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Impact of Combat and Sexual Harassment on the Severity of Posttraumatic Stress Disorder among Men and Women Peacekeepers in Somalia

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The impact of combat and sexual harassment on the severity of posttraumatic stress disorder (PTSD) is compared for 1307 men and 197 women peacekeepers who served in the same military units. A theoretical model was proposed to express the nature of the impact. Structural equation modeling was used to evaluate the model separately for men and women. Good-fitting, parsimonious models were developed that showed substantial similarity for men and women. For men, severity of PTSD symptoms was impacted by exposure to combat directly and indirectly through fear and sexual harassment. For women, severity of PTSD symptoms was impacted by combat indirectly through the same two influences, although the mechanisms involving fear and sexual harassment were somewhat different. For both genders, moreover, PTSD severity was impacted directly by exposure to the dying of the Somali people. These similarities suggest that in modern stressful overseas military missions, both genders may be susceptible to the same types of risk for the development of PTSD. The incidence and impact of sexual harassment is particularly noteworthy in the case of men and calls for more detailed investigation in future studies.

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Diagnostic criteria require that one or more instances of trauma must be identified and linked to cognitive and affective symptoms in order for posttraumatic stress disorder (PTSD) to be diagnosed (American Psychiatric Association, 1994). In the case of war-zone trauma particularly, much attention has been given to articulating the connections between various aspects of traumatic exposure and PTSD and among the various aspects of traumatic exposure itself (Fontana and Rosenheck, 1993, 1994; King et al., 1995, 1996). The first major distinction among types of traumatic exposure was urged by Laufer and his colleagues (Laufer et al., 1984), who argued that combat, as legitimate violence of war, should be separated from atrocities, as abusive violence of war. Fontana and Rosenheck (1999) noted that most measures of combat contain several categories of traumatic exposure that need to be differentiated methodologically in order to understand their interrelationships. Examination of women's stress reactions in the military has documented the importance of sexual harassment and abuse as another category of traumatic exposure with major etiological significance to the development of PTSD (Fontana et al., 1997, 1998; Wolfe et al., 1993, 1998).

The existence of sexual harassment and abuse as a major pathogenic agent for women in the military highlights the importance of understanding possible gender differences in not only traumatic exposure but in the etiological contribution of such exposure to PTSD. King and his colleagues (King et al., 1995, 1996, 1998) have made a start in investigating gender differences in the development of PTSD among women who served in the Vietnam theater. Their investigation has been limited, however, by two characteristics of the data base used to study Vietnam veterans. First, data on sexual harassment and abuse are fragmentary and were not included by these investigators in their models. Second, most women in the Vietnam theater served as nurses, which exposed them to traumatic experiences that were largely different from those experienced by men.

In the Persian Gulf war and the Somalia peacekeeping mission, women's roles in the theater of operations were expanded from nursing and medical support to include combat support and, in some cases, combat itself. This expanded role exposed women to a wider range of traumatic experiences that were more similar to men's exposure. In the

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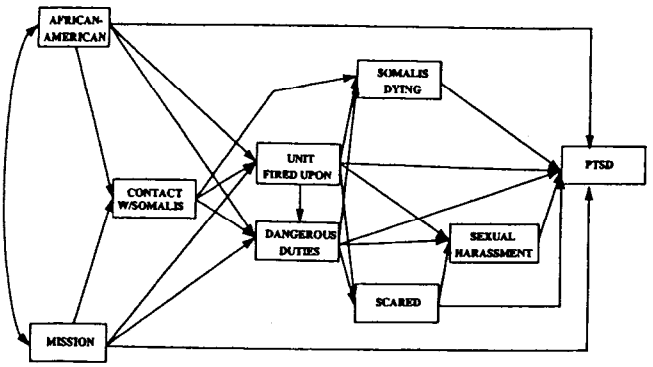

FIG. 1. Initial theoretical model.

present paper, we use data from the Somalia peacekeeping mission to compare etiological models of PTSD for men and women. The models include not only exposure to combat for both genders, but exposure to sexual harassment or abuse as well. Fifty-two percent of the women and 12% of the men reported some sexual harassment or abuse. Moreover, sexual harassment or abuse is correlated significantly with PTSD for both genders. Figure 1 diagrams the initial model of etiology among background, exposure and PTSD variables.

