Published in final edited form as:

J Trauma Stress. 2008 April ; 21(2): 123–132. doi:10.1002/jts.20329.

Elevated Rates of Current PTSD Among Hispanic Veterans in the NVVRS: True Prevalence or Methodological Artifact?

Roberto Lewis-Fernández,

Department of Psychiatry, Columbia University and New York State Psychiatric Institute, New York, NY

J. Blake Turner,

Department of Psychiatry, Columbia University and New York State Psychiatric Institute, New York, NY

Randall Marshall,

Department of Psychiatry, Columbia University and New York State Psychiatric Institute, New York, NY

Nicholas Turse,

Department of Sociomedical Sciences, Mailman School of Public Health, Columbia University, New York, NY

Yuval Neria, and

Departments of Psychiatry and Epidemiology, Columbia University and New York State Psychiatric Institute, New York, NY

Bruce P. Dohrenwend

Department of Psychiatry, Columbia University, Department of Epidemiology, Mailman School of Public Health, Columbia University, and New York State Psychiatric Institute, New York, NY

Abstract

The elevated rate of current posttraumatic stress disorder (PTSD) among Hispanic Vietnam veterans has been attributed to culturally based expressiveness that inflates symptom self-reports. To investigate this possibility, the authors conducted three hypothesis-driven analyses with National Vietnam Veterans Readjustment Study (NVVRS) data from the Structured Clinical Interview for DSM-III-R (SCID-) diagnosed subsample of male Vietnam Theater veterans (N = 260). First, persistence of the Hispanic elevation after adjusting for war-zone stress exposure initially suggested the effect of greater expressiveness. Second, symptom-based analyses isolated this effect to the self-report Mississippi Scale for Combat-Related PTSD and not to the clinician-rated SCID interview. Third, objective measures of functioning did not reveal a unique Hispanic pattern of lower impairment associated with current PTSD. These tests suggest that greater

Hispanic expressiveness does not account for the Hispanic elevation in current PTSD in the NVVRS SCID-diagnosed subsample.

Controversy exists over whether ethnic variability in post-traumatic stress disorder (PTSD) prevalence is due to differences in exposure severity and sociodemographic characteristics or to ethnic-specific vulnerability (Breslau et al., 1998; Frueh, Brady, & de Arellano, 1998; Perilla, Norris & Lavizzo, 2002). Are U.S. ethnic minorities at greater risk to develop PTSD than non-Hispanic Whites when exposed to trauma? Contradictory findings on this topic are hard to reconcile because of methodological differences across studies.

The claim for ethnocultural specificity is most robust for Hispanics, who show higher rates of PTSD symptoms and disorder relative to other ethnic groups after adjusting for traumatic exposure and sociodemographic characteristics (Kulka et al., 1990; Pole et al., 2001; Perilla et al., 2002). Various cultural factors have been proposed to account for this Hispanic elevation. These include an overendorsing reporting style, unintended tapping of cultural idioms of distress by PTSD symptom scales, greater identification with the enemy, over-reliance on fragile coping styles such as stoic fatalism, and greater sensitivity to military-based racism and discrimination (Ortega & Rosenheck, 2000; Perilla et al., 2002; Ruef, Litz, & Schlenger, 2000). Many of these proposals come from work with data from the congressionally mandated National Vietnam Veterans Readjustment Study (NVVRS; Kulka et al., 1990).

The NVVRS found a significantly elevated prevalence of current PTSD among both Black and Hispanic male veterans relative to non-Hispanic Whites. However, after adjustments for premilitary predisposing factors and level of war-zone stress the elevation persisted only for Hispanics (Kulka et al., 1990). Because Blacks and Hispanics who served in Vietnam experienced comparable levels of war-zone stress exposure and had similar prewar risk factors for PTSD (Kulka et al., 1990), this finding has fueled the argument for a Hispanic-specific cultural explanation.

Investigating this possibility, Ortega and Rosenheck (2000) found that both Hispanic and Black men endorsed higher symptom levels than Whites on the self-report Mississippi Scale for Combat-Related PTSD (Keane, Cadell, & Taylor, 1988). However, only for Blacks were these increased symptom levels associated with greater functional impairment. Hispanics appeared to be overendorsing PTSD symptoms relative to their associated impairment, resulting in an elevated rate of PTSD that “may be more a reflection of culturally based expressive style than of disabling psychopathology” (Ortega & Rosenheck, 2000, p. 619). We call this proposal the *expressive-style hypothesis*.

