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PERFORMANCE MOTIVATION IN ARMOR TRAINING

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U. S. Army

Research Institute for the Behavioral and Social Sciences

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Motivation generally affects performance. This research asked specifically what performance outcomes (rewards) would motivate tank crews to perform better during training.

First, 52 Armor crewmen answered, on a list of potentially useful recognition and tangible reward outcomes, how much they valued each one and what they felt was the probability of their getting it. Later, answers from 112

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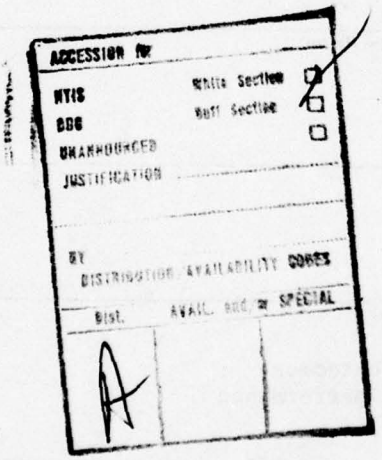
other crewmen confirmed and refined the outcome values, as well as indicating that outcome values were constant across rank for grades E2-E5.

Outcomes with the highest combined scores were then offered as rewards for high performance during training, to 108 Armor crewmen. Analysis of results showed that for tank commanders, drivers, and loaders, performance in general was positively related to recognition-based motivation and negatively related to tangible reward. For gunners, performance was negatively related to recognition-based motivation.

Strategies for motivation management programs could probably be based on recognition.



Technical Paper 291

PERFORMANCE MOTIVATION IN ARMOR TRAINING

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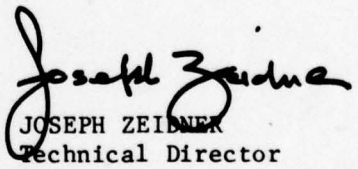
FOREWORD

An area of major importance in the Army Research Institute for the Behavioral and Social Sciences (ARI) is improvement of the individual soldier's training and performance. The ARI Field Unit at Fort Knox, Kentucky, in its work unit area "Performance Motivation in Training and Evaluation Environments" (Army Project 2Q762717A767), is concerned with research and development of technology for increasing soldier productivity by increasing levels of performance motivation. The long-range program includes developing an effective model of performance motivation in a military setting, developing psychological instrumentation to measure performance motivation, and developing strategies to manage performance motivation.

This Technical Paper describes research on performance outcomes (consequences to individuals of their performance) in an operational armor battalion, and the relationship between tank gunnery performance and motivation indices derived from a motivation model and instrument which used the outcomes research. Effective motivation management strategies could be developed from the outcomes and motivation model research.



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PERFORMANCE MOTIVATION IN ARMOR TRAINING

BRIEF

Requirement:

To determine the perceived value and frequency of a set of performance outcomes (consequences to individuals of their performances) in an operational Armor battalion by constructing and testing an objective appropriate motivation model and instrument; and to determine motivation management strategies for an experimental program.

Procedure:

A set of potentially useful performance outcomes was obtained from past research interviews with Armor training cadre and trainees. Outcomes were selected for potential value to individual soldiers in Armor training and perceived potential for occurrence there. A questionnaire, developed to determine the value and perceived frequency of occurrence of each outcome, was given to 52 Armor crewmen during their annual tank gunnery qualification at Fort Hood, Texas (Phase I). Their answers enabled outcomes to be ranked by perceived value x frequency.

Outcomes with the highest value-frequency composite scores were chosen in each of four motivation source categories: recognition, tangible reward, intrinsic, and self-actualization. A motivation model based on contemporary expectancy theory was expanded into a composite-source model to provide specific motivation indices in each of the four source categories. An instrument was then developed, based on the composite-source model and using the selected outcomes, and administered to 108 Armor crewmen in a battalion during their annual gunnery training --tank crew qualification course (TCQC)--at Fort Carson, Colorado (Phase II). The outcomes questionnaire used at Fort Hood was then administered to 112 Fort Carson crewmen to obtain more detailed information on outcome value and frequency perceptions (Phase III).

Findings:

Phase I provided sufficient information for developing the composite-source motivation instrument. In Phase II, gunnery performance was significantly related to motivation indices from the instrument's four source categories. From the standpoint of developing motivation management strategies, most interesting relationships were with the recognition and tangible reward source categories--the most easily managed. For tank commanders, drivers, and loaders, performance generally was

positively related to recognition-based motivation and negatively related to motivation based on tangible reward. For gunners, however, performance was negatively related to recognition-based motivation.

Intensive anlaysis of outcomes data from the Phase III questionnaire administration allowed evaluation of the outcome values and frequencies with some degree of confidence. The analysis also indicated that for enlisted grades E2 - E5 perceived value and frequency of outcomes did not differ by rank. Thus, management strategies need not differentiate for these ranks.

Utilization of Findings:

The composite-source motivation model and instrument has practical utility for motivation research and evaluation. The motivation instrument, refined with information from intensive analysis of performance outcomes, has potential as a diagnostic tool in military settings. Experimental motivation management strategies based on relationships observed in this research can potentially provide the Army with specific, tested motivation management strategies for optimizing motivation in training and testing. Recognition is the most likely source for an experimental management program.

PERFORMANCE MOTIVATION IN ARMOR TRAINING

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FIGURES

PERFORMANCE MOTIVATION IN ARMOR TRAINING

It is a common observation that performance in training and training assessment environments may be degraded by reduced levels of individual and group motivation. Reduced motivational levels during training and assessment, as compared to the actual job situation, can have several adverse effects. Scores obtained during assessment may not reflect true on-the-job performance capability because of attenuated motivation levels during assessment. More damaging, reduced motivation during training may attenuate any beneficial effects of training, thus directly reducing performance capability. The purpose of the research reported here was to study sources of performance motivation in one environment --Armor training and assessment. In later research, the results will be generalized to performance motivation in other combat, combat support, and combat service support settings.

BACKGROUND

Regardless of the particular approach one takes to motivational problems, certain basic relationships are generally recognized. First, an individual's performance is considered to be a function of both the individuals's ability to perform and his performance motivation.[1] Performance motivation is defined as motivation associated with the performance of a particular task or cluster of associated tasks. Thus, it comprises both sources of motivation which are relatively general, applying to many different tasks, and sources which are quite specific, pertaining to only one particular task or limited number of similar tasks. In this way it is analogous to Spence's D + K construct(s).[2] In many situations, where some moderate level of ability can be assumed to exist, superior performance might be observed when performance motivation is high. An easily recognized example would be the highly motivated individual who, though no more gifted than his contemporaries, excels through the sheer concentration and effort he expends in completing an assigned task. Second, performance motivation level is believed to be a function of a number of environmental and internal variables (motivation variables) which serve as sources of motivation. Changes in either an individual's external environment or his internal state could change his motivational level. For instance, an individual who anticipates certain significant outcomes of very good performance may be

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[1]Brown, J. S., and Farber, I. E. Secondary motivational systems. Annual Review of Psychology, 1968, 19, 99-134.

Lawler, E. E. Motivation in Work Organizations. Monterey: Brooks/Cole Publishing Company, 1973.

Spence, K. W. Behavior Theory and Conditioning. New Haven: Yale University Press, 1956.

Vroom, V. H. Work and Motivation. New York: John Wiley & Sons, 1964.

[2]Spence, K. W. Behavior Theory and Learning. Englewood Cliffs, N. J.: Prentice-Hall, 1960.

expected to be more highly motivated, and thus perform better, than an individual who expects no noticeable outcomes for effort expended in the performance of a task.

Relationships which are thought to exist between performance motivation level, motivational variables, and performance are shown in Figure 1. In the model, performance is a function of performance motivation level, and motivation level is a function of a large number of motivational variables. Therefore, performance is a function of those motivational variables.

One general model of motivation is an "expectancy model." According to this model, performance motivation is a function of an individuals's expectancies (subjective probabilites) that good performance on the job will lead to particular outcomes for the individual, and the values he places on those outcomes (Vroom, 1964). These outcome expectancies/values are postulated to be a source of motivation and thus, in part, determine performance motivation level. If this is so, then the manipulation of outcome expectancies and values could serve as a powerful motivation management tool. Research to determine the validity of the general model, or to develop a model and an associated instrument incorporating current research results, therefore, takes on a role of considerable importance.

Recent extensions of the general expectancy models have entailed, in addition to performance-outcome expectancies (POE) and outcome values (OV), the individual's subjective probability that effort expended in the performance of the task will lead to good performance on the task. This belief is an effort-performance expectancy (EPE). According to one widely recognized form of this model (see Lawler, 1973), performance motivation is a function of these three components, as shown in Figure 2. Sample question formats for evaluating each of the three variables are also shown in Figure 2.

The expectancy model, in the above form, has proved to be quite popular among contemporary motivational theorists.[3] This popularity is proably due to the relative ease and objectivity of performance motivation determinations derived from the model, the basic scientific and intuitive appeal of the model, and certain instances of respectable correlations between job performance and individual motivational indices determined from tests based on the model. In one particularly successful study, a correlation coefficient of +.62 ($p < .01$) was demonstrated between motivational scores and supervisor's performance evaluations.[4] Therefore, the general expectancy model has served as a basis for development of a performance motivation model and instrument applicable in military training and evaluation environments.

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[3]Locke, E. A. Personnel Attitudes and Motivation. Annual Review of Psychology, 1975, 26, 457-480.

[4]Orpen, C. A quasi-experimental investigation into the effects of valence, instrumentality, and expectancy on job performance. International Review of Applied Psychology, 1975, 24, 71-78.

Motivational Variables lead to changes in	Level of Performance Motivation leads to changes in	Performance
Momentary encouragement or "cheering on" by contemporaries	defined by an objective, graded operational definition/instrument	on specific task
. . .		. . .
Expectancy of achieving and appreciation of performance consequences		on similar tasks
		.
		and to some extent,
. .		. .
Long-term bias concerning general task being performed		in general

Motivation level	is determined by (a function of)	a number of motivating variables
Performance	is determined by (a function of)	performance motivation level
Therefore: performance	is determined by (a function of)	the motivation variables determining motivation level

Figure 1. Relation between Motivational Variables, Motivation Level, and Performance

$$PM = EPE \times \sum_i \left[PO_iE \times O_iV \right]$$

Each PO_iE and O_iV refer to a particular military outcome i.

The following are examples of 1) a military outcome, 2) an item to assess an effort-performance expectancy (EPE), 3) an item to assess a performance-outcome expectancy (PO_iE), and 4) an item to assess valence (O_iV).

no chance	very very little chance	very little chance	little chance	some chance	50-50 chance	fairly good chance	good chance	very good chance	very very good chance	perfect 100% chance
0/10	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10

1) Sample military outcome i:

C.O.'s commendation for a job well done.

2) Sample Effort-Performance Expectancy (EPE) item:

Estimate the odds from 0/10 to 10/10 that if you work hard and concentrate on Tank Gunnery you will perform very well. _____/10

3) Sample Performance-Outcome$_i$ Expectancy (PO_iE) item:

Estimate the odds that if you perform very well on Tank Gunnery you will receive the C.O.'s commendation for a job well done. _____/10

4) Sample Outcome$_i$ Valence (O_iV) item:

Dislike it extremely	Dislike it greatly	Dislike it a lot	Dislike it some	Dislike it a little	Don't care	Like it a little	Like it some	Like it a lot	Like it greatly	Like it extremely
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5

Look at the eleven expressions listed above. Decide how you would feel about the following outcome if it were to occur. Indicate the expression which best describes your feelings by circling the appropriate number from those next to the outcome.

receiving the C.O.'s commendation for a job well done -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

Figure 2. General Expectancy Theory-based Model of Performance Motivation

Despite success in some situations, the expectancy model has not always proved successful. On many occasions, motivation measured by expectancy-based instruments has not proved to be highly related to the employee's measured performance.[5] One reason may be found in a potential interaction between various sources of motivation--intrinsic and extrinsic sources, for example.[6] The additive relationship between outcome sources suggested by the general model may not be appropriate. Instead, different sources of motivation may be positively or negatively related to one another in a particular situation, and each source may be positively or negatively related to performance. The logical extension of this thinking would provide as many different motivation scores to a model and instrument as individual sources of motivation.

A more parsimonious approach would categorize the sources of motivation and build a "composite-source" expectancy model and instrument providing a motivation score based on each source category. Two general categories seem appropriate: intrinsic and extrinsic sources. Extrinsic sources can be further divided according to type of outcome upon which the source is based, and its ease of management. Recognition outcomes, for instance, are extrinsic motivation sources which are relatively inexpensive and easy to manage. Tangible reward outcomes are relatively easy to manage but not always inexpensive. Outcomes relating to self-actualization are seldom inexpensive or easy to manage because they are likely to be based on relatively rigid organizational policies. Such a categorization is supported by recent research on the interactive effects of these outcome categories.[7]

One can build a composite-source expectancy model and instrument based on these categories which will provide four separate motivation scores, one for each source category: Recognition (R), Tangible Reward (TR), Intrinsic (I) and Self-actualization (A) motivation. Such a

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[5]Porter, L. W., Maanen, J. V., and Crampon, W. J. Continuous monitoring of employees' motivational attitudes during the initial employment period. University of California, Irvine, Technical Report 4, 1971. Prepared under ONR Contract NOD014-69-A-0200-9001 NR Number 151-315.

Pritchard, R. D., and Sanders, M. S. The influence of valence, instrumentality, and expectancy on effort and performance. Journal of Applied Psychology, 1973, 57, 55-60.