Earlier work with the Somalia data set (Litz et al., 1997a) had determined that African-American veterans felt more positively toward the humanitarian goals of the mission than non-African-Americans and that there was a different pattern of relationships among variables for these two ethnic groupings. This work suggests the necessity of preserving this ethnic distinction in any modeling attempt. Also of relevance was a shift in the primary goals of the mission mid-way through its course. Initially, the mission's primary goal was the humanitarian one of bringing food to a starving population, with the associated goal of maintaining the peace by policing the civilian population and keeping the warring clans apart. Subsequently, the mission's primary goal was redefined as the ouster of one of the strongest clan warlords by military means (Litz et al., 1997b). The shift in primary goal not only affected American troops' perception of the peacekeeping mission generally, but it affected their amount of exposure to combat specifically. We included African-American ethnicity and goals of the mission as exogenous variables that we expected to contribute to both the amount of contact with the Somali people and combat exposure. We also included these exogenous variables as direct contributors to the severity of PTSD as a test of the adequacy of the other variables in the model to mediate the exogenous variables' associations with PTSD.

We postulated that contact with the Somali people would contribute to both exposure to combat and witnessing Somalis dying. In turn, we expected that exposure to combat would contribute to being scared, witnessing Somalis dying, and severity of PTSD. We included this last connection as a test of the adequacy of the other variables in the model to mediate the association of exposure to combat with PTSD.

We expected that exposure to combat and being scared would contribute to reports of sexual harassment or abuse. The rationale for these expectations was that, typically, conventional mores are weakened and military discipline is relaxed in combat situations (Goldsmith and Cretekos, 1969) and violence is often committed away from the battlefield and against one's own comrades (Bey and Zecchinelli, 1974). These conditions create more individual and institutional tolerance for sexual harassment or abuse. Moreover, combat is frightening and signs of fear are considered to be unmasculine. Military culture typically tries to offset fear with denigrating terms of femininity (Francke, 1997). Finally, we postulated that being scared, witnessing Somalis dying, and receiving sexual harassment or abuse would contribute to severity of PTSD.

We used structural equation modeling to evaluate the theoretical model and then to modify it to improve its fit to the data and its parsimony of explanation. The two main goals of this paper therefore are to determine the degree of similarity between men and women in the etiology of PTSD from traumatic exposure in a war-zone, and to examine the role of sexual harassment or abuse in the etiology of PTSD.

Methods

Subjects

Data were taken from the survey of veterans who served in the Somalia peacekeeping forces (Litz et al., 1997a). A total of 210 women and 2100 men were surveyed within 1 year of their return to the United States. In order to equate genders for the type of duty in Somalia, subjects were drawn from those military units which had both men and women represented in the data base. Only those veterans with complete data for the model variables were retained for data analysis. This left 197 women and 1307 men who served in the same units. Comparison of men and women on demographic and model variables is presented in Table 1.

TABLE 1
Comparison of Men and Women on Demographic and Model Variables

Variable	Men	Women	t	p
	(N = 1307)	(N = 197)		
Age	26.90 (6.09)*	25.80 (5.73)	2.38	.0200
Caucasian ethnicity	.61 (.49)	.44 (.50)	4.39	.0001
African-American ethnicity	.23 (.42)	.41 (.49)	5.40	.0010
Married	.56 (.50)	.36 (.48)	5.38	.0010
Years of education	12.77 (1.39)	12.89 (1.47)	1.14	NS
Mission goals	2.20 (.81)	2.19 (.82)	0.15	NS
Amount of contact with Somalis	.94 (1.01)	1.02 (1.12)	0.99	NS
Unit fired upon	2.17 (1.24)	2.20 (1.26)	0.91	NS
Went on patrols/ dangerous duties	2.49 (1.18)	2.06 (1.31)	4.34	.0001
Scared	1.85 (1.22)	2.37 (1.23)	5.51	.0001
Witnessed Somalis dying	0.91 (.96)	0.72 (.87)	2.61	.0100
Receipt of sexual harassment or abuse	1.20 (.64)	1.98 (1.21)	8.91	.0001
Severity of PTSD	−.04 (1.84)	0.29 (1.86)	2.41	.0200

*Standard deviations in paretheses.