This hypothesis appears most plausible when diagnoses are derived from self-reported symptoms. In the NVVRS full sample, PTSD rates were based on the Mississippi Scale and other self-report instruments, calibrated in a diagnostic algorithm against Structured Clinical Interview for DSM-III-R (SCID; Spitzer, Williams, Gibbon, & First, 1992) interviews from a subsample of NVVRS veterans ($n = 260$). Full-sample prevalence rates were calculated from the means of the resulting predicted probabilities of current PTSD for each veteran. The SCID-assessed rates in the diagnosed subsample, by contrast, were based on clinician

evaluations. If the SCID interviews had yielded no racial/ethnic variability, this would have supported the expressive-style hypothesis in the self-report assessments. Although potentially vulnerable to expressive style, SCID ratings are influenced by more objective clinician assessments of veterans' appearance, behavior, and psychosocial functioning. Yet SCID evaluations also resulted in a Hispanic elevation in current PTSD compared to non-Hispanic White and Black veterans (Kulka et al., 1990). Is this elevation also due to greater Hispanic expressiveness? For the expressive-style hypothesis to comprehensively explain higher Hispanic rates of PTSD in the NVVRS, it must account for the Hispanic elevation in the SCID-diagnosed subsample. We decided to test this possibility.

In addition to greater objectivity of assessment, the SCID sub-sample has two additional advantages. First, the SCID interview can rule out non-war-related forms of PTSD, reducing confounding of current PTSD rates by premilitary and postmilitary factors. Second, the SCID provides a diagnostic history, which can distinguish three groups of veterans: those with PTSD at interview; those with past, but not current PTSD; and those without any onset of PTSD. Using the SCID subsample thus allows us to compare clinician-based and self-reported measures of PTSD, to exclude non-war-related PTSD, and to distinguish between onset and chronicity of disorder.

Using the SCID subsample, we conducted three tests of the expressive-style hypothesis. First, did war-zone stress exposure account for the ethnic variability in SCID-assessed PTSD rates, making further explanation unnecessary? Previous tests with the full sample used algorithm-based PTSD rates and self-report measures of exposure, which may be affected by expressiveness and are also prone to recall bias (Roemer, Litz, Orsillo, Ehlich, & Friedman, 1998). From military records and other archival sources, we created exposure measures that are independent of self-report, and used these in our analyses. Because we were under-powered for this test in the SCID subsample, however, we decided to continue with our other tests of the expressive-style hypothesis unless by adjusting for exposure we reduced the Hispanic elevation to parity with PTSD rates in White and Black veterans.

Second, were Hispanic veterans more likely to meet SCID criteria for PTSD because greater expressiveness resulted in more positive symptoms on SCID interview? Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (*DSM-III-R*; American Psychiatric Association, 1987) diagnoses of PTSD could result from a minimum number of symptoms in each cluster (1 of 4 in intrusiveness, 3 of 7 in avoidance, and 2 of 6 in hyperarousal, a total of 6 symptoms) or to more than the minimum number (up to 17 PTSD symptoms). Greater expressiveness, therefore, could inflate the number of SCID symptoms obtained. To test this, we stratified the subsample by SCID-assessed PTSD status and compared the number of SCID PTSD symptoms within PTSD statuses across racial/ethnic groups. If the expressive-style hypothesis was correct, Hispanics would show higher SCID symptom counts within PTSD statuses than Whites or Blacks. To compare the impact of expressiveness on clinician-assessed versus self-reported symptoms, we repeated this analysis using the self-report Mississippi Scale mean severity scores, also stratified by SCID-assessed PTSD status.

As a corollary of this second test, we compared the two subgroups of Hispanics, Mexican Americans, and Puerto Ricans. Because Puerto Ricans appear to endorse more self-report anxiety and depressive symptoms than Mexican Americans after adjusting for sociodemographic characteristics (Moscicki, Rae, Regier & Locke, 1987), we would expect greater evidence of expressiveness in the Puerto Rican subgroup.

Third, could greater expressiveness be associated with a change in the quality of the SCID symptoms obtained, rather than with an increase in the absolute number of symptoms? That is, would Hispanic expressiveness result in SCID symptoms that were not associated with functional impairment, but were still coded as positive by the clinician? To test this, we examined the association between SCID PTSD status and functioning across racial/ethnic groups. The expressive-style hypothesis predicted that, among veterans with current PTSD, Hispanics would show higher functioning relative to Whites and Blacks. This would be because, for some of the diagnosed Hispanics, symptom levels were presumably more the result of expressive reporting than of true PTSD. As with the second test, we only used clinician-assessed or objective measures of functioning to avoid confounding by the same possible expressiveness we were assessing. The contrast with Blacks was particularly important because a mismatch between symptom levels and impairment was found in the previous research only for Hispanics, despite similar symptom elevations in Blacks (Ortega & Rosenheck, 2000).

METHOD

Participants

The NVVRS contains a full probability sample of $N = 1,200$ male veterans who served in the Vietnam Theater during the War (August 4, 1964 through May 7, 1975) with oversamples of Blacks and Hispanics. The SCID interviews were administered 11 to 12 years after the War to 260 of these respondents selected by oversampling screen-positive veterans in 28 standard metropolitan areas (Kulka et al., 1990). Our sample was comprised of 96 non-Hispanic Whites, 73 non-Hispanic Blacks, and 86 Hispanics ($n = 255$). Other minorities ($n = 5$) were excluded because they were too few to analyze separately. Race and ethnicity were determined from military records and cross-checked with veterans' self-reports during the interviews (Hunt et al., 1994). In this article, we used the ethnoracial terms veterans were originally assigned to, which result in mutually exclusive categories of "Whites," "Blacks," and "Hispanics." The following Hispanic subgroups were represented: Mexican American ($n = 63$), Puerto Rican ($n = 17$), and Other Latin American ($n = 6$). These last six respondents were excluded from Hispanic subgroup analyses. Nearly all White (99%), Black (100%), and Mexican American (94%) respondents were U.S.-born, but 65% of Puerto Ricans were born in Puerto Rico. After receiving a complete explanation of study aims and procedures, all subjects gave written, informed consent prior to participation (Weiss et al., 1992).

