Sexual Harassment and Assault as Predictors of PTSD Symptomatology Among U.S. Female Persian Gulf War Military Personnel

Jessica Wolfe
Erica J. Sharkansky
Jennifer P. Read
Ree Dawson
James A. Martin
Paige Crosby Ouimette

Reprinted from the *Journal of Interpersonal Violence*
Volume 13, No. 1, February 1998, pp. 40-57
© 1998 Sage Publications, Inc.
Reprinted by Permission of Sage Publications, Inc.

An increasing body of empirical literature documents high rates of sexual assault and related sexual aggression against women in this country. Lifetime rates of completed rape among females have been reported to be as high as 13% (National Victims Center [NVC], 1992). Less severe forms of victimization (e.g., verbal and physical sexual harassment), which are often overlooked, are even more prevalent than assault and may be quite common (Martindale, 1990). A recent large-scale survey of federal employees, for example, found that 44% of women and 19% of men experienced some form of uninvited or unwelcome sexual attention in the workplace over a 2-year period (U.S. Merit Systems Protection Board [USMSPB], 1995).

Sexual victimization of women has been conceptualized along a continuum, ranging from most (sexual assault) to least (verbal harassment) severe (Lott, 1995). More severe experiences have been linked to high rates of psychological disturbance, including posttraumatic stress disorder (PTSD) and major depression (NVC, 1992). PTSD in particular may be an especially common outcome. One study showed that completed rape led to PTSD in as many as 90% of women at 4 weeks postassault and remained as high as 47% at 3 months postassault (Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992). Although community samples report significantly lower rates of lifetime and current PTSD following sexual assault, these rates (along with those for physical assault) exceed those reported following other major stressors (Norris, 1992; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993). Female sexual assault survivors are also at an increased risk for developing other noteworthy difficulties, including self-blame, anxiety, phobia, substance abuse, suicidality, and substantially increased health care use (Resick, Calhoun, Atkeson, & Ellis, 1981; Roth & Lebowitz, 1988). Furthermore, sexual assault has been preliminarily linked to a greater risk for subsequent revictimization, suggesting a cumulative effect (Wyatt, Guthrie, & Notgrass, 1992).

Although less is known about the effects of less severe forms of sexual harassment (i.e., physical and verbal sexual harassment), initial research suggests that these experiences also have a substantial impact. In addition to depression and anxiety, other effects include job attrition (Gutek, 1985), academic decline (Fitzgerald et al., 1988), disturbed interpersonal relationships, and increased health complaints (Crull, 1982). Data from other trauma populations indicate that certain factors (e.g., social support, coping style) can mitigate the effects of trauma (Resnick, Kilpatrick, Best, & Kramer, 1992). Consequently, if events involving sexual aggression are viewed on a spectrum similar to other trauma experiences, it is possible that sexual harassment may affect some women differently than others.

Until recently, sexual victimization in military work settings received little attention (Engel et al., 1993; Martindale, 1990; Wolfe, 1990). However, the growing number of women in military service (Dienstfrey, 1988) and the much publicized Tailhook incident in 1991 have drawn widespread attention to the problem of sexual harassment and assault of women in the U.S. armed forces. To date, a paucity of empirical data has documented the prevalence or sequelae of these events. Martindale (1990) reported that 5% of female respondents described attempted or completed sexual assault during military service over an 18-month period. Rates of sexual harassment were considerably higher, with 15% reporting pressure for sexual favors and 38% describing unwanted physical contact (e.g., touching). This survey provided important information about sexual victimization during peacetime service but did not address the prevalence or sequelae of these experiences during wartime deployment. Still unknown is how effects of sexual trauma compare to those of nonsexual stressors, for example, exposure to combat stress. Combat has been robustly associated with PTSD in male and, to a lesser degree, female military personnel (Kulka et al., 1988). The persistence of this disorder is attested to by the fact that, 20 years after the conclusion of the Vietnam War, 15.2% of male theater veterans still manifest significant symptoms of PTSD. With the increasing rate of women in the U.S. military, the evaluation of female soldiers' experiences offer an important opportunity to assess rates and effects of a range of traumatic stressors.

To our knowledge, an empirical study of PTSD symptomatology across recent sexual assault and combat experiences within a single sample has not yet been conducted. Given high rates of the former among women, more research is needed to assess the occurrence of and relationship between high-magnitude stressors such as sexual assault and combat stress. In addition, more exploration of the psychological impact of less severe forms of sexual harassment is warranted. To accomplish these tasks, we surveyed a sample of female American army veterans who were deployed during the Persian Gulf War and were exposed to a range of potentially life-threatening war zone activities. Our goal was threefold: (a) to determine the rates of sexual victimization experiences in women during military deployment, (b) to examine relationships between harassment severity and variables that may moderate their effects, and (c) to assess the effects of harassment events on psychological status, specifically PTSD symptomatology. All participants were members of the Ft. Devens Operation Desert Storm (ODS) Reunion Survey, an ongoing longitudinal project involving army personnel who were deployed to the Persian Gulf from New England in 1991 (Wolfe, Brown, & Kelley, 1993). For this study, we collected data for two time periods: during deployment in the Persian Gulf and during the 18 to 24 months following the

soldiers' return. We assessed deployment period combat exposure, experiences of sexual harassment and sexual assault, coping, unit cohesion, and leadership support. Postdeployment measures included the assessment of social support and trauma during the 18 to 24 months since return and current psychological adjustment.