Variables

African-American ethnicity was represented as a dichotomous variable. The shift in goals of the mission was represented as a three-level variable, depending on service in Somalia relative to June 15, 1993, the date that military operations against the major warlord began. Humanitarian goals were primary for service that was completed prior to that date and the first phase of the mission was coded 1; the primary goals shifted from humanitarian to military for service which began before and terminated after that date and this phase was coded 2; and military goals were primary for service which began after that date and the final phase was coded 3. Amount of contact with the Somali people was measured as the percentage of time by a 5-point item, ranging from 0% to 100%. Combat was measured by two 5-point items. One item measured the unit's exposure, the number of times one's unit was fired upon; the other item measured personal exposure, the number of times one went on patrols or other very dangerous duties. Fear was measured by a 5-point item asking the extent to which one felt scared while in Somalia. Witnessing dying Somalis was measured by a 5-point item asking for the number of times this occurred. Sexual harassment or abuse was measured by a 5-point item, ranging from "never" to "nearly all the time." The severity of

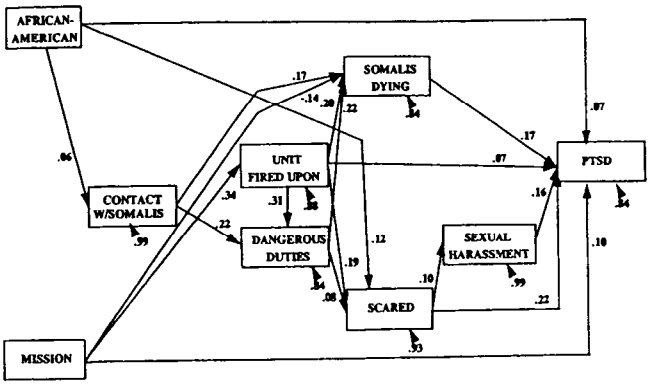

FIG. 2. Significant paths for the modified model for men.

PTSD symptoms was measured as the sum of standardized scores from modified versions of the PTSD Checklist (Weathers et al., 1993) and the Mississippi Scale (Keane et al., 1988). This composite variable had a coefficient alpha of .88 for men and .87 for women.

Data Analysis

Structural equation modeling is an extension of multiple regression analysis that is well-suited to the evaluation of a *set* of postulated interrelationships. Statistically, the extension involves the simultaneous solution of the set of equations expressing the interrelationships and the use of all information in deriving each of the parameter estimates in the model (Bollen, 1989; Hayduk, 1987; James et al., 1982). Conceptually, the extension involves the specification of a model of linkages that serves as a map to the selection of variables to be included in each equation.

The data analysis proceeded by estimating the full theoretical model on the men's and women's samples separately and then modifying it as adding or deleting paths would improve its fit or parsimony. Final parameter estimates for the men's model are presented in Figure 2 and for the women's model in Figure 3. The small arrows in Figures 2 and 3 that are attached to each variable but do not proceed from another variable indicate the disturbance (that is, the proportion of variance unaccounted for by the model) that is associated with each variable. All significance levels are based on two-tailed tests.

The data were checked for outliers, with no cases detected requiring deletion. Parameter estimation was conducted by generalized least squares because the multivariate kurtosis (Mardia, 1976) was more peaked than normal in the male sample. We used the CALIS procedure of the SAS software package (SAS Institute, 1989) to estimate model parameters

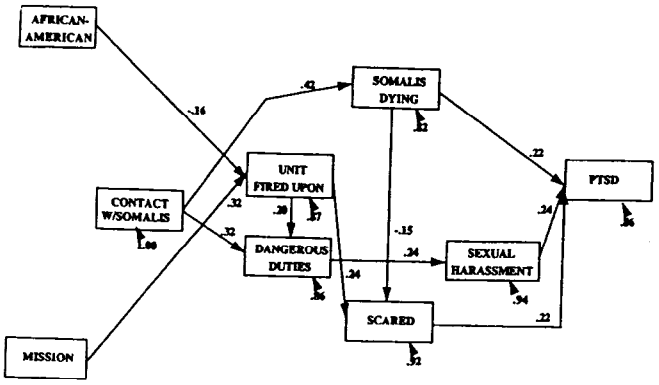

FIG. 3. Significant paths for the modified model for women.

on the covariance matrix. Bivariate correlations among the model variables are presented in Table 2.