[6]Deci, E. L. The effects of extrinsic rewards on "intrinsic motivation." Organizational Behavior and Human Performance, 1976, 15, 117-129.

Notz, W. W. Work motivation and the negative effects of extrinsic rewards: A review with implications for theory and practice. American Psychologist, 1975, 30, 884-891.

[7]Deci, E. L. Intrinsic motivation, extrinsic reinforcement, and inequity. Journal of Personality and Social Psychology, 1972, 22, 113-120.

composite-source model is shown below:

$$PM_j = EP\Sigma\left[PO_{ij}\ E \times O_{ij}\ V\right]$$

Again, EPE is the effort-performance expectancy, and $PO_{ij}E$ refers to the performance-outcome expectancy of outcome i which is in category j; $O_{ij}V$ refers to the value of outcome i in category j; and PM_j refers to a motivation score in category j.

Before a useful expectancy model can be successfully developed to fit a particular use, however, and before a motivation assessment instrument based on that model can be designed and motivation management strategies developed, one must understand clearly which performance outcomes (sources of motivation) are actually relevant to a situation. Relevant outcomes are outcomes which could reasonably be expected by the soldier to occur contingent upon some acceptable level of performance. In addition, one must know to what degree the relevant outcomes are valued by those performing the task in question. It should be emphasized that, according to expectancy theory, these evaluations are based on the perceptions of those to whom the model is to be applied rather than the perceptions of those who apply the model. Thus, motivation models, instruments, and management strategies developed from the manager's or commander's view of appropriate performance outcomes may lead to less desirable results than those directly founded on the views of the soldiers.

The set of performance outcomes which has proved useful in models and instruments designed for private industry may not be completely congruent with the set of performance outcomes appropriate in military settings. And the wide range of activities engaged in by Army personnel may preclude identifying any completely general set of performance outcomes useful within the Army. It may be, however, that outcomes can be identified which are relevant and valuable to soldiers engaged in certain kinds of activity, such as combat or combat training.

Two sources of performance outcomes which may prove useful for this purpose are readily available. Bialek and McNeil[8] studied performance outcomes in a Basic Combat Training (BCT) company at Fort Ord, California; Borman, Johnson, Motowidlo, and Dunnette[9] used a list of performance outcomes in questionnaires given to soldiers in Germany and Korea and to National Guardsmen in Minnesota. It is not certain, however, to what extent data from the 1968 BCT study are appropriate today. Many soldiers in the last half of the 1960's were draftees facing probable involvement

[8]Bialek, H., and McNeil, M. Preliminary study of motivation and incentives in basic combat training. HumRRO Technical Report 68-6, 1968.

[9]Borman, W. C., Johnson, P. D., Motowidlo, S. J., and Dunnette, M. D. Measuring Motivation, Morale and Job Satisfaction in Army Careers Volume II. Report under US Army Research Institute Contract DAHC 19-73-C-0025 by Personnel Decisions, Inc., Minneapolis, Minnesota, 1975.

in the Vietnam War. By contrast, all soldiers today are volunteers entering a peacetime Army. In addition, numerous changes have taken place in training procedures and subject, and in living conditions in the last decade. While Borman's performance outcome list is not too old, it probably also was administered to units still directly feeling the effects of the draft. And Borman did not report data indicating the relative value of the outcomes; while many items (i.e., improved medical care) are of value, they are not outcomes relevant to performance motivation. Quality of medical care, for instance, is not likely to be a function of a soldier's performance on a particular task.

SPECIFIC OBJECTIVES

The specific objectives of the present research were to identify valued performance outcomes which occurred with sufficient frequency in an operational Armor battalion to be useful in evaluating motivation, and to determine the relationship between an expectancy theory-based measure of motivation and performance in an operational Armor battalion. The research was conducted in three separate phases. Phase I was a pilot outcomes study which served as the basis for Phase II. In Phase II, an experimental motivation measure was devised and applied to men in an operational Armor battalion in order to determine the relationship between their motivation levels and tank gunnery performance. In this phase of the research, performance outcomes were more fully investigated to provide a better measure of outcome values and frequencies, and to determine whether either outcome frequency or value was a function of crewmens' pay grade.

PHASE I, PILOT RESEARCH AND INITIAL OUTCOME ANALYSIS

The purpose of this portion of the research was to determine the perceived value and frequency of occurrence of a number of tank gunnery performance outcomes. This information was needed to (1) identify appropriate outcomes for use in an expectancy theory-based motivation model and instrument, and (2) provide a list of potential sources of performance motivation to be utilized in developing a performance motivation management program. Of interest were the value and frequency of individual outcomes as well as the most highly valued and most frequent outcomes in each of the four classes: Recognition (R), Tangible Reward (TR), Intrinsic (I) and Actualization (A) sources.

METHOD

General Method. First, a questionnaire was developed to determine the perceived value to the individual, and the perceived frequency of occurrence following very good performance, of a number of selected performance outcomes. Second, the questionnaire was administered to Armor crewmen in an Armor battalion at Fort Hood, Texas during their annual tank gunnery training.

Questionnaire Development. The questionnaire used in this study was designed to determine the value of 51 performance outcomes and their frequency of occurrence following very good training performance. The outcomes were obtained from several sources. Some were based on a study by Borman et al. (1975), some were from Bialek and McNeil (1968), and others were from numerous interviews with Armor enlisted, noncommissioned officer (NCO), and officer personnel. Outcomes were selected on their potential value to an individual in an Armor setting, and their potential occurrence in that setting. This potential was evaluated by means of preliminary administration to ten soldiers in training and five training cadremen. Care was taken to evaluate both intrinsic and extrinsic sources of motivation. Among extrinsic outcomes were those related to recognition, free time, special privileges, advancement, and tangible rewards.

The resulting questionnaire (PT 5103) presented the list of 51 outcomes in each of two sections. In the first section, the soldiers were asked to indicate how frequently they believed each outcome occurred for the average soldier performing very well (top 25%) on his training task. They were asked to respond on a seven-point scale, from Never happens,0% of tasks, to Always happens, 100% of tasks. In the second section, the soldiers were asked how they, personally, would feel about each outcome if it did occur for them. An 11-point scale from +5, Like it extremely, to -5, Dislike it extremely, was provided. Because it was thought that most outcomes would be rated between +5 (Like it extremely) and -1 or -2 (Dislike it a little, or Dislike it some) in practice the 11-point scale would also approximate a seven-point scale. The questionnaire is included as Appendix A.

Research Participants. The research participants were 52 Armor crewmen (E-5 and below) assigned to an Armor TOE battalion at Ft. Hood, Texas. They were preparing for annual tank gunnery qualification.

Procedure. The data were collected in the field during the conduct of an unrelated research project. Participating soldiers were available in small groups of two or three, or sometimes singly. The instructions were carefully read to the crewmen, and the examples explained, prior to their beginning the questionnaire. The confidentiality of their individual responses was stressed both before and after their completion of the questionnaire. Participants completed the questionnaire either alone, or with one or two other crew members, while sitting on or beside their tanks. Communication between participants was discouraged during the questionnaire administration. About half the participants were instructed to complete only the section on outcome value, to meet time restraints imposed by an unrelated research project.

RESULTS

Of the 52 men completing the value section of the questionnaire, 38 (73%) followed the instructions in completing the questionnaire, and their responses were included in the evaluation of the value results. "Following instructions" was defined as giving not more than 80% of the outcomes the same rating. This criterion was designed to eliminate

those who did not consider the outcomes individually but simply went down the response column giving all or almost all outcomes the same answer. Of the 20 men completing the frequency section, 14 (70%) followed instructions, and their responses were included in the analysis of the frequency results.

Because of the pilot nature of the research, the relatively small samples collected, and the nature of the questions to be answered, extensive evaluation of the data did not seem justified. Analysis was limited, therefore, to the calculation of frequency and value means and standard errors for each of the performance outcomes. Data for all outcomes are provided in Appendix B, the outcomes ranked in order of perceived value.

Table 1 shows the four most-valued, most-frequent outcomes (based on a combination of their value and frequency ranks) for each of the four outcome categories: Recognition, Tangible Reward, Intrinsic, and Self-Actualization. Also shown, with an asterisk, is an outcome "Receiving additional training in your field" which many soldiers indicated they had read as . . . in the field. The men verbally indicated that additional training in their field would be of about average value.

DISCUSSION

The objective of this pilot research was to indicate which performance outcomes, by virtue of their perceived value and frequency of occurrence, might best be incorporated into an expectancy-based motivation model and instrument. Such outcomes should have moderate to high frequencies and values in each measure. Moderate to high frequencies allow acceptable inter-subject variability by eliminating any "floor effects." In principle, any outcome with acceptable inter-subject frequency variance could be chosen for a motivation instrument regardless of its value--so long as there was an acceptable level of variability in its value estimates. In our case, outcomes with moderate to high value estimates were chosen so that they could be used both in the motivation-measurement instrument and as guides to outcomes which could be managed to increase motivation. If moderate to highly valued outcomes should be shown to enter into a motivation instrument reflecting later performance, appropriate changes in the frequency of those outcomes could be expected to increment group motivation levels. If a causal motivation-performance relationship is assumed, the changes could increase overall performance.

Outcomes which met the value and frequency criteria were readily identified from the analyses. Specific outcomes in each of the four arbitrary categories are shown in Table 1. Such outcomes were considered appropriate for an experimental motivation model and "first generation" instrument designed to test the utility of a composite-source expectancy-based motivation theory in an operational setting. The outcomes were therefore incorporated into the motivation instrument utilized in the second phase of the research.

Table 1

THE MOST VALUED-MOST FREQUENT OUTCOMES FOR EACH SOURCE CATEGORY

Recognition

Receiving recognition from the company commander for doing a good job.

Getting an individual award for superior crew performance.

Getting praise from your superior for doing good work.

Receiving a "Well Done" from your platoon sergeant.

Tangible Reward

Getting a promotion in rank.

Being given a 3-day pass.

Being given two hours of free time on one day.

Having more free time to yourself.

Intrinsic

Feeling that you're carrying your share of the load.

Feeling that you have done an honest day's work.

Feeling really proud of having done a good job.

Feeling that you've achieved a worthwhile goal.

Self-Actualization

Being given a more responsible position.

Having more challenging opportunities in your job.

Being held more personally accountable for your work.

Having more to say in how you do your assigned job.

*Receiving additional training in your field.

*Many men said they misread this as . . . in the field and would have assigned the outcome moderate value if they had read it . . . your field.

PHASE II, ASSESSMENT OF MOTIVATION SOURCES IN RELATION TO PERFORMANCE

The second phase of the research was designed to indicate the utility of a composite-source expectancy-based motivation model when applied in an operational Armor setting. Specifically, we wished to determine the relationship between Armor gunnery performance and motivation measures derived from an instrument designed according to the four-category expectancy model discussed earlier. These categories were: Recognition (R), Tangible Reward (TR), Intrinsic (I), and Self-Actualization (A) sources. The most promising outcomes in each of these categories, as determined from Phase 1, were incorporated in the instrument.

Of primary interest were relationships with motivation scores taken well in advance of the tank gunnery criterion firing, for four reasons. First, such motivation measures, if indicative of motivation during the training period preceding qualification, could influence the extent to which the training was effective, and thus affect performance. Second, previous research[10] indicated larger motivation-performance relationships when motivation was measured some time before performance was evaluated than when motivation was measured immediately before performance evaluation. Third, if early measures of motivation were predictive of later performance, and if motivation could be effectively managed, then steps might be taken to improve performance through early motivation management. Fourth, persons familiar with qualification performance generally indicate that when actually beginning the qualification course all crewmen appear to be maximally motivated, some to the extent that their performance suffers. Even motivation measures taken 18-24 hours prior to qualification (as close as is practicable) might not be expected to indicate the varying levels of motivation extant during the actual task performance.

Measures of motivation taken just prior to qualification were of importance primarily because they could give an indication of motivation stability over the time between the tests. One would expect that motivation scores based on A and I sources would be more stable than those based on R and TR sources. The occurrence of R and TR sources are subject to larger changes in perceived performance-consequence contingencies than A and I sources. This is the reason that R and TR sources of motivation are most appropriate candidates for motivation management strategies, and the reason the relations between these sources and performance is of potential importance to the motivation manager.

With these considerations in mind, the research was conducted using a test-retest methodology (described below) in which both motivation measures were obtained prior to tank gunnery performance.

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[10] Lawler, E. E. A causal correlational analysis of the relationship between expectancy attitudes and job performance. Journal of Applied Psychology, 1968, 52, 462-468.

METHOD

Research Participants. The research participants were enlisted armor crewmen in an operational armor battalion at Ft. Carson. They included the 29 tank commanders (TCs), 38 gunners (GNRs), 21 drivers (DVRs), and 20 loaders (LDRs) who were present in the battalion throughout this phase of the research. The number of soldiers in each position differed because of crew turbulence, failure to take the tests, failure to be measured on the performance criteria, etc. The majority of the TCs were in their second three-year enlistment while most GNRs, DVRs, and LDRs were in their first enlistment.