We had several predictions. First, we expected to find a spectrum of sexual victimization ranging from verbal sexual harassment to sexual assault, with the former being the most prevalent. Second, we hypothesized a positive association between the severity of the event and PTSD symptoms whereby women who were sexually assaulted would have more PTSD symptoms than women exposed to either events lower on the continuum of sexual harassment (i.e., verbal or physical) or no harassment at all. Third, we hypothesized that increased exposure to moderate forms of sexual victimization (i.e., physical sexual harassment) would be associated with significant PTSD symptomatology. We also examined the relationship between the frequency of physical sexual harassment and PTSD symptomatology in the context of other factors, including additional traumatic events, social support, and coping. Finally, we explored comparative effects of combat exposure and sexual victimization in terms of the risk of developing PTSD symptomatology.

METHOD

Design and Procedure

The Ft. Devens ODS Reunion Survey was designed to measure war zone stressors and their effects following the Persian Gulf War. Within 5 days of their return to the United States in 1991 (Time 1), we surveyed 2,949 army personnel at Ft. Devens, Massachusetts (including 240 females), using a 45-minute paper-and-pencil survey. Women in this cohort came from 30 different army units representing active duty ($n = 62$), reservists ($n = 66$), and National Guard ($n = 112$). The entire cohort represents approximately 60% of the military personnel deployed from Ft. Devens, and a review of nonsurveyed units indicated a random absence for general administrative purposes only. We recontacted the full cohort for a follow-up survey (Time 2) at face-to-face unit meetings in 1993 to 1994 (18-24 months following the initial survey) or by mail when unit meetings were not feasible (20% of the follow-up sample). The follow-up rate for women in the general survey was 80.8% ($n = 194$). Because of a growing concern with military-related sexual harassment (Martindale, 1990), we added a series of items querying wartime exposure to sexual harassment or assault. This additional component was

mailed to all female personnel in the cohort within weeks following Time 2 using a separate mailing. Women who did not respond initially were sent a reminder with a second questionnaire. The total ODS cohort has been described in detail elsewhere (Wolfe et al., 1993).

Participants

Participants were 160 women (66.7% of original sample) who returned and completed the sexual harassment questionnaire. The mean age was 28.2 years (SD = 6.8) with a range of 19 to 48. Participants had an average educational level of 13.7 years (SD = 1.9); the majority were Caucasian (74.4%), with 14.4% African American, 2.5% Hispanic, and 8.8% designated as "other." More than half of participants were single (54.4%); 33.8% were married and 11.9% were separated, divorced, or widowed. Enlisted soldiers made up 48.8% of female respondents; 41.9% had a rank of noncommissioned officer, and 8.8% were commissioned officers. Respondents represented 28 different U.S. Army units that had served in the Persian Gulf War, with the length of stay overseas ranging from 1 to 8 months (M = 4.27, SD = 1.46).

Materials

At Time 1, study participants completed a number of self-report measures, including those assessing Persian Gulf combat exposure, other deployment stressors, and coping style. All participants also completed items delineating relevant background characteristics (e.g., age, education, family and marital status, ethnicity, military rank, duty status). At follow-up, participants were administered self-report measures querying intervening life stressors, perceived social support, current psychological functioning (including trauma symptoms), wartime unit cohesion, and leadership support. Whenever possible, previously standardized self-report measures were used.

Sexual assault/harassment. The sexual harassment survey included three Likert-scaled items asking respondents about the occurrence of three events during their Persian Gulf deployment: (a) "verbal sexual harassment (e.g., sexual remarks; sexually suggestive looks, gestures, or body language; pressure for sexual favors)," (b) "physical sexual harassment (e.g., unwanted sexual touching, fondling, cornering, or brushing against you)," and (c) "a sexual experience that was unwanted *and* involved the use or threat of force (e.g., attempted rape or completed rape), either by strangers or by people you knew." Item content followed published definitions of sexual harassment

(USMSPB, 1995). Questions were answered using a scale of 0 to 4, where 0 = *never* and 4 = *four or more times*. Questions were presented in order from verbal sexual harassment to attempted or completed sexual assault.

Combat exposure. Combat exposure was assessed with the widely used Laufer Combat Scale (Gallops, Laufer, & Yager, 1981), augmented with items that described distinctive war experiences (e.g., being on alert for Scud or biochemical attack). This self-report measure contains 33 items scored on a 3-point Likert scale ranging from 0 = *never* to 2 = *three or more times*.

