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**The Development of Social Climate  
Measures from the 1991/1992 Surveys of  
Total Army Military Personnel  
(STAMP):  
Scale Construction & Initial Validation**

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**U.S. Army Research Institute for the  
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13. ABSTRACT (Maximum 200 words)  The 1991/1992 Surveys of Total Army Military Personnel (STAMP) collected a wide range of information from Army military personnel on active duty and in the reserve components. This research report describes a systemic effort to derive a set of scales, with adequate psychometric properties, from a subset of 46 questions from the STAMP which deal with such issues as morale, group cohesiveness, stress, and perceived competence, i.e., a response domain that corresponds roughly to what has been referred to as social climate indicators (Futterman, Orlandi, & Schinke, 1991a, 1991b). The strategy that was followed was first to identify potential scales through factor analysis using the data from the sample of enlisted active-duty soldiers, determine the adequacy of their internal-structural properties, and then cross-validate the findings on the STAMP data collected from the active-duty officer sample. The result was a total of nine scales: Horizontal Cohesion, Vertical Cohesion, Social Support in Group, Perceptions of Work, Adequacy of Meeting Personal Needs, Satisfaction-Boredom, Identification with the Army, Stress and Worry, and Personal Efficacy. A final step was to provide initial evidence for the construct validity of two of the scales.				
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THE DEVELOPMENT OF SOCIAL CLIMATE MEASURES FROM THE 1991/1992  
SURVEYS OF TOTAL ARMY MILITARY PERSONNEL (STAMP): SCALE  
CONSTRUCTION AND INITIAL VALIDATION

EXECUTIVE SUMMARY

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Requirement:

During 1991/1992, ARI mailed the Surveys of Total Army Military Personnel (STAMP) to a sample of 51,000 soldiers. The purpose of the research reported here was to derive a psychometrically adequate set of scales from a subset of items from the STAMP which dealt with such issues as morale, group cohesiveness, and stress.

Procedure:

The analyses involved responses of two groups of Army personnel: active duty enlisted personnel (completing Form E of the STAMP) and active duty officers (completing Form F of the STAMP). The data analyses represented a sequential series of psychometric procedures which would, first, identify potential scales through factor analysis, then ascertain the homogeneity of the internal structure of each scale, and, finally, provide some initial evidence bearing on the validity of the scales.

Findings:

Ten scales were identified through factor analysis. Nine of these were demonstrated to possess satisfactory internal structure--replicated across two samples of Army personnel consisting of more than 10,000 individuals--to merit their designation as psychometrically adequate scales. These scales were the following: Horizontal Cohesion, Vertical Cohesion, Social Support in Group, Perception of Work, Adequacy of Meeting Personal Needs, Satisfaction-Boredom, Identification with the Army, Stress and Worry, and Personal Efficacy. A distinctive feature of the program of scale development reported here was the attempt to provide at least some initial evidence for discriminant and construct validity.

Utilization of Findings:

There is a good deal of accumulated evidence linking social climate variables to outcome measures of profound practical significance to the Army, such as personnel attrition and satisfaction. The present research provides some additional psychometric tools with which to measure such important variables.

THE DEVELOPMENT OF SOCIAL CLIMATE MEASURES FROM THE 1991/1992  
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THE DEVELOPMENT OF SOCIAL CLIMATE MEASURES FROM THE 1991/1992  
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CONSTRUCTION AND INITIAL VALIDATION

Introduction

During 1991/1992, ARI mailed the Surveys of Total Army Military Personnel (STAMP) to a sample of 51,000 soldiers. Designed with input from a number of Army agencies and departments, its purpose is to provide information which would be useful to personnel officials in developing policies and procedures during the current period of demobilization/redeployment and downsizing of the U.S. Armed Forces (Elig, in preparation).

The STAMP survey consists of over 200 questions and there are seven different versions or supplements, each of which has questions relevant to a specific target group within the Army--for example, active enlisted soldiers, nurses--in addition to the core set of items common to all versions of the STAMP. The questions in the STAMP address such topics as training needs, quality of leadership, adequacy of preparation for mobilization, previous combat experience, and reenlistment or career plans.

This article reports the results of an effort to derive a set of scales, with adequate psychometric properties, from a subset of 46 items of the STAMP which deal with such issues as morale, satisfaction, group cohesiveness, stress, and perceived competence of self, members of one's unit, and leaders, that is, a response domain that corresponds roughly to what has been referred to as social climate indicators (Futterman, Orlandi, & Schinke, 1991a, b). Examples from this subset are: "I feel my work is appreciated," "My unit works well as a team," and "My health and safety in my job cause me a great deal of stress and anxiety." In Form E of the STAMP, for active duty enlisted personnel, the relevant items are EC072 to EC106 and E109 to E119 located on pages 10 to 12. (For clarity of presentation, all item numbers and page references in this report will be to Form E of the STAMP). It was expected that the aggregation of individual questionnaire items into a number of different sets of items or scales would yield the following benefits:

First, by reducing the number of discriminable variables, it would make extracting useful information from the STAMP an easier and more manageable task.

