
Item ID Number 01856

Author True, William R.

Corporate Author Veterans Administration

Report/Article Title Stress Symptomology Among Vietnam Veterans:
Analysis of the Veterans Administration Survey of
Veterans II

Journal/Book Title

Year 0000

Month/Day

Color

Number of Images 37

Description Notes Funding from Cooperative Studies Program, Study
#256, Veterans Administration Medical Research
Service. An earlier version of this paper was presented
at the Society for Epidemiological Research meetings
in Pittsburgh, PA in June 1986.

**STRESS SYMPTOMATOLOGY AMONG VIETNAM VETERANS:
ANALYSIS OF THE VETERANS ADMINISTRATION
SURVEY OF VETERANS II**

WILLIAM R. TRUE¹, JACK GOLDBERG², SETH A. EISEN³

¹ Psychiatry and Research Services (151A-JB), VA Medical Center, St. Louis, MO 63125. (Reprint requests to Dr. True.)

² University of Illinois, School of Public Health, and the Cooperative Studies Coordinating Center, VA Medical Center, Hines, IL 60141.

³ Medical and Research Services, VA Medical Center, St. Louis, MO 63125.

Running Head: STRESS SYMPTOMATOLOGY

Acronym: PTSD = Post Traumatic Stress Disorder

Acknowledgement of Funding: Cooperative Studies Program, Study # 256, Veterans Administration Medical Research Service

The authors acknowledge the contribution of Dr. A. J. Singh, Director, Statistical Policy and Research Service, Office of Information Management and Statistics, Veterans Administration, Washington, D.C. who provided the data tape and documentation, and consulted with the authors. Mr. Edward Barnes, programmer at the Cooperative Studies Coordinating Center, Veterans Administration Medical Center, Hines, IL, and Dr. Sharon Homan, Assistant Professor of Community Health, St. Louis University Center for Health Services Research and Education, St. Louis MO, provided assistance. Dr. Joel Royalty, Murray State University, Murray KY, developed preliminary approaches to the data.

An earlier version of this paper was presented at the Society for Epidemiological Research meetings in Pittsburgh, PA in June 1986.

ABSTRACT

True, William R. (VA Medical Center, St. Louis, MO 63125), J. Goldberg, and S. A. Eisen. Stress symptomatology among Vietnam veterans: Analysis of the Veterans Administration Survey of Veterans II.

In 1979, the Veterans Administration conducted a health survey of 11,236 veterans. The present analysis of this data focuses on the effects of service in Vietnam and combat on stress symptomatology among the 1,787 Vietnam era veterans who entered the Army, Navy, Marines, or Air Force between 1965 and 1975. In the unadjusted analysis, both service in Vietnam and combat were related to the prevalence of nightmares, sleep problems, troubled memories, depression, temper control, life goal indecision, guilt feelings and confusion. After controlling for length of active military service, year of discharge, branch of service, rank at discharge, draft status, age at discharge, race, and educational attainment at discharge, combat exposure remained strongly associated with all eight measures of Post Traumatic Stress Disorder symptomatology. Because the data were collected prior to the current controversy about the potential psychological and physical health effects of exposure to Agent Orange, the likelihood of response bias is reduced. The analysis demonstrates that combat continues to have profound effects on veterans' psychological health years after the conclusion of military service.

Stress disorders, post traumatic, Vietnam, Veterans

Controversy about the effect of war stress on the current well-being of Vietnam veterans have been prominent in popular, policy, and scientific literature for some years. Since the end of the war, there have been eight major (1-8) studies of the psychological effects of the Vietnam experience. Debate about the validity of their conclusions has turned upon the relative strength of the research designs, the importance of pre-military risk factors, and the nature and methods of measuring war stress experiences and post-service outcomes.

Vietnam experience research studies can be divided into two major design categories: those based on convenience or volunteer samples (1-3) and those based on cross-sectional random samples of defined target populations (4-8). Typical of a convenience sample is the work of Wilson (3) who identified a comprehensive set of stress symptomatology markers which he related to Vietnam service and combat exposure. However, Wilson's study sample consisted of a self-selected set of Vietnam era veterans seeking help for psychological problems. Of greater methodological sophistication are the cross-sectional surveys. Robins (4) and Card (8) both selected samples based upon chronological criteria. Robins used Army examinations to identify servicemen with positive drug screens who left Vietnam in September, 1971. Control subjects were drug-free soldiers from the same group. Card selected veterans and controls from the 1974 Project Talent follow-up study, a national longitudinal project which in 1960 administered an extensive battery of tests to a randomly selected

cohort of 375,000 9th and 12th graders (9). The Egendorf study (7) used an unusual "snowball" sampling technique in which a contacted household without a qualifying subject referred the study personnel to veterans in the extended kin network (cousins, nephews, etc.) who met study criteria. The Harris (6) survey used its national panel to identify a sample of Vietnam era veterans. While differing dramatically in scope and objectives, each of these studies has contributed to our knowledge of the psychological health of Vietnam era veterans.

The present study follows in the tradition of these cross-sectional sample surveys of Vietnam era veterans by examining the association between military service in Vietnam and subsequent Post Traumatic Stress Disorder (PTSD) symptomatology in the national Survey of Veterans II (5).

MATERIALS AND METHODS

Study population: Survey of Veterans II

The Survey of Veterans II, performed in 1979, was designed to collect data by self-report on men who were veterans of active duty military service. The Veterans Administration and the Bureau of the Census created an interagency agreement to conduct the survey. The Bureau of the Census drew the sample from households which had been recently retired from the Current Population Survey, an ongoing random sample of households throughout the United States.

Men in the Current Population Survey who answered that they

had served in the United States armed forces further responded to a detailed personal interview lasting approximately 45 minutes. The questionnaire covered a wide range of topics related to the veteran's health and well-being including sources of medical care, psychological health, pension benefits, education, rehabilitation, loans and burial benefits.