Instruments. The motivation instrument developed for use in the Armor battalion incorporated questions covering the three primary features of general expectancy-based motivation instruments: (1) effort-performance expectancy (EPE), (2) performance-outcome expectancy (PO_iE), and (3) outcome value (O_iV). Four motivation scores could be derived, one in each of the four source areas (R, TR, ,I and A), by using only the PO_iE and O_iV outcomes appropriate to a particular source when calculating the motivation score based on that source. For example, in the calculation of a motivation score based on tangible reward sources, the following calculations would be employed:

$$PM_{TR} = \left[E_{\text{hard work}}{}^{PE} + E_{\text{exert effort}}{}^{PE} + E_{\text{try hard}}{}^{PE} \right] \left\{ \begin{array}{l} (PO_{\substack{\text{promotion in} \\ \text{rank}}}{}^{E}) \times (O_{\substack{\text{promotion in} \\ \text{rank}}}{}^{V}) \\ + \\ \cdot \quad (PO_{\text{3-day pass}}{}^{E}) \times (O_{\text{3-day pass}}{}^{V}) \\ + \\ (PO_{\text{2-hr. free time}}{}^{E}) \times (O_{\text{2-hr. free time}}{}^{V}) \\ + \\ (PO_{\text{more free time}}{}^{E}) \times (O_{\text{more free time}}{}^{V}) \end{array} \right\}$$

There were three EPE questions, each asking in a slightly different way the soldier's perception of the relation between the expenditure of effort and good performance. Each crewman was asked to assign a probability, from 0/10 to 10/10, that the exertion of effort would lead to good performance. Thus, for the $\sum_{i=1}^{3} E_iPE$ portion of the equation scores could vary from 0, if the subject assigned all three questions 0/10, to 3, if the subject assigned all three questions 10/10.

Calculations on the $\sum_{i=1}^{4} PO_iE \times O_iV$ portion of the equation were made in the following manner. The subject was asked the odds that good performance in tank gunnery would lead to his receiving a promotion, and he responded from 0/10 to 10/10. He was then asked the value he would place on a promotion, from -5, "Dislike it extremely" to +5, "Like it

extremely." Thus, for any $PO_iE \times O_iV$ product his score could range from 10/10 x -5 yielding a maximum negative score of -5, through 0/10 x 0, yielding 0, up to 10/10 x +5 yielding +5. The sum of the four different outcome products could therefore range between -20 and +20, and the product of the EPE sum and the $PO_iE \times O_iV$ products from -60 to +60.

The four outcomes in each category shown as most promising in Table 2 (from Phase 1) were used in the instrument. In the actualization section, however, "Receiving additional training in your field" was used rather than "Having more to say in how you do your assigned job" because the subjects in Phase 1 indicated they had misread the former outcome and, had they read it correctly, might have rated it higher than the latter.

The instrument contained 16 PO_iE questions, 4 in each source category; 16 O_iV questions, corresponding to the PO_iE questions; and 3 E_iPE questions which were used in each of the four separate motivation measures derivable from the instrument. The instrument is shown as Appendix C.

A ranking form was also used in this research. It was designed to allow platoon sergeants and platoon leaders to rank their five GNRs, five DVRs, and five LDRs from 1 (best) to 5 (worst) in terms of their demonstrated ability to do their assigned duties. A copy is shown as Appendix D.

Procedure. The motivation instrument was administered to the crewmen by a civilian employee of the US Army Research Institute under controlled classroom conditions about 10 weeks prior to their beginning the annual tank crew qualification course (TCQC - Table VIII) at Fort Carson, Colorado. Guarantees of confidentiality were given.

The same procedures were followed 10 weeks later when the instrument was readministered the day before the crewmen were to begin the TCQC Table VIII. On this administration, however, the men were in the field. The platoon sergeants and platoon leaders were also administered the rating form on their GNRS, DVRs, and LDRs at that time. The instructions were read to them and discussed, and any of their questions were answered. Again it was stressed that only Army Research Institute personnel would see their responses.

Between the first and second administrations of the motivation instrument, the battalion commander announced that a number of outcomes would be provided tank crewmen contingent upon their very good performance in tank gunnery. For men in the top five tank crews (of 54), these included tangible rewards of 2-5 working days off, $25-$75 cash prizes, and exemption from extra duty, as well as recognition outcomes of letters of commendation and an award plaque. All tangible rewards and recognition outcomes were to be presented at a battalion award ceremony. This served as a fledgling motivation management program to increase the crewmen's motivation and thus improve their tank gunnery performance.

The criterion performance data were collected in conjunction with the 4th Infantry Division (Mech) Tank Gunnery Assistance Team and included both overall Table VIII scores and time/accuracy measures on individual engagements. Performance criteria used for TCs were Table VIII overall scores, because the TC has complete supervisory responsibility over the tank crew. Table VIII scores incorporated the sum of all performances with main tank gun and machine gun engagements. Performance (time to first round and success) on main tank gun precision engagements against stationary targets (P-S engagements) was also used as TC criteria. Such engagements require a great deal of TC involvement in terms of both his physical performance requirements and supervisory responsibility.

Criteria used for GNRs were Table VIII scores and time and success on main tank gun battlesight engagements against stationary targets (BS-S engagements). Here, Table VIII scores were chosen because the gunner is involved in all the major components. Battlesight main gun engagements were chosen because these are primarily a GNR's task and require a relatively small performance contribution from the TC.

The DVR's criteria were the DVR's ranking in the platoon (as assigned by the platoon sergeant and platoon leader) and Table VIII overall score. Similarly, LDR's criteria were LDR's rankings and Table VIII overall score.

RESULTS

Motivation scores based on A, I, R, and TR sources were calculated for each man in each crew position on each test administration. For tank commanders, Pearson product-moment correlation coefficients were calculated between each of their three criteria (Table VIII total score, number of successful P-S engagements, and time on P-S engagements) and each of the eight motivation scores (A, I, R and TR for both motivation assessments). Because of the special interest in R and TR as motivation sources having greatest management potential, the multiple correlation between these and the criteria was calculated, as well as the semipartial correlation showing the individual contribution of each source.[11] The multiple regression analysis with R and TR allowed for the optimal combination of these sources with our composite-source model. All above mentioned statistics are shown in Table 2.

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[11] Semipartial correlation (sr's) was chosen because sr coefficients rather than partial coefficients, provide the best index of the relationship of a particular variable to criterion variance with the effects of one other variable removed. Semipartial correlation coefficients tend to be lower than partial correlation coefficients and have a sign indicating the direction of the relationship between the predictor variable and the criterion. When partial correlation coefficients are significantly different from zero, semipartial correlation coefficients are also, and vice versa (Cohen, J., and Cohen, P. Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences. Hillsdale, N. J.: Lawrence Earlbaum, 1975.)

Table 2

RELATIONSHIPS BETWEEN SELECTED MEASURES OF TANK COMMANDERS' PERFORMANCE MOTIVATION AND SELECTED TABLE VIII MEASURES

Motivation Source \ Criterion:	Table VIII	P-S Number of Successful Engagements	P-S Time to First Round [a]
A 1st Adm	-.05	+.09	+.06
I "	+.26	+.34*	.00
R "	+.25	+.30	+.09
TR "	-.46**	-.18	-.03
N = 29			
A 2nd Adm	-.02	+.11	+.19
I "	+.16	+.28	+.14
R "	+.05	+.11	+.15
TR "	-.19	.00	-.14
N = 26			
R R&TR 1st Adm	.68***	.46*	.09
Sr R "	+.50***	+.42**	-.08
Sr TR "	-.63***	-.35*	+.01
R R&TR 2nd Adm	.39	.18	.37
Sr R "	+.34*	+.18	+.35[b]
Sr TR "	-.39**	-.15	-.34[b]

[a]This is a measure where small values are "good" and high values "bad." Thus, signs have been reversed to make these coefficients compatible with the other relationships depicted in this table.

*p $<$.10, 2-tailed
**p $<$.05, 2-tailed
***p $<$.01, 2-tailed

The multiple correlation coefficient between TR and R sources of motivation (those that are most easily managed) and Table VIII scores (the principal criterion for tank commanders) was .68, ($p < .001$), indicating a very strong relationship between these sources and Table VIII scores. Figure 3 shows a graph of this relationship.

Analysis of regression indicated a significant increment in prediction, from $r = .46$ for TR alone (accounting for 21% of Table VIII variance) to $R = .68$ (accounting for 46% of Table VIII variance) when both TR and R were included. Note that while TR and R motivation sources contributed strongly to TC performance, the relationship between R sources and performance (as indicated by $sr_R = +.50$, $p < .002$) was strongly positive whereas the relationship between TR sources and performance ($sr = -.63$, $p < .001$) was strongly negative. Plots of these relationships are shown in Figures 4 and 5.

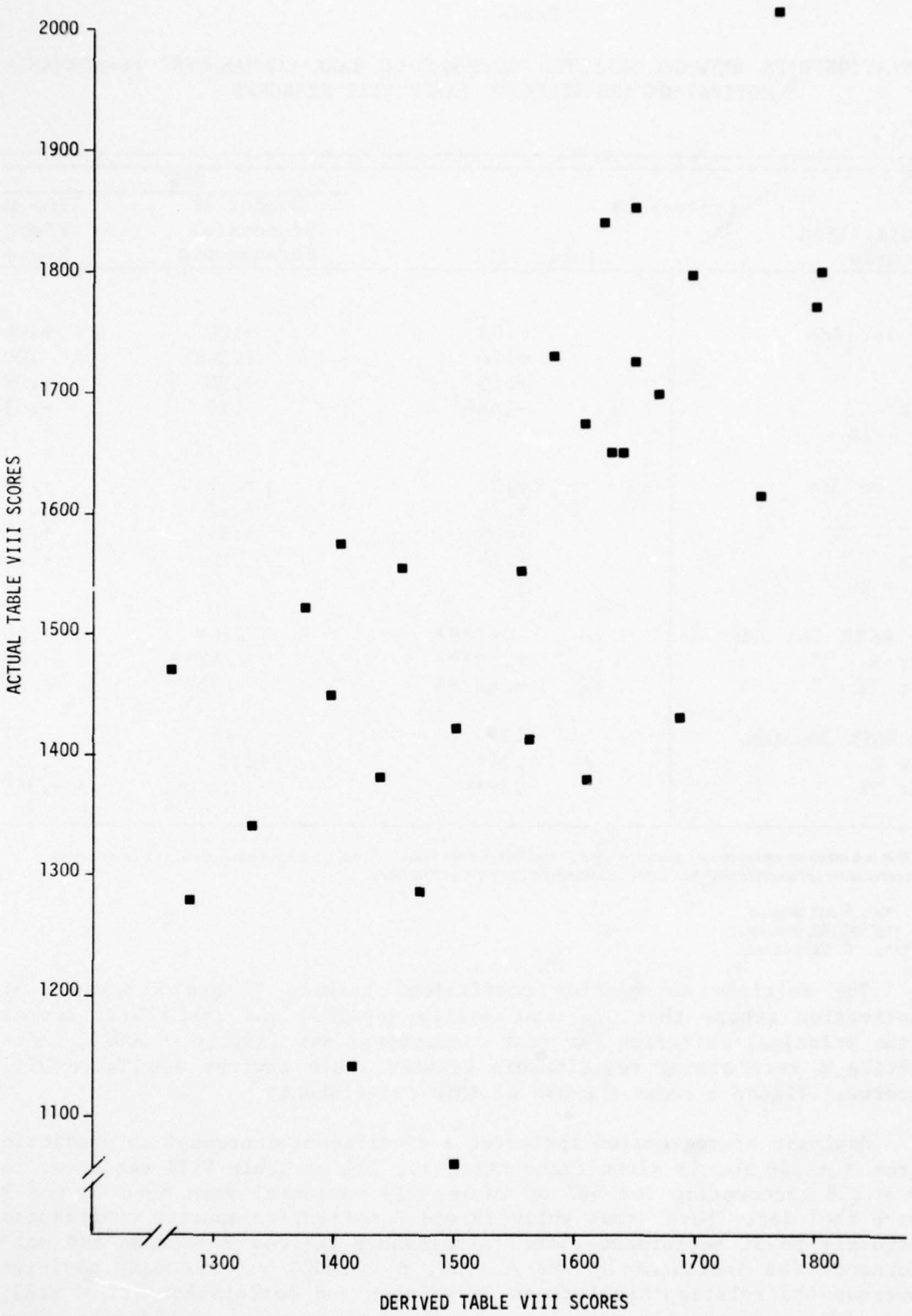

Figure 3. The Relationship between Actual Table VIII Scores and Derived Scores Based on Tank Commanders' Performance Motivation

