other	☐	☐	☐

2. Indicate the approximate time spent at your home station on discussing/viewing:

	More than 2 Hrs.	1-2 Hrs.	Less than an Hr.	None	Not Received
Operations Orders	☐	☐	☐	☐	☐
Overlays	☐	☐	☐	☐	☐
Maps	☐	☐	☐	☐	☐
Demonstration Tapes	☐	☐	☐	☐	☐
Simulator Manuals	☐	☐	☐	☐	☐
Task List for Executing the VTP Tables/Missions	☐	☐	☐	☐	☐
Unit's SOP	☐	☐	☐	☐	☐
Tactical Concepts	☐	☐	☐	☐	☐
Take-Home Packages (THPs from previous VTP rotations)	☐	☐	☐	☐	☐

3. Indicate the approximate time spent at your home station on rehearsals/rock drills for:

	More than 2 Hrs.	1-2 Hrs.	Less than an Hr.	None
Offensive VTP Tables	☐	☐	☐	☐
Defensive VTP Tables	☐	☐	☐	☐

4. Indicate the approximate time spent at your home station on:

	Too Little	About Right	Too Much	Not Received
Discussing the OPORDs	☐	☐	☐	☐
Doing the Overlays	☐	☐	☐	☐
Viewing the Demo Tapes	☐	☐	☐	☐
Discussing the Sim Manuals	☐	☐	☐	☐
Discussing the Tasks Associated with the VTP Tables/Missions	☐	☐	☐	☐
Reviewing THPs	☐	☐	☐	☐
Conducting Rehearsals/Rock Drills	☐	☐	☐	☐

5. The VTP tables for this rotation were mainly chosen by the (mark only one box):

O/C team ☐ Bn CDR ☐ Bn Staff ☐ Co CDR ☐ Co Staff ☐
 PLT LDR ☐ Other ☐ (specify) _____ Don't Know ☐

6. Your input in choosing the VTP tables was:

substantial ☐ modest ☐ minimal ☐ none ☐
 (Skip items 7 and 8, if this is your or your
 unit's first VTP rotation.)

7. Indicate the usefulness of the THPs from previous VTP rotations in assisting your preparation for this rotation:

extremely useful ☐ very useful ☐ useful ☐ slightly useful ☐ not useful ☐

8. List the way(s), if any, that the preparation for this rotation differed from those of previous rotations: _____

II. Expected Improvement Items.

Very Little Improvement		Little Improvement		Marginal Improvement		Large Improvement		Very Large Improvement		
0	1	2	3	4	5	6	7	8	9	10

1. Indicate the degree of expected improvement in **your** performance on this rotation: _____.
2. Indicate the degree of expected improvement in **your unit's** performance on this rotation: _____.

III. **Confidence Items.** Use the numerical scale presented below to indicate your confidence level for these items.

Note: Successfully complete means to standard; basic means with minimal enemy engagement; and difficult means with increased enemy contact.)

Very Little Confidence		Little Confidence		Marginally Confident		Confident		Very Confident		
0	1	2	3	4	5	6	7	8	9	10

1. I have little trouble with (FOR A PLT ROTATION, CO CDRS and XOs **SHOULD NOT ANSWER THIS ITEM**):

Maintaining Situational Awareness
 Making Quick and Accurate Decisions
 Engaging in Cross-Talk
 Establishing the Wingman Concept
 Conducting RTO Procedures
 Reporting to Higher
 Conducting Land Navigation