The sample originally consisted of 11,236 men. From this sample, 492 persons were found to be non-veterans, six were out-of-scope, and 803 were non-interviews. Therefore, 9,929 veterans completed interviews for a response rate of 93 per cent. Veterans who served during the Vietnam era (August 5, 1965 through May 7, 1975) identified themselves by their responses to the question, "What periods did you serve on active duty in the U. S. Armed Forces?" The investigators identified a total of 2,458 Vietnam era veterans. From this group, veterans whose active military service began prior to August 5, 1965 (650 men) or who served in the Coast Guard or National Guard (21 men), were excluded. Thus, the final study sample of 1,787 servicemen was limited to veterans of the Army, Navy, Marines or Air Force who entered service after August 4, 1965.

Measures of military service

A variety of approaches exist for measuring the stresses of war. The present study used two: 1) the simple dichotomy of service in the war zone obtained from the question: "Were you stationed in Vietnam, Laos, or Cambodia; in the waters in or around these countries; or fly in missions over these areas?",

and 2) a multi-dimensional index of exposure to combat as specified in the responses to a set of nine 'Yes/No' items asked of all veterans who served in Vietnam. These items include the following combat roles and experiences: Fired on the enemy, flew in aircraft over war area, stationed at a forward observation post, received incoming fire, encountered mines and booby traps, received sniper or sapper fire, ambushed by the enemy, or was engaged in a firefight with either Vietcong, guerilla, or North Vietnamese Army. These items are quite similar to those used by Egendorf (7) in the Legacies of Vietnam study.

A summary index of combat exposure was constructed from the nine questions on combat roles and experiences. Each positive response to an item scored one point. The combat exposure index is the summation over the nine combat roles and experiences. The mean value of the combat exposure index is 3.43 (n=771).

Cronbach's coefficient alpha, used to provide an indication of the internal consistency of the combat exposure index, was 0.85. The nine-point scale was coded for analysis into the ordinal categories: a) non-Vietnam, b) Vietnam-no combat, c) Vietnam-low combat, d) Vietnam-medium combat, and e) Vietnam-high combat.

Other military experience variables in the Survey of Veterans II reflect factors which have been extensively analyzed in the Vietnam stress literature (10). These include mode of entry into service (drafted or enlisted), branch of service (Air Force, Army, Navy, and Marines), rank or grade at discharge (officer or non-officer), length of service (coded in the

original questionnaire as less than two years or 2-20 years), and year of discharge (before or after 1968). This last point was analyzed because of claims (11) that soldiers discharged after the Tet offensive in 1968 suffered increased stress reactions. The variable length of service was more inclusive than would have been preferred, but further categorization was impossible.

Three further demographic factors were examined in the analysis of the Survey of Veterans II: race (white or non-white), years of education at discharge (less than 12 and at least 12), and age at discharge (less than 22, 22 to 24, and 25 and older). This grouping of age at discharge reflects the evidence in the literature (3) that adolescents exposed to war stress may suffer from increased PTSD symptoms.

Measures of stress symptomatology

Traumatic stress was measured with a eight-item checklist using specific symptoms. Questions were stated in the following form: "Since your LAST release from active military service, have you had . . . a) frightening dreams or nightmares, b) sleep problems, c) troubled memories, d) depression, e) temper control problems, f) life goal indecision, g) guilt feelings, h) confusion?" The items asked for overall prevalence during the years since discharge. There was no probe for timing of the symptom.

Sufficient data were not available to make a presumptive diagnosis of Post-Traumatic Stress Disorder. The items included in the Survey of Veterans II represent the symptom list which in

1979 was associated in the clinical literature with the psychological consequences of combat and subsequently have been largely incorporated as the core criteria for the Diagnostic and Statistical Manual III (12) diagnosis of PTSD. These include nightmares, sleep problems, and guilt feelings. Implied in the PTSD diagnosis are the further items of life goal indecision, troubled memories, confusion, depression and temper control.

Statistical analysis

The statistical analysis of the relationship between military service and post-traumatic stress symptomatology is done in stages. The first stage uses simple contingency table analyses to examine whether service in Vietnam, and specifically exposure to combat, is associated with increased levels of post traumatic stress symptomatology. Prevalence odds ratios and 95 per cent confidence intervals are calculated for each measure of post-traumatic symptomatology. The second stage of analysis examines each of the eight measures of post-traumatic stress in more detail. In particular, logistic regression is used to determine if the association between Vietnam service and stress symptomatology is confounded by military service or demographic factors. Factor adjusted logistic odds ratios and 95 per cent confidence intervals are presented for each of the military service and demographic variables examined.

RESULTS

Post traumatic stress disorder symptoms,
Vietnam service and combat exposure

Table 1 presents the relationship between service in Vietnam and exposure to combat with the eight symptoms of PTSD. For each of the eight symptoms a positive association is observed for Vietnam service. The most striking findings are found for nightmares and troubled memories. Veterans who served in Vietnam are nearly four times more likely ($\Psi = 3.74$, 95 per cent C.I. 2.88-4.87) to have experienced nightmares compared to veterans who did not serve in Vietnam. Likewise, Vietnam service veterans were three and a half times more likely to have reported troubled memories of military service than non-Vietnam veterans. Several other symptoms such as sleep problems, temper control problems, life goal indecision, and confusion are one and a half to two times more common in Vietnam service veterans compared to veterans who did not serve in Vietnam. The weakest association (though the 95 per cent C.I.'s do not include unity) with Vietnam service is found for depression ($\Psi = 1.47$) and guilt feelings ($\Psi = 1.39$).

The prevalence of each of the eight PTSD symptoms increases with increasing levels of combat intensity. The most dramatic association with combat exposure was observed for nightmares and troubled memories. Veterans who were exposed to high intensity combat were eight times more likely than veterans who did not serve in Vietnam to report nightmares since discharge from active

duty. Similarly, reports of troubled memories about experiences in the military were more than seven and a half times more common in high combat exposure Vietnam veterans compared to non-Vietnam service veterans. Odds ratios for the association of combat with temper control problems, guilt feelings, confusion, sleep problems, and depression all display a strong trend with combat exposure. A minimum of a twofold increase in the prevalence of each symptom was found with high combat exposed veterans who were compared to the non-Vietnam veterans. Only for the symptom life goal indecision does the high combat exposed group display an odds ratio of less than two.