Second, it would lead to the usual psychometric gains that are attained whenever one uses multi-act or multi-item, rather than single-act or single-item indices of a construct, that is, improved reliabilities, as well as higher validity coefficients when attempting to relate the measure to some other measure or aspect of behavior.

## Method

### Subject Samples

The analyses to be reported here involved responses to two versions of the STAMP. Most of them were conducted on the responses of a group of active duty enlisted personnel (STAMP Form E). These were then followed by a number of analyses of the responses of active duty officers (STAMP Form F) either alone or combined with the enlisted sample. The total sample size was 10,919, of which 4,632 were enlisted personnel and 6,347 were officers. Because of missing data, the actual number of scores that were analyzed were fewer, and varied across variables and analyses. It should be noted that no weighting procedures were incorporated into these analyses. Thus, any means or other summary statistics reported in this paper should not necessarily be assumed to be representative of the relevant target population as a whole (i.e., active duty enlisted personnel or active duty officers).

### Item Response Format

All 46 items used 5-point Likert-type scales whose response options ranged from 1 = Strongly Disagree to 5 = Strongly Agree. Thirty-four of the items were positively-keyed, that is, agreeing with the item expresses a positive sentiment. An example is: "My immediate leader is a good leader." Twelve of the items were negatively-keyed, that is, agreement is an expression of negative feelings. An example of such an item is: "My health and safety in my job cause me a great deal of stress and anxiety." Responses to items EC072 to EC106 were, according to the instructions, to represent the respondents' feelings "now after ODS/S [Operation Desert Shield/Storm]." Prior to this, the respondent would have already responded to the same set of items, first in terms of his or her feelings before ODS/S (Items EA072 to EA106) and, second, during ODS/S (Items EB072 to EB106).

### Procedure

The data analyses represented a sequential series of psychometric procedures, as follows:

First, frequency distributions of the responses to each of the 46 target questions in Form E were obtained. This preliminary step had two purposes. First, it would determine whether or not responses to each item were spread across all five response options. If this step found certain items not showing variation in responding, for example, virtually all answers being 5 = strongly agree, or, conversely, all answers being 1 = strongly disagree, then it would not be considered a candidate as an item of a scale since such an item would only be "excess baggage"--it will have a very small variance and will not contribute substantively to a scale's reliability and validity (Jackson, 1970).

A second purpose of obtaining a frequency distribution of responses to each question was to provide a check on the operation of one response style--an agreeing response set or yea-saying tendency. A yea-saying tendency is a predisposition to agree with assertions regardless of content, and, if operating, is a source of error in scale construction and interpretation. In the set of items under investigation, a yea-saying tendency would be in evidence if negative-sentiment items would show similar patterns of responses across the five response alternatives as would items expressing a favorable attitude or opinion. To the extent that the response patterns of the two types of items would differ from each other, one could be confident that subjects were responding discriminatively to item content rather than as a function of their personal style of responding.

Next, to provide suggested groupings of items that might constitute distinct scales, a factor analysis was carried out on the 46 "social climate" items on responses to the E version of STAMP. If the initial factor analysis did not yield an interpretable set of factors, further rotations specifying a smaller number of factors would be carried out.

Each of the factors resulting from the rotation would be examined in turn, and all items with loadings of approximately .50 or higher were to be studied and analyzed for the presence of some underlying common theme. When identified, this common theme would become the name of the (potential) scale these high-loading items constituted.

To get a measure of the homogeneity of the internal structure of each scale, Cronbach's alpha--a measure of internal consistency reliability--was computed for each of them. A prior step necessary for scales which contained negative-sentiment items was to reverse-score them, so that, as a result, a higher scale score would represent a more favorable response, and lower score a less favorable one.

Next, as a first step in the validation process, an attempt was made to establish discriminant validity for the scales. This was done by calculating scale scores by summing the items (or their reversals, when appropriate) belonging to them, and computing a correlation matrix involving all the scales.

As a further step in the validation process, an attempt was made to demonstrate construct validity for two scales which seemed to tap broad underlying dispositions, by correlating them with other conceptually and logically relevant questions in other parts of the STAMP questionnaire.

For cross-validation purposes, the three prior steps were then repeated with the officer sample (i.e., STAMP Form F). First, alphas were computed to see if the internal structure of the scales holds across samples. Second, the discriminant

validity step was repeated with the officer sample, i.e., intercorrelating all the scales, resulting in a correlation matrix. Then, the pattern of intercorrelations across the two samples was compared. Third, in a step aimed at providing construct validity for two scales which seemed to be tapping broad underlying dispositions, scores on these scales were correlated with sets of conceptually and logically relevant questions from other parts of the STAMP.