PTSD symptomatology. PTSD symptoms were evaluated using the well-known Mississippi Scale for Combat-Related PTSD. This scale is a reliable and valid self-report measure of PTSD and has excellent sensitivity and specificity (Keane, Caddell, & Taylor, 1988). The measure comprises 35 items scored on a 5-point Likert scale. Minor wording changes were made to reference the Persian Gulf War.

Coping. Coping was assessed with the Coping Responses Inventory (CRI) (Moos, 1988), which asks respondents to describe an event and rate the frequency of 48 items depicting coping with that situation. Participants selected an event from the "most important experience or stressful situation experienced during Operation Desert Storm." For this study, coping was conceptualized as a traitlike measure and assumed to be moderately stable and consistent across situations. This measure contains two scales: approach-based and avoidance-based coping, each containing 24 items. We computed an index of the percentage of approach coping by dividing the respondent's score on approach-based items by the sum of her scores on all items, a strategy recommended by Holahan and Moos (1991).

Intervening life events. Intercurrent life stressors were assessed using a questionnaire designed for this project based on a format by Norris (1990) for surveying high-magnitude events in community samples. An eight-item scale asked participants about categories of events widely accepted as major life stressors (e.g., criminal victimization, experiencing or witnessing severe accidents or death, life-threatening illness). Participants were queried about the time between discharge and follow-up.

Support and cohesion. General social support was evaluated using a measure from the National Vietnam Veterans Readjustment Study (NVVRS) (Kulka et al., 1988). This measure comprises 10 dichotomous items assessing the existence of friends or relatives from whom respondents are able to

receive specific emotional or material support. We divided 9 of these items into two subscales assessing instrumental ($\alpha = .71$, 4 items) and emotional ($\alpha = .86$, 5 items) support. Subscales were created by the authors' consensus. In a confirmatory factor analysis of these items and others in the NVVRS data set (King, King, Fairbank, Keane, & Adams, in press), 8 of the 9 items in our subscales were contained in parallel scales measuring emotional and instrumental support. One item was not used in the analysis by King et al., and the 10th item in our original pool formed part of their structural support scale. In addition, a retrospective report of unit cohesion and leadership support during the deployment was also administered (Marlowe, 1987). This questionnaire has been used to assess soldiers' support resources during military activity. The measures each use a 5-point Likert scale in which 1 = *strongly disagree* and 5 = *strongly agree* to evaluate two primary domains: the quality of small unit leadership (i.e., support by a commanding officer) and the extent of trust, closeness, and cooperation derived from the immediate military group (unit cohesion).

Respondent Attrition

Women who did not complete the Time 2 portion of the study did not differ from those who did on measures of age, education, marital status, officer status, or race. There were no differences on these demographic variables between women who did and did not complete the sexual harassment questionnaire. However, women on active duty were less likely to return the sexual harassment questionnaire (53.2%, $n = 33$) than those in either reserve component (71.3%, $n = 127$), $\chi sup2_1 = 6.80$, $p < .01$. There was also a marginally significant difference in follow-up return status for women on active duty (72.6%, $n = 45$) and those on nonactive duty status (83.7%, $n = 149$), $\chi sup2_1 = 3.67$, $p = .055$. The significance of these findings is difficult to ascertain because many active duty personnel were redeployed to foreign countries (e.g., Turkey, Somalia) and consequently harder to locate. Conversely, it is possible that women still on active duty were more reluctant to disclose gender harassment linked to their current vocational setting.

Eighteen women returned but did not complete the sexual harassment questionnaire. These women completed other items not used in this study pertaining to the percentage of time in isolation, the percentage of time under discrimination, or whether harassment was reported to the military, but they did not respond to any items assessing sexual harassment. A comparison of these 18 women to those who completed the questionnaire suggested that officers were more likely to return partially blank sexual harassment ques-

tionnaires (26.3%, $n = 5$) than enlisted personnel (8.2%, $n = 13$), $\chi sup2_1 = 6.14$, $p < .05$. Also, those who returned incomplete sexual harassment data had lower scores on the Mississippi scale at follow-up ($M = 63.11$, $SD = 15.89$) than those who completed the questionnaire ($M = 75.36$, $SD = 19.88$), $t(161) = 2.51$, $p < .05$. There were no other differences on demographic measures. Due to the small number of nonresponders, interpretation of these differences should be made cautiously, although it is possible that the career ramifications of reporting harassment are greater for officers than for enlisted personnel.

Statistical Analyses

Due to the differences in respondent attrition across duty status (active vs. reserve or National Guard), we computed prevalence rates for each type of sexual harassment (verbal, physical, sexual assault), adjusted for return rates by duty status, by multiplying the percentage of women experiencing the event within each duty status by the percentage of women in that duty status and summing the result. We then examined the association between sexual harassment during Gulf War duty and the severity of PTSD symptomatology at 18 to 24 months following return for the 160 respondents who completed sexual harassment data, using scores on the Mississippi scale as our outcome.

