DISPOSITION FORM DTIC FILE COPY

For use of this form, see AR 340-15, the proponent agency is TAGO.

(1)

REFERENCE OR OFFICE SYMBOL	SUBJECT
SGRD-UE -HP M63	Request for Clearance of Technical Paper (USARIEM)

TO Commander, USARIEM FROM Dir, H&P Div, USARIEM DATE 30 Jun 88 CMT 1

1. Reference USARIEM Memo 360-1, request clearance of attached [X] manuscript, [ ] abstract, [ ] presentation, [ ] report, [ ] review article. Report Documentation Page, DD Form 1473 (is)(is not) attached.

AD-A199 201

Influence of attitude and expectation on moods and symptoms during cold weather military training

(s) Richard F. Johnson, Laurence G. Branch and Donna J. McMenemy

d for publication in Aviation, Space, and Environmental Medicine

d for presentation before _____

_____ Location _____ Date _____

Project No. 3M161102BS15 Cost Code 8480082101047

3. Attached contains no classified material. It meets accepted standards for scientific accuracy and propriety. It contains no potentially sensitive or controversial items.

Encl

TERRY M. RAUCH, Ph.D.
MAJ, MS
Director, Health & Performance Division

SGRD-UEZ ( )

THRU Chief, Admin Svc Br FROM Commander DATE 21 Jul 88 CMT 2

TO Ch, H&P Div

[X] Clearance is granted.

[ ] Clearance is not granted.

[ ] This document must be forwarded to USAMRDC for clearance.

DTIC
ELECTE
SEP 1 2 1988
S D
H

David Schnakenberg
DAVID D. SCHNAKENBERG
Colonel, MS
Commanding

Encl
nc

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

88 9 8 037

CLEARANCE NO. M63-88

NATICK FL 453
1 Jun 86 EDITION OF 1 DEC 84 IS OBSOLETE.

DA FORM AUG 80 2496 PREVIOUS EDITIONS WILL BE USED

* U.S. Government Printing Office: 1983—406-862

Title:

Influence of Attitude and Expectation on Moods and Symptoms During Cold Weather Military Training

Authors:

Richard F. Johnson, MA, PhD, Laurence G. Branch, MA, PhD,

and Donna J. McMenemy, BS

Laboratory of Origin:

US Army Research Institute of Environmental Medicine

Natick, Massachusetts 01760-5007

Address correspondence to:

Richard F. Johnson, PhD

Health and Performance Division

US Army Research Institute of Environmental Medicine

Natick, MA 01760-5007

Telephone:

(617) 651-4465

after 15 July 1988: (508) 651-4465

Running head:

SUBJECTIVE REACTION TO COLD

Influence of Attitude and Expectation on Moods and Symptoms During Cold Weather Military Training

ABSTRACT

The present study examined the influence of (1) air temperature, (2) day into training, (3) self rating of life stress, (4) rating of relative warmth in cold weather, and (5) expectation for liking cold weather training, on 59 soldiers' self-reports of illness and mood during 3 days of training in the cold (-18° to 0°C range). Mood was assessed on six domains of the Profile of Mood States rating scale, and symptoms of illness were assessed on 14 domains of the Environmental Symptoms Questionnaire. Multiple regression analyses showed that (1) the more soldiers expected to dislike the cold weather training, the more tense, depressed, angry, fatigued, and physically uncomfortable they were during training; (2) the more stress they perceived in their everyday lives, the more fatigued, confused, and physically uncomfortable they were during training; (3) as days into training increased the more fatigued they became; and (4) due to appropriate clothing and training, ambient temperature was found to have little influence on the soldiers' moods and symptoms.

INDEX WORDS: fatigue, stress, psychology, ESQ, POMS, subjective reports, illness, warmth, mountaineering.

Influence of Attitude and Expectation on Moods and Symptoms During Cold Weather Military Training

Cold-related injuries during cold weather combat are common (5). However, the frequency of cold-related injuries during cold weather military training is low, especially when compared to the frequency of most other injuries (e.g., orthopedic injury and acute trauma) (7,10). This low rate during training may be due to the researcher's focus on reports to sick call at medical treatment facilities and inattention to unreported symptoms. Symptoms may go unreported either because the disorder is treated in the field or the individual fails to report them to anyone. Most prior research (e.g. 7,10) has focused on large populations (thousands of soldiers) making it difficult for research teams to canvas individuals in order to document "unreported" injuries. Recently, the US Army Research Institute of Environmental Medicine has followed smaller groups of soldiers through military training during cold weather. The objective has been to measure systematically the nature and frequency of injuries and illnesses which occur during training (whether reported to the regular medical treatment facility or not) and, concurrently, to assess the psychological moods of the participants. The goal is to determine if illness, psychological mood, or both are systematically related to cold weather conditions, preexisting subjective factors, or both.