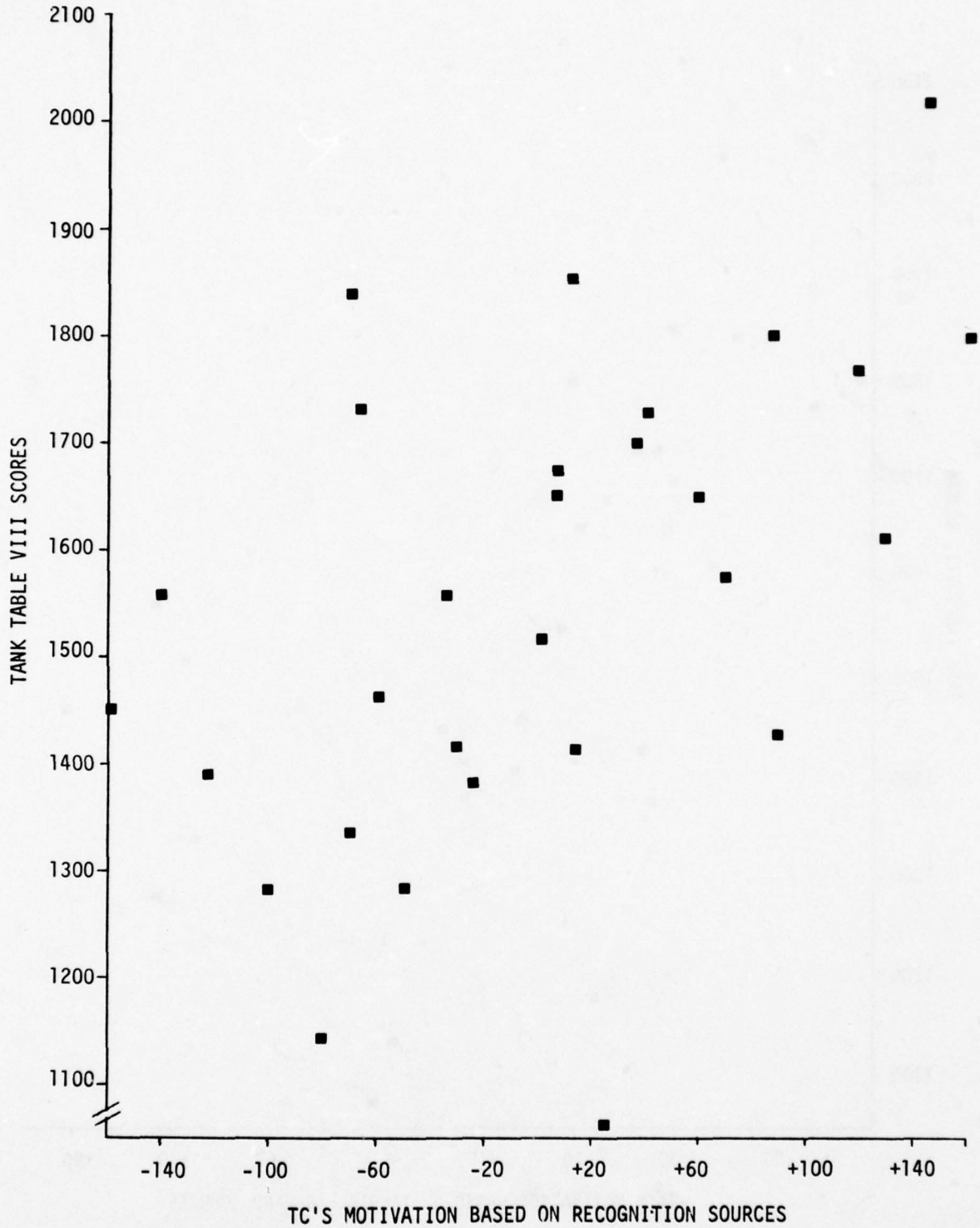

Figure 4. The Relationship between Actual Table VIII Scores and Derived Scores Based on Tank Commanders' Recognition Based Motivation

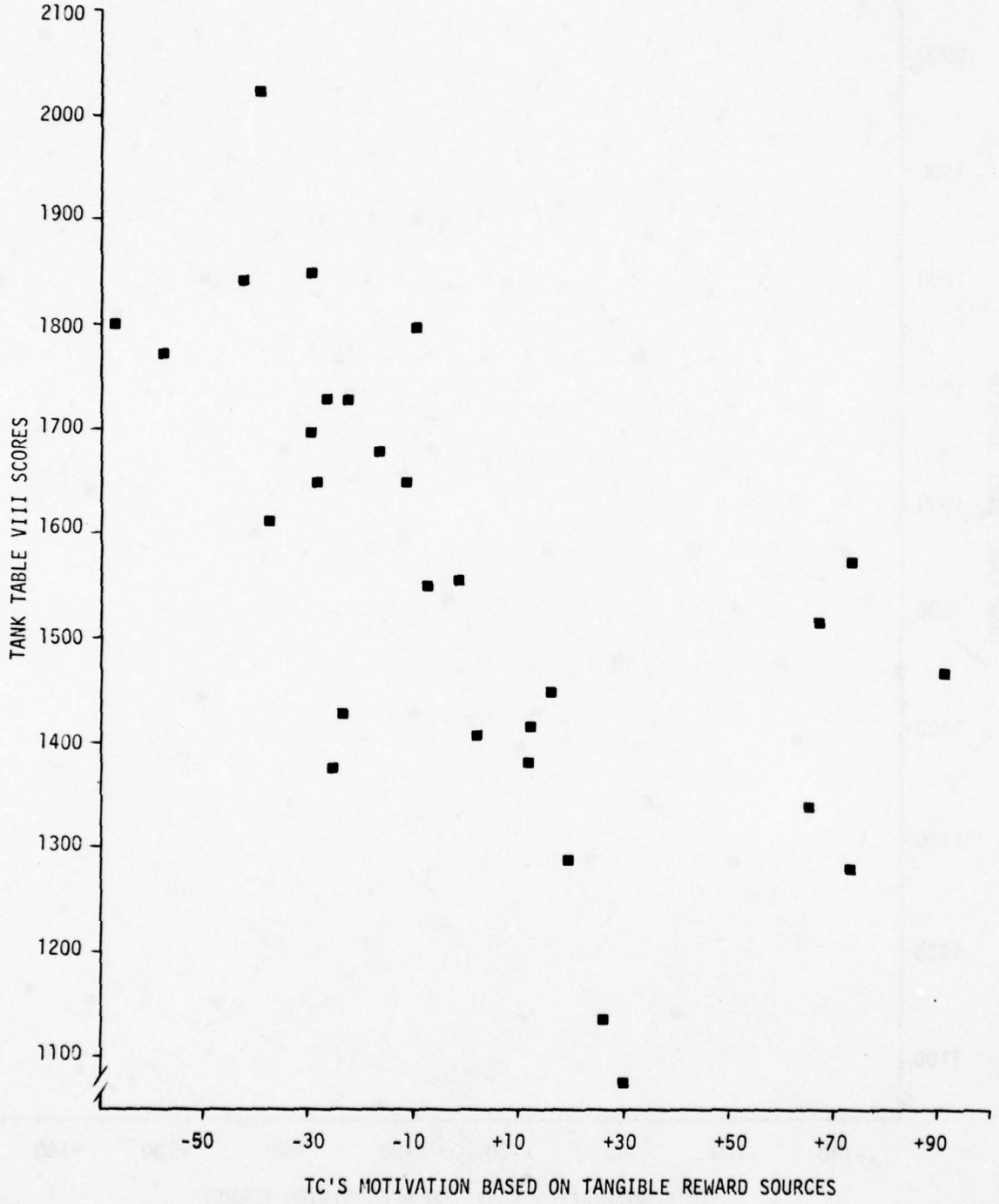

Figure 5. The Relationship between Actual Table VIII Scores and Derived Scores Based on Tank Commanders' Tangible Reward Based Motivation

Because a relationship of this nature was not anticipated, data from the three individual companies were analyzed to determine whether the relationship would hold up in what could be considered three small independent replications of the same study. The results of these analyses are presented in Table 3. In all cases the sr_R's were positive, and the sr_{TR}'s negative, reflecting the relationship observed for the battalion over all.

Table 3

RELATIONSHIP BETWEEN TABLE VIII AND TANK COMMANDERS' R AND TR MOTIVATION SCORES, BY COMPANY

Company	n	$R_{\text{Table VIII. R\&TR}}$	sr_R	sr_{TR}
A	10	.64	+.56	-.53
B	11	.87	+.29	-.86
C	8	.57	+.53	-.48

When TR and R sources were combined additively, as suggested by a conventional expectancy model rather than the composite-source model evaluated in this research, there was no relationship between motivation and performance ($r = .02$, $p > .20$).

Because of the particularly strong relationship between performance and motivation based on TR and R sources, the individual components of the model were evaluated in an attempt to identify the source of the relationship. No relationship was found between TCs' Effort-Performance Expectancies (EPE) alone and performance (r +.071, $p > .20$). Thus the EPE component of the model was probably not a significant contributor to the results illustrated in Figures 1, 2, and 3. Next, TCs' Performance Outcome Expectancies (PO_IE) were evaluated for TR and R outcomes. PO_IE based on TR sources proved to be the best predictor ($r = -.634$, $p < .001$, accounting for 40% of the criterion variance). The addition of PO_IE for R variables yielded a significant increment in variance-accounted-for (8% increment, $p = .055$). Mirroring the full model results, the semipartial correlation coefficients based on PO_iEs were -.690, ($p < .001$) and +.283, ($p = .055$) for TR and R outcomes respectively. An analogous analysis with TC outcome values (OVs) revealed neither significant zero-order, semipartial, or multiple correlation (all $p > .20$). Thus, the sources of the motivation-performance relationships would seem to stem from a strong <u>negative</u> relationship between TR PO_iE and performance, and a smaller but significant <u>positive</u> relation between R PO_iE and performance.

An analysis schema analogous to that used for TCs was used to determine the relationship between GNRs' motivation scores and their criteria (Table VIII score, number of successful BS-S engagements, and time to first round on BS-S engagements). These results are shown in Table 4. This analysis indicated a relationship which was, in part, the reverse of that indicated for TCs: GNR motivation based on R sources revealed a small but significant negative relation to Table VIII total score and number of successful BS-S engagements.

The DVRs' and LDRs' motivation scores were related to their ratings and Table VIII overall scores in the same manner as for TCs and GNRs. These results are shown in Tables 5 and 6, respectively.

Table 4

RELATIONSHIPS BETWEEN SELECTED MEASURES OF GUNNERS' PERFORMANCE MOTIVATION AND SELECTED TABLE VIII GUNNERY MEASURES

Source \ Criterion:	Table VIII	BS-S	
		Number of Successful Engagements	Time[a] to First Round
A 1st Adm	-.09	-.17	-.08
I "	-.23	-.25	-.05
R "	-.34**	-.34**	-.26
TR "	-.06	-.12	+.04
N = 38			
A 2nd Adm	-.18	+.01	-.37**
I "	-.06	-.13	-.27
R "	-.24	-.11	-.46***
TR "	-.27	+.05	-.26
N = 38			
R R&TR 1st Adm	.39	.36	.36
Sr R "	-.39***	-.34**	-.36**
Sr TR "	+.19	+.12	+.25
R R&TR 2nd Adm	.27	.27	.50**
Sr R "	-.05	-.26	-.42***
Sr TR "	-.12	+.25	+.19

[a]This is a measure where small values are "good" and high values "bad." Thus, signs have been reversed to make these coefficients compatible with the other relationships depicted in this table.

*$p < .10$, 2-tailed
**$p < .05$, 2-tailed
***$p < .01$, 2-tailed

Table 5

RELATIONSHIPS BETWEEN SELECTED MEASURES OF DRIVERS' PERFORMANCE MOTIVATION AND SELECTED TABLE VIII GUNNERY MEASURES

Source \ Criteria:	Table VIII	Ranking[a]
A 1st Adm	-.22	+.40*
I "	-.20	+.44**
R "	-.07	+.41*
TR "	+.04	+.31
N = 21		
A 2nd Adm	-.18	+.27
I "	-.12	+.20
R "	+.01	+.27
TR "	+.02	+.08
N = 21		
R R&TR 1st Adm	.18	.41
Sr R "	+.17	+.26
Sr TR "	+.18	+.03
R R&TR 2nd Adm	.02	.42
Sr R "	-.01	+.42**
Sr TR "	+.02	-.33

[a]This is a measure where small values are "good" and high values "bad." Thus, signs have been reversed to make these coefficients compatible with the other relationships depicted in this table.

*$p < .10$, 2-tailed
**$p < .05$, 2-tailed
***$p < .01$, 2-tailed

As Tables 2-5 show, the same interesting pattern emerged for the relationship between motivation based on TR sources and motivation based on R for the nonfirers in the tank, the TC, DVR, and LDR. All significant relationships between R and performance measures were positive (4 for TC, 2 DVR, 3 for LDR). For motivation based on TR sources, all significant relationships were negative (5 for TC, and 1 for LDR). Gunners, who actually fired the tanks, presented a different picture. All significant relationships between R and performance for GNRs were negative (7 instances), presenting a marked contrast to the positive relationships between R and performance for nonfirers (TCs, DVRs, and LDRs).

Correlation coefficients between first and second administration motivation measures were calculated for each crew position and each motivation source. Then the weighted average correlation across crew positions was calculated. These are shown for each motivation source in Table 7. All mean r's were significant, but A, I, and R had markedly higher correlations than TR.

Table 6

RELATIONSHIPS BETWEEN SELECTED MEASURES OF LOADERS' PERFORMANCE MOTIVATION AND SELECTED TABLE VIII GUNNERY MEASURES

Source \ Criteria:	Table VIII	Ranking[a]
A 1st Adm	.00	+.10
I "	-.07	-.04
R "	+.50**	+.23
TR "	+.09	+.09
N = 20		
A 2nd Adm	-.02	-.13
I "	+.15	+.13
R "	+.33	+.27
TR "	+.34	+.02
N = 20		
R R&TR 1st Adm	.57**	.24
Sr R "	+.56***	+.23
SR TR "	-.28	-.08
R R&TR 2nd Adm	.35	.48
Sr R "	+.09	+.48**
Sr TR "	+.10	+.40*

[a]This is a measure where small values are "good" and high values "bad." Thus, signs have been reversed to make these coefficients compatible with the other relationships depicted in this table.