Measures

Posttraumatic stress disorder symptoms and diagnoses were assessed using data from the M-PTSD and the SCID. The M-PTSD is a self-report summation questionnaire assessing 36

Likert-scaled questions on five PTSD domains, with acceptable reliability and validity (Keane et al., 1988); it was the most important of the three self-report symptom scales used in the full-sample diagnostic algorithm. The SCID PTSD module identified lifetime and current (past 6 months) PTSD based on *DSM-III-R* criteria (Spitzer et al., 1992). Although the *DSM-III-R* did not have an impairment criterion as part of the PTSD category, the SCID included a measure of general adaptive functioning (GAF) that was rated for all respondents. This was scored on a scale (0–100) anchored on standardized descriptions, wherein higher numbers indicate better functioning (Spitzer et al., 1992). Interviews were tape-recorded, and interrater reliability for the diagnoses of current and lifetime PTSD was excellent in a subsample of 30 participants ($\kappa = .87$ and $.94$, respectively; Weiss et al., 1992).

For each Criterion A traumatic event identified, the clinicians ascertained whether it occurred prior to, during, or after service in Vietnam. The clinicians also ascertained the date of initial onset of PTSD and diagrammed the course of disorder on a chart divided into preevent, event, and postevent periods. This information revealed whether the first onset of PTSD was related to veterans' service in Vietnam. Veterans with a prewar PTSD onset ($n = 4$) were removed, leaving only veterans at risk to have a war-related first onset of PTSD. Veterans were classified into three groups: those without any war-related PTSD (no-PTSD); those with lifetime war-related PTSD who did not meet current criteria (past-only) and those with war-related PTSD during the 6 months prior to the interview (current PTSD). We defined chronicity as the proportion of veterans with lifetime war-related PTSD who still met PTSD criteria during the 6 months prior to the interview.

Psychosocial functioning was assessed using the clinician-rated GAF scores and four objective measures of functioning: (a) completion of a college education after Vietnam service; (b) socioeconomic status (SES) of veteran's current job or of his highest-status job since leaving the service if different from current job—this variable was operationalized using Duncan's SES index (Duncan, 1961), calibrated to 1980 Census classifications (Stevens & Cho, 1985); (c) whether the veteran was married and never divorced as compared to divorced, separated, or never married as representatives of poorer functioning; and (d) total months of involuntary unemployment experienced since the War. Because the racial/ethnic groups differed in educational attainment, SES, unemployment, and marital status, the strategy for estimating impairment involved comparing veterans with current PTSD to veterans without war-related PTSD within each of the racial/ethnic groups.

Combat exposure was assessed by means of self-report and composite military/historical measures. A retrospective self-report measure was developed by the original NVVRS investigators from 85 fixed-alternative-response questions and is described in more detail elsewhere (Kulka et al., 1988). As in the original, this measure was dichotomized into high war-zone stress (25% of veterans) and low/moderate war-zone stress (the remaining 75%).

A composite military/historical measure was developed based on military records containing data on veterans' military occupational specialty (MOS) in Vietnam, the units in which they served, and the start and end dates of Vietnam service. Together with information on casualty rates down to the company level, we used this information to create four military-historical measures (MHMs) of probable exposure to war-zone stress: (a) probable level of

combat involvement associated with their MOS; (b) average monthly rate of U.S. military killed in action (KIA) during his Vietnam service; (c) KIA rate in his larger military unit (division or independent brigade); and (d) number of KIAs in the veteran's company during his Vietnam tour(s) (Coffelt, Arnold, & Argabright, 2002). These measures were combined into a composite MHM in a manner previously described (Dohrenwend et al., 2004). The composite was a four-category variable dividing veterans into groups with low, moderate, high, and very high probable severity of war-zone stress exposure.

Data Analysis

All data were weighted to reflect the differential probability of selection into the SCID-diagnosed subsample. Standard errors were estimated using the Taylor-series procedures in the software package SUDAAN 7.5 (Shah, Barnwell, & Bieler, 1997). Level of significance was $\alpha = .05$ throughout and all tests were two-tailed.

RESULTS

Ethnic/Racial Differences in PTSD Prevalence and War-Zone Stress Exposure

Table 1 compares the PTSD rates of White, Black, and Hispanic Theater veterans. The pattern of SCID-based prevalence rates of current PTSD across race/ethnicity is similar to that obtained using the PTSD algorithm. Hispanics have the highest rate of current PTSD; Whites the lowest rate. Moreover, the SCID diagnostic history reveals that the Hispanic elevation in current PTSD relative to Whites is a function of both higher onset and chronicity of war-related PTSD. The Hispanic elevation relative to Blacks, however, is due exclusively to higher chronicity of disorder.