2. My unit is able to successfully complete the more **BASIC OFFENSIVE** tasks/procedures in the following areas:

Maneuver
 Actions on Contact
 Reporting
 Fire Control and Distribution
 RTO

3. My unit is able to successfully complete the more **DIFFICULT OFFENSIVE** tasks/procedures in the following areas:

Maneuver

Actions on Contact

Reporting

Fire Control and Distribution

RTO

4. My unit is able to successfully complete the more **BASIC DEFENSIVE** tasks/procedures in the following areas:

Maneuver

Actions on Contact

Reporting

Fire Control and Distribution

RTO

5. My unit is able to successfully complete the more **DIFFICULT DEFENSIVE** tasks/procedures in the following areas:

Maneuver

Actions on Contact

Reporting

Fire Control and Distribution

RTO

IV. Demographic Information Items.

1. Approximate Time in Armor/Infantry: Yrs. _____ Mos. _____

2. Approximate Time Assigned to Current Unit: Yrs. _____ Mos. _____

3. Position(s) for this VTP Rotation
(you may check more than one box)

Company CDR ☐ Company XO ☐ Platoon LDR ☐

Platoon SGT ☐ Vehicle CDR ☐ Other ☐

4. Indicate your assigned duty position:

Company CDR ☐ Company XO ☐ Platoon LDR ☐

Platoon SGT ☐ Vehicle CDR ☐ Other ☐

5. Approximate time in currently assigned duty position: Yrs. _____ Mos. _____

6. Have you had any previous VTP training: Yes ☐ No ☐
(If no, then skip Questions 7 and 8)

7. Position(s) during your last VTP rotation:

Company CDR ☐ Company XO ☐ Platoon LDR ☐
Platoon SGT ☐ Other ☐ (specify) _____

8. Approximately how many previous times have you visited a SIMNET facility for a VTP rotation: _____

9. Your last visit to a SIMNET facility was:

more than two years ago ☐ 1-2 years ago ☐
7-11 months ago ☐ 1-6 months ago ☐

10. Location of your last visit to a SIMNET facility _____.

11. Your last live field training experience was:

more than two years ago ☐ 1-2 years ago ☐
7-11 months ago ☐ 1-6 months ago ☐
never had live training ☐

(If this is the case, then skip the next item.)

12. Location of your last live training experience: _____

13. Your last visit to a combat training center (e.g., NTC or JRTC) was:

more than two years ago ☐ 1-2 years ago ☐
7-11 months ago ☐ 1-6 months ago ☐
never been to a training center ☐

(If this is the case, then skip the last item.)

14. Location of and your duty position for your last visit to a combat training center: _____

Appendix E

Assessment A: Post-Training Questionnaire

DATA REQUIRED BY THE PRIVACY ACT OF 1974

AUTHORITY: Title 10, USC, Sec 2358.

PRINCIPLE PURPOSE: The purpose of this form is to help examine the effects of unit preparation and prior Virtual Training Program (VTP) experiences upon you and your unit's performance for this rotation. The data collected from this form are to be used for **research purposes only**. Also, the data will not be released to anyone in your unit's chain of command.

DISCLOSURE: Your participation in this research is strictly voluntary. Individuals are encouraged to provide complete and accurate information in the interest of the research, but there will be no effect on individuals who do not provide all or any part of the information requested.

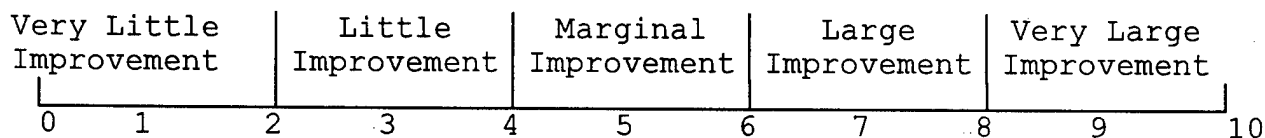
Please provide the information requested below to indicate that you have agreed to participate in this data collection effort. This page will be removed from the rest of the form before responses are examined.

Last Four Digits of Your Social Security Number: _____

Date: _____ Unit: (BN-BDE): _____ (CO): _____ (PLT): _____ STATE: _____

CAREFULLY ANSWER ALL REQUESTED ITEMS AS YOUR ANSWERS WILL HELP THE ARMY TO BETTER UNDERSTAND THE VTP TRAINING PROCESS. WE THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE.

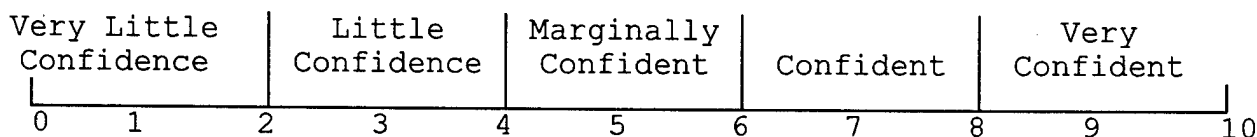
I. Performance Improvement Items. Use the numerical scale presented below to indicate your confidence level for these items. **(FOR A PLT ROTATION, CO CDRS and CO XO's SHOULD NOT ANSWER THESE ITEMS.)**



1. Indicate the degree of improvement in **YOUR** performance on this rotation: _____.
2. Indicate the degree of improvement in **YOUR UNIT'S** performance on this rotation: _____.