A closer examination of the relationship of combat with the PTSD symptoms is revealing. For troubled memories, the prevalence odds ratios increase monotonically and sharply beginning with the Vietnam service non-combat group. An equally steady progression in prevalence is observed for nightmares. Several of the symptoms such as sleep problems, depression, life goal indecision, guilt problems and confusion, show a relatively small increase in prevalence among the Vietnam non-combat group and Vietnam low combat group. It is only when combat exposure reaches the medium and high levels that the prevalence odds ratios for these conditions rise appreciably.

PTSD symptoms - Multiple logistic regression analysis of
military service and demographic factors

Table 2 presents a multiple logistic regression analysis of the relationship of nightmares to six military service and three

demographic factors. As in the unadjusted analysis, combat exposure remains strongly associated with the prevalence of nightmares in Vietnam era veterans; a four unit change in combat produces nearly an eight-fold increase in the frequency of reported nightmares. None of the other military service factors are associated with the prevalence of nightmares. Age at discharge and race demonstrate significant associations with the prevalence of nightmares. Non-white veterans are nearly twice as likely as white veterans to report troubling dreams or nightmares. Age at discharge displays a negative association with the frequency of nightmares; men who were discharged after the age of 25 report problems with nightmares 0.64 less often than men discharged prior to age 22.

The relationship of the military service and demographic factors with depression is examined in table 3. Significant associations are observed for combat exposure, age, race and education at discharge from active duty. Combat exposure is positively related to the prevalence of depression. Vietnam service high combat veterans report depression more than twice as frequently as non-Vietnam veterans. Though not significant, veterans who served in the Army, Navy, or Marines show a trend toward a lower frequency of depression compared to Air Force veterans, after the adjustment for combat exposure. Older age at time of discharge is associated with a diminished prevalence of depression. Conversely, the factor adjusted prevalence odds ratio for race indicates that depression is increased in non-

whites. Education is also related to the prevalence of depression; veterans discharged with less than 12 years of education are more than one and a half times more likely to report problems with depression.

Table 4 presents the results of the logistic regression analysis for the symptom guilt feelings. The combat exposure index is significantly related to the prevalence of guilt feelings, even after adjustment for military service and demographic variables. Several of the military service factors exhibit unexpected relationships with the prevalence of guilt feelings. Veterans released after 1968 are less likely to report guilt feelings than veterans released prior to 1969. Likewise, veterans who served in the Army, Navy or Marines display a trend toward reporting feelings of guilt about activities during military service less often than veterans who served in the Air Force, though this is not significant. Each of the three demographic factors are associated with the presence of guilt feelings in veterans. Age at discharge from active duty displays an inverse association with the prevalence of guilt feelings; men who were discharged from active duty after the age of 24 were 0.68 less likely to report guilt feelings compared to men who were discharged prior to age 22. Non-white veterans complain of guilt feelings more frequently than white veterans ($\Psi = 1.59$, 95 per cent C.I. 1.11-2.28). Veterans who had not completed high school when they were released from active duty are one and a half times more likely to report guilt feelings compared to

veterans who had completed at least a high school education.

Factor adjusted prevalence odds ratios examining the relationship between troubled memories and the six military service factors and three demographic factors are presented in table 5. Most striking is the strong association between troubled memories and combat exposure. A four unit change on the grouped combat exposure index produces a more than seven-fold increase in the prevalence of troubled memories after adjustment for covariates. None of the remaining military service factors are associated with the prevalence of troubled memories. Of the demographic factors examined, both age and race are related to troubled memories. Men who are discharged at an older age are less likely to report troubled memories. Non-white veterans are more likely to report troubled memories.

Table 6 examines the relationship between military service and demographic factors and temper control problems. The combat index is positively related to the prevalence of temper control problems which are nearly three times more common in veterans who experienced high levels of combat exposure compared to non-Vietnam service veterans. Of the military service covariates examined, only length of service and rank at discharge are found to be marginally related to the prevalence of temper control problems. However, marginal associations are observed for both length of service and rank at discharge. For length of service, veterans who served less than two years are less likely to report temper control problems than veterans who served between 2 and 20

years. A twofold increase in the frequency of temper control problems is found for veterans discharged as non-officers compared to veterans discharged as officers. Of the demographic factors examined, age and years of education at discharge are both independently associated with temper control problems. Older age at discharge (25 or above) is associated with a reduced prevalence of temper control problems compared to younger age at discharge (21 and under). Also, men with less than a high school education complained of temper control problems more frequently than those who completed high school.

Factors associated with the prevalence of the PTSD symptom life goal indecision are examined in table 7. Combat exposure demonstrates a positive relationship with the prevalence of life goal indecision. High combat Vietnam veterans are 1.85 times more likely to report problems with life goal indecision compared to non-Vietnam veterans. Among the remaining military service factors, a significant association with life goal indecision is found for rank at discharge and whether the veteran was drafted or enlisted. For branch of service, Marines, Army and Navy veterans report problems with life goal indecision more commonly than Air Force veterans; this difference is only marginally significant ($P < 0.10$). Veterans who are non-officers are twice as likely to complain of problems with life goal indecision compared to veterans who are officers. Veterans who are drafted into military service are less likely to report problems with life goal indecision than veterans who enlisted into the

military. Both age and years of education at release are related to the prevalence of life goal indecision. Age at discharge is negatively related to life goal indecision, with older age at discharge associated with a lower prevalence. Veterans with less than 12 years of education report life goal indecision problems more frequently than veterans with at least 12 years of education ($\Psi = 1.44$, 95 per cent C.I. 1.01-2.03).

Table 8 presents factor adjusted prevalence odds ratios for sleep problems. Combat exposure shows a positive dose-response relationship with reporting of sleep problems. A four unit change on the grouped combat scale produces a twofold increase in the prevalence odds ratio. None of the other military service factors are significantly associated with the prevalence of sleep problems. Of the demographic factors, only years of education is related to sleep problems. As was found for many of the previously examined PTSD symptoms, less education is associated with a higher prevalence of sleep problems. Age at discharge is marginally associated with sleep problems. Consistent with other PTSD symptoms, age is negatively related to sleep disorders.