A final step (at least, so far) in the validation process, which combined both enlisted and officer samples (Forms E and F of the STAMP), used the method of known groups. In this approach to construct validity, naturally-occurring groups with consensually distinguishable characteristics are given a scale which purportedly taps one of those characteristics. If the groups differ significantly on the scale in the direction consistent with the underlying meaning of the scale, this is seen as providing evidence for construct validity. For example, the developers of the Uniqueness Scale (Snyder & Fromkin, 1980) used this method in one of their validation studies. They administered the scale to members of Mensa (a very unique group made up of persons with very high IQs) and a group of non-members and found the former to score significantly higher on the scale than the latter. In the present context, officers and enlisted personnel served as the known groups who were expected to differ on several scales, if the scales measured the underlying constructs that I believed they would.

### Results

Inspection of the frequency distributions of each of the target items in Form E revealed that all response options had been used in all the items, though the distributions were positively-skewed with the "agree" and "strongly agree" options typically garnering 40-70% of the responses on the positive-sentiment items. Thus, all items in the target set were deemed potentially usable as items in the scale. Furthermore, comparisons of frequency distribution patterns of positive-sentiment and negative-sentiment items showed that they differed from each other, making it highly improbable that an agreement response-set exerted an important influence. An example of these contrasting patterns can be found in Table 1. It should be noted that there was no clear-cut way of checking on the presence of another potentially biasing response-set, that is, the tendency to respond in a socially-desirable manner.

A principal components factor analysis with Varimax rotation of the 46 target items in Form E suggested a ten-factor solution. Eigenvalues ranged from a high of 13.025 (Factor 1) to a low of 1.045 (Factor 10). Identification and study of the items with high loadings (approximately .50 or higher) on each factor, in turn, deemed each factor interpretable. Table 2 presents the ten factors, their (and potential scale) names, and the items with high loadings on each of them, respectively. It should be noted

that, although for the most part the groupings in Table 2 were empirically-derived, that is, represented the pattern of factor loadings, in two instances rational considerations came into play. First, item EC079 ("Transportation is adequate to do the job right") was included in the Perception of Work scale (Factor 4) because, logically, it fit with the other items, despite its relatively low factor loading (.35759). Second, one item, E112 ("Job causes great personal stress and anxiety") loaded both Factor 4, Perceptions of Work scale (.54743), and Factor 8, Stress and Worry scale (.55213). In order to make the two scales completely content-independent entities, this item was dropped from both of them, and does not appear in Table 2.

After reverse-scoring the items expressing a negative feeling, I computed Cronbach alphas for each of the ten scales on the enlisted sample (Form E of the STAMP). The resultant alphas, as well as the number of items per scale, scale means, and standard deviations, are found in the left-hand portion of Table 3. With one exception, the alphas represent adequate internal consistency reliabilities, suggesting that each of the sets of items possesses a sufficiently homogeneous internal structure to be considered a scale--the alphas ranged from a high of .91 to a low of .63. The "scale" whose alpha (.48) fell outside of this range was Cynicism. Its low alpha was probably due, at least in part, to the fact that it consists only of two items. (All the other scales are at least four items long.) At any rate, the low reliability of the Cynicism scale precludes its use, and it is omitted from most of the analyses to be presented.

Next, as a first step in the validation process, an attempt was made to establish discriminant validity for the scales by inter-correlating all the newly-created scale scores, using the enlisted sample (STAMP Form E). The resultant correlation matrix is found in Table 4. Inspection of the correlation coefficients shows that, although all of them were significant, they were only in the low or moderate range. Specifically, they ranged from a low of  $r = .26146$ , between the Identification with the Army scale and the Vertical Cohesion scale, to a high of  $r = .56620$ , between Horizontal Cohesion and Satisfaction/Boredom scale. It should not be surprising that the scales are somewhat correlated, given the shared method variance and the fact that all the scales tap, in one form or another, evaluative judgments about Army life. At the same time, the fact that most of the correlation coefficients were below .50 indicates that there is a lot of unshared variance among the scales. Therefore, it is appropriate to consider them sufficiently distinct from each other psychometrically. As a benchmark, the relatively low magnitude of these correlations between scales is to be compared with the Cronbach alphas--a measure of correlation of items within scales--which were invariably higher (the lowest being .63).