II. Confidence Items. Use the numerical scale presented below to indicate your confidence level for these items.

(Note: Successfully complete means to standard; basic means with minimal enemy engagement; and difficult means with increased enemy contact.)



1. I have little trouble with **(FOR A PLT ROTATION, CO CDRS and XO's SHOULD NOT ANSWER THIS ITEM):**

Maintaining Situational Awareness
 Making Quick and Accurate Decisions
 Engaging in Cross-Talk
 Establishing the Wingman Concept
 Conducting RTO Procedures
 Reporting to Higher
 Conducting Land Navigation

2. My unit is able to successfully complete the more **BASIC OFFENSIVE** tasks/procedures in the following areas:

Maneuver
 Actions on Contact
 Reporting
 Fire Control and Distribution
 RTO

3. My unit is able to successfully complete the more **DIFFICULT OFFENSIVE** tasks/procedures in the following areas:

Maneuver	_____
Actions on Contact	_____
Reporting	_____
Fire Control and Distribution	_____
RTO	_____

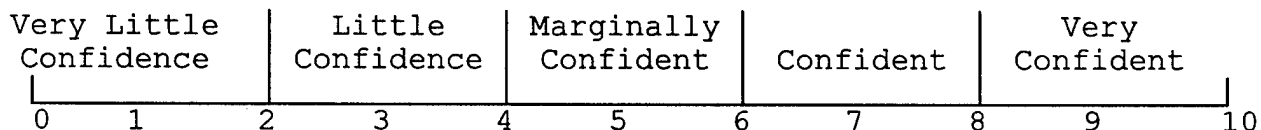
4. My unit is able to successfully complete the more **BASIC DEFENSIVE** tasks/procedures in the following areas:

Maneuver	_____
Actions on Contact	_____
Reporting	_____
Fire Control and Distribution	_____
RTO	_____

5. My unit is able to successfully complete the more **DIFFICULT DEFENSIVE** tasks/procedures in the following areas:

Maneuver	_____
Actions on Contact	_____
Reporting	_____
Fire Control and Distribution	_____
RTO	_____

III. Items on Future VTP Performance Skills. Use the following numerical scale to answer all of these items. Assume that your next VTP rotation will be held 6 months from now and that you will NOT have any intervening practice on the tasks/procedures listed below.



1. I will have little trouble (FOR A PLT ROTATION, CO CDRS OR CO XO's SHOULD NOT ANSWER THIS ITEM):

	In Six Months
Maintaining Situational Awareness	_____
Making Decisions	_____
Engaging in Cross-Talk	_____
Establishing the Wingman Concept	_____
Conducting RTO Procedures	_____
Reporting to Higher	_____
Conducting Land Navigation	_____

2. My unit will be able to successfully complete the more **BASIC OFFENSIVE** tasks/procedures in the following areas:

	In Six Months
Maneuver	_____
Actions on Contact	_____
Reporting	_____
Fire Control and Distribution	_____
RTO	_____

3. My unit will be able to successfully complete the more **DIFFICULT OFFENSIVE** tasks/procedures in the following areas:

	In Six Months
Maneuver	_____
Actions on Contact	_____
Reporting	_____
Fire Control and Distribution	_____
RTO	_____

4. My unit will be able to successfully complete the more **BASIC DEFENSIVE** tasks/procedures in the following areas:

	In Six Months
Maneuver	_____
Actions on Contact	_____
Reporting	_____
Fire Control and Distribution	_____
RTO	_____

5. My unit will be able to successfully complete the more **DIFFICULT DEFENSIVE** tasks/procedures in the following areas:

	In Six Months
Maneuver	_____
Actions on Contact	_____
Reporting	_____
Fire Control and Distribution	_____
RTO	_____

IV. Items on The VTP Instructional Process.

(Note: Check the appropriate boxes for items 1-3.)