Table 9 presents the results from a logistic regression analysis of confusion with the military service and demographic factors. A positive and significant association is found with the intensity of combat exposure. Age at discharge is negatively associated with confusion as veterans discharged over the age of 24 complain of difficulties with confusion about half as frequently as veterans discharged prior to age 22. Non-white

veterans are more than twice as likely to report this symptom compared to white veterans. Educational level is related to the prevalence of confusion, with the less educated (under 12 years of schooling) more likely to report this problem than veterans with at least 12 years of education.

DISCUSSION

The analysis of the Survey of Veterans II has demonstrated a marked correlation between eight symptoms of PTSD and military service and combat experience in Vietnam. The advantages of this study include a large random sample (n=1,787) selected from the total U. S. population, an excellent interview response rate (93 per cent), and the collection of data prior to the recent controversy surrounding the issue of the health effects of possible exposure of Vietnam veterans to Agent Orange. The analysis excluded men who served in the military prior to 1965; thus, the results are uncontaminated by military service prior to the Vietnam era. An ordinal index of combat exposure was constructed which demonstrated a high level of internal consistency.

One disadvantage of the study was the incidence-prevalence bias of cross-sectional studies. It was not possible to determine if the elevation of PTSD symptomatology found for Vietnam veterans, and especially for those exposed to combat, existed prior to military service. Pre-military service risk factors, prominent in much of the literature about PTSD (4, 8,

11) were unavailable on the survey. Likewise, there were no measures of post military service traumatic events. Another disadvantage is that the measures of PTSD symptomatology included in the Survey of Veterans II were not sufficiently complete to make the specific psychiatric diagnosis.

A summary of the associations among the eight PTSD symptoms and the nine military service and demographic variables is presented in table 10. The relationship of each factor with each symptom is indicated by a plus or a minus sign. For nominal factors the reference category is indicated to assist interpretation.

Four factors are consistently associated with PTSD symptomatology: combat exposure index, age at discharge, race, and years of education at discharge. Only combat was associated with an increased prevalence in all eight symptoms. Age at discharge was found to be inversely associated with the prevalence of seven stress symptoms. Years of education at discharge was inversely associated with six symptoms. Race (non-white) correlated positively with five symptoms. None of the remaining military service factors demonstrated a consistent association with the PTSD symptoms. That combat shows such a positive correlation with all symptoms is consistent with other studies (8, 6, 7,). Indeed, the first evidence in the literature of the presence of marked psychologic symptomatology came in clinical studies which investigated the influence of combat (13). These early studies, however, were not controlled.

A monotonic increase in the prevalence of several PTSD symptoms was observed with combat exposure in the unadjusted analysis. For example, for the symptom nightmares, prevalence odds ratios increase from 1.32 (no combat) to 2.49 (low combat), 5.49 (medium combat), and 8.19 (high combat). Similarly, troubled memories increases from 1.73 (no combat), to 2.02 (low combat), to 5.29 (medium combat) and to 7.85 (high combat). The other symptoms show consistent but lesser magnitudes of change.

Although there is considerable consistency in reporting strong effects of elevated war stress experiences, some studies (4, 14, 15) have not found these risks to outweigh the role of predispositional risk factors. The original Robins (4) study included a seven-point combat scale, but as combat did not show any association with psychological outcomes, the data were not presented. Helzer's work (14, 15) derived from the same cohort, interviewed veterans one and three years after their return to the United States. The study found an association between combat and depression in the first survey, with 27 per cent of the Vietnam veterans reporting at least some depression, which had largely evaporated by the second survey. In the Helzer studies, combat was a three-level ordinal scale, and the measurement of depression covers only a portion of the symptoms now included under the broader category of PTSD.

Card (8) used a nine-item combat scale, plus a special measurement for being wounded, and found that 8 of the 10 combat experiences were significantly associated with the PTSD scale she

devised. Card scored PTSD as present if two symptoms existed in each of the symptom categories of re-experiencing trauma, numbing, and miscellaneous. This is a somewhat idiosyncratic definition not conforming with the Diagnostic and Statistical Manual III (12). Further, her analysis of the stress symptoms was limited because all symptom data were reduced to an additive scale, thus losing the ability to look at individual symptoms.

Harris (6) also used a nine-point combat index, but the results of the analysis are not comparable to the Survey of Veterans II because the study's only symptom is the simple statement 'Have you had. . . Mental or emotional problems?' While there were three-fold increases in 'problems' due to combat, no refined analysis was conducted.

Egendorf et al. (7) used an 11-point combat scale, the most extensive of the measurements of war stress in the major surveys using random sampling. Their major finding was that more than a third of heavily combat exposed veterans showed significant stress symptoms compared to less than 20 per cent of other veterans. In later analyses of this study, Laufer (16, 17) focused attention on the importance of exposure to and participation in abusive violence and atrocities, which appear to markedly enhance stress reactions.

The importance of the combat exposure index is highlighted by a comparison to the simple dichotomy of Vietnam versus non-Vietnam service. This comparison can be seen in table 1, where prevalence odds ratios for Vietnam service are not pronounced for

the symptoms such as guilt feelings (1.39, 95 per cent C.I. 1.10-1.74) and sleep problems (1.53, 95 per cent C.I. 1.20-1.94).

However, a distinct gradient in the prevalence of these symptoms is observed with increasing levels of the combat exposure index. Previous studies (7, 8) have found that service in Vietnam itself did not induce PTSD symptoms.

Analysis of the variable race reveals that non-whites have a pattern of increased risk for suffering PTSD symptoms. This pattern was present for five of the eight symptoms, with non-whites suffering more nightmares, troubled memories, depression, guilt feelings, and confusion than whites. Kadushin (18) found that being white attenuated war stress, and that blacks showed twice the prevalence of stress symptomatology with exposure to high combat. However, Card (8) did not find a correlation between PTSD (as defined by her) and race. Card dichotomized PTSD into present or absent while Kadushin analyzed stress as a continuous scale.