One-way analyses of variance were performed to examine levels of PTSD symptomatology, combat exposure, coping strategies, social support, leadership support, unit cohesion, and intervening events across harassment groups. For these analyses, women were grouped according to the most severe level of sexual harassment experienced during the Gulf War (i.e., none, verbal, physical, assault). In addition, we examined linear trends across groups to determine if more severe forms of sexual harassment were associated with poorer coping strategies, lower availability of social support (leadership support, unit cohesion, and postdeployment emotional and instrumental support), and higher incidence of intervening life events. ANCOVA was used to estimate the effects on PTSD symptomatology of specific levels of sexual harassment when compared to no-harassment experiences, controlling for effects of combat exposure.

Regression was performed on scores on the Mississippi scale to examine the effects of frequency of physical sexual harassment.[1] Blocks of variables, ordered by chronology, were entered hierarchically into a regression model. Due to the limited number of women experiencing physical sexual harassment, there was insufficient power to examine hypothesized interactions (e.g., the interaction of frequency of physical sexual harassment with style of coping); consequently, models are additive. Twenty-nine women were omit-

ted from the regression and ANCOVA. The 15 women omitted from the ANCOVA did not return Time 2 surveys. Omission of the remaining 14 women was primarily due to missing predictor data. Inspection of responses showed that this was largely due to a nonresponse on measures of unit cohesion, leadership support, and post-Gulf support. All values reported in the Results section are for two-tailed tests.

RESULTS

Incidence of Harassment

Of the 160 participants, 13 (7.3% adjusted) experienced sexual assault, 52 (33.1% adjusted) reported physical sexual harassment (of these, 13 also experienced assault), 105 (66.2% adjusted) reported verbal sexual harassment (46 of whom also reported physical sexual harassment, with 1 subject missing data on this variable), and 49 (30.2% adjusted) reported no sexual harassment.

Differences Across Harassment Groups

We found a number of significant group differences and linear trends for predictor variables across groups. These included linear trends for respondents with more severe levels of sexual harassment to report higher levels of PTSD symptomatology, $F(1,141) = 9.16$, $p < .01$; lower proportions of approach-based coping, $F(1,154) = 4.86$, $p < .05$; less perceived emotional support, $F(1,140) = 10.02$, $p < .01$; poorer leadership support, $F(1,131) = 4.86$, $p < .05$; more intervening life events, $F(1,140) = 24.85$, $p < .0001$; and a marginally significant trend for poorer unit cohesion, $F(1,131) = 3.15$, $p = .08$. There was no linear trend across harassment groups for combat exposure ($F < 1$) or instrumental social support, $F(1,129) = 2.40$, *ns* (see Table 1).

Predictors of PTSD

ANCOVA on Mississippi scale scores at follow-up, using combat exposure as a covariate, revealed that women who were assaulted experienced a statistically significant 18.9-point increase in their scores ($M = 91.83$, $SD = 22.69$) compared to respondents with no harassment ($M = 71.35$, $SD = 17.53$). Women who were sexually assaulted were also at a significantly increased risk for PTSD symptomatology compared to women who were only physically (12.5-point difference; $M = 77.80$, $SD = 24.41$) or verbally (15.9-point

TABLE 1: Means for Predictor Variables by Sexual Harassment Group

	No Harassment (n = 49)		*Verbal Only (n = 59)*		*Physical (n = 39)*		*Assault (n = 13)*	
Predictor Variables	M	SD	M	SD	M	SD	M	SD
Mississippi scale score	71.36	(17.53)	73.39	(16.17)	77.79	(24.41)	91.83	(22.69)
Combat exposure	4.81	(2.88)	4.44	(2.43)	5.15	(3.14)	5.64	(4.80)
Leadership support	17.10	(6.22)	15.02	(5.57)	15.20	(6.75)	12.50	(6.27)
Unit cohesion	20.22	(6.59)	18.90	(6.01)	17.97	(6.19)	17.33	(6.24)
% approach coping	.58	(.12)	.58	(.12)	.54	(.11)	.52	(.10)
Intervening events	1.10	(.96)	1.44	(1.15)	2.18	(1.38)	2.75	(1.91)
Emotional support	4.64	(.96)	4.25	(1.46)	3.53	(1.93)	3.67	(2.10)
Instrumental support	3.83	(.54)	3.76	(.65)	3.47	(1.11)	3.67	(.65)

TABLE 2: Comparative Effects of Harassment and Combat Events on Mississippi Scale Scores

	ANCOVA	
Group Contrast	*B*	SE *B*
Assault versus no harassment	18.93	6.13**
Assault versus verbal sexual harassment	15.89	5.98**
Assault versus physical sexual harassment	12.46	6.29*
Physical sexual harassment versus no harassment	6.47	4.31
Covariate (combat exposure)	1.72	.53**

NOTE: B = the unstandardized coefficient that represents raw difference in Mississippi's scores controlling for effects of covariates.
*$p < .05$. **$p < .01$.

difference; $M = 73.39$, $SD = 16.17$) sexually harassed. Although the 6.5-point increase on Mississippi scale scores associated with the presence of physical sexual harassment was not statistically significant, this increase is still greater than that associated with a one standard deviation change in combat exposure (5.14 points; see Table 2).