Results

First, we evaluated the fit of the theoretical model to the data in the men's sample. The chi-square for the model was 62.68 (11, $N = 1307$, $p < .0001$), with a comparative fit index (Bentler, 1989) of .90 and a parsimonious goodness of fit index (Mulaik et al., 1989) of .30. These indices indicate that the fit of the model was good but that its parsimony was relatively low. Inspection of modification indices suggested that the fit could be improved substantially by adding paths from African-American ethnicity to being scared and from mission to witnessing Somalis dying and that the parsimony could be improved by deleting the nonsignificant paths. The modifications, therefore, freed up an additional 6 degrees of freedom (17 minus 11). Evaluation of the modified model yielded a chi-square of 33.02 (17, $N = 1307$, $p < .02$), with a comparative fit index of .97 and a parsimonious goodness of fit index of .47. The highly significant decrease ($p < .005$) in chi-square of 29.66 (62.68 minus 33.02) and the increase in the comparative fit from .90 to .97 indicated that the modifications did indeed improve the fit of the model. At the same time, the increase of the parsimonious goodness of fit index from .30 to .47 indicates that the parsimony of the model was increased substantially.

We used the same procedure to evaluate the theoretical model for the women's sample. The chi-square for the model was 22.88 (11, $N = 197$, $p = .02$), with a comparative fit index of .87 and a parsimonious goodness of fit index of .30. These indices indicated a slightly less than good fit to the data, with relatively low parsimony. Modification indices suggested that the fit could be improved by adding a path from witnessing Somalis dying to being scared, and that the parsimony could be improved by deleting nonsignificant paths. The modified model had a chi-square of 33.16 (25, $N = 197$, $p > .12$), with a comparative fit index of .91 and a parsimonious goodness of fit index of .67. The increase in chi-square of 10.28 (33.16 minus 22.88) with 14 degrees of freedom (25 minus 11) was not significant ($p > .70$). Modifications to the model, then, improved the comparative fit index somewhat from .87 to .91, while improving the parsimonious goodness of fit index substantially from .30 to .67.

For men, the theoretical model was supported empirically with 17 of the 24 theoretical paths reaching significance. African-American ethnicity was associated positively with amount of contact with the Somali people; and the shift in the goals of the mission to the ouster of a powerful clan warlord was associated positively with unit, although not personal, exposure to combat. In addition, a significant path was supported empirically between shift in the mission and exposure to Somalis dying. Both African-American ethnicity and the shift in the goals of the mission were associated significantly and directly with the severity of PTSD symptoms, indicating that the other model variables did not mediate these associations with PTSD completely. The association of African-American ethnicity with greater severity of PTSD is consistent with the greater incidence of PTSD found among African-American troops in Vietnam (Kulka et al., 1990).

Amount of contact with the Somali people was associated significantly with personal, although not unit, exposure to combat and with witnessing Somalis dying. Amount of unit exposure to fighting was associated positively with personal exposure to dangerous situations as expected. Both unit and personal exposure to combat was associated positively with being scared and witnessing Somalis dying, but only unit exposure was associated directly with PTSD as well. Neither unit nor personal exposure to combat was associated directly with sexual harassment, but both were associated with sexual harassment indirectly through being scared. For men, admitting to or showing fear appears to be the signal for being taunted and denigrated with sexually demeaning epithets and actions. Finally, being scared, being sexually harassed, and witnessing Somalis dying were each associated with PTSD as expected.

