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Item ID Number 01837

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Report/Article Title Typescript: Prevalence Odds Ratios for Stress Symptomology Among Vietnam Veterans from a Major Health Survey

Journal/Book Title

Year 1986

Month/Day June

Color []

Number of Images 21

Description Notes Alvin L. Young filed this item under "Vietnam Veterans Twin Study." Item includes cover letter from William R. True to Alvin L. Young, June 26, 1986.



June 26, 1986

Alvin L. Young, LTCOL, USAF, Ph.D.
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Dear Alvin:

I really enjoyed seeing you in Washington, and thanks again for lunch. I'm gratified that this project is finally coming to show some results for all the time and effort that has gone into it. We also owe you so much for your significant assistance throughout.

I wanted to get your schedule for your St. Louis trip. Please have your secretary give us a call as I'd love to take you to one of our fun Italian restaurants on the hill, former home of Yogi Berra and Joe Garagiola. My growing bride will join us, eating for two.

I'm enclosing a copy of the paper I gave last week at the Society for Epidemiological Research in Pittsburgh. It got some press which was fun.

Best wishes. I'll look forward to seeing you.

Sincerely,



William R. True, Ph.D., M.P.H.
Research Anthropologist (151A-JB)

cc: Seth Eisen, M.D.

**Prevalence Odds Ratios for Stress Symptomology
Among Vietnam Veterans
from a Major Health Survey**

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**Presented at the Society for Epidemiological Research
June 18-20, 1986
Pittsburgh PA**

I. Introduction

Many research studies (Figley, 1978) have suggested that participation in the Vietnam War is correlated with psychological difficulties presently reported by Vietnam veterans. Underachievement in educational and employment spheres (Egendorf et al., 1981), marital and personality problems, and drug and/or drinking problems are just a few examples of symptom clusters which have been attributed to the conflict.

Although the Vietnam War, like other wars, left combatants with feelings of danger, loss, helplessness, and disruption (Laufer, 1985; Yager, 1984), many investigators have concluded that the Vietnam experience was unique and therefore worthy of special research efforts. In contrast with other wars, veterans point out that they left the war zone as individuals rather than as members of military units, faced broad-based opposition at home to their participation, suffered the frustrations of a "limited war mentality," and had to deal with an abrupt transition from a wartime to a civilian environment. The issue is further complicated by the perception shared by many veterans that exposure to Herbicide Orange and other potentially toxic substances while in Vietnam caused the psychological and physiologic disorders they believe they are now experiencing (Wade, 1979; Holden, 1979).

While considerable research attention has been directed towards understanding the long-term psychological and physical health effects of the Vietnam War, the relationship remains

incompletely defined. Many clinical studies have had no control groups, inadequate definition of outcomes, and insufficient attention to confounding factors. Four relatively large scale epidemiological studies do exist which examine the relationships between Vietnam service and subsequent health status.

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Although these surveys constitute an impressive body of knowledge, some limitations upon their interpretation exist. Only the Harris (1980) study is based on national probability sampling techniques. Robins (1974) and Card (1983) both selected presumably unbiased samples based upon chronological criteria: Robins used Army examinations to identify servicemen with positive drug screens leaving Vietnam in September, 1971 and matched these subjects with drug-free soldiers from the same group; Card selected veterans from the 1974 Project Talent follow-up study. The Egendorf study (referred to as 'Legacies...') is potentially biased because participants were selected using an unusual "snowball" sampling technique in which a contacted household referred the study personnel to other veterans meeting study criteria.

Further, the research projects had different research objectives, thereby accounting for the variety of methods employed. Thus, studies defined control groups as Vietnam or non-Vietnam experienced soldiers, although there was considerable

non-Vietnam experienced soldiers, although there was considerable variation in levels of war trauma encountered. Alternatively control groups were defined as non-veterans. For example, in the Card study, comparisons were made with non-veterans, whose reasons for not being in the military would themselves have complicated any analysis of this question.

The research reported here is based on the secondary analysis of a major study, the Survey of Veterans II, commissioned by the Veterans Administration. The study was

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conducted in 1979 by the Census Bureau of the Department of Commerce on the Current Population Survey respondents who had identified themselves as veterans of the U.S. Armed Forces serving since 1917. From this study sample of 11,230, a Vietnam Era sub-sample of 2,452 was identified and interviewed. This group was divided between 1,036 Vietnam theater and 1,416 Vietnam Era veterans.

II. Epidemiological Analysis of the SOV II

This sample is particularly important because it was studied in 1979, a time preceeding the development of the major controversy about Agent Orange and the considerable litigation surrounding that issue. Therefore the SOV II was an important benchmark sample against which other current surveys may be compared.

The analysis of the effects of war service in this sample was performed with Mantel-Haenszel prevalence odds ratios controlling for age, race, length of service, year of release

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from service, years of education at discharge, rank, drafted-enlisted, and branch of service. Test-based Confidence Intervals are presented in lieu of significance levels. In this analysis, the controlling variables were adjusted for simultaneously. Further analysis of the specific associations of the individual potential confounding variables with the outcome measures is now in progress. The survey did not include questions about preservice risk factors or youthful liability measures which have been shown to be important in other studies.