TABLE 3: Summary of Hierarchical Regression Analysis for Variables Predicting Follow-Up Mississippi Scale Scores ($N = 131$)

	Step 1 *Adjusted R^2 = .08*			*Step 2* ΔR^2 = .05**			*Step 3* ΔR^2 = .08**		
Variable	*B*	SE *B*	β	*B*	SE *B*	β	*B*	SE *B*	β
Combat exposure	1.95	.545	.31***	1.89	.532	.29***	1.84	.511	.28***
Frequency of physical sexual harassment				3.48	1.27	.22**	2.87	1.25	.18*
Leadership support							–.02	.340	–.01
Unit cohesion							–.89	.332	–.28**

	Step 4 ΔR^2 = .05**			*Step 5* ΔR^2 = .07***			*Step 6* ΔR^2 = .11**** *Adjusted R^2 = .42*		
Variable	*B*	SE *B*	β	*B*	SE *B*	β	*B*	SE *B*	β
Combat exposure	1.66	.50	.26**	1.60	.48	.25**	1.49	.44	.23***
Frequency of physical sexual harassment	2.43	1.22	.16*	–.69	1.25	.04	–.63	1.19	–.04
Leadership support	–.08	.33	–.02	.07	.32	.02	–.14	.30	–.04
Unit cohesion	–.79	.32	–.25*	–.94	.31	–.30**	–.63	.29	–.20*
Coping style	–36.54	12.69	–.22**	–27.21	12.33	–.17*	–20.66	11.38	–.13
Intervening life events				4.70	1.25	.31***	4.48	1.17	.29***
Emotional support							–4.45	1.18	–.30***
Instrumental support							–2.64	2.10	–.10

NOTE: B = the unstandardized coefficient that represents raw difference in Mississippi's scores controlling for effects of covariates.
*$p < .05$. **$p < .01$. ***$p < .001$. ****$p < .0001$.

Regression analysis (see Table 3) indicated that the frequency of physical sexual harassment was significantly predictive of increased scores on the Mississippi scale at 18 to 24 months postdeployment, controlling for the effects of combat exposure, leadership support, unit cohesion, and coping style. After controlling for the effects of intervening life events, the effect of physical sexual harassment frequency was no longer significant. The final model accounted for 42% of the variance in scores on the Mississippi scale (see Table 4).

Because of the dramatic effect of controlling for intervening life events on the relationship between the frequency of deployment-related physical sexual harassment and follow-up PTSD symptomatology, we computed a series of multiple regression equations to test whether the effects of the frequency of physical sexual harassment on Mississippi scale scores were mediated by intervening life events. Following Baron and Kenny (1986), we computed three equations: (a) the mediator variable (intervening life events) was regressed on the independent variable (frequency of physical sexual harassment), (b) the dependent variable (Mississippi scale score) was regressed on

TABLE 4: Bivariate Correlations Among Variables in Regression ($N = 131$)

	Mississippi Scale Score	*Combat Exposure*	*Frequency of Physical Sexual Harassment*	*Leadership Support*	*Unit Cohesion*	*% Approach Coping*	*Number of Intervening Events*	*Emotional Support*
Combat exposure	.301***							
Frequency of physical sexual harassment	.236***	.039						
Leadership support	–.246**	–.046	–.208*					
Unit cohesion	–.322***	–.035	–.136	.665***				
% approach coping	–.308***	–.126	–.133	.052	.113			
Number of intervening events	.385***	.073	.401***	–.139	–.020	–.230**		
Emotional support	–.435***	–.059	–.267**	.052	.163	.148	–.093	
Instrumental support	–.397***	–.081	–.158	.030	.188*	.197*	–.230**	.504***

*$p < .05$. **$p < .01$. ***$p < .001$.

the independent variable (physical sexual harassment), and (c) the dependent variable (Mississippi scale score) was regressed on both the independent variable (physical sexual harassment) and the mediator variable (intervening events). The three conditions required for mediation held, indicating that the effects of the frequency of physical sexual harassment on follow-up symptomatology were mediated through their impact on intervening life events (see Figure 1).

DISCUSSION

We found a spectrum of sexual victimization events in women during wartime that ranged from no harassment to completed sexual assault. Although our findings are comparable to those reported for some college women (Hanson & Gidycz, 1993), rates of sexual harassment and sexual assault for the study interval are elevated compared to general community samples that estimate annual rates at about 44% (USMSPB, 1995) and .2% (Norris, 1992) for sexual harassment and assault, respectively. Our findings, as well as those in another recent study of military personnel (Martindale, 1990), suggest that military settings may be prone to increased sexual aggression toward women. In fact, certain characteristics of that setting (e.g., high male-female ratios, traditionally male environments, predominance of male supervisors) are all factors that have been associated with the increased likelihood of sexually harassing behavior (Gutek, 1985; USMSPB, 1995).