*p < .10, 2-tailed
**p < .05, 2-tailed
***p < .01, 2-tailed

Finally, in order to determine the direction of any overall group changes in motivation scores over the 10 weeks between motivation measurements, a 4 x 4 x 2 ANOVA was conducted, having as factors motivation source (A, I, R and TR), crew position (TC, GNR, DVR, and LDR), and measurement time (10 weeks or 1 day before the TCQC - Table VIII). After the first motivation measurement, but before the second, the battalion commander had announced that a number of tangible rewards, as well as a certain degree of recognition, would be awarded to men in the top tank crews on the TCQC. It might be expected, therefore, that motivation levels based on TR sources, and perhaps R sources, would have increased between the two measurements. The results of the ANOVA, however, indicated only one significant main effect, Motivation Source ($F = 113$, $df = 3/315$, $p < .001$). The means were 91, 102, 146, and 190 for TR, A, R, and I, respectively. Only one interaction proved significant, Motivation Source x Crew Position ($F = 2.13$, $df = 9/315$, $p < .025$). All other main effects and interactions failed to reach significance (all F's < 1.69, all p's >.10).

Table 7

RELATIONSHIP BETWEEN MOTIVATION MEASURES ADMINISTERED 10 WEEKS PRIOR TO AND 1 DAY PRIOR TO THE TCQC

	TC n=26	GNR n=38	DR n=25	LDR n=20	$\bar{r}$
r_{R1-R2}	.50***	.51***	.35*	.63***	.50***
r_{I1-I2}	.76***	.43***	.62***	.36	.56***
$r_{TR1-TR2}$	.47***	.21	.19	.21	.27***
r_{A1-A2}	.71***	.42***	.36*	.61***	.53***

*p< .10, 2-tailed
**p< .05, 2-tailed
***p< .01, 2-tailed

DISCUSSION

The results of this study bring to light several interesting relationships between motivation and performance, and indicate a number of potential uses of these relationships in motivation management strategies. One of our first questions dealt with the relation between motivation, as measured by an instrument based on a composite-source model from expectancy theory, and observable performance in tank gunnery. While previous research with the additive model by a number of investigators had provided some support for motivation-performance relationships, most investigations reported only modest relationships. There are several reports of relatively strong relationships between motivation and performance ratings--such as Orpen's (1975)--but only one study has shown a significant relationship where actual observable behavior was the performance criterion.[12] In Matsui and Terai's study, the significant result was due in part to the large N (190): r's were in the .20's. The research presented here represents the first report (to the author's knowledge) of really strong relationships demonstrated between expectancy theory-based motivation measures and a "hard" criterion of observable behavior.

[12]Matsui, T., and Terai, T. A cross-cultural study of the validity of the expectancy theory of work motivation. Journal of Applied Psychology, 1975, 60, 263-265.

There are several possible reasons for this. First, the measures were taken in conjunction with a training program. Motivation could affect the degree to which the preparatory training was effective, and through this relationship, affect criterion performance. This concept is supported by the markedly stronger relation between TCs' first motivation measures and performance than between their second measures and performance. TCs have primary responsibility for training their crews. Thus, differences in TCs' motivation early in training could markedly affect their crews' training and later performance.

From the relationships between motivation performance across the four crew positions, it becomes apparent that the strongest relationships were for TCs. As suggested above, this is not particularly surprising in that the individual TCs' motivation can affect not only his own performance in training and testing, but also the degree to which his crew benefits from training and performs during testing. The TC can, to some extent, override any effects of gunner, driver, or loader motivation through his supervision, leadership, and command responsibilities.

A second major factor leading to the stronger motivation-performance relationships with observable behavior reported here was the use of a composite-source model of motivation. The composite-source model, wherein summations are made separately within each category and sources are treated separately, is different from the more conventional additive procedure in which (PO_iE) (O_iV) products are summed over all outcomes regardless of category. A great deal of current theoretical discussion supports looking at the components separately. Both Deci (1971, 1972, and 1975) and Notz (1975) have offered convincing data and discussion championing the potential interaction between intrinsic and extrinsic motivation sources.[13] In 1972, Deci reported an experiment wherein performance of students given recognition ("verbal reinforcement") was superior to that of students given none and inferior to that of students promised tangible reward.

Deci's result was similar to that observed for our non-firers (tank commanders, drivers, and loaders). For men in these positions, all relationships between motivation based on recognition sources and performance were positive, and all for tangible reward sources were negative. Deci interpreted his result as consistent with the hypothesis that extrinsic motivation serves to decrease intrinsic motivation (and thus performance based primarily on intrinsic motivation sources). Recognition, according to Deci, "was not phenomenologically distinguishable from internal satisfaction" and served to increment intrinsic motivation.

Assuming Deci's interpretation is correct for his data, one additional ingredient would be needed to make the conclusion to apply to our TC, DVR, and LDR data as well. Deci measured intrinsic motivation by looking at post-criterion performance, when he assumed extrinsic motivation

[13] Deci, E. L. Effects of externally mediated rewards on intrinsic motivation. Journal of Personality and Social Psychology, 1971, 18, 105-115.

sources were not acting to affect performance. He noted, however, that in other cases pre-criterion performance might be positively affected by expectancy of extrinsic outcomes. We would have to assume that even though training performance preceded criterion gunnery qualification, for certain critical (but unspecified) training elements, no causal relationship was perceived between training performance on those elements and TR criterion performance. Thus, performance would have to have been motivated by intrinsic sources and (according to Deci) closely associated recognition sources. Increased recognition-based motivation would thus have incremented performance. Increased tangible reward motivation, however, would have decreased intrinsic/recognition-based motivation but failed in itself to increment performance, thus leading to a net performance decrement. Obviously, any firm adherence to such hypothesized mechanisms would require independent confirmation of the basic assumptions.

Such an interpretation was not consistent with the gunners' results. Although one might wish that the results were chance occurrences that would not be replicated, the number of significant relationships seriously weakens that notion. An argument could be made that for gunners, unlike TCs', drivers, and loaders, gunnery performance is more under the direct control of the reinforcing contingencies offered by tangible reward, and less affected by effects of intrinsic motivation. It is not clear, however, why that should be the case for only gunners when all contingencies were apparently operationally applied equally, without regard to crew position. It would probably be best to suggest that this is a finding for which no readily credible explanation is available.

The results for three of the four positions are apparently related to motivational sources in a way which is consistent with contemporary literature. What management strategies, then, are most likely to benefit the crew performance? Given the general negative relation between extrinsic (tangible reward) motivation and performance, tangible reward would seem to be an inappropriate motivation management strategy. Perhaps efforts should be extended to reduce the relatively widespread use of such management strategies. If one were to infer some causal relation between TR and performance, then for TCs, DVRs and LDRs, the strategy may be damaging. If no causal relationship is inferred, one can at least suggest that such management would provide little positive benefit, and expending the manager's effort on TR may prevent his concentrating on other sources.

Recognition sources, on the other hand, look more promising. A potential strategy would be to manage motivation through the management of recognition sources which are relatively "pure" in the sense of being free of associated tangible reward. Such a strategy might be expected to increment the motivation of TCs, DVRs, and LDRs, if any causal relationship can be inferred from the correlations we observed. That such causal relationships might be expected can be inferred from the causal correlational analysis presented by Lawler (1968).

The time factor noted above is also important in terms of the potential for use of management strategies. If motivation measured just prior to performance was the only measure related to performance, management opportunities would be extremely limited. In our case, however, the relatively long (10-week) time period between measured motivation and performance suggests the possibility that motivation could be effectively managed during this time. Management of recognition sources seems to be an appropriate first step.

What of the effect of this procedure on gunner's performance? Hopefully, it would not decrement gunner's performance. If one were to attribute the majority of crew performance to the supervision, leadership, and command emphasis given crews by TCs during training, overall improved performance might be expected. Such a thesis awaits empirical confirmation.

PHASE III, INTENSIVE OUTCOME ANALYSIS

Although outcomes were identified in Phase I which proved appropriate for use in a motivation assessment instrument in Phase II, further questions remained which the Phase I pilot data did not answer. Answers to these questions take on a good deal of importance, given the relative success of the initial research with the composite-source motivation model presented in Phase II.

Because of the small sample available in Phase I, it was not possible to determine with any confidence the relative value to the individual or frequency of the majority of the performance outcomes. Only relatively gross differences could be determined. In Phase III, a much larger sample was used in order to provide relatively small confidence intervals for each mean value and frequency, thus allowing finer distinctions to be made between outcomes. Secondly, in the Phase I research, the small sample size did not permit comparisons to be made between outcome values and frequencies as perceived by men of different grades. This comparison could be very important, however, in either the refinement of a motivation measurement instrument or the development of a motivation management program. If perceived values or frequencies do vary with grade, separate procedures or strategies may be required for men in the different grades. Such a result seems a distinct possiblility, given the variation in pay, prestige, career commitment, and personal freedom afforded men of different grades.

The specific objectives of this phase of the research were the refinement of our knowledge about the value and frequency of outcomes in an operational Armor battalion, and evaluation of the effect of military grade on these value and frequency perceptions.

METHOD

Research Participants. The research participants were 112 Armor crewmen in an armor battalion undergoing annual tank gunnery qualification at Fort Carson, Colorado. The sample included 30 Privates (E2), 34 Privates First Class (E3), 23 Specialists (E4), and 25 Sergeants (E5).

Procedure. A civilian employee of the Army Research Institute administered the outcome questionnaire (Appendix A) under controlled classroom conditions in conjunction with several additional instruments pertinent to a separate study. As in Phases I and II, guarantees of confidentialty were given.

RESULTS

Of the 112 armor crewmen participating in the study, 102 (91%) followed the instructions in completing the questionnaire, and their answers were included in the analysis of the results. "Following instructions" was defined as responding in such a way that not more than 80% of the outcomes were given the same rating. This criterion was designed to eliminate those who did not consider the outcomes individually but simply went down the response column giving all or almost all outcomes the same answer. Of the 102 men who followed instructions, 26 were E2s, 31 were E3s, 20 were E4s, and 25 were E5s.

An Outcome by Rank unweighted-means analysis of variance was conducted separately for the soldiers' value and frequency ratings. The procedures outlined in Winer[14] were followed. The analysis of frequency responses yielded a reliable main effect of Outcome ($F = 23.51$, $df = 50/4900$, $p < .001$). This result indicates a significant difference in the soldiers' perceptions of the frequency with which outcomes occurred. The main effect of Grade and the interaction of Outcome by Grade, however, were not significant (F's < 1.00, dfs 3/98 and 150/4900, respectively). This result indicates that there was neither any overall difference between grades in perceived outcome frequency nor any significant variation in the way men of different grades perceived the frequency of the various outcomes. The outcomes, and their mean frequencies are shown in Table 8. The mean within-rank variance for each outcome, also shown, is an indication of the degree to which the crewmen agreed upon the frequency of each outcome. To permit comparisons of any pair of outcome means, a "critical difference" at the 1% level was computed, yielding a value of .55. The confidence interval of any particular mean was $\pm$ .39.

An identical analysis of the outcome values revealed a significant main effect of Outcome ($F = 12.07$, $df = 50/4900$, $p < .001$), indicating highly significant differences in the perceived values of the outcomes. Again, the main effect of grade did not prove to be a significant source of variance ($F < 1.00$, $df = 3/98$). Thus, value perceptions over all outcomes were not a function of grade. Outcome by Grade interaction approached but did not reach significance ($F = 1.22$, $df = 150/4900$, $p = .038$). Because of the very small F-value obtained, and the very large df, the interaction was judged to be of no practical significance. Therefore, overall mean values for each outcome are shown in Table 9. Again, outcome variances, the critical difference between means, .58, and the confidence interval of a mean, $\pm$ .41, are also shown.

[14]Winer, B. J. Statistical Principles in Experimental Design. New York: McGraw-Hill, 1971.