1. Your input in the decision to repeat a VTP table was:

Substantial ☐ Modest ☐ Minimal ☐ None ☐

No tables were repeated ☐

2. Rate the amount of time spent at your home station on the following preparatory activities for this VTP rotation:

	Too Little	About Right	Too Much	Not Received
Discussing the OPORD	☐	☐	☐	☐
Doing the Overlays	☐	☐	☐	☐
Viewing the Demo Tapes	☐	☐	☐	☐
Discussing the Sim Manuals	☐	☐	☐	☐
Discussing the Critical Tasks Associated with the VTP Tables/Missions	☐	☐	☐	☐
Reviewing the Take-Home Packages	☐	☐	☐	☐
Conducting Rehearsals/ Rock Drills	☐	☐	☐	☐

3. Rate the instructional value of the following for this rotation:

	Extremely Useful	Very Useful	Useful	Not Useful	Not Received /Done
Advance visit(s) by the O/C Team (at your home station)	☐	☐	☐	☐	☐
Unit Preparation (at your home station)	☐	☐	☐	☐	☐
Familiarization Course	☐	☐	☐	☐	☐
Take Home Packages	☐	☐	☐	☐	☐
Table Preview Procedures (at the O/C station)	☐	☐	☐	☐	☐
O/C Prompting to Execute the Tables	☐	☐	☐	☐	☐
Participation in the AAR Discussion	☐	☐	☐	☐	☐

4. Rank order the instructional value of the listed VTP components with "5" equaling the most instructional value and "1" equaling the least. (Note: Each component must have a different numerical value.)

Unit Preparation (at your home station)	_____
Familiarization Course	_____
Table Preview Procedures (at the O/C Station)	_____
Table Execution	_____
AARs	_____

Appendix F

Assessment A: Psycho-Metric Properties of Questionnaires

Table F-1

Inter-Item Reliability (Alpha Coefficient) for the Pre-Training, Post-Training, and Future Training Items

Item	alpha Coefficient	<u>n</u>
Pre-Training	.93	101
Post-Training	.93	101
Future-Training	.95	101

Note. Alpha coefficients were conducted for the items dealing with leadership and offensive tasks.

Table F-2

Inter-Rater Reliability for Unit Preparation Items^a

Unit	Alpha Coefficient	<u>n</u> ^a
1	.69	3
2	.47	3
3	.83	3
4	.61	3
5	.19	2
6	.30	2
7	.89	3
8	.76	2
9	.73	2
10	.75	3
11	.90	3
12	.67	3
13	.75	3
14	.75	2
15	.83	2
16	.51	3
17	.84	4
18	.13	3
19	.78	4
20	.87	5
21	.78	2
22	.87	3
23	.84	3
24	.94	3
25	.86	4
26	.71	3
27	.63	3
28	.51	3

Note. Ratings were based upon participants' responses to the pre-training questionnaire items on unit preparation;

^an = number of participants per unit who completed the questionnaire items.

Appendix G

Assessment A: Results Associated with the Preliminary Factor Analysis

The initial step in this set of data analyses involved determining the existence of any patterns in the participants' responses to the pre-training questionnaire item dealing with the estimated time spent on different preparation activities. A factor analysis was thus computed. A "Not Received" response was considered as a "None" (no time) response. This factor analysis was computed through the use of the Statistical Package for the Social Sciences for Windows (Norusis, 1993). Unique factors were considered to be those with eigenvalues greater than 1.00. The factor loadings for any unique factor was then determined by a varimax rotation. See Tables G-1 and G-2 for the results of this factor analysis.

Table G-1

Factors Extracted from the Unit Preparation Activity Data

Factor	Eigenvalue	Percent of Variance	Cumulative Percentage
1	3.27212*	32.7	32.7
2	1.58420*	15.8	48.6
3	1.18954*	11.9	60.5
4	.77720	7.8	68.2
5	.72806	7.3	75.5
6	.68576	6.9	82.4
7	.62656	6.3	88.6
8	.47040	4.7	93.3
9	.37306	3.7	97.1
10	.29308	2.9	100

*Significant factors at .05 level.