Table 1

Contrasting Frequency Distributions of a Positive-sentiment and a Negative-sentiment Questionnaire Item

ITEM #E110: FAIR AMOUNT OF WORK ASSIGNED

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No Response	96	2.1	97	2.1
Strong Disagree	217	4.7	314	6.8
Disagree	624	13.5	938	20.3
Neither A/D	851	18.4	1789	38.6
Agree	2452	52.9	4241	91.6
Strong Disagree	391	8.4	4632	100.0

ITEM #E111: TOO MUCH WORK TO DO ALL WELL

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No Response	151	3.3	151	3.3
Strong Disagree	419	9.0	570	12.3
Disagree	1949	42.1	2519	54.4
Neither A/D	1306	28.2	3825	82.6
Agree	586	12.7	4411	95.2
Strong Disagree	221	4.8	4632	100.0

Table 2

Ten Factors Extracted from the Social Climate Portion of the STAMP (Form E): Their (and Potential Scale) Names and Items Which Loaded on Them

Item Number	Factor 1 Horiz. Cohesion	Factor 2 Vertical Cohesion	Factor 3 Soc. Sppt in Group	Factor 4 Percept of Effort	Factor 5 Adequacy of Meeting Para. Needs	Factor 6 Satisfac/ Boredom	Factor 7 Ident. w/Army	Factor 8 Stress/ Worry	Factor 9 Personal Efficacy	Factor 10 Cynicism	Item Wording (approximate)
EC072					.53219						Adq info for Pers Decisions
EC073					.81711						Pay/Alloca Handled Accurate
EC074					.86073						Satisfied w/Mail Delivery
EC075					.81318						Med/Dent Svc easily available
EC077				.45607							Had enough time to do job right
EC078				.48619							Had enough exp to do job right
EC079				.35756							Trans is adq to do job right
EC080									.85603		Well trained to do duty
EC081						.48880					Feel work is appreciated
EC082						.62872					Satisfied with job
EC083									.52249		Well prepared for rapid deploy
EC084			.74585								S/O in unit to do favor
EC085			.78821								S/O in unit w/whom to relax
EC086			.78928								S/O in unit listens re job
EC087			.78185								S/O in unit listens re family
EC088						.63480					Job is important
EC089							-.53809				Frequently wish to leave Army
EC090						.62871					Boredom is problem
EC091									.71991		Conf in ability to do duties
EC092								.60728			Very worried about family
EC093		.86368									Sr leaders trust immediate leader
EC094		.84436									Conf in immediate leader's ability
EC095		.76972									Immediate leader open to suggestion
EC096		.87028									Immediate leader is a good

Item Number	Factor 1 Herts. Cohesion	Factor 2 Vertical Cohesion	Factor 3 Soc. Suppt In Group	Factor 4 Percept. of Work	Factor 5 Adequacy of Meeting Pers. Needs	Factor 6 Satis./ Boredom	Factor 7 Ident. w/Army	Factor 8 Stress/ Worry	Factor 9 Personal Efficacy	Factor 10 Cynicism	Item Wording (approximate)
EC097	.63617										Unit leaders work well as team
EC098	.72737										Unit works well as a team
EC099	.66862										Unit well prep to perform
EC100	.67843										Morale in unit high
EC101	.73666										Satis w/unit's performance
EC102	.75264										Unit well prep for deploy
EC104								.65372			Conf perform well in combat
EC105	.70599										Conf unit do well in combat
EC106	.66568										Conf leaders do well in combat
E109										.76662	To satisfy some on job must upset others
E110				.66174							Fair amount of work assigned
E111				-.68314							Too much work to do all well
E113								.53665			Relations w/people cause stress/anxiety
E114								.61815			Working conditions cause stress/anxiety
E115								.67931			Health/safety in job cause stress/anxiety
E116							-.65028				Army unimp as long as receive paycheck
E117							.73417				Want to stay in Army as long as possible
E118										.76633	Can't satisfy self at same time
E119							.77420				What happens to Army is important to me

Table 3

Scores and Alphas of Enlisted Personnel and Officers on Ten Scales Derived from the STABE

Name of Scale	Number of Items	Enlisted			Officers			Is Outcome Consistent w/Prediction?
		Scale Mean	SD	Alpha	Scale Mean	SD	Alpha	
Horizontal Cohesion	8	25.89433	6.84181	.91	28.17185	6.19007	.90	Yes
Vertical Cohesion	4	14.20608	4.00086	.90	14.75171	3.86087	.91	Yes
Social Support In Group	4	14.79822	3.54333	.86	15.35748	3.12061	.86	Yes
Perceptions of Work	5	17.1547	3.68177	.74	16.7714	3.74386	.75	Yes
Adequacy of Meeting Personal Needs	4	14.3416	2.8632	.63	14.35863	2.76754	.57	No
Satisfaction/Boredom	4	14.34413	3.5542	.77	15.2275	3.21257	.75	Yes
Ident. w/the Army	4	14.84586	3.18084	.71	15.45745	2.96771	.68	Yes
Stress & Worry	4	13.12632	2.83371	.64	13.60214	2.96785	.62	Yes
Personal Efficacy	4	16.26868	2.56016	.71	16.38432	2.42074	.68	Yes
Cynicism	2	5.38057	1.71712	.43	5.23511	1.68173	.57	Yes

Note. Negative-sentiment items are reverse-scored. Therefore, a high scale score always represents positive feelings. Thus, for example, a high score on the Stress and Worry scale implies a relative lack of stress and worry and a high score on Cynicism implies less cynicism.