Cold-related injury may be defined as tissue trauma produced by exposure to cold temperature. Tissue trauma typically includes the freezing type (frostbite - superficial or deep) and the non-freezing types (chilblains, trench foot, immersion foot, and hypothermia) (2). Among the

factors that increase susceptibility of an individual to cold-related injuries are: age (the very young and the very old are more vulnerable), fatigue, inadequate nutrition, inexperience with cold temperatures, previous cold injuries, activity level (both excessive and too little activity predispose one to injury), substances and medications which influence circulation and/or have vascular effects, improper clothing, weather conditions, and psychosocial factors. Race is a factor which historically has been reported to influence susceptibility, specifically Blacks being more vulnerable than Caucasians, but this issue remains unsettled (4).

The above factors have been studied extensively, and the scientific findings have been incorporated into official military guidance for prevention and management of cold injury (1,2,3).

The majority of these factors, such as the soldier's age or whether or not the soldier is receiving medication, are relatively easy to measure. However, the psychosocial factors including attitudes, motivations, and expectations are more difficult to measure and hence to quantify in terms of their influence upon the soldier's susceptibility to the cold.

The present study was designed to clarify the influence of psychosocial factors on the soldier's moods and subjective reports of medical symptoms during cold weather operations. The goal is to determine if subjective symptoms, psychological mood, or both are systematically related to preexisting psychosocial factors, cold weather conditions, days into training, or all three. Specifically, the present investigation seeks to clarify the relative influences of (a) ambient temperature (-18°C to 0°C), (b) number of days into outdoor training (1 to 3 days), and (c)

three preexisting subjective judgments (self-perception of usual stress level, self-perception of relative warmth in cold weather, and self-expectations of like or dislike for an upcoming three-day outdoor field training exercise (FTX)) on psychological mood and subjective report of medical symptoms.

METHODS

Subjects

The subject population consisted of 107 male volunteers participating in eight days of winter training at the Vermont Army National Guard Mountaineering School in northern Vermont. The subjects were active duty and reserve personnel representing the Army National Guard, the Army, the Navy, and the Marine Corps. Training was conducted during two separate eight-day phases; of the 107 male soldiers, 52 participated during Phase I and 55 participated during Phase II. On a daily basis, the subjects completed paper-and-pencil subjective rating scales (these rating scales are described below). Eight of the 107 soldiers were non-Caucasian and were excluded from the study because some literature suggests racial differences in susceptibility to cold-related injuries (1,5) and they were too few to analyze separately. Fifty-nine (60 percent) of the remaining 99 soldiers had no missing data on any of the rating scale administrations. These 59 soldiers are the subject of the data analysis.

With respect to personal background, a comparison of the 59 subjects having no missing information with the 40 subjects having some missing information revealed no statistically significant differences between the two groups (Table I). The 59 soldiers in the data analysis had a mean age of 30 yrs, a mean height of 177.8 cm (5 ft 10 ins), and a mean weight of

78.2 kg (172 lbs). Most (52 %) were currently married but many (36 %) had never married, nearly half (48 %) did not have formal education beyond high school while nearly half (52 %) did. Some used tobacco products (29 % current smokers and 14 % current chewers). The participants were in the service an average of nine years and were predominantly in the ranks of E4-E6 (42 %); 19 % were officers.

Table I about here.

Measures

On the first day of training, each participant made three subjective self-ratings:

(a) Subjective stress. "Indicate the current amount of stress in your life: 1=no stress, 2=occasional stress, 3=frequent stress, and 4=constant stress";

(b) Relative warmth. "Compared to others around you, in a cool or a cold environment, how do you generally feel: 1=colder than others, 2= about the same as others, and 3=warmer than others"; and

(c) Expectation for liking the FTX. "Rate how much you think you are going to like living in the field during this upcoming exercise: 1=I will like it very much, 2=I will like it somewhat, 3=I will neither like it nor dislike it, 4=I will dislike it somewhat, and 5=I will dislike it very much".

Most reported occasional stress, felt about the same as others when in the cold, and expected to like the upcoming cold weather training exercise (see Table II).

Table II about here.

The Profile of Mood States (POMS), rating scale (9) was completed twice a day (morning and evening) by the participants, each time providing subjective ratings of feelings experienced during the previous 12 hours. The POMS is a pencil and paper rating scale of 65 items assessing six mood states: tension, depression, anger, vigor, fatigue, and confusion (8). The format of the 65 POMS items is presented in Table III.