Table G-2

Factor Loadings Produced by the Varimax Rotation

Preparation Activity	Factor 1	Factor 2	Factor 3
OPORDS	.24177	.54374	.45152
Overlays	.13901	.13617	.83487
Maps	.50384	.08566	.51913
Demonstration Tapes	.77869	-.05776	.09659
Simulator Manuals	.73195	.08566	-.08247
Task List	.50359	.47980	-.03257
Units' SOP	.04248	.82939	.21455
Tactical Concepts	-.02205	.88060	.06412
Take-Home Packages	.60314	.08346	.33533
Rock Drills/Rehearsals	-.08385	.21182	.72350

Based on the cited factor loadings, the factors were then labeled as: (a) Site Preparation (Factor 1); (b), General Tactical Preparation (Factor 2); and (c) Specific Table Preparation (Factor 3).

The effects of the three preparation modes upon the participants' confidence scores were then analyzed by a one-way repeated measures covariant analysis of variance. The independent variable for this analysis consisted of two levels of time (pre-training vs. post-training), and the covariant measures were the participants' scores for the three modes of unit preparation--site preparation, general tactical preparation, and specific table preparation. The results of this analysis is presented in Table G-3.

Please note that Table G-3's data failed to reveal a statically significant effect for time, which was different from the previous analyses (see Appendix H). This issue was not the result of different participants in the different analyses. An effect for the time variable was found for a one-way Analysis of Variance (ANOVA) with participants who had factor scores (see Table G-4). Hence, the noted difference may be a statistical artifact of the procedures for computing the factor scores.

Table G-3

Source Table for Covariant Analyses of Variance with Modes of Unit Preparation as the Covariant Measures (n=100)

Source	df	F Value
TIME	1	2.17
SP x Time	1	.21
GTP X Time	1	.73
STP x Time	1	.14
within-subject error	96	(.652)

Note. Total n less than 124 because data for the confidence items were excluded from the analysis for participants who did not respond to: (a) five or more of the seven items for the leadership tasks set and (b) three or more of the five items for each offensive tasks set; values enclosed in parentheses represent mean square errors; TIME consists of participants' pre-training versus post-training scores; SP is the covariant measure, "Site Preparation"; GTP is the covariant measure, "General Tactical Preparation"; STP is the covariant measure, "Specific Table Preparation."

Table G-4

Source Table for Analyses of Variance for Participants Collapsed Across Factor Scores (n=107)

Source	df	F Value
TIME	1	25.53*
within-group error	106	(.70)

Note. Total n less than 124 because data for the confidence items were excluded from the analysis for participants who did not respond to: (a) five or more of the seven items for the leadership tasks set and (b) three or more of the five items for each offensive tasks set; values enclosed in parentheses represent mean square errors; TIME consists of participants' pre-training scores for the leadership, basic offensive and more difficult offensive tasks versus post-training scores for these same tasks.

*p < .01

Appendix H

Assessment A: Results of Data Analyses on the Participants' Confidence Scores

Table H-1

Source Table for Analyses of Variance On the Effects of Training and Previous Experience upon the Participants' Confidence Scores ($n=105$)

Source	df	F Value
Between-Subjects Effect		
PREVTP	1	6.53*
between-group error	103	(1.11)
Within-Subjects Effect		
TIME	1	24.39**
PREVTP x TIME	1	1.39
within-group error	103	(.71)

Note. Total n less than 124 because data for the confidence items were excluded from the analysis for participants who did not respond to: (a) five or more of the seven items for the leadership tasks set and (b) three or more of the five items for each offensive tasks set; values enclosed in parentheses represent mean square errors; PREVTP is the comparisons between participants with previous VTP experience and those without such experience; TIME consists of comparing the participants' pre-training with their post-training confidence scores.

* $p < .05$. ** $p < .01$

Table H-2

Relationships between the Participants Confidence Scores for the Post-Training and Future Training Items

Relationships of (Post-Training to Future-training items)	<u>n</u>	Correlational Coefficients
Leadership Tasks	110	.693*
Basic Offensive Tasks	123	.447*
More Difficult Offensive Tasks	119	.484*

Note. Total n less than 124 because data for the confidence items were excluded from the analysis for participants who did not respond to: (a) five or more of the seven items for the leadership tasks set and (b) three or more of the five items for each offensive tasks set.