The first panel of Table 2 shows that the racial/ethnic distributions of the self-report and records-based measures of war-zone stress exposure in the full sample are similar. In both cases, Whites show the lowest exposure levels. It is the Blacks, however, and not the Hispanics who tend to show the highest exposure levels. This pattern is the same in the diagnosed subsample (data not shown). Clearly, although exposure differences may contribute to higher levels of current PTSD in the minority groups relative to Whites, they cannot account for the Hispanic elevation relative to Blacks.

The second panel confirms this, showing that racial/ethnic differences in algorithm-based rates of current PTSD in the full sample are attenuated for both minority groups relative to Whites after adjusting for war-zone stress exposure. Yet the prevalence differential remains significantly elevated for Hispanics relative to both Whites and Blacks, as well as for Blacks relative to Whites when measured by the MHMs.

The bottom panel of Table 2 repeats these regression analyses using the SCID-based prevalence rates in the diagnosed subsample. Note first that the racial/ethnic differences in current PTSD are more attenuated after adjusting for exposure in the SCID-assessed rates than in the algorithm-based data. Current PTSD prevalence becomes nearly identical across Black and White veterans and the Hispanic elevation relative to Whites is substantially reduced. Second, despite this attenuation, the Hispanic elevation in current PTSD relative to Whites and Blacks clearly persists, although the smaller sample size renders it

nonsignificant. Third, as with the unadjusted rates, the Hispanic elevation relative to Blacks appears to be due to a higher rate of PTSD chronicity rather than to a difference in rate of initial onset.

Our first test of the expressive-style hypothesis was therefore inconclusive. As with the algorithm-based data, adjusting for war-zone stress exposure in the SCID subsample reduced, but did not bring to parity, the Hispanic elevation relative to White and Black veterans, leaving open a possible role for greater Hispanic expressiveness. Our remaining analyses sought to further test this hypothesis in the diagnosed subsample, starting with a comparison of clinician-rated versus self-reported PTSD symptoms.

PTSD Symptoms by SCID Diagnostic Status

Contrary to what was predicted by the expressive-style hypothesis, Figure 1 shows that clinician-rated symptom patterns on the SCID are the same among Hispanics as among Blacks and Whites. In all three ethnic groups the diagnostic categories differ significantly from each other: Whites, $F(2, 76) = 77.57, p < .001$; Blacks, $F(2, 61) = 120.22, p < .001$; Hispanics, $F(2, 69) = 172.73, p < .001$.

Not only are the patterns within each ethnic group the same, but across the three ethnic groups symptom counts do not differ significantly for either past PTSD, $F(2, 18) = 1.18, ns$, or current PTSD, $F(2, 44) = 0.19, ns$. Cross-ethnic counts are significantly different in the no-PTSD group, $F(2, 131) = 3.67, p < .05$, but this is largely due to the low number of symptoms in Whites, which may reflect their lesser exposure to war-zone stress than minority veterans. The symptom levels between Hispanics and Blacks, and those between Hispanics and Whites, do not differ significantly.

Comparisons of Puerto Rican and Mexican American veterans show the same pattern of findings (right of Figure 1). Symptom counts differ significantly across the three diagnostic statuses among Mexican Americans, $F(2, 52) = 131.44, p < .001$, and across the two diagnostic statuses present in the Puerto Rican group, $t(10) = 6.75, p < .001$; no Puerto Ricans in this sample had past-only PTSD.

Figure 2 presents the same group comparisons as Figure 1, but now using mean M-PTSD symptom severity scores. In contrast to the SCID findings, this self-report scale reveals evidence of heightened Hispanic expressiveness. Symptom severity levels in veterans without PTSD differ significantly by ethnic group, $F(2, 147) = 4.18, p < .05$, with the largest difference being between Hispanics and Whites, $t(148) = 2.67, p < .01$. A similar pattern exists for the small number of individuals with past PTSD. Among veterans with current PTSD, however, Hispanics show somewhat lower mean symptom levels than Whites and Blacks.

We also examined whether the M-PTSD discriminated across diagnostic status within each ethnic group. As Figure 2 shows, the M-PTSD discriminates well between all three diagnostic categories in the White, $F(2, 86) = 31.18, p < .001$, and Black, $F(2, 64) = 34.58, p < .001$, subgroups. It discriminates among Hispanics, $F(2, 78) = 14.71, p < .001$, but less well, and it does not discriminate at all between past and current PTSD.

Analyses of M-PTSD symptom severity scores in the two Hispanic subgroups contain three important findings. First, the Hispanic elevations in symptom severity scores among veterans without PTSD are driven largely by the Puerto Rican subgroup. Puerto Rican veterans in the no-PTSD group have significantly higher M-PTSD scores than their Mexican-American counterparts, $t(43) = 3.5, p < .01$, whose scores do not differ from those of Whites and Blacks without PTSD. Second, any ability of the M-PTSD to discriminate by diagnostic status among Hispanics is limited to the Mexican Americans, $F(2, 58) = 18.16, p < .001$. The average symptom levels among Puerto Rican veterans with current PTSD are virtually the same as among those with no PTSD. Third, among Mexican Americans, the M-PTSD nonetheless fails to discriminate between those with current and those with past PTSD, as was the case with the Hispanic group as a whole.