The Environmental Symptoms Questionnaire (ESQ) (10,11) was also administered twice daily (morning and evening), each time providing subjective ratings of symptoms experienced during the previous 12 hours. The ESQ is a pencil and paper rating scale of 68 items developed at the US Army Research Institute of Environmental Medicine which obtains reports of frequency of complaints of medical symptoms such as feeling chilly, feeling weak, feeling cold hands, etc. (6,10). The format of the 68 ESQ items is presented in Table IV. For this analysis, elements of the ESQ were grouped into additive scales for each of 14 domains: fatigue, muscle aches, general bodily discomfort, cardiopulmonary discomfort, negative mood, positive mood, cold discomfort, heat discomfort, nasal discomfort, head discomfort, gastrointestinal discomfort, vision discomfort, hearing discomfort, and miscellaneous discomfort. These 14 domains are presented in Table V along with the numbers of the items in the ESQ which were added

---

Tables III, IV, and V about here.

---

together to comprise each domain.

Weather conditions, including dry bulb temperature, were recorded continuously; mean daytime temperature was used in subsequent analyses.

Context

During training, the soldiers learned military tactics for operations in mountainous terrain. Instruction took place both in indoor classrooms and outdoor settings. Near the end of training, three days and two nights were devoted to an outdoor FTX. During the days prior to the FTX, the participants received lectures on strategies for preventing cold-related injuries and discomfort. In addition, appropriate cold weather clothing and equipment were supplied to each participant. Individual clothing included arctic boots, mittens, parka, cold weather trousers, and layers of shirts and undergarments.

The average daytime temperature during the three days of outdoor training was always above $-18^{\circ}C$ ($0^{\circ}F$) and below $0^{\circ}C$ ($32^{\circ}F$). The actual average daytime temperatures during the two phases of FTX training were: -16.3°, -15.1°, -13.9°, -12.9°, -1.8°, and $-0.9^{\circ}C$.

The focus of the present analysis is the three subjective judgments made prior to the FTX, the average daily temperature during the FTX, the number of days into the FTX, the self-reported moods (POMS) during the FTX, and the self-reported symptoms (ESQ) during the FTX. Only the soldiers' POMS and ESQ scores at the end of each day were used in the analysis. Concern with the utility of the nighttime scores because of the variability of temperatures within and between tents necessitated their exclusion from the analysis.

Analytic Techniques

Ordinary least squares and forward stepwise multiple regression analyses were used to analyze the data. Three self-reports of moods (POMS) and three self-reports of symptoms (ESQ) (both reflecting the three days of outdoor training) comprise the dependent variables used in the 20 regression analyses (one analysis for each of the six domains of the POMS and one for each of the 14 domains of the ESQ). The resulting regression equations are based on 177 records: 59 soldiers providing ratings at the end of each of the three FTX days. Each of the 20 dependent variables is continuous. The five independent variables for each regression analysis are ambient temperature, the number of days into the outdoor training, and the three subjective judgments made prior to the FTX. Collinearity among the five independent variables was not problematic; none of the bivariate correlations among them exceeded 0.6. The regression model does not require adaptations for the fact that the three subjective judgments were repeated measures for the 59 soldiers comprising the 177 records. The last step in the stepwise model and the least squares model produced comparable results; hence, only the ordinary least squares model is presented.

RESULTS

Tables VI and VII summarize the results of the multiple regression analyses on self-reported psychological mood (POMS) and self-reported symptoms (ESQ).

Determinants of Mood

Concerning the POMS domains of mood labeled tension, depression, and anger, only one variable achieved statistical significance as a predictor:

the individual's expectation of like or dislike of the outdoor training exercise (Table VI). Those whose expectation was dislike of the upcoming exercise reported significantly more tension, significantly more depression, and significantly more anger than those whose predisposition was to like the exercise.

Table VI about here.

The domains of vigor and confusion also were each predicted by one significant variable, self-reported stress. Those reporting lower levels of usual stress subsequently reported more vigor during the training, while those initially reporting higher levels of usual stress subsequently reported more confusion during the training.

The sixth psychological mood, fatigue, was significantly influenced by three predictors. More fatigue was reported as the training exercise progressed. Those who initially expected to dislike the exercise reported more fatigue. In addition, those who reported more stress in their daily lives reported more fatigue during the training.

Determinants of Symptoms

The regression analyses on the domains of symptoms of discomfort from the ESQ are presented in Table VII.

The variables significantly related to the ESQ fatigue domain are identical to those significantly related to POMS fatigue: the number of days into training, the initial expectations of disliking the outdoor training, and the more reported stress in daily life were each significant independent predictors of ESQ fatigue.

Table VII about here.

The ESQ domain of muscle discomfort (e.g. aches and pains) was significantly predicted by an expectation of disliking the outdoor training and by the number of days into the training. General bodily discomfort (such as lost appetite, thirsty, dry mouth, hands shaking, or a change in urinary frequency) was significantly influenced by days into training (more days, more discomfort) and by the subjective judgment that the individual is usually colder than others in a cold environment.

Both increased levels of self-assessed stress and more days into the outdoor training significantly influenced judgments of negative psychological mood like irritability or depression, while lower levels of self-assessed stress significantly influenced expressions of positive psychological mood such as feeling good or feeling alert.