Questions as they were stated on the questionnaire took the following form: "Since your LAST release from active military service, have you...had any problems with your physical health? /alternatively/...had frightening dreams or nightmares?" The items asked for overall prevalence during the years since discharge, and there was no probe for timing of the item. The question concerning Vietnam service was phrased as follows: Were you stationed in Vietnam, Laos, or Cambodia; in the waters in or around these countries; or fly in missions over these areas?

The prevalence odds ratios for psychiatric symptom outcomes

revealed increased prevalence odds ratios for those exposed to in-country Vietnam Duty. The striking elevation in prevalence

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odds ratios for nightmares was the strongest outcome in the study, and this nearly four-fold increase did not diminish with adjustment. Although sufficient data are not available to make a presumptive diagnosis of Post-Traumatic Stress Disorder, we looked at the evidence relevant to this diagnosis. Nightmares, for example, along with confusion, are specifically included in the Diagnostic and Statistical Manual III (APA, 1980) as contributing to the diagnosis of Post-Traumatic Stress Disorder. Depression and guilt both have also been included in clinical descriptions of post-traumatic stress symptomatology (Helzer, 1979). Another feature of the clinical presentation of troubling dreams are night terrors, which are often accompanied by retrograde amnesia, therefore causing the symptom to be commonly under-reported. Consequently, we suspect that although these findings are quite dramatic, they may still understate this troubling symptomatology.

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These psychological outcomes, including Troubled Memories, Psychological Problems, and Temper Control also contribute to the

Post Traumatic Stress Disorder diagnosis. The diagnosis itself encompasses two different domains of symptoms, intrusive imagery and numbing. Intrusive symptoms, such as the psychological outcomes displayed, suggest the re-experiencing of the original trauma. This may occur through hyper-reactivity to environmental stimuli such as startle responses to backfires, irrational feelings and actions upon seeing an oriental face, or disturbing dreams.

Numbing suggests constricted affect, feelings of estrangement, deliberate efforts to avoid feelings and activities which may directly or indirectly resonate with the original trauma. Thus, for example, a veteran may avoid sports in spite of personal interest because the emotional closeness of the team may recall the esprit of the platoon, which may have been decimated in combat. In these data, life goal indecision suggests a reflection of the numbing symptomology.

General Problem Outcomes suggest more of the areas

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included in the numbing aspect of the Post Traumatic Stress Disorder diagnosis, although in this study, they do not appear to be important. Outcomes relating to job, school and family would suggest these difficulties.

These findings are increased with measurement of the combat exposure. Combat was measured with an additive scale for all

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Vietnam veterans and was grouped for this analysis into four levels: none, low, medium, and high. The psychiatric outcomes and combat show the increased prevalence odds ratios for

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higher levels of combat. Again, Nightmares for high combat shows over a nine-fold increase. Prevalence odds ratios for all psychiatric symptoms show highly significant combat effects with the Test for Trend.

Similar findings are shown for the psychological outcomes.

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Troubled memories show almost an eight fold increase, and all outcomes save Life Goal Indecision demonstrate clear stepped increases with combat. All trends are highly significant.

Of the General Problem Outcomes, Physical Health shows

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increased Prevalence Odds Ratios and highly significant trend with combat. This finding is interesting although we cannot

determine whether the health problems were the result of injuries from the war itself, or related to the indirect stresses of combat as these might be hypothesized to affect physical health or increased risk-taking. The other outcomes show modest but consistent increases and significant trend.

Evidence has been presented of the presence of traumatic stress symptomology for a randomly selected sample of veterans studied in 1979, a time preceding recent increases in the political sensitivities surrounding the issue of the effects of the Vietnam War. That these symptoms are magnified by combat exposures follows clinical experience and other research already conducted.

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Table 1

Vietnam Veteran Surveys

<u>Study</u>	<u>Question</u>	<u>Population</u>	<u>N</u>	<u>Controls</u>
Robins, 1974	Post service drug use	Army enlisted leaving VN 9/71	495 drug	470 <u>drug</u>
Legacies of Vietnam, 1981	War effects	Strat prob sample: 10 sites	350 VN	363 <u>VN</u> 629 <u>Veterans</u>
Harris, 1980	War effects	Prob sample	1176 VN	1388 <u>VN</u> 4073 <u>Veterans</u>
Card, 1979	War effects	Project Talent	500 VN	500 <u>VN</u> 500 <u>Veterans</u>
SOV II, 1979	War effects	CPS	1036 VN	1416 <u>VN</u>

Table 2

Study Sample

Survey of Veterans II (1979)