Veterans discharged from service with less than 12 years of education are more likely to suffer from sleep problems, depression, temper control problems, life goal indecision, guilt, and confusion, independent of the effects of combat. The Legacies study (18) found that low educational attainments were correlated with increased stress. Helzer (14) found a significant correlation in the prevalence of depression at one year after discharge with educational attainment, defined as in the Survey of Veterans II. However, these differences had resolved by the time of the

three-year follow-up. Card (8) had the most exhaustive data on educational attainment, but did not use education at enlistment or discharge as a covariate in the analysis of war stress and PTSD symptomatology.

Age at discharge is negatively related to PTSD symptoms, with older age being protective. The only symptom not associated with age at release is sleep problems. Greater maturity during war service appears to be protective against later symptomatology. Wilson and Krauss (3) found suffering traumatic stress during the formative late adolescent years to be especially predictive of higher stress symptom outcomes.

Further support for the increased psychological vulnerability of younger Vietnam experienced veterans to the development of PTSD symptomatology is provided by the post-service mortality study of conducted by the Centers for Disease Control (19). The authors found an increased mortality rate in the 5 years following discharge among Vietnam veterans, and particularly those discharged before age 21. The principal causes of death were the following: accidents, suicide, homicide, and poisonings, including drug-related incidents.

The present study did not identify any consistent association of stress symptoms with enlistment status (volunteered or drafted), length of service, branch of service, or rank at discharge. Year of discharge (before or after 1968--the Tet Offensive) appears not to have the importance reported by Laufer (11). Only the symptom guilt is correlated with year of

discharge, with post 1968 service suggesting a protective effect ($\gamma = 0.64$, 95 per cent C.I. 0.44-0.93). Card (8) examined this point as well, and also found no support for the distinction between service before and after 1968.

Evidence has been presented of the presence of traumatic stress symptomatology for a randomly selected sample of veterans studied in 1979, a time preceding recent controversies about Agent Orange and war effects. That these symptoms are magnified by combat exposure confirms clinical experience and other research.

TABLE 1

The association of the Vietnam service and combat exposure with the eight measures of post-traumatic stress symptomatology

Symptoms of Post-Traumatic Stress	Service in Vietnam ?		Non-Vietnam	Vietnam No Combat	Combat Exposure Index			Vietnam High Combat
	No	Yes			Vietnam Low Combat	Vietnam Medium Combat		
	n	n			n	n	n	
Nightmares								
Yes	85	197	85	13	60	60	64	
No	925	573	925	107	262	119	85	
Prevalence Odds Ratios (95% CI)	1.00	3.74 (2.88-4.87)	1.00	1.32 (.71-2.45)	2.49 (1.76-3.53)	5.49 (3.86-7.81)	8.19 (5.77-11.64)	
Sleep Problems								
Yes	160	172	160	21	56	43	52	
No	851	599	851	99	266	136	98	
Prevalence Odds Ratios (95% CI)	1.00	1.53 (1.20-1.94)	1.00	1.13 (.68-1.86)	1.12 (.80-1.56)	1.68 (1.15-2.46)	2.82 (1.96-4.07)	
Troubled Memories								
Yes	105	220	105	20	61	68	71	
No	906	549	906	100	260	111	78	
Prevalence Odds Ratios (95% CI)	1.00	3.46 (2.70-4.43)	1.00	1.73 (1.03-2.89)	2.02 (1.44-2.84)	5.29 (3.77-7.41)	7.85 (5.58-11.05)	
Depression								
Yes	312	306	312	41	110	83	72	
No	699	465	699	79	212	96	78	
Prevalence Odds Ratios (95% CI)	1.00	1.47 (1.21-1.79)	1.00	1.16 (.78-1.74)	1.16 (.89-1.52)	1.94 (1.41-2.67)	2.07 (1.47-2.91)	

TABLE 1

The association of the Vietnam service and combat exposure with the eight measures of post-traumatic stress symptomatology
(Continued)

Symptoms of Post-Traumatic Stress	Service in Vietnam ?		Non-Vietnam	Combat Exposure Index			
	No	Yes		Vietnam No Combat	Vietnam Low Combat	Vietnam Medium Combat	Vietnam High Combat
	n	n	n	n	n	n	n
<u>Temper Control Problems</u>							
Yes	144	176	144	15	62	49	50
No	868	595	868	105	260	130	100
Prevalence Odds Ratios (95% CI)	1.00	1.78 (1.40-2.27)	1.00	0.86 (.49-1.52)	1.44 (1.04-1.99)	2.27 (1.58-3.28)	3.01 (2.08-4.36)
<u>Life Goal Indecision</u>							
Yes	225	231	225	34	92	57	48
No	786	539	786	86	230	122	101
Prevalence Odds Ratios (95% CI)	1.00	1.50 (1.21-1.85)	1.00	1.38 (.91-2.11)	1.40 (1.05-1.85)	1.63 (1.16-2.31)	1.66 (1.15-2.41)
<u>Guilt Feelings</u>							
Yes	191	188	191	23	65	49	51
No	821	583	821	97	257	130	99
Prevalence Odds Ratios (95% CI)	1.00	1.39 (1.10-1.74)	1.00	1.02 (.63-1.65)	1.09 (.79-1.49)	1.62 (1.13-2.33)	2.21 (1.54-3.19)
<u>Confusion</u>							
Yes	148	163	148	19	60	44	40
No	864	607	864	101	262	135	109
Prevalence Odds Ratios (95% CI)	1.00	1.57 (1.23-2.00)	1.00	1.10 (.65-1.85)	1.34 (.96-1.86)	1.90 (1.30-2.78)	2.14 (1.44-3.18)