Expressions of cold discomfort such as cold hands, cold feet, being chilly, shivering, or numbness were not significantly influenced by any of the five factors in the model.

Heat discomfort, (for example, sweating all over) was inversely influenced by the ambient temperature. Lower temperatures were significantly related to more heat discomfort.

Nasal discomfort, including sinus pressure or runny nose, was independently and significantly predicted by expectations of disliking the outdoor training and by the judgment of usually feeling warmer than other people in cold environments. None of the predictors significantly predicted reports of head discomfort such as headache.

Cardiopulmonary discomforts such as chest pain and breathing hard were influenced only by the number of days into the training: the more days into the FTX the more discomfort experienced.

Gastrointestinal complaints such as stomach aches, gas pressure, and bowel irregularity were influenced only by self-perceived stress: the more stress the more gastrointestinal discomfort.

Increased visual discomforts such as irritated eyes or blurry vision were inversely related to expectations of liking the outdoor training: the more one expected to dislike the outdoor training the less visual discomfort would be reported by the soldier while on the FTX. In addition, visual discomforts were associated with warmer ambient temperatures.

The increased frequency of hearing discomforts (ears ringing or feeling blocked) was significantly related to the expectation of disliking the outdoor training. Miscellaneous discomforts, such as problems with coordination or concentration, were significantly associated with reports of more stress in one's everyday life.

DISCUSSION

In the context of a three-day outdoor winter training exercise of moderate activity level, with average daytime ambient temperatures below freezing but above -18°C (0°F), with appropriate winter field clothing and with instruction on the prevention of cold-related injuries, it was possible to develop multiple regression models to determine the independent influence of the five predictor variables: temperature, days into training, and three subjective judgments (usual stress level, rating of warmth relative to others in cold environments, and expectation of liking/disliking the outdoor training).

Ambient Temperature

Ambient temperature was not a significant independent predictor for 18 of the 20 domains. Its only significant influence was with heat discomfort (the lower temperatures were associated with more reports of heat discomfort such as sweating) and vision discomfort (the warmer winter weather was associated with blurred vision or irritated eyes). It is plausible that some of the participants in fact overdressed for the outdoor winter training, particularly on the colder days, and then could not dissipate the extra heat generated from their activities thus producing the heat discomfort symptoms. The vision discomfort might have been the result of facial perspiration irritating the eyes and blurring vision.

Days Into Training

The number of days into training was significantly related to each of the domains which assess some aspect of physical tiredness (i.e., POMS fatigue, ESQ fatigue, muscle discomfort, and general bodily discomfort). This pattern of findings suggests that the level of activity required by the outdoor training phase exceeded the participants' level of usual activity, and consequently produced general physical fatigue. In fact, one of the objectives of the outdoor training was to require a level of physical challenge beyond the usual level of the participants. Apparently this objective was met.

Soldier Attitudes and Expectations

The associations of the soldiers' initial attitudes and expectations suggest several interesting interpretations. The individual's judgment of his own level of usual stress was an important predictor of subsequent moods and reactions during outdoor winter training. Those who reported

higher stress in their daily lives were found to report more confusion, less vigor, more fatigue (both POMS and ESQ), more negative psychological feelings, and less positive psychological feelings during the subsequent outdoor activities. This pattern of reports during training, all influenced significantly by the level of stress the individual brought to the training, suggests a subgroup of individuals who can be identified in advance as perhaps requiring specialized attention during training exercises such as this. In addition, and somewhat expected, those with higher levels of usual stress also reported more gastrointestinal and miscellaneous discomforts.

The subjective judgment of relative warmth (whether one is usually colder, about the same, or warmer than others in a cold environment) demonstrated very few significant associations with subsequent reports, and a pattern is difficult to discern. Those who judge they are usually colder than others reported more general bodily discomforts, while those who judge they are usually warmer than others reported more nasal discomfort.

The individual's expectation to like or dislike the outdoor training was an important predictor for nine of the 20 subsequent moods and symptoms. Those expecting to dislike the outdoor training subsequently reported more tension, more depression, more anger, more fatigue (both POMS and ESQ), more muscle discomfort, more nasal discomfort, more hearing discomfort, but less vision discomfort. This pattern strongly supports the interpretation that expectations and outcomes are intertwined. These individuals might have had accurate self-knowledge based on prior experience to predict accurately their own negative reactions, or they might have "programmed" themselves to have negative reactions and produced

self-fulfilling prophecies. It is clear that the individual's expectancy was demonstrated to be a powerful and independent predictor of subsequent moods and symptoms.

Reports of cold-related discomfort were not significantly related to any of the five potential predictor variables. This suggests that, regardless of the participants' initial attitudes and expectations, the clothing, instruction on cold injury prevention, level of activity, and duration of the exercise were effective and appropriate for this range of ambient temperature.