Table 4

Correlation Matrix of Nine Scales from Enlisted Sample (STAMP Form E): Correlation Coefficients, P values, and Ns

	Horizontal Cohesion	Vertical Cohesion	Social Support	Perceptions of Work	Personal Needs	Satisfaction/Boredom	Identification with Army	Stress & Worry	Personal Efficacy
HRZCOHSN	1.0000 0.0 4191	0.56600 0.0000 4107	0.52185 0.0001 4115	0.45868 0.0001 4023	0.40309 0.0001 4047	0.56620 0.0001 4028	0.35640 0.0001 4014	0.35654 0.0001 4036	0.45110 0.0001 4066
VRTCOHSN	0.56600 0.0000 4107	1.00000 0.0 4338	0.46321 0.0001 4256	0.33787 0.0001 4152	0.28966 0.0001 4180	0.45437 0.0001 4165	0.26146 0.0001 4158	0.28901 0.0001 4176	0.28855 0.0001 4189
SOCLSPRT	0.52185 0.0001 4115	0.46321 0.0001 4256	1.00000 0.0 4447	0.38603 0.0001 4273	0.35722 0.0001 4319	0.47824 0.0001 4223	0.27651 0.0001 4187	0.35059 0.0001 4204	0.34793 0.0001 4241
PRCPTWRK	0.45868 0.0001 4023	0.33787 0.0001 4152	0.38603 0.0001 4273	1.00000 0.0 4329	0.48607 0.0001 4209	0.43553 0.0001 4121	0.28256 0.0001 4110	0.44803 0.0001 4120	0.33487 0.0001 4139
PRSNEEDS	0.40309 0.0001 4047	0.28966 0.0001 4180	0.35722 0.0001 4319	0.48607 0.0001 4209	1.00000 0.0 4375	0.40125 0.0001 4155	0.29254 0.0001 4119	0.36471 0.0001 4126	0.31714 0.0001 4173
STSFBRDM	0.56620 0.0000 4028	0.45437 0.0001 4165	0.47824 0.0001 4223	0.43553 0.0001 4121	0.40125 0.0001 4155	1.00000 0.0 4271	0.47760 0.0001 4100	0.41313 0.0001 411C	0.47561 0.0001 4148
IDTWARMY	0.35640 0.0001 4014	0.26146 0.0001 4158	0.27651 0.0001 4187	0.28256 0.0001 4110	0.29254 0.0001 4119	0.47760 0.0001 4100	1.00000 0.0 4268	0.37407 0.0001 4186	0.38872 0.0001 4113
STRSWORRY	0.35654 0.0001 4036	0.28901 0.0001 4176	0.35059 0.0001 4204	0.44803 0.0001 4120	0.36471 0.0001 4126	0.41313 0.0001 4110	0.37407 0.0001 4186	1.00000 0.0 4277	0.28613 0.0001 4128
PRSEFFC	0.45110 0.0001 4066	0.28855 0.0001 4189	0.34793 0.0001 4241	0.33487 0.0001 4139	0.31714 0.0001 4173	0.47561 0.0001 4148	0.38872 0.0001 4113	0.29613 0.0001 4128	1.00000 0.0 4291

Table 5 (Enlisted Sample)

Evidence for Construct Validity of Identification with Army Scale: Correlations (as well as P values and Ns) of 18 STAMP Items With the Scale

STAMP QUESTIONNAIRE ITEMS	
E014A: How likely to retire after this enlistment	0.04728 0.0066 3315
E014B: How likely leave Army & find civilian job after this enlistment	-0.56067 0.0001 3162
E014C: How likely leave Army & attend college after this enlistment	-0.45236 0.0001 3125
E014D: How likely leave Army & attend voc/tech school after this enlistment	-0.29187 0.0001 3073
E014E: How likely reenlist & not make Army career after this enlistment	0.13756 0.0001 2408
E014F: How likely stay in Army until retirement after this enlistment	0.66287 0.0000 3359
E015: How likely stay on active duty until retirement after 20 years	0.60739 0.0000 4006
E016: How likely stay on active duty beyond 20 years	0.56931 0.0 4025
E039: Seeking civilian job information in case leave Army	-0.33406 0.0001 4108
E040: Would you advise friend to see military recruiter	0.39478 0.0001 4108
E041: Recommend joining Army to anyone	0.40427 0.0001 4084
E042A: Want son to join military	0.30166 0.0001 3963
E042B: Want daughter to join military	0.24034 0.0001 3958
E043A: After active duty how likely join an Army reserve unit	0.18234 0.0001 3256
E043B: After active duty how likely join Army National Guard unit	0.10503 0.0001 3141
E043C: After active duty how likely join Active Guard/Reserve (AGR) Program	0.30456 0.0001 319

Table 6 (Enlisted Sample)

Evidence for Construct Validity of the Personal Efficacy Scale: Correlations (as well as P values and Ns) of 5 STAMP Items with the Scale