The expressive-style hypothesis predicts that the impairment in post-war social functioning associated with a diagnosis of PTSD will be less for Hispanics than for both Black and White veterans. Contrary to this prediction, weighted mean GAF scores among veterans with current PTSD do not show any ethnic/racial variability (Whites: $M = 62.7, SD = 12.8$; Blacks: $M = 64.8, SD = 12.5$; Hispanics: $M = 64.7, SD = 10.8$; Wald $F(2, 47) = .118, ns$). In addition, the proportion of veterans with current PTSD who have more than slight impairment (GAF < 70) also does not differ by race/ethnicity (Whites: 84%; Blacks: 74%; Hispanics: 90%; ns for Whites vs. Hispanics and for Whites vs. Blacks). However, there is some tendency for Whites to have a larger proportion of veterans in the most serious categories of impairment (GAF < 50 ; e.g., 33% of Whites vs. 14% of Hispanics), although these differences do not approach significance (e.g., ns for Whites vs. Hispanics).

Figure 3 shows that for only one of the four measures of social functioning—marital stability—is the pattern of findings consistent with the expressive-style hypothesis. The impact of current war-related PTSD is smallest for the Hispanics and largest for Blacks, with Whites in-between (Whites vs. Hispanics: $-0.06, 95\% \text{ CI} = -0.49\text{--}0.37$; Blacks vs. Hispanics: $-0.17, \text{CI} = -0.59\text{--}0.25$).

By contrast, the pattern for postwar unemployment is clearly inconsistent with the expressive-style hypothesis: The adverse effect of PTSD is actually largest among the Hispanics. The adverse impact appears to be less among the Whites (Whites vs. Hispanics interaction: $-3.8, \text{CI} = -13.8\text{--}6.1$) and nonexistent in the Blacks (Blacks vs. Hispanics interaction: $-9.4, \text{CI} = -20.3\text{--}1.4$).

For the other two indicators of functioning (SES and college degree), the patterns are inconsistent with the hypothesis of Hispanic-specific greater expressiveness, relative to both Whites and Blacks. Although the adverse impact of PTSD tends to be greater among majority Whites relative to Hispanics ($-0.64 [\text{CI} = -12.69\text{--}11.42]$ and $-0.14 [\text{CI} = -0.38\text{--}0.09]$, respectively), both indicators appear to have the smallest adverse impact for Black veterans, as evidenced by positive Black vs. Hispanic interaction coefficients (SES: $3.46, \text{CI} = -9.33\text{--}16.26$; college degree: $0.04, \text{CI} = -0.21\text{--}0.29$).

The statistical power for these interaction analyses is limited. For example, Blacks with current PTSD are 24% less likely to have maintained a stable marriage since the war than

their counterparts without PTSD—in contrast to an 8% difference among Hispanics—our power to detect inferentially an interaction of this magnitude was only .27. Nonetheless, only one of the four functioning measures showed an interaction effect that was in the direction predicted by the expressive-style hypothesis, revealing very limited support for a uniquely Hispanic pattern of greater expressiveness.

DISCUSSION

In this NVVRS clinician-interviewed subsample, SCID evaluations of male Vietnam Theater veterans confirmed the ethnic variability in PTSD rates found with the diagnostic algorithm in the full NVVRS sample. After exclusion of non-war-related PTSD cases and veterans from other minority groups, Hispanic respondents were significantly more likely to receive SCID diagnoses of current war-related PTSD than Whites (22.0% vs. 9.0%), with Blacks having an intermediate rate (16.6%). The prevalence differential between Blacks and Hispanics was not statistically significant in the smaller diagnosed subsample; nevertheless, it was in the same direction and similar in magnitude to the statistically significant difference between the minorities in the larger sample (Kulka et al., 1990). The SCID diagnostic history revealed that the Hispanic elevation in current PTSD rates was due to both higher onset and greater chronicity relative to Whites, but only to greater chronicity relative to Blacks. In light of these findings, we proceeded to conduct three tests of the hypothesis that this Hispanic elevation in clinician-assessed PTSD was the product of greater expressiveness of PTSD symptoms by Hispanic respondents.

We first assessed the role of war-zone stress exposure in the racial/ethnic variability in PTSD rates. Self-report and military record-based measures showed equally that adjusting for exposure level substantially reduced the elevation among Blacks relative to Whites, but left the Hispanic rate elevated with respect to both of the other groups. This is consistent with the expressive-style hypothesis because factors other than war-zone stress exposure are obviously driving the persisting Hispanic elevation. Given that the expressive-style hypothesis remained viable after the first test, we proceeded with our other tests of this hypothesis.