* $p < .000$

Appendix I

Assessment A: Findings Not Presented in the Body of the Text

Table I-1

Participants' Pre-Training Opinions About Discussing or Viewing Preparatory Activities

Preparatory Activities	<u>n</u>	Frequency of Not Received Responses	Median	Mean	Mode
Discussing OPORDs	114	8	1.00	1.40	1.00
Discussing/Doing Overlays	115	11	2.00	1.42	2.00
Viewing Demo Tapes	111	71	0.00	0.47	0.00
Discussing Sim Manuals	112	65	1.00	0.57	0.00
Discussing the Task List	112	29	1.00	1.05	1.00
Reviewing the THPs	107	58	0.00	0.61	0.00
Conducting Rock Drills	112	16	2.00	1.45	2.00

Note. Items scored in the following manner: 0 = not received; 1 = too little time; 2 = about right; and 3 = too much time. Median is considered to be the most valid measure of central tendency for categorical data; total n less than 124 because data for the confidence items were excluded from the analysis for participants who did not respond to: (a) five or more of the seven items for the leadership tasks set and (b) three or more of the five items for each offensive tasks set.

Table I-2

Data for the Participants' Ratings of the Instructional Value of VTP Instructional Components

Instructional Components	<u>n</u> ^a	Mean	Standard Deviation
Home-Station Preparation Familiarization Course	123	2.46	1.54
Table Previews	123	3.02	1.30
Execution of Tables	123	3.12	1.26
After-Action Reviews	123	3.72	1.26
	121	3.93	1.31

Note. Items were scored on 1-5 scale with 1= least instructional value and 5= most instructional value; total n less than 124 because data for the confidence items were excluded from the analysis for participants who did not respond to: (a) five or more of the seven items for the leadership tasks set and (b) three or more of the five items for each offensive tasks set.

Appendix J

Assessment B: The Observer Controller Questionnaire

DATA REQUIRED BY THE PRIVACY ACT OF 1974

AUTHORITY: Title 10, USC, Sec 2358.

PRINCIPLE PURPOSE: The purpose of this form is to collect information about the performance of the unit for which you were an observer/controller. The data collected from this form are to be used for **research purposes only**. Hence, the data will not be released to anyone in your or the unit's chain of command.

DISCLOSURE: Your participation in this research is strictly voluntary. Individuals are encouraged to provide complete and accurate information in the interest of the research, but there will be no effect on individuals who do not provide all or any part of the information requested.

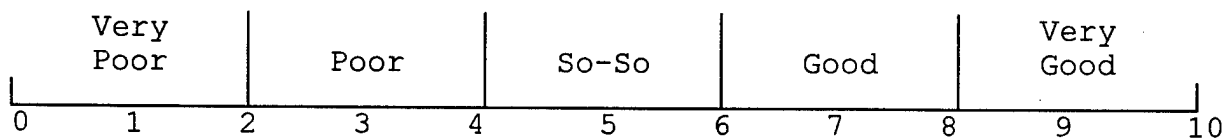
Please print your name below indicating that you have agreed to participate in this data collection effort. This page will be removed from the rest of the form before responses are examined so that your name will not be identified when the data are analyzed.

Print Name: _____ Date: _____

Unit under Your Guidance: BN-BDE _____ CO _____ PLT _____ STATE: _____

CAREFULLY ANSWER ALL ITEMS. WE THANK YOU FOR TAKING THE TIME TO
COMPLETE THIS QUESTIONNAIRE.