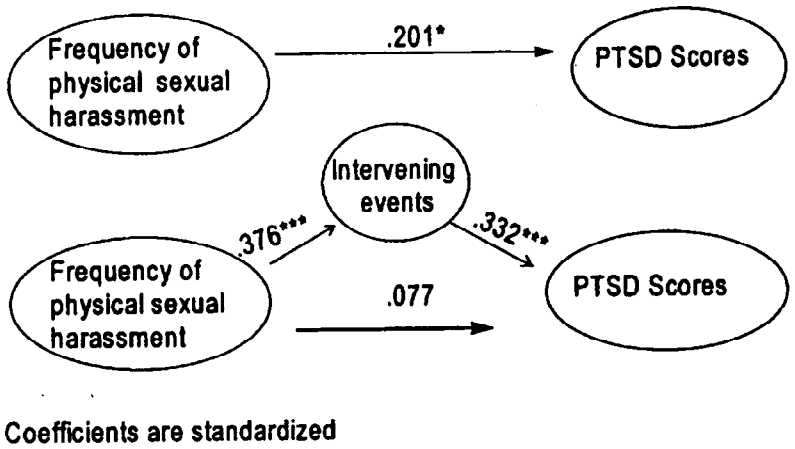

Figure 1: Effects of Physical Sexual Harassment on PTSD Symptomatology Are Mediated by Intervening Events
NOTE: Coefficients are standardized.

Our data suggest a clear relationship between incident severity and psychological outcome: Women who were assaulted showed significantly more symptoms of PTSD than women who experienced physical, verbal, or no sexual harassment. Furthermore, our findings show that the increased frequency of physical sexual harassment was associated with an increased risk for PTSD, providing additional evidence for the adverse effects of this behavior. These data are widely consistent with other research on the relationship between sexual assault and PTSD symptomatology (NVC, 1992; Resnick et al., 1993; Rothbaum et al., 1992). Our results also support dose response models of PTSD, whereby increasing stressor intensity is associated with higher symptom levels (Resnick et al., 1992).

To date, combat exposure has been one of the strongest predictors of PTSD symptomatology (Foy & Card, 1987). Until the completion of the NVVRS (Kulka et al., 1988), however, the relationship between combat exposure and PTSD symptomatology had focused primarily on men. Our findings confirm that women with higher levels of combat exposure have more PTSD symptomatology after wartime service. Still, no study that we are aware of has addressed the comparative effects of concurrent combat exposure and sexual assault on women's adjustment. We found that women who were sexually assaulted (vs. those with physical sexual harassment) had an increase in scores on the Mississippi scale more than twice that of a one standard deviation increase in combat exposure. Furthermore, the experience of physical sexual harassment was associated with an increase in Mississippi scale

scores nearly equal to that of a one standard deviation increase in combat exposure. These data preliminarily suggest that the impact of wartime sexual assault may be more detrimental than that of combat exposure. These findings, however, should be viewed as preliminary: Levels of combat reported during the Persian Gulf War were considerably lower than those for other wars (e.g., Vietnam). Thus, it is possible that effects of combat and other stressors will differ across contexts.

Our data indicate that the way in which physical sexual harassment and combat exposure are linked to psychological outcomes may differ. The frequency of physical sexual harassment was associated with a number of specific predictors (intervening events, emotional social support, leadership support), but combat exposure was not. Furthermore, controlling for these predictor variables—along with coping style, unit cohesion, and instrumental social support—attenuated the impact of physical sexual harassment on psychological functioning but had little effect on the impact of combat. One possible explanation is that the experience of combat is qualitatively (as well as quantitatively) different from exposure to sexual aggression. Sexual harassment transpires exclusively in an interpersonal context and involves a perpetrator often known to the victim. Often, the setting is social or work related, carrying economic and social implications (USMSPB, 1995). As a result, sexual harassment can lead to feelings of humiliation, social alienation, and personal vulnerability (Gutek, 1985). It is possible that these responses are more readily modified through action-oriented, problem-based coping and/or the presence of social support. In contrast, reactions to combat exposure, at least those reported here, may involve less personal blame and distress when viewed as a normative group response to a hostile but impersonal threat. Increased amounts of physical sexual harassment also were associated with increased rates of highly stressful postdischarge events. A similar relationship has been noted in other samples of female assault survivors in which prior assault is associated with both trauma reexposure and poorer psychological outcome (Wyatt et al., 1992). In this study, exposure to these events mediated the relationship between physical sexual harassment and PTSD symptomatology. We found no relationship between intervening life events and combat exposure, again suggesting that these events affect women in different ways.