STAMP QUESTIONNAIRE ITEMS	
E007: Years on active duty	0.18127 0.0001 4143
E010: Physical Readiness Test Score	0.12167 0.0001 3717
E011A: Score of most recent Skill Qualification Test	0.08864 0.0001 3583
E012: Overall potential box by senior rater (reverse scored)	-0.14562 0.0001 2888
E013: How well prepared for wartime job	0.54912 0.0000 4139

As a further step in the validation process, two scales which seem to tap broad underlying dispositions--Identification with the Army (IDTWARMY) and Personal Efficacy (PE) scales--were selected in an attempt to demonstrate their construct validity. This was done by correlating scores on these scales with "external" measures (i.e., measures from other parts of the STAMP) which were conceptually and logically relevant to the constructs the scales were believed to be tapping. Some of these "external" measures were quasi-behavioral, that is, measures of behavioral intentions or self-reports of behavior or test scores. Table 5 presents the correlational analyses relevant to the IDTWARMY scale. It was expected that if this scale was indeed measuring degree of identification with the Army, scores on this scale should be predictive of measures tapping intentions and possible behaviors which are supportive of the Army and should correlate negatively with responses which represent lack of support for the furtherance of the Army's goals. Table 5 lists 16 items from the STAMP that were thought to be conceptually relevant to the IDTWARMY construct. As can be seen, all the items correlated significantly, and some very strongly, with the IDTWARMY scale in a manner consistent with the meaning of the construct of IDTWARMY. Thus, for example, high IDTWARMY scorers were: more likely to stay on active duty beyond 20 years ( $r = .57$ ); more likely to want their sons ( $r = .30$ ) or daughters ( $r = .24$ ) to join the Army; and less likely to be looking for a civilian job ( $r = -.33$ ).

Table 6 presents the correlational analyses relevant to the construct validity of the Personal Efficacy (PE) scale. The general prediction was that if the scale was indeed tapping the underlying construct of personal efficacy--a generalized feeling of competence--it should be predictive of perceived success in particular situations (e.g., readiness to perform tasks in a war) as well as of more objective indexes of ability and achievement. In addition, it was expected that PE scale score should correlate positively with years on active duty, since--everything being equal--the person should acquire more competencies and have received more recognition and therefore have a greater sense of personal efficacy the longer he or she has been in the Army. Table 6 lists five conceptually relevant measures and their correlations with the PE scale. As can be seen, although all the correlations were significant and in the expected direction, most were quite small. The three lowest correlations were those with items E010, E011A, and E012, three "objective" measures, that is, self-reports of test scores. The low correlation coefficients may be due to the attenuation of the range of scores on these items, since most participants clustered at the top of the range.

For cross-validation purposes, the three prior steps were repeated with another sample (the officer sample; STAMP Form F). First, to see if the internal structure of the scales is stable and generalizable across samples, Cronbach alphas were computed

for the same ten scales on which Cronbach alphas had already been computed for the enlisted sample. These are given in the right-hand portion of Table 3. As can be seen, they were very similar to the alphas obtained for the enlisted sample (presented in the left-hand portion of the table). In no case (except for Cynicism) were alphas for the same scale more than six points apart; more typically, they were one or two points apart.

Next, the step intended to demonstrate discriminant validity for the scales was repeated with the officer sample. The relevant correlation matrix is found in Table 7. Comparison with Table 4, the analogous correlation matrix with the enlisted sample, shows a remarkable degree of similarity. Although the range of correlations was slightly larger in the officer sample (.23316 to .60231), most of the correlation coefficients were below .50, as was the case with the enlisted sample. Most of the correlations were very similar; some were virtually identical in both samples, for example, Horizontal Cohesion with Stress and Worry, IDTWARMY with Perceptions of Work.

Finally, the step intending to demonstrate construct validity for the IDTWARMY and Personal Efficacy scales by correlating them with conceptually relevant "external" items was repeated with the officer sample. The results relevant to the IDTWARMY scale are shown in Table 8 and those relating to the Personal Efficacy scale in Table 9. Six of the "external" items used in the construct validity analysis with the enlisted sample (Table 5; items E014A to E014F) did not appear in the officer version of the STAMP (Form F). Therefore, the construct validity analysis with the officer sample involved only ten "external" items. Their correlations with the IDTWARMY scale are given in Table 8. Comparison with the outcome of the same analysis on the enlisted sample (Table 5) shows a very similar pattern of correlations. Thus, for example, the IDTWARMY score was similarly predictive, among both enlisted personnel and officers, of: the likelihood of remaining on active duty after 20 years ( $r_s = .57$  and  $.55$ ); the likelihood (inversely) of seeking civilian job information ( $r_s = -.33$  and  $-.35$ ); wanting their sons to join the military ( $r_s = .30$  and  $.29$ ).

Turning to Personal Efficacy (PE), only three out of the five "external" items used for the purpose of demonstrating construct validity with the enlisted sample also appeared in the officer version of the STAMP. The correlation coefficients of each of these three items with the PE scale are found in Table 9. Comparison with the same analysis on the enlisted sample (Table 6) shows two out of the three correlations to be very similar to each other.