**Sponsored by Reports and Statistics Service
Veterans Administration Central Office**

**Conducted by Bureau of Census
Commerce Department
February to April 1979**

**Sample size: 11,230 male veterans
(Military Service since 1917)
Bureau of Census Current Population Sample (CPS)**

Table 3

Potential Confounding Variables

Age at time of Survey

Race

Length of Service

Year of Release

Years of Education

Rank

Drafted - Enlisted

Branch of Service

Table 4

**Prevalence Odds Ratios for Psychiatric Symptom Outcomes
and Service in Vietnam**

	<u>Unadjusted</u>	<u>95% C.I.</u>	<u>Adjusted</u>	<u>95% C.I.</u>
Nightmares	3.69	2.91-4.68	3.78	2.85-5.02
Confusion	1.53	1.22-2.19	1.82	1.39-2.39
Depression	1.43	1.20-1.70	1.65	1.35-2.01
Guilt	1.37	1.12-1.68	1.42	1.12-1.81

Table 5

**Prevalence Odds Ratios for Psychological Outcomes
and Service in Vietnam**

	<u>Unadjusted</u>	<u>95% C.I.</u>	<u>Adjusted</u>	<u>95% C.I.</u>
Troubled Memories	3.31	2.64-4.14	3.52	2.69-4.61
Psychological Problems	1.66	1.29-2.13	1.75	1.30-2.35
Temper Control	1.72	1.39-2.12	1.78	1.38-2.29
Life Goal Indecision	1.43	1.18-1.73	1.53	1.22-1.90
Sleeping Problems	1.51	1.22-1.87	1.46	1.13-1.87

Table 6

**Prevalence Odds Ratios for General Problem Outcomes
and Service in Vietnam**

	<u>Unadjusted</u>	<u>95% C.I.</u>	<u>Adjusted</u>	<u>95% C.I.</u>
Physical Health	1.42	1.16-1.75	1.30	1.10-1.68
Drug or Drinking	1.58	1.08-2.37	1.81	1.18-2.79
Finding Job	1.29	1.07-1.56	1.36	1.09-1.71
Holding Job	1.43	1.02-2.07	1.57	1.05-2.36
Inadequate Pay	1.19	1.01-1.41	1.18	.97-1.44
Family Trouble	1.26	1.01-1.57	1.27	.97-1.65
Legal Trouble	1.07	.74-1.56	1.27	.81-1.99
School Trouble	1.05	.71-1.55	1.10	.69-1.79

Table 7

Combat Scale

- 1 Artillery Unit which fired on the enemy
- 2 Flew missions over Vietnam, Laos, and/or Cambodia
- 3 Stationed at a forward observation post
- 4 Received incoming fire (artillery, rockets, or mortars)
- 5 Encountered enemy mines or booby traps
- 6 Received sniper or sapper fire
- 7 Ambushed by enemy
- 8 Engaged the Vietcong, Guerilla, or unidentified
troups in a firefight
- 9 Engaged the North Vietnamese Army
or other organized military forces in a firefight

Combat Scale equals sum of positive responses to any of the above.
There are two groups: Non-Vietnam and Vietnam (Combat Scale 0 to 9).

Table 8

**Prevalence Odds Ratios for Psychiatric Symptom Outcomes
and Combat Scale**

	<u>Combat Level</u>					<u>Test for Trend</u>
	<u>Non-VN</u>	<u>None</u>	<u>Low</u>	<u>Med</u>	<u>High</u>	
Nightmares	1.00	1.54	2.27	5.47	9.31	203.333***
Confusion	1.00	1.21	1.26	1.85	2.24	22.811***
Depression	1.00	1.13	1.12	1.97	2.05	29.938***
Guilt	1.00	.97	1.08	1.77	2.21	22.533***

*** $p < .001$

Table 9

**Prevalence Odds Ratios for Psychological Outcomes
and Combat Scale**

	<u>Combat Level</u>					<u>Test for Trend</u>
	<u>Non-VN</u>	<u>None</u>	<u>Low</u>	<u>Med</u>	<u>High</u>	
Troubled Memories	1.00	1.68	1.92	7.74	7.94	188.331***
Psychological Problems	1.00	1.04	1.39	1.93	2.72	28.737***
Temper Control	1.00	1.05	1.46	2.17	2.75	43.049***
Life Goal Indecision	1.00	1.42	1.28	1.70	1.52	13.683***
Sleep Problems	1.00	1.09	1.03	1.90	3.02	35.931***

*** p < .001

Table 10

**Prevalence Odds Ratios for General Problem Outcomes
and Combat Scale**

	<u>Non-VN</u>	<u>None</u>	<u>Combat Level</u>			<u>Test for Trend</u>
			<u>Low</u>	<u>Med</u>	<u>High</u>	
Physical Health	1.00	.92	1.04	2.18	2.17	26.821***
Drug or Drinking	1.00	.66	1.58	2.07	1.82	8.836**
Finding Job	1.00	1.17	1.13	1.52	1.62	11.165**
Holding Job	1.00	1.05	1.32	1.70	1.78	6.459**
Inadequate Pay	1.00	.97	1.15	1.46	1.22	6.382**
Family Trouble	1.00	.77	1.12	1.69	1.65	11.047**
Legal Trouble	1.00	.67	.98	1.96	1.21	.904
School Trouble	1.00	.58	.91	1.59	1.18	.881

** p < .01

*** p < .001