The data for women bore out theoretical expectations with 10 of 24 paths reaching significance. African-American ethnicity was associated negatively and shift in the mission positively with amount of unit exposure to combat. Amount of contact with the Somali people was associated posi-

TABLE 2
Bivariate Correlations among Model Variables[a]

Variable	African-American	Mission	Contact	Unit Fired upon	Patrols or Danger	Scared	Somalis Dying	Sexual Harassment	PTSD
African-American	—	.03	.05	−.04	−.03	.10	−.07	.01	.08
Mission goals	−.05	—	−.04	.33	.12	.09	−.05	−.01	.18
Amount of contact with Somalis	.04	.08	—	.04	.24	.02	.24	.05	.09
Unit fired upon	−.16	.34	.08	—	.33	.21	.24	.06	.20
Went on patrols/dangerous duties	−.07	.18	.34	.24	—	.14	.32	.06	.16
Scared	.02	.24	.10	.25	.02	—	.12	.10	.28
Witnessing Somalis dying	−.04	−.06	.38	.05	.16	−.16	—	.05	.21
Receipt of sexual harassment or abuse	−.12	.00	.11	.00	.23	−.04	−.02	—	.20
Severity of PTSD	.06	.18	.26	.14	.20	.25	.16	.20	—

[a]The men's subsample (N = 1307) is above the diagonal; the women's sample (N = 197) is below the diagonal. For men, $r = .08$ significant at $p < .05$; for women $r = .14$ significant at $p < .05$.

tively with personal exposure to combat and with witnessing Somalis dying. Unit exposure to combat was associated positively with personal exposure to combat and with being scared. Personal exposure to combat, however, was not associated significantly with being scared but was associated significantly with being sexually harassed. Being scared was not associated significantly with being sexually harassed. These associations among personal exposure to combat, being scared, and being sexually harassed constitute the only major differences in significant paths between the men's and women's models. Rather than showing fear being the signal for women being sexually harassed, being exposed personally to combat appears to be the critical signal. For women, then, occasions for sexual harassment or abuse seemed to be associated more with a relaxation of conventional mores and military discipline in combat situations generally rather than with reactions to manifestations of fear specifically. It would seem that woman's gender was sufficient stimulus for eliciting sexual harassment when women were exposed to combat situations personally regardless of their exhibition of fear. The one path that was not postulated initially but that was supported empirically was the negative one between witnessing Somalis dying and being scared. Finally, as expected, being scared, being sexually harassed and witnessing Somalis dying were associated significantly with PTSD.

Discussion

The models for men and women are similar in several respects. In each case, the shift in mission from providing humanitarian aid to forcibly removing a warlord was associated with one's unit receiving more fire. Further, the greater the amount of contact with the Somali people the greater was the amount of personal exposure to combat and witnessing Somalis dying. The more one's unit was exposed to combat, the more fear one experienced. Finally, the more fear one experienced and the more one was sexually harassed and witnessed Somalis dying, the more severe were the PTSD symptoms that developed. These similarities suggest that as men's and women's roles in modern stressful overseas military missions become more and more similar, the more the risks for developing PTSD will be shared by both genders.

To our knowledge, the present study is the only one that has examined empirically the role of sexual harassment or abuse in the development of PTSD among men and women in similar circumstances. This examination is particularly meaningful because the association between sexual harassment and PTSD is highly significant in the model for men as well as for women. Not only therefore is sexual harassment or abuse toward women in the military a pressing concern, but sexual harassment may be more prevalent and pathogenic than has generally been recognized for men as well. Recently, attention has been called to this latter possibility by clinicians in the Department of Veterans Affairs (Peterson et al., 1995). It is unfortunate that the Somali survey contained only one item regarding sexual harassment or abuse and did not differentiate among its several forms. For example, it would be of great importance to know both the relative incidence and pathogenicity of verbal versus physical harassment. Fortunately, the absence of such specificity and precision to the assessment of sexual harassment in the present study had little influence on the associations among the other variables. We examined the models for such effects by deleting sexual harassment and reestimating their parameters. Only mini-

mal and nonsignificant changes appeared in the parameter estimates for the men's model. For the women's model, all significant paths remained so. The one change was that the path from personal combat exposure to PTSD that had been mediated by sexual harassment became a direct path.