Table 7

Correlation Matrix of Nine Scales from the Officer Sample (STAMP Form F): Correlation Coefficients, P values, and Ns

	Horizontal Cohesion	Vertical Cohesion	Social Support	Perceptions of Work	Personal Needs	Satisfaction/Boredom	Identification with Army	Stress & Worry	Personal Efficacy
HRZCOHSN	1.0000 0.0000 5961	0.60231 0.0 5868	0.48437 0.0 5879	0.39107 0.0001 5744	0.34219 0.0001 5774	0.55154 0.0000 5758	0.38400 0.0001 5904	0.35936 0.0001 5815	0.44869 0.0001 5834
VRTCOHSN	0.60231 0.0000 5868	1.00000 0.0 6156	0.42500 0.0001 6066	0.28080 0.0001 5927	0.25497 0.0001 5957	0.42772 0.0001 5949	0.28213 0.0001 5995	0.27792 0.0001 5996	0.23316 0.0001 5995
SOCLSPRT	0.48437 0.0000 5879	0.42500 0.0001 6066	1.00000 0.0 6239	0.31090 0.0001 6031	0.33368 0.0001 6070	0.45656 0.0001 6016	0.28227 0.0001 6029	0.33080 0.0001 6039	0.29329 0.0001 6069
PRCPTWRK	0.39107 0.0001 5744	0.28080 0.0001 5927	0.31090 0.0001 6031	1.00000 0.0 6085	0.42203 0.0001 5932	0.31478 0.0001 5868	0.28322 0.0001 5903	0.42774 0.0001 5908	0.28710 0.0001 5929
PRSNEEDS	0.34219 0.0001 5774	0.25497 0.0001 5957	0.33368 0.0001 6070	0.42203 0.0001 5932	1.00000 0.0 6134	0.36548 0.0001 5908	0.27123 0.0001 5927	0.34464 0.0001 5921	0.26025 0.0001 5955
STSFBDM	0.55154 0.0000 5758	0.42772 0.0001 5949	0.45656 0.0001 6016	0.31478 0.0001 5868	0.36548 0.0001 5908	1.00000 0.0 6069	0.44277 0.0001 5912	0.37423 0.0001 5916	0.40567 0.0001 5952
IDTWARMY	0.38400 0.0001 5804	0.28213 0.0001 5995	0.28227 0.0001 6029	0.28322 0.0001 5903	0.27123 0.0001 5927	0.44277 0.0001 5912	1.00000 0.0 6125	0.36554 0.0001 6032	0.39009 0.0001 5962
STRSWORRY	0.35936 0.0001 5815	0.27792 0.0001 5996	0.33080 0.0001 6039	0.42774 0.0001 5908	0.34464 0.0001 5921	0.37423 0.0001 5916	0.36554 0.0001 6032	1.00000 0.0 6125	0.26287 0.0001 5966
PRSEFFIC	0.44869 0.0001 5834	0.23316 0.0001 5995	0.29329 0.0001 6069	0.28710 0.0001 5929	0.26025 0.0001 5955	0.40567 0.0001 5952	0.39009 0.0001 5962	0.26287 0.0001 5966	1.00000 0.0 6121

Table 8 (Officer Sample)

Evidence for Construct Validity of Identification with Army Scale: Correlations (as well as P values and Ns) of 10 STAMP Items With the Scale

STAMP QUESTIONNAIRE ITEMS	
E015: How likely stay on active duty until retirement at 20 years	0.46111 0.0001 5112
E016: How likely stay on active duty beyond 20 years	0.54926 0.0000 5141
E038: Seeking civilian job information in case leave Army	-0.34553 0.0001 5926
E040: Would you advise friend to see military recruiter	0.32843 0.0001 5929
E041: Recommend joining Army to anyone	0.33396 0.0001 5783
E042A: Want son to join military	0.29153 0.0001 5773
E042B: Want daughter to join military	0.17901 0.0001 5775
E043A: After active duty how likely join an Army reserve unit	0.17222 0.0001 4131
E043B: After active duty how likely join Army National Guard unit	0.13235 0.0001 4034
E43C: After active duty how likely join Active Guard/Reserve (AGR) Program	0.28545 0.0001 4034

Table 9 (Officer Sample)

Evidence for Construct Validity of the Personal Efficacy Scale: Correlations (as well as F values and Ns) of 3 STAMP Items with the Scale

STAMP QUESTIONNAIRE ITEMS	
E007: Years on active duty	0.15371 0.0001 5941
E010: Physical Readiness Test Score	0.06645 0.0001 5241
E013: How well prepared for wartime job	0.55012 0.0000 5941