Generalizing the Findings

There are limits to the generalizability of these findings that merit attention. First, the findings were produced in the context of a mild winter temperature range: below freezing but above -18°C (0°F). Second, the participants had a full supply of appropriate arctic clothing and state-of-the-art instruction on the prevention of cold-related injuries. Third, the length of outdoor training was only three days. Therefore, it is unwarranted to generalize these findings to temperatures below -18°C (0°F), to individuals without appropriate clothing or instruction on the prevention of cold-related injuries, or to longer periods of exposure to the cold outdoors.

Nevertheless, within this ambient temperature range, with this number of days, and for those with adequate instruction and clothing, we find expected associations of days-into-training with reports of physical fatigue. We also find important independent associations between the individual's usual level of stress and outcome on the FTX (more perceived stress in one's everyday life is associated with more fatigue, confusion,

and gastrointestinal discomfort on the FTX), and between the individual's expectation of liking or disliking the FTX and outcome on the FTX (expecting to dislike the FTX is associated with tension, depression, anger, fatigue, and bodily discomforts on the FTX).

The relative lack of association of ambient temperature with moods or symptoms was determined to be due to the fact that the micro-environment of the soldier was relatively stable. That is, even though the air temperature of the surrounding environment was below freezing, the soldier was suitably clothed and thus protected from such an environment. Suitable winter clothing, combined with the vigorous exercise required by the FTX, resulted not in symptoms indicative of a cold soldier but rather symptoms of a soldier who actually is relatively warm and adapted to his surroundings. The low incidence of cold-related discomfort suggests that the clothing, instruction in cold-injury prevention, and level of activity during the FTX were appropriate for this range of ambient temperature (-18° to 0°C). Further research in colder environments (below -18°C), where it is more difficult for the soldier to remain warm, may show a significant influence of ambient temperature on cold-related discomfort.

CONCLUSIONS

In summary, during a three-day military training exercise in cold mountainous terrain, it was found that:

(a) the more the soldiers expected to dislike the FTX, as measured prior to the FTX, the more tense, depressed, angry, fatigued, and physically uncomfortable they were when on the FTX;

(b) the more the soldiers perceived stress in their everyday lives outside of the FTX, the more fatigued, confused, and uncomfortable they

were when on the FTX;

(c) the longer the soldiers were on the FTX the more fatigued they became; and

(d) ambient temperature (in the -18° to 0°C range) was found to have little influence on the soldiers' moods and physical symptoms (probably due to appropriate clothing, training, and activity level).

This study suggests that a subgroup of individuals may be identified in advance of a cold weather FTX who are likely to display symptoms of negative mood (tension, depression, anger, and confusion) and symptoms of poor physical well-being (fatigue, muscle discomfort, and nasal discomfort) when they are on the FTX. These individuals are likely to have more stress in their everyday lives, are likely to expect that they will dislike being on the particular upcoming FTX, or both.

ACKNOWLEDGMENTS

The authors wish to thank the officers and enlisted personnel of the Vermont Army National Guard Mountaineering School, Jericho, Vermont, for letting us observe winter training at the School. By permitting us to administer the POMS and the ESQ at the same time each day, our data collection went smoothly and our data are more rigorous than might otherwise have been the case. Special thanks are extended to MAJ Russell Holden, who spent much personal time assisting in the planning of the study and who insured that we received much of the material support we required to carry out this study. The following individuals rendered invaluable assistance in the collection of the data: SGT Douglas T. Dauphinee, Ms. Shelley R. Strowman, MAJ Earl S. Stein, and CPT Peter Manilla.

The views, opinions, and/or findings contained in this report are those of the authors and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other official documentation.

Human subjects participated in these studies after giving their free and informed voluntary consent. Investigators adhered to AR 70-25 and USAMRDC Regulation 70-25 on Use of Volunteers in Research.

REFERENCES

1. Department of the Air Force. AFP 161-11, Cold injury. Washington DC: US Government Printing Office, 1976.
2. Department of the Army. TB MED 81, Cold injury. Washington DC: US Government Printing Office, 1976.
3. Department of the Navy. NAVMED P-5052-29, Cold injury. Washington DC: US Government Printing Office, 1976.
4. Hamlet M. An overview of medically related problems in the cold environment. Milit. Med. 1987; 152,393-6.
5. Hanson HE, Goldman RF. Cold injury in man: A review of its etiology and discussion of its prediction. Milit. Med. 1969; 134,1307-16.
6. Kobrick JL, Sampson JB. New inventory for the assessment of symptom occurrences and severity at high altitude. Aviat. Space Environ. Med. 1979; 50:925-9.
7. McCarroll JE, Jackson RE, Traver CA, Langevin RC, Phair PW, Murray CA, Farese LJ. Morbidity associated with cold weather training. Milit. Med.1979; 144,680-4.
8. McNair MD, Lorr M, Droppelman LF. Manual for the Profile of Mood States. San Diego, CA: Educational and Industrial Testing Service, 1981.
9. Sampson JB, Kobrick JL. The Environmental Symptoms Questionnaire: Revisions and new field data. Aviat. Space Environ. Med. 1980;51,872-7.
10. Sampson JB, Stokes JW, Barr JG, Jobe JB. Injury and illness during cold weather training. Milit. Med. 1983; 148,324-30.