Because all sexually assaulted women in our sample experienced physical sexual harassment, we tested the effects of the frequency of physical sexual harassment with and without assault. When separate regressions were performed, the frequency of physical sexual harassment was a significant predictor of symptomatology for assaulted women only when leadership support, unit cohesion, and coping style were included in the model. The frequency

of physical sexual harassment was eliminated as a predictor after including intervening life stressors and social support. For women without sexual assault, the frequency of physical sexual harassment was not a significant predictor of symptomatology. Furthermore, the correlation between the frequency of physical sexual harassment and symptomatology for women who were assaulted was marginally significant ($r = .47$, $p = .06$), but the same correlation for women without sexual assault was not significant ($r = .06$). Due to the small number of women reporting sexual assault, these post hoc results should be viewed cautiously. However, results do suggest that the frequency of less severe events (i.e., physical sexual harassment) has the greatest impact on women who also experience more severe forms of sexual victimization.

There are a number of limitations to this study, including sample design, retrospective reporting, and the absence of information on premilitary functioning. We relied exclusively on self-report data because no unit records were available. The use of these data for both event exposure and its repercussions raises the possibility that aversive events bias reporting and that preexisting symptoms might influence event perceptions. Our mediational model suggests that the relationship between physical sexual harassment and PTSD is due to the former's relationship to subsequent exposure to other negative events. However, the design of this study precludes any exploration of the mechanisms that might underlie this relationship; consequently, other variables might also exert an influence. For example, there are extensive data on the highly adverse and enduring effects of childhood sexual abuse in women (Browne & Finkelhor, 1986), suggesting that certain predeployment experiences might influence military exposure to sexual harassment and later stressors. In fact, childhood events appear to influence the emergence of PTSD symptomatology in some women under combat conditions (Engel et al., 1993). These issues highlight the importance of research that is prospective and that systematically evaluates respondents' histories and pertinent individual and contextual characteristics. Research on factors associated with the risk and sequelae of exposure to sexual aggression is needed to provide further advances in the remediation of effects of these events.

NOTE

1. At the suggestion of a reviewer, we also examined the effects of sexual harassment scored on a single continuum, both by summing frequencies of physical sexual harassment and sexual assault and by summing all three forms of sexual harassment (verbal, physical, and assault). The results of these analyses were substantively very similar to those using solely physical sexual harassment as the measure of interest. Due to the difficulties inherent in the interpretation of a

summation of qualitatively different events, we present the more easily interpretable analyses, using physical sexual harassment frequency. The results of analyses using sexual harassment measured on a single continuum are available from the first author on request.

REFERENCES

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

Browne, A. & Finkelhor, D. (1986). In pact of child sexual abuse: A review of the research. *Psychological Bulletin, 99*, 66-77.

Crull, P. (1982). Stress effects of sexual harassment on the job: Implications for counseling. *American Journal of Orthopsychiatry, 52*, 539-544.

Dienstfrey, S. J. (1988). Women veterans' exposure to combat. *Armed Forces and Society, 14*, 549-558.

Engel, C. C., Engel, A. L., Campbell, S. J., McFall, M. E., Russo, J., & Katon, W. (1993). Posttraumatic stress disorder symptoms and precombat sexual and physical abuse in Desert Storm veterans. *Journal of Nervous and Mental Disease, 181*, 683-688.

Fitzgerald, L. F., Shullman, S. L., Bailey, N., Richard, M., Swecker, J., Gold, Y., Ormerod, M., & Weitzman, L. (1988). The incidence and dimensions of sexual harassment in academia and the workplace. *Journal of Vocational Behavior, 32*, 152-175.

Foy, D. W., & Card, J. J. (1987). Combat related post-traumatic stress disorder etiology: Replicated findings in a national sample of Vietnam-era men. *Journal of Clinical Psychology, 43*, 28-31.

Gallops, M., Laufer, R. S., & Yager, T. (1981). Revised combat scale. In R. S. Laufer & T. Yager (Eds.), *Legacies of Vietnam: Comparative adjustments of veterans and their peers* (Vol. 3). Washington, DC: Government Printing Office.

Gutek, B. A. (1985). *Sex and the workplace: The impact of sexual behavior and harassment on women, men, and organizations*. San Francisco: Jossey-Bass.

Hanson, K. A., & Gidycz, C. A. (1993). Evaluation of a sexual assault prevention program. *Journal of Consulting and Clinical Psychology, 61*, 1046-1052.

Holahan, C. J., & Moos, R. H. (1991). Life stressors, personal and social resources, and depression: A 4-year structural model. *Journal of Abnormal Psychology, 100*, 31-38.

Keane, T. M., Caddell, J. M., & Taylor, K. L. (1988). Mississippi Scale for Combat-Related Posttraumatic Stress Disorder: Three studies in reliability and validity. *Journal of Consulting and Clinical Psychology, 56*, 85-90.

King, L., King, D., Fairbank, J. A., Keane, T. M., & Adams, G. A. (in press). Resilience/recovery factors in posttraumatic stress disorder among female and male Vietnam veterans: Hardiness, postwar social support, and additional stressful life events. *Journal of Personality and Social Psychology.*

Kulka, R. A., Schlenger, W. E., Fairbank, J. A., Hough, R. L., Jordan, B. K., Marmar, C. R., & Weiss, D. S. (1988). *Contractual report of findings from the National Vietnam Veterans Adjustment Study: Vol. 1. Description of findings and technical appendices* (Executive summary). Washington, DC: Veterans Administration.