TABLE 2

Factor adjusted prevalence odds ratios for nightmares

<u>Military Service and Demographic Factors</u>	<u>Logistic Regression Beta Coefficients</u>	<u>Factor Adjusted Prevalence Odds Ratios</u>	<u>95% CI</u>
<u>Military Service Factors</u>			
<u>Combat Exposure</u>	.5181		
Non-Vietnam		1.00	
Vietnam no combat		1.68	(1.53-1.85)
Vietnam low combat		2.82	(2.33-3.42)
Vietnam medium combat		4.73	(3.55-6.31)
Vietnam high combat		7.94	(5.41-11.66)
<u>Length of Service</u>	-.0256		
2 to 20 years		1.00	
less than 2 years		.97	(.69-1.37)
<u>Year of Discharge</u>	.3657		
Before 1968		1.00	
1968 and after		1.44	(.87-2.40)
<u>Branch of Service</u>			
Air Force		1.00	
Army	.0649	1.07	(.68-1.67)
Navy	-.2926	.75	(.45-1.24)
Marines	-.0179	.98	(.56-1.73)
<u>Rank of Discharge</u>	.1716		
Officer		1.00	
Non-Officer		1.19	(.61-2.31)
<u>Enlisted vs. Drafted</u>	.0041		
Enlisted		1.00	
Drafted		1.00	(.68-1.48)
<u>Demographic Factors</u>			
<u>Age at Discharge</u>	-.2232		
21 and younger		1.00	
22 - 24		.80	(.65- .99)
25 and older		.64	(.42- .99)
<u>Race</u>	.6722		
White		1.00	
Non-white		1.96	(1.31-2.92)
<u>Years of Education at Discharge</u>	.2490		
At least 12 yrs of education		1.00	
Less than 12 years		1.28	(.84-1.96)

TABLE 3

Factor adjusted prevalence odds ratios for depression

<u>Military Service and Demographic Factors</u>	<u>Logistic Regression Beta Coefficients</u>	<u>Factor Adjusted Prevalence Odds Ratios</u>	<u>95% CI</u>
<u>Military Service Factors</u>			
<u>Combat Exposure</u>	.1930		
Non-Vietnam		1.00	
Vietnam no combat		1.21	(1.12-1.31)
Vietnam low combat		1.47	(1.26-1.71)
Vietnam medium combat		1.78	(1.42-2.24)
Vietnam high combat		2.16	(1.60-2.93)
<u>Length of Service</u>	-.0236		
2 to 20 years		1.00	
less than 2 years		.98	(.76-1.25)
<u>Year of Discharge</u>	-.1167		
Before 1968		1.00	
1968 and after		.89	(.63-1.25)
<u>Branch of Service</u>			
Air Force		1.00	
Army	-.3831	.68	(.50-.94)
Navy	-.1603	.85	(.61-1.19)
Marines	-.3018	.74	(.48-1.13)
<u>Rank of Discharge</u>	.4239		
Officer		1.00	
Non-Officer		1.53	(.93-2.51)
<u>Enlisted vs. Drafted</u>	.0740		
Enlisted		1.00	
Drafted		1.08	(.80-1.44)
<u>Demographic Factors</u>			
<u>Age at Discharge</u>	-.2587		
21 and younger		1.00	
22 - 24		.77	(.66-.91)
25 and older		.60	(.43-.82)
<u>Race</u>	.4508		
White		1.00	
Non-white		1.57	(1.13-2.18)
<u>Years of Education at Discharge</u>	.4583		
At least 12 years of education		1.00	
Less than 12 years		1.58	(1.14-2.19)

TABLE 4

Factor adjusted prevalence odds ratios for guilt feelings

<u>Military Service and Demographic Factors</u>	<u>Logistic Regression Beta Coefficients</u>	<u>Factor Adjusted Prevalence Odds Ratios</u>	<u>95% CI</u>
<u>Military Service Factors</u>			
<u>Combat Exposure</u>	.1828		
Non-Vietnam		1.00	
Vietnam no combat		1.20	(1.10-1.31)
Vietnam low combat		1.44	(1.21-1.71)
Vietnam medium combat		1.73	(1.34-2.24)
Vietnam high combat		2.08	(1.48-2.92)
<u>Length of Service</u>	-.0800		
2 to 20 years		1.00	
less than 2 years		.92	(.69-1.23)
<u>Year of Discharge</u>	-.4446		
Before 1968		1.00	
1968 and after		.64	(.44-.93)
<u>Branch of Service</u>			
Air Force		1.00	
Army	-.3951	.67	(.47-.96)
Navy	-.3524	.70	(.48-1.03)
Marines	-.4697	.63	(.38-1.02)
<u>Rank of Discharge</u>	.4276		
Officer		1.00	
Non-Officer		1.53	(.85-2.78)
<u>Enlisted vs. Drafted</u>	-.1096		
Enlisted		1.00	
Drafted		.90	(.64-1.26)
<u>Demographic Factors</u>			
<u>Age at Discharge</u>	-.1954		
21 and younger		1.00	
22 - 24		.82	(.68-.99)
25 and older		.68	(.47-.98)
<u>Race</u>	.4640		
White		1.00	
Non-white		1.59	(1.11-2.28)
<u>Years of Education at Discharge</u>	.4035		
At least 12 years of education		1.00	
Less than 12 years		1.50	(1.04-2.15)

TABLE 5

Factor adjusted prevalence odds ratios for troubled memories

<u>Military Service and Demographic Factors</u>	<u>Logistic Regression Beta Coefficients</u>	<u>Factor Adjusted Prevalence Odds Ratios</u>	<u>95% CI</u>
<u>Military Service Factors</u>			
<u>Combat Exposure</u>	.5015		
Non-Vietnam		1.00	
Vietnam no combat		1.65	(1.51-1.81)
Vietnam low combat		2.73	(2.27-3.27)
Vietnam medium combat		4.50	(3.43-5.91)
Vietnam high combat		7.43	(5.17-10.69)
<u>Length of Service</u>	-.1682		
2 to 20 years		1.00	
less than 2 years		.85	(.62-1.17)
<u>Year of Discharge</u>	.2339		
Before 1968		1.00	
1968 and after		1.26	(.79-2.02)
<u>Branch of Service</u>			
Air Force		1.00	
Army	.1513	1.16	(.76-1.78)
Navy	.1797	1.20	(.76-1.88)
Marines	-.0353	.97	(.56-1.67)
<u>Rank of Discharge</u>	.1727		
Officer		1.00	
Non-Officer		1.19	(.65-2.19)
<u>Enlisted vs. Drafted</u>	.0456		
Enlisted		1.00	
Drafted		1.05	(.72-1.51)
<u>Demographic Factors</u>			
<u>Age at Discharge</u>	-.2105		
21 and younger		1.00	
22 - 24		.81	(.66-.99)
25 and older		.66	(.44-.98)
<u>Race</u>	.4472		
White		1.00	
Non-white		1.56	(1.05-2.32)
<u>Years of Education at Discharge</u>	-.0397		
At least 12 years of education		1.00	
Less than 12 years		.96	(.63-1.47)