Table I. Comparison of participants with complete information and participants with incomplete information.

Characteristics	Complete Information	Incomplete Information	Probability of Significance Of Difference
(n)	(59)	(40)	
Age (mean in years)	30.4	29.6	.637[a]
(minimum-maximum)	20-46	20-43	
Height (cm)	177.8	178.3	.766[a]
Weight (kg)	78.0	78.3	.872[a]
Marital Status			
Never married	36%	30%	.580[b]
Currently married	52%	62%	
Previously married	12%	8%	
Education			
High School Graduate or less	48%	42%	.632[b]
Some College	30%	43%	
College Graduate	15%	10%	
Beyond College	7%	5%	
Smoking Status[c]			
Current Cigarette Smoker	29%	32%	.695[b]
Current Pipe or Cigar Smoker	2%	5%	.347[b]
Current Tobacco Chewer	14%	20%	.393[b]
Length of Time in Military Service (months)	107.9	90.0	.235[a]
Military Ranks			
E2-E3	19%	10%	.057[b]
E4-E6	42%	70%	
E7-E9	20%	12%	
O1-O5	19%	8%	

[a] Derived from the t statistic.
[b] Derived from the χ^2 statistic.
[c] Separate chi-square analyses were conducted on each smoking category because of the possibility of the same person being represented in more than one row. In fact, this occurred only three times: one soldier (with complete information) was both a cigarette smoker and a tobacco chewer; one soldier (with incomplete information) smoked cigarettes and cigars and chewed tobacco; and one soldier (with incomplete information) smoked cigarettes and pipes.

Table II. Self-reported subjective judgments of study sample (n=59)

Subjective Judgment	Percent Subjects Responding			
Current Amount of Stress in Your Life:				
	None	Occasional	Frequent	Constant
	5.1%	57.6%	28.8%	8.5%
Relative Warmth During Cold Weather:				
	Colder than Others	About Same as Others	Warmer than Others	
	15.3%	54.2%	30.5%	
Expectation for Liking Outdoor Training (FTX):				
	Like Very Much	Like Somewhat	Neither Like Nor Dislike	Dislike Somewhat	Dislike Very Much
	40.7%	35.6%	13.6%	8.5%	1.7%

Table III. Profile of Mood States (POMS) rating scale

Below is a list of words that describe feelings people have. Please read each one carefully. Then fill in ONE space under the answer to the right which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST DAY/NIGHT.

	not at all 0	a little 1	moder-ately 2	quite a bit 3	extremely 4
1. Friendly . . .	[]	[]	[]	[]	[]
2. Tense . . .	[]	[]	[]	[]	[]
3. Angry . . .	[]	[]	[]	[]	[]
.					
. (See below for remaining items.)					
.					
64. Uncertain about things	[]	[]	[]	[]	[]
65. Bushed . . .	[]	[]	[]	[]	[]

4. Worn out	24. Spiteful	44. Gloomy
5. Unhappy	25. Sympathetic	45. Desperate
6. Clear-headed	26. Uneasy	46. Sluggish
7. Lively	27. Restless	47. Rebellious
8. Confused	28. Unable to concentrate	48. Helpless
9. Sorry for things done	29. Fatigued	49. Weary
10. Shaky	30. Helpful	50. Bewildered
11. Listless	31. Annoyed	51. Alert
12. Peeved	32. Discouraged	52. Deceived
13. Considerate	33. Resentful	53. Furious
14. Sad	34. Nervous	54. Efficient
15. Active	35. Lonely	55. Trusting
16. On edge	36. Miserable	56. Full of pep
17. Grouchy	37. Muddled	57. Bad-tempered
18. Blue	38. Cheerful	58. Worthless
19. Energetic	39. Bitter	59. Forgetful
20. Panicky	40. Exhausted	60. Carefree
21. Hopeless	41. Anxious	61. Terrified
22. Relaxed	42. Ready to fight	62. Guilty
23. Unworthy	43. Good natured	63. Vigorous

Table IV. USARIEM Environmental Symptoms Questionnaire (ESQ)

Circle the number of each item to correspond to HOW YOU HAVE BEEN FEELING DURING THE PAST DAY/NIGHT. PLEASE ANSWER EVERY ITEM. If you did not have the symptom, circle zero (NOT AT ALL).