Table 8

MEAN OUTCOME VALUE AND VARIANCE (N=102)

Critical difference between means = .55 (α = .01)
Confidence interval of a mean $\pm$ .39 (α = .01)

Mean Frequency	Mean Variance	Outcome
4.33	1.94	feeling really proud of having done a good job
4.19	2.33	receiving a "Well Done" from your Platoon Sergeant
4.17	1.89	feeling that you are carrying your share of the load
3.98	1.80	being held more personally accountable for your work
3.97	2.16	feeling that you have achieved a worthwhile goal
3.92	2.38	feeling that you have done an honest day's work
3.88	2.25	playing an important part in helping your unit get the job done
3.87	1.95	getting praise from your superior for doing good work
3.87	2.66	feeling proud to be a soldier in the United States Army
3.79	2.12	being popular with the men in your unit
3.73	2.14	receiving additional training in your job area
3.71	2.14	getting respect from your friends in the unit
3.68	2.23	feeling that you are an important part of the Armor Team
3.68	2.78	feeling more that you are serving your country in an important way
3.66	1.77	being given a more responsible position
3.63	2.42	taking part in sports during duty hours
3.53	2.33	feeling that you are really doing something worthwhile
3.44	1.21	receiving recognition from Company Commander for doing a good job
3.25	2.86	getting a promotion in rank
3.20	1.87	receiving greater leadership responsibilities
3.14	2.53	being presented with a trophy before the company
3.13	2.21	being given a three-day pass
3.13	2.62	being given the opportunity to further your military education (like NCO school)
3.08	1.75	having more challenging opportunities in your job

Table 8 continued

Mean Frequency	Mean Variance	Outcome
3.02	2.06	receiving a letter of merit from the C.O.
3.02	1.74	getting more respect from your superiors
2.94	2.52	receiving the Battalion C.O.'s commendation
2.94	2.38	getting an individual award for superior crew performance
2.93	2.38	having more say in how you do your assigned job
2.93	2.15	being treated more fairly and more consistently in the Army
2.93	1.90	being treated with more consideration by your superiors
2.87	2.36	having more opportunity to supervise the work of others
2.76	2.68	having more control over your personal life
2.64	3.30	having more free time to yourself
2.62	2.04	receiving the Company Commander's special recognition
2.61	2.46	being the Post's "Soldier of the Month"
2.61	2.42	getting less harrassment from officers
2.54	1.82	being given two hours of free time on one day
2.51	2.40	receiving a $25 savings bond as an award
2.50	1.89	having more of an opportunity to try out your own job ideas
2.49	1.83	being relieved from a short detail
2.43	2.05	having more time to spend with your friends
2.43	2.90	being exempt from guard duty
2.29	1.98	having your picture and story in the Post/your hometown newspaper
2.07	2.84	receiving 24 hr post privileges for one week
2.05	1.57	getting an hour off each day for a week to do as you like
1.99	1.11	being able to plan and organize your own work activities
1.92	1.90	having a special letter of merit sent to your parents
1.69	1.54	being excused from standing inspection for one week
1.57	1.95	getting free laundry service for one month
1.42	1.21	being allowed to sleep late every morning for a week

Table 9

MEAN OUTCOME FREQUENCY AND VARIANCE (N=102)

Critical difference between overall means = .58 (α = .01)
Confidence interval for overall means = $\pm$ .41 (α = .01)

Overall Mean	Mean Variance	Outcome
3.94	2.64	being exempt from guard duty
3.92	2.75	getting a promotion in rank
3.89	1.42	having more control over your personal life
3.36	3.01	being given a three-day pass
3.30	3.73	being allowed to sleep late every morning for a week
3.29	3.68	getting less harrassment from officers
3.27	2.92	having more free time to yourself
3.23	2.72	being treated with more consideration by your superiors
3.19	2.25	being treated more fairly and more consistently in the Army
3.12	3.28	having more say in how you do your assigned job
3.08	2.99	getting an hour off each day for a week to do as you like
3.06	3.71	being excused from standing inspection for one week
3.00	3.06	getting more respect from your superiors
2.97	5.68	receiving a $25 savings bond as an award
2.88	4.14	receiving the Battalion C.O.'s commendation
2.87	3.39	taking part in sports during duty hours
2.79	5.04	getting free laundry service for one month
2.71	3.05	being given two hours of free time on one day
2.66	2.76	having more time to spend with your friends
2.64	2.35	feeling really proud of having done a good job
2.63	3.05	getting praise from your superior for doing good work
2.58	3.75	getting an individual award for superior crew performance
2.57	2.62	feeling that you have achieved a worthwhile goal
2.56	3.13	having more of an opportunity to try out your own job ideas

Table 9 continued

Overall Mean	Mean Variance	Outcome
2.55	5.52	having a special letter of merit sent to your parents
2.52	2.97	being able to plan and organize your own work activities
2.51	4.84	being presented with a trophy before the company
2.48	3.61	being given a more responsible position
2.47	4.22	having more opportunity to supervise the work of others
2.47	4.48	receiving a letter of merit from the C. O.
2.47	5.55	getting respect from your friends in the unit
2.46	4.63	being relieved from a short detail
2.45	4.49	feeling that you are really doing something worthwhile
2.45	2.97	receiving a "Well Done" from your Platoon Sergeant
2.43	5.48	feeling that you are carrying your share of the load
2.42	4.64	receiving the Company Commander's special recognition
2.40	5.19	feeling more that you are serving your country in an important way
2.40	3.69	receiving greater leadership responsibilities
2.37	3.33	feeling that you have done an honest day's work
2.35	4.65	receiving 24 hr post privileges for one week
2.33	3.93	having more challenging opportunities in your job
2.22	3.24	being held more personally accountable for your work
2.20	3.64	playing an important part in helping your unit get the job done
2.19	9.47	being given the opportunity to further your military education (like NCO school)
2.12	4.12	receiving recognition from Company Commander for doing a good job
2.00	6.94	feeling proud to be a soldier in the United States Army
1.99	5.99	being the Post's "Soldier of the Month"
1.99	3.35	being popular with the men in your unit
1.97	5.77	feeling that you are an important part of the Armor Team
1.51	7.87	having your picture and story in the Post/your hometown newspaper
1.11	6.37	receiving additional training in your field

Finally, to determine the degree to whch mean outcome value and frequency perceptions evaluated at Fort Carson were like those evaluated in the Phase I pilot research at Fort Hood, standard Pearson product-moment correlation coefficients were calculated. Correlation between mean values assigned the 51 outcomes at the two posts was .42, while the correlation between the mean frequencies assigned the outcomes was .76, both $p < .01$.

DISCUSSION

This research was designed to evaluate the values and frequencies of occurrence of selected performance outcomes as perceived by individuals in an operational Armor battalion undergoing annual tank gunnery training. Two questions were of particular interest. First, we wished to determine the relationship between an individual's military grade and his perceptions of the value and frequency of motivation sources. The discovery of a significant relationship between either perceived value and grade or perceived frequency and grade would have major implications for the measurement or management of motivation. Such a finding could lead to the development of different measurement/management techniques for men in different grades. In addition, we were interested in determining the relationships between the outcomes in terms of their judged frequencies, and in terms of their judged values. This information could be used in the refinement of our instrument for measuring performance motivation, and in the development of programs to improve performance motivation.

The results of the frequency analysis did not suggest that perceived outcome frequency is a function of grade. And the results of the value analysis yielded little evidence that value perception is a function of grade. Taken together, these findings indicate that we may evaluate overall outcome frequency and value judgements, disregarding grade. Thus, in the development of motivation-measurement instruments and potential management strategies, grade need not be a major concern when dealing with men between E2 - Private, and E5 - Sergeant. This finding is particularly important because men in those grades make up the majority of enlisted armor crewmen (91% in the battalion evaluated). Thus, men in those grades comprise the population most likely to be of interest to those evaluating or managing performance motivation in Armor battalions.

Our second question dealt with the potential use of selected outcomes in motivation measurement instruments and experimental motivation management programs. In evaluating the outcomes for these two separate purposes, different sets of criteria are required. Outcomes most suitable for inclusion in measurement instruments have moderate mean values and moderate perceived frequencies. They should have relatively large variance on these measures to indicate substantial individual differences which may be related to performance.

On the other hand, outcomes most suitable for consideration in an experimental motivation management program should meet the following three criteria: First, they should have relatively high values with

small value variances, indicating that they have about the same appeal for most people. Second, they should have pre-existing frequencies which indicate that they can be effectively managed. If one hypothesized that increasing motivation based on recognition sources would increase performance, then one would choose recognition sources which had relatively low pre-existing frequencies. Third, they should have the potential for economical frequency changes through motivation management efforts. A number of outcomes meeting each set of requirements can be identified from Tables 8 and 9.

Outcomes which might be used in motivation measurement include "having more opportunity to supervise the work of others," "being presented with a trophy before the company," and "feeling that you are really doing something worthwhile." Outcomes more appropriate for potential use in a performance motivation management program as recognition sources might include "receiving the Battalion CO's commendation" or "getting praise from your superior for doing good work." Of course, these should be considered examples of outcomes which may be identified from the tables as having potential utility in measurement instruments or management programs. The decision regarding which specific outcomes would be most likely to be productive depends to a large degree upon the particular situation in which they are to be utilized, and the hypothesized relationship between motivation scores and performance.

SUMMARY AND CONCLUSIONS

The specific objectives of this research were to identify valued performance outcomes which occur with sufficient frequency in an Armor battalion to be useful in motivation evaluations, and to determine the relationship between an expectancy theory-based measure of motivation and actual performance in an operational Armor battalion. Phases I and III of the research dealt with initial outcome evaluation and intensive outcome analysis, respectively, while Phase II dealt with evaluation of a composite-source motivation model based on contemporary expectancy-theory conceptions of motivation.

The pilot research conducted in Phase I provided a list of performance outcomes which were evaluated in terms of their rank on perceived value and perceived frequency of occurrence. From these, outcomes were chosen in each of four categories (recognition, tangible reward, intrinsic, and self actualization sources) for use in the composite-source expectancy theory-based motivation instrument.

In Phase II of the research, the instrument was administered twice to Armor crewmen in an operational Armor battalion undergoing the annual tank gunnery training and qualification. The first administration was given under controlled classroom conditions 10 weeks prior to qualification, and the second under field conditions a day prior to qualification. Numerous significant relationships were observed between gunnery performance and measures of motivation. Although many measures of intrinsic and self-actualization sources of motivation were related to gunnery performance, our primary interest was in the relationships between performance motivation and recognition and tangible reward sources.

Sources in those two categories are likely candidates for management because it is easier to modulate frequencise of occurrence of outcomes in those source categories. Recognition sources of motivation were generally fournd to be positively related to performance for the non-firers on the tank--the tank commander, driver, and loader--while tangible reward sources were negatively related to performance. For gunners, however, this relationship appeared in part to be opposite, recognition-based motivation being negatively related to performance.

The research in Phase II demonstrated the practical utility of the composite-source motivation model. Because the four motivation sources were not related to performance in the same direction, the conventional additive model was seriously questioned. Frthermore, when the additive model was used for tank commanders' recognition and tangible reward outcomes, no hint of a relationship was observed between additive-model motivation indices and performance. Yet, when the composite model was used with the same data, a remarkably strong relationship was observed between measured motivation and performance.

Several potential applications of the motivation model were discussed. The most likely source for an experimental motivation management research program is recognition, which was positively related to performance for tank commanders, driver, and loaders. Despite the apparent negative relationship found between gunners' recognition motivation and performance, it was argued that incrementing recognition sources may have a positive overall effect on crew performance. Such a recognition-source management strategy may positively affect the performance of three of the four crewmen, one of whom is the tank commander who has the primary responsibility for crew training and performance. Any negative effects on gunners may be outweighed by the other three crew members, particularly the tank commander.

In Phase III, further information was gathered for the development of a second generation motivation instrument and potential motivation management strategies. Phase III research, based on a relatively large number of men, permitted a much clearer determination of the relative values and frequencies of the outcomes, and allowed the motivation evaluator and manager to choose his outcomes from a list based on empirical determinations from the target population, as recently suggested by Campbell and Pritchard.

Second, Phase III considered the relation between crewmens' grade and judged frequency and value of outcomes. In view of the interaction between crew position and motivation source effect observed in Phase II, it seemed entirely possible that outcome value and frequency judgments could be modulated by crewmen's grade. However, neither value nor frequency perceptions were found to be a function of grade. Thus grade, over the range evaluated, need not be of concern when designing motivation measurement instruments and management strategies.

[15]Campbell, J. P. and Pritchard, R. T. Motivation theory in industrial and organizational psychology. In M. D. Dunnette (Ed.), Handbook of Industrial and Organizational Psychology. Chicago: Rand McNally, 1976.

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APPENDIXES

APPENDIX A

OUTCOMES QUESTIONNAIRE USED IN PHASES I AND III (PT5103)

How often does it happen?

As we all know, particular events are typically followed by certain outcomes. For instance, the event of scoring highest on the PT test in Basic Training was normally followed by a trophy, feeling of pride, or C.O.'s commendation for the high scorer.

The purpose of these questions is to determine how often certain outcomes (like receiving a trophy, the C.O.'s commendation, or a feeling of pride) occur following very good performance (top 25%) on various Armor training tasks in an operational Armor company. Because you have undergone a great deal of training in the past months you are in a very good position to help us obtain this information.

For each of the following outcomes please select an answer from the choices below. The answer should describe your beliefs about how often each outcome occurs for the average soldier when he performs very well (top 25%) on the various Armor training tasks.

Never happens, 0% of tasks	Rarely happens, less than 20% of tasks	Seldom happens, between 20% & 40% of tasks	Sometimes happens, between 40% & 60% of tasks	Often happens, between 60% & 80% of tasks	Almost always, happens more than 80% of tasks	Always happens, 100% of tasks
1	2	3	4	5	6	7

Example:

How frequently do you believe the following outcome will occur for the average soldier who performs very well (top 25%) on his training tasks? Please choose best answer and circle. Thank you.

being relieved from a cleanup detail 1 2 3 (4) 5 6 7

If you believe that the average soldier is sometimes (about 50% of the time) relieved from cleanup details for very good (top 25%) performance on training tasks circle 4.

How frequently do you believe the following outcome will occur for the average soldier who performs very well (top 25%) on his training tasks? Please choose best answer and circle. Thank you.