Lott, B. (1995). Consequences and remedies. In B. Lott & M. E. Reilly (Eds.), *Combating sexual harassment in higher education*. Washington, DC: NEA.

Marlowe, D. H. (1987). *New manning system field evaluation* (Technical Report No. 5). Washington, DC: Walter Reed Army Institute of Research.

Martindale, M. (1990). *Sexual harassment in the military: 1988 report.* Arlington, VA: Defense Manpower Data Center.

Moos, R. (1988). *Coping responses inventory manual.* Palo Alto, CA: Stanford University and Department of Veterans Affairs Medical Centers.

National Victims Center (NVC). (1992). *Rape in America: A report to the nation.* Arlington, VA: Author.

Norris, F. H. (1990). Screening for traumatic stress: A scale for use in the general population. *Journal of Applied Social Psychology, 20*(Pt. 2), 1704-1718.

Norris, F. H. (1992). Epidemiology of trauma: Frequency and impact of different potentially traumatic events on different demographic groups. *Journal of Consulting and Clinical Psychology, 60*(3), 409-418.

Resick, P. A., Calhoun, K., Atkeson, B., & Ellis, E. (1981). Adjustment in victims of sexual assault. *Journal of Consulting and Clinical Psychology, 49*, 704-712.

Resnick, H. S., Kilpatrick, D. G., Best, C. L., & Kramer, T. L. (1992). Vulnerability-stress factors in development of posttraumatic stress disorder. *Journal of Nervous and Mental Disease, 180*, 424-430.

Resnick, H. S., Kilpatrick, D. G., Dansky, B. S., Saunders, B. E., & Best, C. L. (1993). Prevalence of civilian trauma and posstraumatic stress disorder in a representative national sample of women. *Journal of Consulting and Clinical Psychology, 61*, 984-991.

Roth, S., & Lebowitz, L. (1988). The experience of sexual trauma. *Journal of Traumatic Stress, 1*, 79-107.

Rothbaum, B. O., Foa, E. B., Riggs, D. S., Murdock, T., & Walsh, W. (1992). A prospective examination of post-traumatic stress disorder in rape victims. *Journal of Traumatic Stress, 5*, 455-475.

U.S. Merit Systems Protection Board (USMSPB). (1995). *Sexual harassment in the federal workplace: Trends, progress, continuing challenges.* Washington, DC: Government Printing Office.

Wolfe, J. (1990). Abuse and trauma in women: Broadening the social context. *American Psychologist, 45*, 1386.

Wolfe, J., Brown, P. J., & Kelley, J. M. (1993). Reassessing war stress: Exposure and the Persian Gulf War. *Journal of Social Issues, 49*, 15-31.

Wyatt, G. E., Guthrie, D., & Notgrass, C. M. (1992). Differential effects of women's child sexual abuse and subsequent sexual revictimization. *Journal of Consulting and Clinical Psychology, 60*, 167-173.

Jessica Wolfe, Ph.D., is currently the director, Women's Health Division, National Center for PTSD. She has completed postdoctoral training in psychology and neuropsychology. She is also an associate professor of psychiatry (psychology) at Tufts University School of Medicine and a lecturer in psychiatry (psychology) at Harvard Medical School and Boston University School of Medicine. She is the recipient of a number of grants on posttraumatic stress disorder, violence, health, and gender and has published extensively in these areas.

Erica J. Sharkansky received her PhD in psychology from Indiana University and completed a clinical internship at the Boston Veterans Administration Medical Center.

She is currently a postdoctoral fellow at the Women's Health Sciences Division, National Center for PTSD. Her research interests include posttraumatic stress disorder, substance use and abuse, and gender.

Jennifer P. Read, M.Ed., is currently a graduate student in clinical psychology at the University of Rhode Island. She completed a summer internship at the Women's Health Sciences Division, National Center for PTSD. Her research interests include sexual assault and women's health.

Ree Dawson, Ph.D., is a statistician specializing in advanced social sciences statistical models, specifically those relating to longitudinal data and change, sample attrition, and complex outcomes. She has been the principal statistical consultant on a number of large nationally funded studies involving health, mental health, and functional status outcomes. She is affiliated with the Harvard University School of Public Health.

James A. Martin, Ph.D., is an associate professor, Graduate School of Social Work and Social Research, Bryn Mawr College. He was formerly at the Department of Military Psychiatry, Walter Reed Army Institute of Medicine. He is a retired colonel in the U.S. Army.

Paige Crosby Ouimette received her PhD in clinical psychology from SUNY Stony Brook and completed a postdoctoral fellowship at the National Center for PTSD, Women's Health Sciences Division. She is a senior research associate, Program Evaluation and Resource Center at the Veterans Administration Palo Alto Health Care System. Her research interests include posttraumatic stress disorder and substance abuse, gender issues, and victimization/perpetration of interpersonal violence.