	not at all	slight	some-what	moder-ate	quite a bit	extreme
1. I felt lightheaded	0	1	2	3	4	5
2. I had a headache	0	1	2	3	4	5
3. I felt sinus pressure	0	1	2	3	4	5
. (See below for remaining items.)						
66. I felt alert	0	1	2	3	4	5
67. I felt good	0	1	2	3	4	5
68. I was hungry	0	1	2	3	4	5

4. I felt dizzy	35. My feet were cold
5. I felt faint	36. I felt chilly
6. My vision was dim	37. I was shivering
7. My coordination was off	38. Parts of my body felt numb
8. I was short of breath	39. My skin was burning or itchy
9. It was hard to breathe	40. My eyes felt irritated
10. It hurt to breathe	41. My vision was blurry
11. My heart was beating fast	42. My ears felt blocked up
12. My heart was pounding	43. My ears ached
13. I had a chest pain	44. I couldn't hear well
14. I had chest pressure	45. My ears were ringing
15. My hands were shaking or trembling	46. My nose felt stuffed up
16. I had a muscle cramp	47. I had a runny nose
17. I had stomach cramps	48. I had a nose bleed
18. My muscles felt tight or stiff	49. My mouth was dry
19. I felt weak	50. My throat was sore
20. My legs or feet ached	51. I was coughing
21. My hands, arms, or shoulders ached	52. I lost my appetite
22. My back ached	53. I felt sick
23. I had a stomach ache	54. I felt hungover
24. I felt sick to my stomach	55. I was thirsty
25. I had gas pressure	56. I felt tired
26. I had diarrhea	57. I felt sleepy
27. I felt constipated	58. I felt wide awake
28. I had to urinate more than usual	59. My concentration was off
29. I had to urinate less than usual	60. I was more forgetful than usual
30. I felt warm	61. I felt worried or nervous
31. I felt feverish	62. I felt irritable
32. My feet were sweaty	63. I felt restless
33. I was sweating all over	64. I was bored
34. My hands were cold	65. I felt depressed

Table V. The 14 Environmental Symptoms Questionnaire (ESQ) domains

	ESQ Domain	Items Comprising Domain
1.	Cold discomfort	(5 items: Nos. 34, 35, 36, 37, & 38)
2.	Heat discomfort	(3 items: Nos. 31, 32 & 33)
3.	Head discomfort	(4 items: Nos. 1, 2, 4, & 5)
4.	Muscle aches	(5 items: Nos. 16, 18, 20, 21, & 22)
5.	Fatigue	(3 items: Nos. 19, 56, & 57)
6.	Gastrointestinal discomfort	(6 items: Nos. 17, 23, 24, 25, 26, & 27)
7.	Hearing discomfort	(4 items: Nos. 42, 43, 44, & 45)
8.	Vision discomfort	(3 items: Nos. 6, 40, & 41)
9.	Nasal discomfort	(4 items: Nos. 3, 46, 47, & 48)
10.	Cardiopulmonary discomfort	(7 items: Nos. 8, 9, 10, 11, 12, 13, & 14)
11.	General bodily discomfort	(11 items: Nos. 15, 28, 29, 39, 49, 50, 51, 52, 53, 55, & 68)
12.	Psychologically negative feelings	(5 items: Nos. 61, 62, 63, 64, & 65)
13.	Psychologically positive feelings	(3 items: Nos. 58, 66, & 67)
14.	Miscellaneous discomfort	(3 items: Nos. 7, 59, & 60)

NOTE: Two items of the ESQ were omitted from the domains (item Nos. 30 & 54).

Table VI. Ordinary least squares regression analysis of six psychological moods from the Profile of Mood States (POMS) rating scale

	Psychological Moods[a]					
	Tension		Depression		Anger	
Predictor Variables	Beta	p[b]	Beta	p	Beta	p
Ambient Temperature	0.1517		0.0704		0.0802	
Days into FTX	0.1303		0.1074		0.1517	
Subjective Judgments						
Stress[c]	0.0462		0.0923		0.1072	
Relative warmth[d]	0.1161		0.1535		0.1726	
Expectation for liking FTX[e]	0.2084	.02	0.2981	.00	0.2535	.01
R^2	.0642		.0903		.0838	

	Psychological Moods[a]					
	Vigor		Fatigue		Confusion	
Predictor Variables	Beta	p[b]	Beta	p	Beta	p
Ambient Temperature	0.0578		0.1241		0.0106	
Days into FTX	-0.0837		0.3414	.00	0.0024	
Subjective Judgments						
Stress[c]	-0.1893	.02	0.1641	.02	0.2743	.00
Relative warmth[d]	0.1177		0.0968		0.0241	
Expectation for liking FTX[e]	-0.0153		0.3365	.00	0.1292	
R^2	.0613		.2409		.0986	

[a] A higher score indicates a stronger mood.
[b] Probability of significance of the association if $p \leq .05$.
[c] Self report of stress in everyday life; a high score indicates more stress.
[d] Self report of of feelings of warmth in a cold environment; a low score indicates colder than others, a high score indicates warmer than others.
[e] Self report of expected like for FTX; a low score indicates like for the FTX, a high score indicates dislike.