The final effort (thus far) to validate the scales used the method of known groups, and combined both officer and enlisted samples. This analysis was predicated on the assumption that, because being an enlisted soldier versus an officer carries with it differing rights, obligations, and responsibilities, the two groups should perceive and experience some aspects of Army life differently. Furthermore, it seemed to this author that some of these expected perceptual and experiential differences should manifest themselves as differences between the two groups on several of the ten scales. Specifically, a series of ten one-way analyses of variance were conducted such that in each case enlisted versus officer status served as the independent variable, and each of the ten scales, in turn, served as the dependent variable. Before conducting the analyses, I generated a set of eight predictions regarding officer versus enlisted differences, which, I thought, should be confirmed if the scales were measuring the constructs I believed they were measuring. (I had no basis for making a prediction for two scales: Social Support in Group scale and Cynicism scale.) Thus, I predicted that officers should score higher on the Horizontal Cohesion scale than enlisted personnel, since the former should see the creation of group cohesion as a necessary part of their duties. I also expected officers to report higher satisfaction and less boredom since presumably they have more control over, and freedom to choose among, the activities they would be involved in. For the same reason, I expected officers to score higher on the Personal Efficacy scale than enlisted personnel. Officers should also score higher on the Identification with the Army scale, I believed, since more of the former would have made a career out of the Army and more likely to be involved in decision-making than the latter. In some ways, however, both enlisted soldiers and officers are "in the same boat" in relation to Army life, and I expected no differences between the two groups on scales relevant to these aspects of Army life. Thus, because both groups are part of similar hierarchical organizational structures, I did not expect them to differ on the Vertical Cohesion scale. Nor did I expect them to differ on the Perceptions of Work scale, since I assumed the items of this scale referred to the more objective details of Army life. For similar reasons, I expected no differences between the two groups on the Adequacy of Meeting Personal Needs scale. And finally, I did not believe that the stresses and anxieties experienced by the two groups were much different. The last two columns of Table 3 present the outcomes germane to this analysis. The first gives the outcome of the ANOVAs and the second indicates whether or not the outcome was consistent with the prediction. As can be seen, nine out of ten ANOVAs yielded significant differences between officers and enlisted soldiers. Inspection of the relevant scale means reveals that in eight cases officers scored higher (more favorably) than the enlisted individuals, while in one case--the Perceptions of Work scale--the reverse occurred. Turning to the last column in Table 3, one can see that of the

eight predictions made, five were confirmed and three were disconfirmed.

### Conclusions and Recommendations

This report presented the results of a sequential program of scale extraction and development involving a subset of items from the 1991/1992 STAMP. Nine of the ten scales identified through factor analysis were demonstrated to possess satisfactory internal structure--replicated across two samples, consisting of more than 10,000 participants--to merit their designation as psychometrically adequate scales. The readiness and confidence with which one can use these scales will depend on one's views regarding the necessity for demonstrating construct validity for them. It is the writer's opinion that the more a scale appears to tap some "deep structure," the greater the need for it to undergo a process of validation. A distinctive feature of the program of scale development reported in this article was the attempt to provide at least some initial evidence for discriminant and construct validity. In many, if not most, cases, social climate scales developed for use by the Armed Forces have not included a validation phase. The attempt to validate two of the scales presented in this report should be considered only an initial effort. Clearly more can and needs to be done in this regard. One approach that is likely to be fruitful is to link scores on these newly-identified scales to measures that are truly external to the STAMP, that is, found in the master file of enlisted personnel and officers.

There is a good deal of accumulated evidence linking social climate variables such as cohesion and satisfaction to outcome measures of profound practical importance to the Army, such as personnel attrition and satisfaction (e.g., Alderks, 1992; Ingraham & Manning, 1981; Lawrence, 1992). The present effort has provided some additional psychometric tools with which to measure such important variables.

## References

- Alderks, C. E. (1992). Relationships between vertical cohesion and performance in light infantry squads, platoons, and companies at the Joint Readiness Training Center (JRTC) (Research Report 1609). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A249254)
- Elig, T. (in preparation). 1991/1992 Surveys of Total Army Personnel: Information Paper. Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.
- Futterman, R., Orlandi, M., & Schinke, S. (1991a). Handbook of social climate indicators for the U.S. Army (ARI Research Product 91-22). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A243405)
- Futterman, R., Orlandi, M., & Schinke, S. (1991b). Social climate indicators for the U.S. Army (ARI Research Product 91-21). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A243615)
- Ingraham, L. H., & Manning, F. J. (1981). Cohesion: Who need it, what is it and how do we get it to them? Military Review, 56, 2-12.
- Jackson, D. N. (1970). A sequential system for personality scale development. In C. D. Spielberger (Ed.), Current topics in clinical and community psychology, Vol. 2 (pp. 62-96). New York: Academic Press.
- Lawrence, G. H. (1992). Motivation and platoon performance at combat training centers (Research Report 1608). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A248316)
- Snyder, R. C., & Fromkin, H. L. (1980). Uniqueness: The human pursuit of difference. New York: Plenum.