The existence of numerous similarities between the exposure and reactions of men and women, however, does not preclude the existence of differences between them. Most notable are the differences among the linkages between combat exposure, being scared, and sexual harassment. As noted above, the signal for the sexual harassment of men appears to be the exhibition of fear. Moreover, the fear appears to be elicited by combat exposure at both the unit level (being fired upon) and the personal level (going on patrols or having dangerous duties), whereas for women, simply their personal exposure to a combat situation appears to be a sufficient signal for sexual harassment. Furthermore, only combat at the unit level appears to elicit fear among women. The differences among these linkages might be accounted for in part by differences in the levels of these variables between men and women. Reference to Table 1 shows that men and women agreed on the extent to which their units were fired upon but that women reported going on patrols or having dangerous duties significantly less than men did. Yet, women reported that they were more scared and more sexually harassed than men did. Because men had a higher level of personal exposure to combat than women, there was more of an opportunity for personal exposure to contribute to their fear than there was for women. On the other hand, women had more anxiety about being shot at than men ($t = 6.13$, $df = 1502$, $p < .001$), so that their fear was aroused more generally by their units' exposure to combat. Under these conditions, women who were in personally dangerous circumstances would more likely be stereotyped as scared and be targeted more for sexual harassment due to their gender than men would be.

The foregoing interpretation carries important implications for both the measurement of traumatic exposure and the determination of its effects across different groups and situations. First, the difference in etiological roles found for unit and personal exposure to combat between men and women, but the similarity in etiological roles found for being scared and witnessing the death of Somalis highlight the importance of distinguishing among the components of war zone trauma (Fontana and Rosenheck, 1999). Second, there may be important differences in tasks or duties that may have a substantial influence on the amount and impact of traumatic exposure. We think that it is possible that the item assessing exposure to personal combat reflected different emphases in tasks and duties for women and men.

The associations between African-American ethnicity and both unit exposure to combat and being scared were unexpected. Compared with non-African-American troops, African-American men reported that their units were fired upon less, and African-American women reported being more scared. The latter path was not postulated initially but was added as a modification that improved the fit of the model substantially. The pattern of associations suggest that African-American troops more often might have been given duty assignments such as the humanitarian task of delivering food which removed them from as much exposure to fighting as other troops, but that these other duty assignments were stressful in their own right. This interpretation is consistent with the path within the model for men that African-American troops had more contact with "needy, hungry, and/or sick people" than other troops and that African-American troops more often saw Somalis starving ($t = 6.33$, 1482 df, $p < .0001$).

There are limitations to our efforts that should be borne in mind. We mentioned earlier that additional information regarding the nature of sexual harassment and the prevalence of sexual abuse as distinct from sexual harassment was not available. More precise and detailed information is needed about this domain for men as well as for women. Second, the sample size for women was smaller than optimal for structural equation modeling. A sample twice as large would have been desirable to increase confidence in the stability of the parameter estimates. Hopefully, future research will help to correct this deficiency as well. Third, although it is reasonable to expect that PTSD is a primary psychiatric consequence of traumatic exposure, it is likely that it is not the only psychiatric consequence. Depression, demoralization, and aggression warrant investigation as well (Litz et al., 1997a). Finally, there is the potential for a reporting bias that is inherent in retrospective data. Studies of veterans from both Operation Desert Storm and the present data set have found a significant increase in reports of traumatic exposure over two points in time; moreover, these studies have found that the increase is related significantly to the level of PTSD symptomatology at the second time (Roemer et al., 1998; Southwick et al., 1997). It is not clear to what extent these findings are due to veterans' more complete recovery of objectively valid memories over time and to what extent they are due to veterans' reconstruction of memories over time in the search for an explanation of subsequent symptomatic distress. Until more is

known about this phenomenon, it is prudent to be cautious in accepting the connections among retrospectively reported variables as representing the connections that existed historically. These concerns notwithstanding, retrospective data are still fruitful avenues to gaining an understanding of the characteristics and effects of stressful peacekeeping and peace-enforcement missions in the post-Cold War era.

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