Table VII. Ordinary least squares regression analysis of discomfort symptoms from the Environmental Symptoms Questionnaire (ESQ)

	Environmental Discomfort Symptoms[a]					
	Fatigue		Muscle Discomfort		Body	
Discomfort Predictor Variables	Beta	p[b]	Beta	p	Beta	p
Ambient Temperature	0.0880		0.0047		-0.1260	
Days into FTX	0.2948	.00	0.2379	.00	0.2232	.01
Subjective Judgments						
Stress[c]	0.1876	.01	0.0630		0.0316	
Relative warmth[d]	-0.0284		-0.0788		-0.1894	.02
Expectation for liking FTX[e]	0.2246	.01	0.2514	.00	0.0163	
R^2	.1960		.1549		.1195	

	Environmental Discomfort Symptoms[a]					
	Negative Mood		Positive Mood		Cold	
Discomfort Predictor Variables	Beta	p[b]	Beta	p	Beta	p
Ambient Temperature	0.1732		0.0775		-0.0677	
Days into FTX	0.1929	.03	-0.0426		0.1484	
Subjective Judgments						
Stress[c]	0.1669	.03	-0.1980	.01	0.0857	
Relative warmth[d]	0.1213		0.0727		-0.0344	
Expectation for liking FTX[e]	0.0888		-0.0357		0.1624	
R^2	.0849		.0536		.0706	

[a] A higher score indicates more discomfort.
[b] Probability of significance of the association if $p \leq .05$.
[c] Self report of stress in everyday life; a high score indicates more stress.
[d] Self report of of feelings of warmth in a cold environment; a low score indicates colder than others, a high score indicates warmer than others.
[e] Self report of expected like for FTX; a low score indicates like for the FTX, a high score indicates dislike.

Table VII. Ordinary least squares regression analysis of discomfort symptoms from the Environmental Symptoms Questionnaire (ESQ) (continued)

	Environmental Discomfort Symptoms[a]					
	Heat Discomfort		Nasal Discomfort		Head	
Discomfort Predictor Variables	Beta	p[b]	Beta	p	Beta	p
Ambient Temperature	-0.1976	.04	-0.0742		-0.0914	
Days into FTX	-0.0454		0.1409		-0.0435	
Subjective Judgments						
Stress[c]	0.0954		0.0676		0.0413	
Relative warmth[d]	-0.1252		0.2118	.01	-0.0933	
Expectation for liking FTX[e]	0.1325		0.2372	.01	0.0123	
R^2	.0613		.0863		.0127	

	Environmental Discomfort Symptoms[a]					
	Cardiopulmonary Discomfort		Gastrointestinal Discomfort		Vision Discomfort	
Predictor Variables	Beta	p[b]	Beta	p	Beta	p
Ambient Temperature	0.1540		-0.1631		0.1866	.05
Days into FTX	0.2480	.00	-0.0070		0.1426	
Subjective Judgments						
Stress[c]	-0.0729		0.2016	.01	0.0398	
Relative warmth[d]	0.1298		0.0458		-0.0882	
Expectation for liking FTX[e]	0.1404		0.1491		-0.1760	.05
R^2	.0695		.0604		.0490	

[a] A higher score indicates more discomfort.
[b] Probability of significance of the association if $p \leq .05$.
[c] Self report of stress in everyday life; a high score indicates more stress.
[d] Self report of of feelings of warmth in a cold environment; a low score indicates colder than others, a high score indicates warmer than others.
[e] Self report of expected like for FTX; a low score indicates like for the FTX, a high score indicates dislike.

Table VII. Ordinary least squares regression analysis of discomfort symptoms from the Environmental Symptoms Questionnaire (ESQ) (continued)

Predictor Variables	Environmental Discomfort Symptoms[a]			
	Hearing Discomfort		Miscellaneous Discomfort	
	Beta	p[b]	Beta	p
Ambient Temperature	-0.1458		-0.0851	
Days into FTX	-0.0246		0.0262	
Subjective Judgments				
Stress[c]	-0.0610		0.2715	.00
Relative warmth[d]	-0.0475		-0.1189	
Expectation for liking FTX[e]	0.1809	.04	-0.0847	
R^2	.0486		.0878	

[a] A higher score indicates more discomfort.
[b] Probability of significance of the association if $p \leq .05$.
[c] Self report of stress in everyday life; a high score indicates more stress.
[d] Self report of of feelings of warmth in a cold environment; a low score indicates colder than others, a high score indicates warmer than others.
[e] Self report of expected like for FTX; a low score indicates like for the FTX, a high score indicates dislike.