Receiving recognition from Company Commander for doing a good job	1	2	3	4	5	6	7
being allowed to sleep late every morning for a week	1	2	3	4	5	6	7
being excused from standing inspection for one week	1	2	3	4	5	6	7
feeling proud to be a soldier in the United States Army	1	2	3	4	5	6	7
being given a more responsible position	1	2	3	4	5	6	7
getting praise from your superior for doing good work	1	2	3	4	5	6	7
being presented with a trophy before the company	1	2	3	4	5	6	7
getting a promotion in rank	1	2	3	4	5	6	7
taking part in sports during duty hours	1	2	3	4	5	6	7
receiving a letter of merit from the C. O.	1	2	3	4	5	6	7
receiving greater leadership responsibilities	1	2	3	4	5	6	7

PT 5103

Never happens, 0% of tasks	Rarely happens, less than 20% of tasks	Seldom happens, between 20% & 40% of tasks	Sometimes happens, between 40% & 60% of tasks	Often happens, between 60% & 80% of tasks	Almost always happens, more than 80% of tasks	Always happens, 100% of tasks
1	2	3	4	5	6	7

How frequently do you believe the following outcome will occur for the average soldier who performs very well (top 25%) on his training tasks? Please choose best answer and circle.

feeling really proud of having done a good job	1	2	3	4	5	6	7
being given two hours of free time on one day	1	2	3	4	5	6	7
receiving additional training in your job area	1	2	3	4	5	6	7
being able to plan and organize your own work activities	1	2	3	4	5	6	7
receiving the Company Commander's special recognition	1	2	3	4	5	6	7
feeling that you are an important part of the Armor Team	1	2	3	4	5	6	7
having a special letter of merit sent to your parents	1	2	3	4	5	6	7
being the Post's "Soldier of the Month"	1	2	3	4	5	6	7
getting an individual award for superior crew performance	1	2	3	4	5	6	7
playing an important part in helping your unit get the job done	1	2	3	4	5	6	7
receiving a "Well Done" from your Platoon Sergeant	1	2	3	4	5	6	7
being held more personally accountable for your work	1	2	3	4	5	6	7
getting free laundry service for one month	1	2	3	4	5	6	7
getting less harrassment from officers	1	2	3	4	5	6	7
having more opportunity to supervise the work of others	1	2	3	4	5	6	7
being relieved from a short detail	1	2	3	4	5	6	7
feeling more that you are serving your country in an important way	1	2	3	4	5	6	7
having more say in how you do your assigned job	1	2	3	4	5	6	7
receiving 24 hr post privileges for one week	1	2	3	4	5	6	7
feeling that you are really doing something worthwhile	1	2	3	4	5	6	7
getting more respect from your superiors	1	2	3	4	5	6	7
being given the opportunity to further you military education (like NCO school)	1	2	3	4	5	6	7
being given a three-day pass	1	2	3	4	5	6	7
having more challenging opportunities in your job	1	2	3	4	5	6	7

PT 5103

Never happens, 0% of tasks	Rarely happens, less than 20% of tasks	Seldom happens, between 20% & 40% of tasks	Sometimes happens, between 40% & 60% of tasks	Often happens, between 60% & 80% of tasks	Almost always happens, more than 80% of tasks	Always happens, 100% of tasks
1	2	3	4	5	6	7

How frequently do you believe the following outcome will occur for the average soldier who performs very well (top 25%) on his training tasks? Please choose best answer and circle.

getting an hour off each day for a week to do as you like	1	2	3	4	5	6	7
feeling that you have done an honest day's work	1	2	3	4	5	6	7
having your picture and story in the Post/ your hometown newspaper	1	2	3	4	5	6	7
being treated more fairly and more consistently in the Army	1	2	3	4	5	6	7
being popular with the men in your unit	1	2	3	4	5	6	7
feeling that you have achieved a worthwhile goal	1	2	3	4	5	6	7
having more free time to yourself	1	2	3	4	5	6	7
having more of an opportunity to try out your own job ideas	1	2	3	4	5	6	7
being treated with more consideration by your superiors	1	2	3	4	5	6	7
having more time to spend with you friends	1	2	3	4	5	6	7
having more control over your personal life	1	2	3	4	5	6	7
feeling that you are carrying your share of the load	1	2	3	4	5	6	7
getting respect from your friends in the unit	1	2	3	4	5	6	7
receiving a $25 savings bond as an award	1	2	3	4	5	6	7
receiving the Battalion C. O.'s commendation	1	2	3	4	5	6	7
being exempt from guard duty	1	2	3	4	5	6	7

This information is being collected by the Army Research Institute. It is for RESEARCH PURPOSES ONLY. No part of any soldier's individual scores will be entered into his records or be available to anyone other than Army Research Institute personnel for research uses only.

How do you feel about it?

A number of things happen to a soldier in the Army. Many of these things happen when the soldier performs well on his assigned tasks. The purpose of this questionnaire is to find out how you, personally, would feel about these things if they did happen to you.

Please think about each of the outcomes listed below. Then carefully answer how you would feel about each one by circling the number corresponding to the phrase which best describes your feelings. Your answers will be used for research purposes only.

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Dislike it extremely	Dislike it greatly	Dislike it a lot	Dislike it some	Dislike it a little	Don't care	Like it a little	Like it some	Like it a lot	Like it greatly	Like it extremely

Example: How would you feel about:

being congratulated by the Commanding General for doing very well in tank gunnery. -5 -4 -3 -2 -1 0 +1 +2 +3 (+4) +5

If you would like it greatly you would circle +4

How would you feel about:	Please circle one.
receiving recognition from Company Commander for doing a good job	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
being allowed to sleep late every morning for a week	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
being excused from standing inspection for one week	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
feeling proud to be a soldier in the United States Army	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
being given a more responsible position	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
getting praise from your superior for doing good work	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
being presented with a trophy before the company	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
getting a promotion in rank	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
taking part in sports during duty hours	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
receiving a letter of merit from the C. O.	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
receiving greater leadership responsibilities	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
receiving the Battalion C. O.'s commendation	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
being exempt from guard duty	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

PT 5103

! INFORMATION FOR RESEARCH PURPOSES ONLY !

Dislike it extremely	Dislike it greatly	Dislike it a lot	Dislike it some	Dislike it a little	Don't care	Like it a little	Like it some	Like it a lot	Like it greatly	Like it extremely
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5

How would you feel about:

feeling really proud of having done a good job	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
being given two hours of free time on one day	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
receiving additional training in your job area	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
being able to plan and organize your own work activities	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
receiving the Company Commander's special recognition	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
feeling that you are an important part of the Armor Team	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
having a special letter of merit sent to your parents	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
being the Post's "Soldier of the Month"	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
getting an individual award for superior crew performance	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
playing an important part in helping your unit get the job done	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
receiving a "Well Done" from your Platoon Sergeant	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
being held more personally accountable for your work	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
getting free laundry service for one month	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
getting less harrassment from officers	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
having more opportunity to supervise the work of others	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
being relieved from a short detail	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
feeling more that you are serving your country in an important way	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
having more say in how you do your assigned job	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
receiving 24 hr post privileges for one week	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
feeling that you are really doing something worthwhile	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5
getting more respect from your superiors	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

Dislike it extremely	Dislike it greatly	Dislike it a lot	Dislike it some	Dislike it a little	Don't care	Like it a little	Like it some	Like it a lot	Like it greatly	Like it extremely
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5

How would you feel about:

being given the opportunity to further your military education (like NCO school)	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	_
being given a three-day pass	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
having more challenging opportunities in your job	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
getting an hour off each day for a week to do as you like	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
feeling that you have done an honest day's work	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
having your picture and story in the Post/ your hometown newspaper	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	_
being treated more fairly and more consistently in the Army	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
being popular with the men in your unit	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
feeling that you have achieved a worthwhile goal	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
having more free time to yourself	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
having more of an opportunity to try out your own job ideas	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	_
being treated with more consideration by your superiors	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
having more time to spend with your friends	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
having more control over your personal life	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
feeling that you are carrying your share of the load	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
getting respect from your friends in the unit	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	
receiving a $25 savings bond as an award	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	_

This information is being collected by the Army Research Institute. It is for RESEARCH PURPOSES ONLY. No part of any soldier's individual scores will be entered into his records or be available to anyone other than Army Research Institute personnel for research uses only.

PT 5103

Please fill in your name, number, and unit below. As soon as possible your data will be coded and your name, number, and unit will be clipped off this sheet and destroyed.

Name	Number	Company	Platoon

APPENDIX B

THE PERCEIVED VALUE AND FREQUENCY MEANS, RANKS, AND STANDARD ERRORS OF THE 51 OUTCOMES EVALUATED IN PHASE I OF THE RESEARCH

Rank		Mean		S.E.		
Value	Freq	Value	Freq	Value	Freq	Outcome
1.	3	3.65	4.20	.27	.42	getting a promotion in rank
2.	9	3.60	3.92	.22	.35	feeling that you have done an honest day's work
3.	7.5	3.55	4.00	.22	.43	feeling that you are carrying your share of the load
4.	14.5	3.53	3.71	.25	.53	being given a three-day pass
5.	16.5	3.50	3.64	.26	.40	having more control over your personal life
6.	21	3.44	3.50	.25	.48	feeling that you are really doing something worthwhile
7.	50	3.39	1.71	.36	.46	being exempt from guard duty
8.	5.5	3.34	4.07	.26	.38	feeling really proud of having done a good job
9.	34	3.29	2.93	.29	.51	having more say in how you do your assigned job
10.	36	3.25	2.85	.26	.36	having more of an opportunity to try out your own job ideas
11.	26	3.23	3.28	.33	.58	being given the opportunity to further your military education (like NCO school)
12.	12.5	3.18	3.78	.30	.41	feeling that you have achieved a worthwhile goal
13.	45	3.18	2.22	.26	.38	receiving the Battalion C.O.'s commendation
14.5	12.5	3.11	3.78	.26	.33	being given a more responsible position
14.5	16.5	3.11	3.64	.29	.37	playing an important part in helping your unit get the job done
16.	5.5	3.09	4.07	.26	.44	receiving recognition from Company Commander for doing a good job
17.	10.5	3.08	3.85	.24	.36	having more challenging opportunities in your job
18.	26	3.07	3.28	.29	.45	feeling that you are an important part of the Armor Team
19.	14.5	3.05	3.71	.25	.45	being given two hours of free time on one day
20.	19	3.04	3.57	.32	.40	having more free time to yourself
21.	24	3.02	3.30	.31	.47	getting an individual award for superior crew performance
22.5	30	2.99	3.10	.26	.49	receiving greater leadership responsibilities
22.5	7.5	2.99	4.00	.25	.44	being held more personally accountable for your work
24.	4	2.95	4.14	.25	.33	getting respect from your friends in the unit

Rank		Mean		S.E.		Outcome
Value	Freq	Value	Freq	Value	Freq	
25.	41	2.93	2.42	.31	.47	receiving a $25 savings bond as an award
26.	38	2.92	2.72	.29	.45	feeling proud to be a soldier in the United States Army
27.	19	2.84	3.57	.28	.41	being treated with more consideration by your superiors
28.5	22.5	2.83	3.42	.36	.48	getting more respect from your superiors
28.5	22.5	2.83	3.42	.27	.45	feeling more that you are serving your country in an important way
30.	29	2.76	3.14	.39	.50	being treated more fairly and more consistently in the Army
31.	35	2.74	2.92	.35	.49	receiving a letter of merit from the C.O.
32.	19	2.71	3.57	.30	.41	receiving a "Well Done" from your Platoon Sergeant
33.	2	2.65	4.21	.34	.36	getting praise from your superior for doing doing good work
34.	26	2.60	3.28	.36	.53	taking part in sports during duty hours
35.	46	2.47	2.14	.43	.39	being excused from standing inspection for one week
36.5	43.5	2.46	2.28	.38	.34	having a special letter of merit sent to your parents
36.5	39	2.46	2.53	.35	.50	receiving 24 hr post privileges for one week
38.	28	2.42	3.21	.32	.59	getting less harrassment from officers
39.	31	2.39	3.07	.34	.38	having more time to spend with your friends
40.5	33	2.36	3.00	.35	.58	being able to plan and organize your own work activities
40.5	43.5	2.36	2.28	.32	.37	getting an hour off each day for a week to do as you like
42.	32	2.35	3.03	.28	.51	having more opportunity to supervise the work of others
43.	49	2.28	1.85	.43	.53	getting free laundry service for one month
44.	47.5	2.27	2.00	.37	.35	being the Post's "Soldier of the Month"
45.	40	2.23	2.46	.39	.46	being presented with a trophy before the company
46.	51	2.22	1.64	.40	.31	being allowed to sleep late every morning for a week
47.	37	2.21	2.78	.31	.35	receiving the Company Commander's special recognition
48.	42	2.19	2.35	.37	.41	being relieved from a short detail
49.	1	1.91	4.42	.36	.40	being popular with the men in your unit
50*	10.5	1.86*	3.85	.46	.49	receiving additional training in your field
51.	47.5	1.22	2.00	.43	.36	having your picture and story in the Post/your hometown newspaper

*Many men said they misread this as . . . in the field and would have assigned the outcome moderate value if they had read it . . . your field.

APPENDIX C PERFORMANCE MOTIVATION INSTRUMENT USED IN PHASE II
(PT 5102A)

Last Name	First Name	Service number	Tank

Please fill in your name, number, and tank above. As soon as possible your data will be coded and your name, number, and tank will be clipped off this sheet and destroyed. No part of any soldier's individual scores will be entered into his records or be available to anyone other than Army Research Institute personnel for research uses only.

In the following sections we want to find out what you think the odds are for certain specific happenings. Then we want to know how you might feel <u>if</u> <u>they</u> <u>did</u> happen to you.

SECTION I What are the odds?

For each general question below please circle the odds (chances in 10) which best tells how certain <u>you</u> are that the statement is true. Choose any odds from the following:

no chance	very very little chance	very little chance	little chance	some chance	50-50 chance	fairly good chance	good chance	very good chance	very very good chance	perfect 100% chance
0/10	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10

Example: What are the odds that if you do very well on tank gunnery the Commanding General will shake your hand and congratulate you?

0/10 1/10 (2/10) 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

If you feel there is <u>very</u> <u>little</u> <u>chance</u> that this would happen circle 2/10.