The second test entailed comparing the role of the proposed racial/ethnic variability in expressiveness on PTSD symptom levels across self-report and clinician-rated PTSD measures. If Hispanics showed higher symptom levels on SCID interview or the M-PTSD than the other groups after stratification by SCID-diagnosed PTSD status, this would support the expressive-style hypothesis for that assessment method. This analysis revealed no differential racial/ethnic effect of expressiveness on clinician-rated symptom counts. Hispanic, White, and Black veterans did not differ in SCID symptom levels in any diagnostic group. Posttraumatic stress disorder symptom counts likewise clearly discriminated across SCID diagnostic statuses in the three groups—and this was also the case for both Hispanic subgroups. In short, a unique Hispanic pattern of PTSD symptoms was not observed in the SCID interview.

The self-report M-PTSD findings, however, were more consistent with the expressive-style hypothesis. In the no-PTSD group, self-report symptom scores on the M-PTSD were

significantly higher in Hispanics than Whites. Among veterans with SCID-diagnosed PTSD, Hispanics showed an unusual pattern of continuous M-PTSD scores characterized by lack of discrimination between respondents with current and past-only PTSD. Breakdown into Hispanic subgroups revealed this same pattern among Mexican American veterans, the majority of the Hispanic group. The lack of diagnostic discrimination among the small subgroup of Puerto Ricans was even more profound, in that the M-PTSD did not discriminate between the no-PTSD versus current-PTSD groups.

Taken together, the SCID and M-PTSD findings confirm a possible role for greater Hispanic expressiveness with respect to self-report scales, particularly among Hispanic veterans without current PTSD. As expected, this tendency was more pronounced in Puerto Rican than Mexican American respondents (Moscicki et al., 1987). The lack of effect from differential expressiveness on SCID symptom counts, however, reveals that the use of clinician interviewers corrects for these self-report differences, from the perspective of diagnostic criteria.

Our final test of the expressive-style hypothesis involved the relationship of diagnostic status to impairment across racial/ethnic groups. The hypothesis predicted that the diagnosis of current PTSD would be associated with lower impairment among Hispanics. However, clinician-rated GAF scale results showed minimal racial/ethnic variability in impairment levels among veterans with current PTSD. Furthermore, the adverse impact of PTSD on social functioning was smallest in the Hispanic subgroup for only one of the four measures tested (marital stability). Evidently, there was no consistent pattern of lesser impairment in Hispanics in relation to SCID-diagnosed current PTSD.

In conclusion, our analyses challenge the hypothesis that the Hispanic elevation in PTSD found in the NVVRS is an artifact of expressive style. Although self-report measures seem affected by a pattern of Hispanic expressiveness, SCID evaluations seem generally free of such problems. Our view of the reason for the Hispanic elevation in algorithm-defined current PTSD in the full NVVRS sample is that the self-report measures were calibrated against the SCID diagnoses, which had controlled clinically for the susceptibility of self-reported symptoms to greater expressiveness among Hispanic veterans.

This study has several limitations. First, the smaller size of the SCID-diagnosed subsample compared to the full NVVRS limited our power to detect ethnic differences. We particularly lacked power to detect a statistical interaction between ethnicity and diagnostic status in influencing social functioning. Second, the diagnostic categories of no-PTSD and past-only PTSD were retrospective and may be subject to recall bias and distortion. Long-term studies of military personnel with baseline evaluations prior to combat exposure would be required to overcome this limitation. Our results would be affected, however, only if recall showed racial/ethnic variation, which has not been reported previously. Third, research on the ethnic variability of combat-related PTSD may not generalize to non-combat PTSD. Additional research with diverse Hispanic trauma populations is needed to address this issue.

Future research should explore whether Hispanic elevations in noncombat-related PTSD found in police officers and disaster victims were due to methodological factors, such as the

use of self-report scales and lay diagnoses. Methodological approaches for future research on racial/ethnic variability in PTSD prevalence should include clinician ratings of PTSD, objective measures of functional impairment, prospective assessments, and sufficient power to detect intra-Hispanic differences, including differences in rates of nativity such as those found in the NVVRS between Mexican American and Puerto Rican veterans. These studies should include direct assessment of cultural factors, such as the experience of interpersonal and socioeconomic stress as bodily affliction (Guarnaccia, Good, & Kleinman, 1990), which may enhance the risk of PTSD symptom onset or persistence.

Acknowledgments

This project was supported by National Institute of Mental Health grant MH-059309 and The Spunk Fund, Inc. The authors wish to thank William Vega, Patrick Shrout, Eva Petkova, and Huiping Jiang for their comments and suggestions.