I. **Performance.** Use the following numerical scale to rate the unit's or unit leader's performance. Please keep in mind the following while completing this section - **successfully complete means to standard; basic means with minimal enemy engagement; and difficult means with increased enemy contact.**



1. Rate the **unit leaders'** abilities for:

	For the First Table	For the Last Table
Maintaining Situational Awareness		
Making Decisions		
Engaging in Cross-Talk		
Establishing the Wingman Concept		
Conducting RTO Procedures		
Reporting to Higher		
Conducting Land Navigation		

2. Rate the **unit's** ability to complete the more basic tasks/procedures in the areas of:

	For the First Table	For the Last Table
Maneuver		
Actions on Contact		
Reporting		
Fire Control and Distribution		
RTO		

3. Rate the **unit's** ability to complete the more difficult/advanced tasks/procedures in the areas of:

	For the First Table	For the Last Table
Maneuver		
Actions on Contact		
Reporting		
Fire Control and Distribution		
RTO		

II. Factors Affecting Performance

Not Influential		Slightly Influential		Moderately Influential		Very Influential		Extremely Influential		
0	1	2	3	4	5	6	7	8	9	10

1. Use the scale cited above to estimate the influences of the following factors upon the **unit's performance for their first few tables**:

Preparing at their home station _____

Being coached by the O/Cs or E/C
to complete a critical task _____

Adapting to the SIMNET terrain data base _____

Adapting to the SIMNET equipment _____

Other (specify below) _____

2. Use the scale cited above to estimate the influence of the following factors upon the **unit's performance for their last few tables**:

Preparing at their home station _____

Being coached by the O/Cs or E/C
to complete a critical task _____

Adapting to the SIMNET terrain data base _____

Adapting to the SIMNET equipment _____

Other (specify below) _____

III. Follow-up Items about the Unit's Rotation

1. Name of Tables Executed	Number of Iterations Per Table	Reasons/Criteria for Additional Iterations
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

2. How well prepared was the unit for this rotation:

Very Well Prepared ☐ Well Prepared ☐ Adequately Prepared ☐

Poorly Prepared ☐ Very Poorly Prepared ☐

(comments about their preparation) _____

3. To what extent did the unit leadership bring all the necessary materials:

All ☐ Almost All ☐ Most ☐ A Few ☐ None ☐

(If not all, then please specify what was not brought.) _____

4. Number of times that the unit was late for REDCON1: _____

(reasons for them being late for REDCON1) _____

5. The unit leaders' (e.g., PLT LDRs, PLT SGTs, VEH CDRs for PLTs) input in the decision to repeat a VTP table was:

Substantial ☐ Modest ☐ Minimal ☐ None ☐ No tables were repeated ☐

6. Any final comments about this unit's preparation and/or performance: _____

Appendix K

Assessment B: Findings Not Presented in the Body of the Report

Table K-1

T-Tests for Comparisons between OCs' Ratings of Unit Leaders' and Units' Performance for their First and Last Tables

Comparisons (First vs. Last Tables)	<u>n</u>	<u>df</u>	<u>SE</u> ^a	<u>t</u>
Leadership Tasks ^b	28	27	.267	10.99*
Basic Tasks (Unit) ^c	28	27	.290	9.79*
More Difficult Tasks (Unit) ^d	27 ^a	26	.261	10.66*

^aSE is the standard error of the mean. ^bItems 1-7 of the OC questionnaire. ^cItems 8-12 of the OC questionnaire. ^dItems 13-17 of the OC questionnaire.

*p < .01

Table K-2

Relationships Between the OCs' Ratings of the Units' Level of Preparation and Their Judgments Concerning the Unit Leaders' and Units' Performance

Relationships	<u>n</u>	Correlational Coefficients
Ratings of Unit Preparation with OCs' Data Concerning:		
Leaders' performance ^a for the first table	28	.467 *
Leaders' performance for the last table	28	.656**
Units' performance on basic tasks ^b for the first table	28	.411*
Units' performance on basic tasks for the last table	28	.692**
Units' performance on more difficult tasks ^c for the first table	27	.520**
Units' performance on more difficult tasks for the last table	27	.674**
Times units were late for REDCON1 ^d	28	-.159
Number of different VTP tables executed by the units	28	.478*

Note. The unit preparation measure was scored in the following manner: 1 = Very Poorly Prepared; 2 = Poorly Prepared; 3 = Adequately Prepared; 4 = Well Prepared; and 5 = Very Well Prepared.

^aLeaders' performance relate to items 1-7 of the OC questionnaire.

^bUnits' performance for basic tasks relate to 8-12 of the OC questionnaire. ^cUnits' performance for more difficult tasks relate to items 13-17 of the OC questionnaire. ^dREDCON1 means ready to go.

* $p < .05$. ** $p < .01$.