TABLE 6

Factor adjusted prevalence odds ratios for temper control problems

<u>Military Service and Demographic Factors</u>	<u>Logistic Regression Beta Coefficients</u>	<u>Factor Adjusted Prevalence Odds Ratios</u>	<u>95% CI</u>
<u>Military Service Factors</u>			
<u>Combat Exposure</u>	.2695		
Non-Vietnam		1.00	
Vietnam no combat		1.31	(1.20-1.43)
Vietnam low combat		1.71	(1.43-2.05)
Vietnam medium combat		2.24	(1.71-2.94)
Vietnam high combat		2.94	(2.05-4.22)
<u>Length of Service</u>	-.2932		
2 to 20 years		1.00	
less than 2 years		.75	(.54-1.02)
<u>Year of Discharge</u>	-.1631		
Before 1968		1.00	
1968 and after		.85	(.56-1.29)
<u>Branch of Service</u>			
Air Force		1.00	
Army	.0345	1.04	(.69-1.56)
Navy	-.0186	.98	(.64-1.52)
Marines	.0874	1.09	(.65-1.83)
<u>Rank of Discharge</u>	.7576		
Officer		1.00	
Non-Officer		2.13	(.99-4.62)
<u>Enlisted vs. Drafted</u>	-.0678		
Enlisted		1.00	
Drafted		.93	(.65-1.35)
<u>Demographic Factors</u>			
<u>Age at Discharge</u>	-.4452		
21 and younger		1.00	
22 - 24		.64	(.52-.79)
25 and older		.41	(.27-.62)
<u>Race</u>	-.3652		
White		1.00	
Non-white		.69	(.44-1.09)
<u>Years of Education at Discharge</u>	.6001		
At least 12 years of education		1.00	
Less than 12 years		1.82	(1.26-2.64)

TABLE 7

Factor adjusted prevalence odds ratios for life goal indecision

<u>Military Service and Demographic Factors</u>	<u>Logistic Regression Beta Coefficients</u>	<u>Factor Adjusted Prevalence Odds Ratios</u>	<u>95% CI</u>
<u>Military Service Factors</u>			
<u>Combat Exposure</u>	.1541		
Non-Vietnam		1.00	
Vietnam no combat		1.17	(1.08-1.27)
Vietnam low combat		1.36	(1.16-1.60)
Vietnam medium combat		1.59	(1.24-2.03)
Vietnam high combat		1.85	(1.34-2.57)
<u>Length of Service</u>	-.2052		
2 to 20 years		1.00	
less than 2 years		.82	(.62-1.07)
<u>Year of Discharge</u>	.2207		
Before 1968		1.00	
1968 and after		1.25	(.84-1.85)
<u>Branch of Service</u>			
Air Force		1.00	
Army	-.0878	.92	(.66-1.28)
Navy	-.2178	.80	(.56-1.15)
Marines	-.5178	.60	(.47-.76)
<u>Rank of Discharge</u>	.6935		
Officer		1.00	
Non-Officer		2.00	(1.13-3.55)
<u>Enlisted vs. Drafted</u>	-.4308		
Enlisted		1.00	
Drafted		.65	(.47-.90)
<u>Demographic Factors</u>			
<u>Age at Discharge</u>	-.3281		
21 and younger		1.00	
22 - 24		.72	(.60-.86)
25 and older		.52	(.36-.74)
<u>Race</u>	-.0015		
White		1.00	
Non-white		1.00	(.69-1.44)
<u>Years of Education at Discharge</u>	.3616		
At least 12 years of education		1.00	
Less than 12 years		1.44	(1.01-2.03)

TABLE 8

Factor adjusted prevalence odds ratios for sleep problems

<u>Military Service and Demographic Factors</u>	<u>Logistic Regression Beta Coefficients</u>	<u>Factor Adjusted Prevalence Odds Ratios</u>	<u>95% CI</u>
<u>Military Service Factors</u>			
<u>Combat Exposure</u>	.1908		
Non-Vietnam		1.00	
Vietnam no combat		1.21	(1.11-1.32)
Vietnam low combat		1.46	(1.23-1.75)
Vietnam medium combat		1.77	(1.36-2.31)
Vietnam high combat		2.15	(1.51-3.05)
<u>Length of Service</u>	.0961		
2 to 20 years		1.00	
less than 2 years		1.10	(.82-1.48)
<u>Year of Discharge</u>	-.1256		
Before 1968		1.00	
1968 and after		.88	(.59-1.32)
<u>Branch of Service</u>			
Air Force		1.00	
Army	.1578	1.17	(.78-1.75)
Navy	-.1621	.85	(.54-1.33)
Marines	.4397	1.55	(.94-2.56)
<u>Rank of Discharge</u>	-.0142		
Officer		1.00	
Non-Officer		.99	(.56-1.74)
<u>Enlisted vs. Drafted</u>	-.0774		
Enlisted		1.00	
Drafted		.93	(.65-1.31)
<u>Demographic Factors</u>			
<u>Age at Discharge</u>	-.1816		
21 and younger		1.00	
22 - 24		.83	(.69-1.01)
25 and older		.70	(.47-1.03)
<u>Race</u>	.2474		
White		1.00	
Non-white		1.28	(.87-1.89)
<u>Years of Education at Discharge</u>	.4726		
At least 12 years of education		1.00	
Less than 12 years		1.60	(1.11-2.31)