REFERENCES

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 3rd ed., rev.. Author; Washington, DC: 1987.
- Breslau N, Kessler RC, Chilcoat HD, Schultz LR, Davis GC, Andreski P. Trauma and PTSD in the community. *Archives of General Psychiatry*. 1998; 55:626–632. [PubMed: 9672053]
- Coffelt, RD.; Arnold, RJ.; Argabright, D. An electronic database of combat area casualties. National Archives and Records Administration; Washington, DC: 2002.
- Dohrenwend BP, Neria Y, Turner JB, Turse N, Marshall R, Lewis-Fernández R. Positive tertiary appraisals and PTSD in Vietnam veterans. *Journal of Clinical and Consulting Psychology*. 2004; 72:417–433.
- Duncan, OD. A socioeconomic index for all occupations.. In: Reiss, AJ., editor. *Occupations and Social Status*. Free Press; New York: 1961. p. 109-138.
- Frueh BC, Brady KL, de Arellano MA. Racial differences in combat-related PTSD: Empirical findings and conceptual issues. *Clinical Psychology Review*. 1998; 18:287–305. [PubMed: 9564582]
- Guarnaccia PJ, Good BJ, Kleinman A. A critical review of epidemiological studies of Puerto Rican mental health. *American Journal of Psychiatry*. 1990; 147:1449–1456. [PubMed: 2221155]
- Hunt, PN.; Schlenger, WE.; Jordan, BK.; Fairbank, JA.; LaVange, LM.; Potter, FJ. NVVRS public use analysis file documentation. Research Triangle Institute; Research Triangle Park, NC: 1994.
- Keane T, Caddell J, Taylor K. Mississippi Scale for Combat-Related PTSD. *Journal of Consulting and Clinical Psychology*. 1988; 56:85–90. [PubMed: 3346454]
- Kulka, RA.; Schlenger, WE.; Fairbank, JA.; Hough, RL.; Jordan, BK.; Marmar, CR., et al. Contractual report of findings from the NVVRS, Volume I. Research Triangle Institute; Research Triangle Park, NC: 1988.
- Kulka, RA.; Schlenger, WE.; Fairbank, JA.; Hough, RL.; Jordan, BK.; Marmar, CR., et al. *Trauma and the Vietnam War generation*. Brunner/ Mazel; New York: 1990.
- Moscicki, EK.; Rae, DS.; Regier, DA.; Locke, BZ. The Hispanic Health and Nutrition Examination Survey.. In: Gaviria, M.; Arana, JD., editors. *Health and behavior: Research agenda for Hispanics*. University of Illinois; Chicago: 1987. p. 145-159.
- Ortega AN, Rosenheck R. PTSD among Hispanic Vietnam veterans. *American Journal of Psychiatry*. 2000; 157:615–619. [PubMed: 10739422]
- Perilla JL, Norris FH, Lavizzo EA. Ethnicity, culture, and disaster response. *Journal of Social and Clinical Psychology*. 2002; 21:20–45.
- Pole N, Best SR, Weiss DS, Metzler T, Liberman AM, Fagan J, et al. Effects of gender and ethnicity on duty-related posttraumatic stress symptoms among urban police officers. *Journal of Nervous and Mental Disease*. 2001; 189:442–448. [PubMed: 11504321]

- Roemer L, Litz B, Orsillo S, Ehlich P, Friedman M. Increases in retrospective accounts of war-zone exposure over time. *Journal of Traumatic Stress*. 1998; 11:597–605. [PubMed: 9690197]
- Ruef AM, Litz BT, Schlenger WE. Hispanic ethnicity and risk for combat-related PTSD. *Cultural Diversity and Ethnic Minority Psychology*. 2000; 6:235–251. [PubMed: 10938633]
- Shah, BV.; Barnwell, BG.; Bieler, GS. SUDAAN users' manual. Research Triangle Institute; Research Triangle Park, NC: 1997.
- Spitzer RL, Williams JBW, Gibbon M, First MB. The Structured Clinical Interview for DSM-III-R (SCID). *Archives of General Psychiatry*. 1992; 49:624–629. [PubMed: 1637252]
- Stevens G, Cho JH. Socioeconomic indices and the new 1980 Census Occupational Classification Scheme. *Social Sciences Research*. 1985; 14:142–168.
- Weiss DS, Marmar CR, Schlenger WE, Fairbank JA, Jordan BK, Hough RL, et al. The prevalence of lifetime and partial PTSD in Vietnam Theater veterans. *Journal of Traumatic Stress*. 1992; 5:365–376.

Figure 1.

Mean number of current Structured Clinical Interview for DSM-III-R posttraumatic stress disorder (SCID PTSD) symptoms by ethnic/racial group, Hispanic subgroup, and war-related SCID PTSD diagnosis ($n = 2481$). Five “other” minorities were removed from the analysis: four cases with prewar onsets of PTSD (who were not in the risk set for a war-related first onset), two cases without sufficient data on PTSD onset, and one case without a sampling weight. Standard errors are indicated. All p -values for the post hoc pairwise tests are adjusted for multiple comparisons using the sequential Bonferroni procedure. * $p = ns$. ** $p = .05$. † $p = .01$. †† $p = .001$.

Figure 2.

Mean Mississippi Scale for Combat-Related PTSD scores by ethnic/racial group, Hispanic subgroup, and war-related Structured Clinical Interview for DSM-III-R posttraumatic stress disorder (SCID PTSD) diagnosis ($n = 2481$). Standard errors are indicated. All p -values for the post hoc pairwise tests are adjusted for multiple comparisons using the sequential Bonferroni procedure. * $p = ns$. ** $p < .05$. † $p < .01$. ‡ $p < .001$.