YOUR ANSWERS WILL BE KEPT CONFIDENTIAL. PLEASE ANSWER CAREFULLY AND HONESTLY. THANK YOU.

1. What are the odds that if you do very well in tank gunnery you will receive praise from your superior for doing good work?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

2. What are the odds that if you do very well in tank gunnery you will feel really proud of having done a good job?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

3. What are the odds that you will receive a promotion in rank if you do very well in tank gunnery?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

4. What are the odds that you will do very well in tank gunnery if you really put in a lot of effort?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

5. What are the odds that you will be held more personally accountable for your work if you do very well in tank gunnery?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

no chance	very very little chance	very little chance	little chance	some chance	50-50 chance	fairly good chance	good chance	very good chance	very very good chance	perfect 100% chance
0/10	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10

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6. What are the odds that you will feel that you are carrying your share of the load if you do very well on tank gunnery?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

7. What are the odds that if you do very well on tank gunnery you'll have more free time to yourself?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

8. What are the odds that you will be given a more responsible position if you do very well in tank gunnery?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

9. If you do very well in tank gunnery what are the odds that you will receive a "Well done" from your platoon sergeant?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

10. What are the odds that you will be given a three-day pass if you do very well in tank gunnery?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

11. If you exert yourself and concentrate what are the odds that you will perform very well on tank gunnery?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

12. If you do very well in tank gunnery what are the odds that you will receive recognition from the Company Commander for doing a good job?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

13. What are the odds that you will feel you've done an honest day's work if you do very well in tank gunnery?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

14. If you do very well in tank gunnery what are the odds you will be given more challenging opportunities in your job?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

15. What are the odds that you'll be given two hours of free time on one day if you do very well in tank gunnery?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

no chance	very very little chance	very little chance	little chance	some chance	50-50 chance	fairly good chance	good chance	very good chance	very very good chance	perfect 100% chance
0/10	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10

16. What are the odds that if you work hard you will do very well in tank gunnery?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

17. If you do very well in tank gunnery what are the odds that you will get an individual award for superior crew performance?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

18. What are the odds that you will feel you have achieved a worthwhile goal if you do very well in tank gunnery?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

19. If you do very well in tank gunnery what are the odds that you will receive additional training in your job area?

0/10 1/10 2/10 3/10 4/10 5/10 6/10 7/10 8/10 9/10 10/10

SECTION II — How do you feel about it?

In this section we are asking how you feel about the happenings you saw in Section I. We would like to know how you would feel if it happened to you.

Dislike it Extremely	Dislike it greatly	Dislike it a lot	Dislike it some	Dislike it a little	Don't care	Like it a little	Like it some	Like it a lot	Like it greatly	Like it extremely
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5

Example: How would you feel about being congratulated by the Commanding General for doing very well in tank gunnery?

-5 -4 -3 -2 -1 0 +1 +2 (+3) +4 +5

If you would like it a lot circle +3.

YOUR ANSWERS WILL BE KEPT CONFIDENTIAL. PLEASE ANSWER CAREFULLY AND HONESTLY. THANK YOU.

20. How would you feel about getting a three-day pass?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

21. How would you feel about knowing that you've done an honest day's work?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

22. How would you feel about receiving additional training in your job area?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

Dislike it extremely	Dislike it greatly	Dislike it a lot	Dislike it some	Dislike it a little	Don't care	Like it a little	Like it some	Like it a lot	Like it greatly	Like it extremely
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5

YOUR ANSWERS WILL BE KEPT CONFIDENTIAL. PLEASE ANSWER CAREFULLY AND HONESTLY. THANK YOU.

23. How would you feel about receiving praise from your superior?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

24. How would you feel about being given more challenging opportunities in your job?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

25. How would you feel about believing that you have achieved a worthwhile goal?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

26. How would you feel about being able to carry your share of the load?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

27. How would you feel about being really proud of having done a good job?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

28. How would you feel about being given two hours of free time on one day?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

29. How would you feel about receiving a "Well done" from your platoon sergeant?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

30. How would you feel about getting an individual award for superior crew performance?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

31. How would you feel about receiving a promotion?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

32. How would you feel about receiving recognition from the Company Commander for doing a good job?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

33. How would you feel about being given a more responsible position?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

34. How would you feel about having more free time to yourself?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

35. How would you feel about being held more personally accountable for your work?

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

APPENDIX D

PLATOON LEADER'S - PLATOON SERGEANT'S RATING FORM

1. PLEASE LIST THE GUNNERS IN YOUR PLATOON, starting with the gunner assigned to your first tank (i.e. A21 if A Co, 2nd Plt) and continuing to your fifth tank.

CO	PLT	TANK	GUNNER'S NAME	RANKING
____	_____	1	_____	_____
____	_____	2	_____	_____
____	_____	3	_____	_____
____	_____	4	_____	_____
____	_____	5	_____	_____

Consider your gunners in terms of their demonstrated gunning ability at this time. Disregard their personality, conduct in the platoon, military courtesy, motivation, training, etc. Rank the gunners in terms of demonstrated gunning ability only, with the best gunner ranked 1, the second best 2, etc. Write your ranking next to the man's name in the column headed "Ranking".

2. PLEASE LIST THE DRIVERS IN YOUR PLATOON, starting with the driver assigned to your first tank (i.e. A21 if A Co, 2nd Plt) and continuing to your fifth tank.

Co	PLT	TANK	DRIVER'S NAME	RANKING
____	_____	1	_____	_____
____	_____	2	_____	_____
____	_____	3	_____	_____
____	_____	4	_____	_____
____	_____	5	_____	_____

Consider your drivers in terms of their demonstrated driving ability at this time. Disregard their personality, conduct in the platoon, military courtesy, motivation, training, etc. Rank the drivers in terms of demonstrated driving ability only, with the best driver ranked 1, the second best 2, etc. Write your ranking next to the man's name in the column headed "Ranking".

(OVER)
PLEASE CONTINUE ON THE BACK OF THIS PAGE

3. PLEASE LIST THE LOADERS IN YOUR PLATOON, starting with the loader assigned to your first tank (i.e. A21 if A Co, 2nd Plt) and continuing to your fifth tank.

CO	PLT	TANK	LOADER'S NAME	RANKING
____	____	1	_____	_____
____	____	2	_____	_____
____	____	3	_____	_____
____	____	4	_____	_____
____	____	5	_____	_____

Consider your loaders in terms of their demonstrated loading ability at this time. Disregard their personality, conduct in the platoon, military courtesy, motivation, training, etc. Rank the loaders in terms of demonstrated loading ability only, with the best loader ranked 1, the second best 2, etc. Write your ranking next to the man's name in the column headed "Ranking".

THANK YOU

DISTRIBUTION

ARI Distribution List

4 OASD (M&RA)
2 HQDA (DAMI-CSZ)
1 HQDA (DAPE-PBR
1 HQDA (DAMA-AR)
1 HQDA (DAPE-HRE-PO)
1 HQDA (SGRD-ID)
1 HQDA (DAMI-DOT-C)
1 HQDA (DAPC-PMZ-A)
1 HQDA (DACH-PPZ-A)
1 HQDA (DAPE-HRE)
1 HQDA (DAPE-MPO-C)
1 HQDA (DAPE-DW)
1 HQDA (DAPE-HRL)
1 HQDA (DAPE-CPS)
1 HQDA (DAFD-MFA)
1 HQDA (DARD-ARS-P)
1 HQDA (DAPC-PAS-A)
1 HQDA (DUSA-OR)
1 HQDA (DAMO-RQR)
1 HQDA (DASG)
1 HQDA (DA10-PI)
1 Chief, Consult Div (DA-OTSG), Adelphi, MD
1 Mil Asst. Hum Res, ODDR&E, OAD (E&LS)
1 HQ USARAL, APO Seattle, ATTN: ARAGP-R
1 HQ First Army, ATTN: AFKA-OI-TI
2 HQ Fifth Army, Ft Sam Houston
1 Dir, Army Stf Studies Ofc, ATTN: OAVCSA (DSP)
1 Ofc Chief of Stf, Studies Ofc
1 DCSPER, ATTN: CPS/OCP
1 The Army Lib, Pentagon, ATTN: RSB Chief
1 The Army Lib, Pentagon, ATTN: ANRAL
1 Ofc, Asst Sect of the Army (R&D)
1 Tech Support Ofc, OJCS
1 USASA, Arlington, ATTN: IARD-T
1 USA Rsch Ofc, Durham, ATTN: Life Sciences Dir
2 USARIEM, Natick, ATTN: SGRD-UE-CA
1 USATTC, Ft Clayton, ATTN: STETC-MO-A
1 USAIMA, Ft Bragg, ATTN: ATSU-CTD-OM
1 USAIMA, Ft Bragg, ATTN: Marquat Lib
1 US WAC Ctr & Sch, Ft McClellan, ATTN: Lib
1 US WAC Ctr & Sch, Ft McClellan, ATTN: Tng Dir
1 USA Quartermaster Sch, Ft Lee, ATTN: ATSM-TE
1 Intelligence Material Dev Ofc, EWL, Ft Holabird
1 USA SE Signal Sch, Ft Gordon, ATTN: ATSO-EA
1 USA Chaplain Ctr & Sch, Ft Hamilton, ATTN: ATSC-TE-RD
1 USATSCH, Ft Eustis, ATTN: Educ Advisor
1 USA War College, Carlisle Barracks, ATTN: Lib
2 WRAIR, Neuropsychiatry Div
1 DLI, SDA, Monterey
1 USA Concept Anal Agcy, Bethesda, ATTN: MOCA-WGC
1 USA Concept Anal Agcy, Bethesda, ATTN: MOCA-MR
1 USA Concept Anal Agcy, Bethesda, ATTN: MOCA-JF
1 USA Artic Test Ctr, APO Seattle, ATTN: STEAC-MO-ASL
1 USA Artic Test Ctr, APO Seattle, ATTN: AMSTE-PL-TS
1 USA Armament Cmd, Redstone Arsenal, ATTN: ATSK-TEM
1 USA Armament Cmd, Rock Island, ATTN: AMSAR-TDC
1 FAA-NAFEC, Atlantic City, ATTN: Library
1 FAA-NAFEC, Atlantic City, ATTN: Hum Engr Br
1 FAA Aeronautical Ctr, Oklahoma City, ATTN: AAC-44D
2 USA Fld Arty Sch, Ft Sill, ATTN: Library
1 USA Armor Sch, Ft Knox, ATTN: Library
1 USA Armor Sch, Ft Knox, ATTN: ATSB-DI-E
1 USA Armor Sch, Ft Knox, ATTN: ATSB-DT-TP
1 USA Armor Sch, Ft Knox, ATTN: ATSB-CD-AD
2 HQUSACDEC, Ft Ord, ATTN: Library
1 HQUSACDEC, Ft Ord, ATTN: ATEC-EX-E-Hum Factors
2 USAEEC, Ft Benjamin Harrison, ATTN: Library
1 USAPACDC, Ft Benjamin Harrison, ATTN: ATCP-HR
1 USA Comm-Elect Sch, Ft Monmouth, ATTN: ATSN-EA
1 USAEC, Ft Monmouth, ATTN: AMSEL-CT-HDP
1 USAEC, Ft Monmouth, ATTN: AMSEL-PA-P
1 USAEC, Ft Monmouth, ATTN: AMSEL-SI-CB
1 USAEC, Ft Monmouth, ATTN: C, Facl Dev Br
1 USA Materials Sys Anal Agcy, Aberdeen, ATTN: AMXSY-P
1 Edgewood Arsenal, Aberdeen, ATTN: SAREA-BL-H
1 USA Ord Ctr & Sch, Aberdeen, ATTN: ATSL-TEM-C
2 USA Hum Engr Lab, Aberdeen, ATTN: Library/Dir
1 USA Combat Arms Tng Bd, Ft Benning, ATTN: Ad Supervisor
1 USA Infantry Hum Rsch Unit, Ft Benning, ATTN: Chief
1 USA Infantry Bd, Ft Benning, ATTN: STEBC-TE-T
1 USASMA, Ft Bliss, ATTN: ATSS-LRC
1 USA Air Def Sch, Ft Bliss, ATTN: ATSA-CTD-ME
1 USA Air Def Sch, Ft Bliss, ATTN: Tech Lib
1 USA Air Def Bd, Ft Bliss, ATTN: FILES
1 USA Air Def Bd, Ft Bliss, ATTN: STEBD-PO
1 USA Cmd & General Stf College, Ft Leavenworth, ATTN: Lib
1 USA Cmd & General Stf College, Ft Leavenworth, ATTN: ATSW-SE-L
1 USA Cmd & General Stf College, Ft Leavenworth, ATTN: Ed Advisor
1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: DepCdr
1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: CCS
1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: ATCASA
1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: ATCACO-E
1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: ATCACC-CI
1 USAECOM, Night Vision Lab, Ft Belvoir, ATTN: AMSEL-NV-SD
3 USA Computer Sys Cmd, Ft Belvoir, ATTN: Tech Library
1 USAMERDC, Ft Belvoir, ATTN: STSFB-DQ
1 USA Eng Sch, Ft Belvoir, ATTN: Library
1 USA Topographic Lab, Ft Belvoir, ATTN: ETL-TD-S
1 USA Topographic Lab, Ft Belvoir, ATTN: STINFO Center
1 USA Topographic Lab, Ft Belvoir, ATTN: ETL-GSL
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: CTD-MS
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATS-CTD-MS
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-TE
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-TEX-GS
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