TABLE 9

Factor adjusted prevalence odds ratios for confusion

<u>Military Service and Demographic Factors</u>	<u>Logistic Regression Beta Coefficients</u>	<u>Factor Adjusted Prevalence Odds Ratios</u>	<u>95% CI</u>
<u>Military Service Factors</u>			
<u>Combat Exposure</u>	.2057		
Non-Vietnam		1.00	
Vietnam no combat		1.23	(1.12-1.35)
Vietnam low combat		1.51	(1.25-1.82)
Vietnam medium combat		1.85	(1.41-2.45)
Vietnam high combat		2.28	(1.57-3.29)
<u>Length of Service</u>	.1174		
2 to 20 years		1.00	
less than 2 years		1.12	(.83-1.53)
<u>Year of Discharge</u>	-.1950		
Before 1968		1.00	
1968 and after		.82	(.54-1.24)
<u>Branch of Service</u>			
Air Force		1.00	
Army	-.0191	.98	(.65-1.49)
Navy	-.1405	1.15	(.74-1.78)
Marines	-.0081	.99	(.58-1.70)
<u>Rank of Discharge</u>	.4089		
Officer		1.00	
Non-Officer		1.51	(.74-3.04)
<u>Enlisted vs. Drafted</u>	-.1030		
Enlisted		1.00	
Drafted		.90	(.62-1.30)
<u>Demographic Factors</u>			
<u>Age at Discharge</u>	-.2974		
21 and younger		1.00	
22 - 24		.74	(.60- .91)
25 and older		.55	(.37- .83)
<u>Race</u>	.7395		
White		1.00	
Non-white		2.09	(1.45-3.03)
<u>Years of Education at Discharge</u>	.5575		
At least 12 years of education		1.00	
Less than 12 years		1.75	(1.20-2.54)

Summary of analyses of PTSD symptoms †

Military Service and Demographic Factors	PTSD SYMPTOMS							
	<u>Nightmares</u>	<u>Sleep Problems</u>	<u>Troubled Memories</u>	<u>Depression</u>	<u>Temper Control Problems</u>	<u>Life Goal Indecision</u>	<u>Guilt Feelings</u>	<u>Confusion</u>
Combat	+ ^{***}	+ ^{***}	+ ^{***}	+ ^{***}	+ ^{***}	+ ^{***}	+ ^{***}	+ ^{***}
Length of Service (2-20 yrs)								
Year of Release (Before 1968)							-*	
Branch (Air Force)								
Rank at Discharge (Officer)						+*		
Drafted (Enlisted)						-**		
Age of Discharge	-*		-*	-**	-***	-**	-*	-**
Race (White)	+ ^{***}		+*	+**			+*	+ ^{***}
Years of Education (≥12 yrs)		+*		+**	+**	+*	+*	+**

*p<.05

**p<.01

***p<.001

† Positive and inverse associations between each military service and demographic factor and PTSD symptom are represented by plus (+) and minus (-) signs, respectively.

REFERENCES

- 1 Borus JF. Reentry II. "Making It" Back in the States. *American Journal of Psychiatry* 1973;130(8):850-854.
- 2 Nace EP, O'Brien CP, Mintz J, et al. *Stress Disorders Among Vietnam Veterans*. C. R. Figley, New York: Brunner/Mazel, 1978:71-128.
- 3 Wilson JP, Krauss GE. Post-Traumatic Stress Disorder and the War Veteran Patient. in William E. Kelly, New York: Brunner/Mazel, 1985:102-147.
- 4 Robins LN, Davis DH, Goodwin DW. Drug Use by U.S. Army Enlisted Men in Vietnam: A Follow-Up on Their Return Home. *American Journal of Epidemiology* 1974;99(4):235-249.
- 5 Veterans Administration. 1979 National Survey of Veterans, Summary Report. 1980.
- 6 Harris L. *Myths and Realities: A Study of attitudes toward Vietnam era Veterans*. Washington, DC 1980. Submitted to the Committee on Veterans' Affairs.
- 7 Egendorf A, Kadushin C, Laufer RS, et al. *Summary of Findings*. New York City: The Center for Policy Research, Inc., 1981. A Study Conducted for the Veterans Administration.
- 8 Card JJ. *Lives after Vietnam*. Lexington, Massachusetts Toronto: Lexington Books, D.C. Heath and Company, 1983.
- 9 Wise LL, McLaughlin DH, Steel L. *The Project TALENT Data Bank Handbook*. Palo Alto: American Institutes for Research, 1979.

- 10 Boulanger G and Kadushin C, eds. The Vietnam Veteran Redefined: Fact and Fiction. Hillsdale, NJ: Lawrence Erlbaum Associates, 1986.
- 11 Laufer RS, Yager T, Frey-Wouters E, et al. Post-War Trauma: Social and Psychological Problems of Vietnam veterans in the aftermath of the Vietnam War. New York: Center for Policy Research, 1981. The final report to the Veterans Administration.
- 12 American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders III (DSM-III). Washington, DC 1980.
- 13 Shatan CF. The Grief of Soldiers: Vietnam Combat Veterans' Self-Help Movement. American Journal of Orthopsychiatry 1973;43(4):640-653.
- 14 Helzer JE, Robins LN, Davis DH. Depressive Disorders in Vietnam Returnees. The Journal of Nervous and Mental Disease 1976;163(3):177-185.
- 15 Helzer JE, Robins LN, Wish E, et al. Depression in Viet Nam Veterans and Civilian Controls. American Journal of Psychiatry 1979;136(4B):526-529.
- 16 Laufer RS, Gallops MS, Frey-Wouters E. War Stress and Trauma: The Vietnam Veteran Experience. Journal of Health and Social Behavior 1984;25(1):65-85.
- 17 Laufer RS, Brett E, Gallops MS. Dimensions of Posttraumatic Stress Disorder among Vietnam Veterans. The Journal of Nervous and Mental Disease 1985;173(9):538-545.

STRESS SYMPTOMATOLOGY

True et al. 37

18 Kadushin C, Boulanger G, Martin J. Long Term Stress Reactions: Some Causes, Consequences, and Naturally Occurring Support Systems. Center for Policy Research, Inc., 1981.

19 The Centers for Disease Control Vietnam Experience Study. Postservice Mortality Among Vietnam Veterans. JAMA 1987;257(6).