Figure 3.
Indicators of postwar functioning by ethnic/racial group and war-related PTSD status adjusted for parental education and age at entry into Vietnam.

Table 1

Algorithm-Based and SCID-Based PTSD Rates in the NVVRS by Race/Ethnicity

	Ethnic/racial background				
Assessment approach	Total	White	Black	Hispanic	$\chi^2(2)$
PTSD Algorithm					
Full sample: <i>n</i>	1,183	589	313	281	
Current prevalence (%)	14.8	13.1	20.6 ^a	27.9 ^{a, b}	32.91 ^{***}
Diagnosed subsample: <i>n</i>	254 ^c	95	73	86	
Current prevalence (%)	15.3	12.5	22.8 ^a	32.8 ^a	7.06 [*]
SCID Diagnoses of War-Related PTSD					
Subsample: <i>n</i>	248 ^d	94	70	84	
Lifetime PTSD (%)	21.6	18.7	33.0	32.9	5.18
Current PTSD (%)	10.9	9.0	16.6	22.0 ^a	6.64 [*]
Chronicity (%)	50.7	48.4	50.4	66.8	1.87

Note. PTSD = Posttraumatic stress disorder; NVVRS = National Vietnam Veterans Readjustment Study.

****p* < .01.

^aSignificantly different from the White group (post hoc *t* test; $\alpha = .05$).

^bSignificantly different from the Black group.

^cReflects the removal of five members of "other" minority groups and one case without a sampling weight.

^dReflects the removal of five members of "other" minority groups, four cases with prewar onsets of PTSD (who were not in the risk set for a war-related first onset), two cases without sufficient data on PTSD onset, and one case without a sampling weight.

*
p < .05.

p < .001.

Table 2PTSD Rates and War-Zone Stress Exposure in the NVVRS by Race/Ethnicity: Weighted % (Subgroup *n*)

War-zone stress exposure in the full sample (<i>N</i> = 1,183)					
		White	Black	Hispanic	
		83.1% (<i>n</i> = 589)	11.5% (<i>n</i> = 313)	5.5% (<i>n</i> = 281)	Wald $\chi^2(2)$
Self-report measure					
Low	75.3% (<i>n</i> = 776)	77.8%	62.6% ^a	67.3% ^a	
High	24.7% (<i>n</i> = 397)	22.4%	37.4% ^a	32.7% ^a	22.86***
Composite military/historical measure					
Low	20.1% (<i>n</i> = 184)	20.7%	15.5%	19.7%	3.51
Moderate	68.1% (<i>n</i> = 764)	68.9%	64.1%	69.5%	2.54
High	8.6% (<i>n</i> = 146)	8.0%	12.4%	9.6%	4.37
Very high	3.2% (<i>n</i> = 89)	2.4%	8.0% ^a	6.2% ^a	16.01***
Algorithm-based current PTSD prevalence in the full sample adjusted for level of war-zone stress exposure ^{c, d}					
					Wald $\chi^2(2)$
Adjusted for self-report measure		13.8%	17.2%	25.8% ^{a, b}	26.21***
Adjusted for composite military/historical measure		13.3%	19.5% ^a	27.3% ^{a, b}	28.27***
War-related SCID-diagnosed PTSD prevalence in the diagnosed subsample adjusted for level of war-zone stress exposure (<i>n</i> = 248) ^{c, e, f}					
		White	Black	Hispanic	
		79.6% (<i>n</i> = 94)	13.6% (<i>n</i> = 70)	6.7% (<i>n</i> = 84)	$-2\log(L_0/L_1)$
Adjusted for self-report measure					
Lifetime PTSD (onset)		20.4%	25.5%	27.7%	0.71
Current PTSD		10.5%	10.5%	16.7%	0.69
Chronicity		50.6%	41.1%	70.6%	1.65
Adjusted for composite military/historical measure					
Lifetime PTSD (onset)		19.6%	29.1%	30.1%	2.40
Current PTSD		10.1%	12.6%	17.8%	1.35
Chronicity		51.2%	40.9%	67.2%	1.33

Note. PTSD = Posttraumatic stress disorder; NVVRS = National Vietnam Veterans Readjustment Study.

**p* < .05.

***p* < .01.

^aSignificantly different from White group (post hoc *t* test; α = .05).

^bSignificantly different from Black group.

^cAdjusted figures are based on reparameterizations of regression equations estimating the likelihood of PTSD as a function of race/ethnicity, with war-zone stress exposure controlled.

^dWald χ^2 tests the independent contribution of race/ethnicity to the prediction of PTSD net of exposure.

^eReflects the removal of five members of “other” minority groups, four cases with prewar onsets of PTSD (who were not in the risk set for a war-related first onset), two cases without sufficient data on PTSD onset, and one case without a sampling weight.

^fThe log-likelihood ratio $[-2\log(L_0/L_1)]$ contrasts these estimates with those made with only exposure in the model to test the independent contribution of race/ethnicity. It is chi-square distributed with $K_1 - K_0$ degrees of freedom.

 $p < .001$.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript