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Coping With Gulf War Combat Stress: Mediating and Moderating Effects

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The authors examined relationships between method of coping with combat-related stress and psychological symptoms among Gulf War Army personnel (N = 1,058). Participants were surveyed on return from the Gulf region (Time 1) with the Coping Responses Inventory (R. Moos, 1990) and a measure of combat exposure. Outcomes were symptom measures of posttraumatic stress disorder (PTSD) and depression. At Time 2 (18–24 months) participants completed the same symptom measures and an index of postwar stress. Higher proportions of approach-based coping in the war zone were related to lower levels of psychological symptoms. Combat exposure moderated the effects of coping on Time 1 PTSD. Coping predicted changes in symptoms of depression but not PTSD. Combat exposure affected changes in depression through postwar stress but had a direct negative effect on PTSD.

For decades we have known that exposure to combat-related stress results in certain psychological symptoms for some people. Classically, these symptoms are characterized by reexperiencing of traumatic war events (e.g., having flashbacks, nightmares, or intrusive thoughts), emotional numbing, avoidance of circumstances reminiscent of war experiences, and hyperarousal, which together form a syndrome now known as posttraumatic stress disorder (PTSD; American Psychiatric Association, 1994). However, only a subset of individuals exposed to combat will develop PTSD (Kulka et al., 1990; Sutker & Allain, 1996). As a result, researchers have recently begun to examine factors other than the type or level of war-related stressor associated with PTSD symptomatology, such as prior exposure to highly stressful life events, precombat conduct problems, and postwar social support (D. W. King, King, Foy, & Gudanowski, 1996; L. A. King, King, Fairbank, Keane, & Adams, 1998). This article attempts to examine the effects of one factor that may be associated with response to combat or other traumatic stress: the method of coping used during the event itself.

Coping is generally defined as conscious attempts to manage internal or external stressors that the individual perceives as exceeding existing resources (Folkman & Lazarus, 1991). A considerable body of literature has demonstrated the importance of method of coping with life stressors on psychological outcome. However, the ability to compare studies in this area is impaired by the use of different terms to describe coping and different measures to assess coping. There are two predominant ways of describing coping efforts. The first classifies efforts as either *problem-focused* (attempting to deal directly with the stressor) or *emotion-focused* (attempting to alleviate the emotional distress associated with the stressor). The second way of classifying coping strategies describes methods as either *approach-based* (directly resolving or conquering the stressor; Moos, 1990, p. 2), or *avoidance-based* (attempting to either avoid thinking about the stressor or control the associated affect; Moos, 1990). Although considerable overlap between these two classification schemes exists (i.e., most problem-focused coping is approach-based, and most emotion-focused coping is avoidance-based), they are not entirely parallel, and caution is required when comparing results across studies using different frameworks and associated measures.

Much of the existing literature examining the effects of coping has used samples of college students or community dwelling adults. These studies have suggested that efforts to deal directly with the stressor (problem-focused or approach-based coping) tend

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to be associated with better outcome (e.g., Florian, Mikulincer, & Taubman, 1995; Haley, Levine, Brown, & Bartolucci, 1987; Moos, Brennan, Fondacaro, & Moos, 1990), whereas attempts to alleviate the emotional distress associated with the stressor or efforts to avoid the object of stress (emotion-focused or avoidance-based coping) are associated with higher levels of stress-related symptoms or depression (Billings & Moos, 1984; Haley et al., 1987; Holahan & Moos, 1987). Much less is known about the specific process and most effective methods of coping with combat stress, which is likely to differ both qualitatively and quantitatively from the types of stressors encountered by college or community samples.

Most of the extant research on coping with combat and other traumatic stressors addresses methods of coping with the effects of the trauma or events occurring following the trauma, rather than with the trauma itself (e.g., Solomon, Mikulincer, & Flum, 1988; Valentiner, Foa, Riggs, & Gershuny, 1996; Wolfe, Keane, Kaloupek, Mora, & Wine, 1993). Although an understanding of effective methods of coping with posttraumatic stress symptoms may be quite useful for informing treatment interventions, an understanding of effective methods of coping closer to the time of the traumatic event may be most crucial for preventing symptoms. However, the majority of the limited body of work examining the effects of coping at the time of a trauma relies on data that were collected months or even years after the index event, raising the question of whether recall of coping at the time of stress is influenced by current symptomatology. These studies have found higher levels of current PTSD symptomatology among college students who reported using higher levels of cognitive avoidance during a sexual assault (Santello & Leitenberg, 1993) and among male and female veterans reporting greater use of emotion-focused coping and male veterans reporting increased use of problem-focused coping during the Vietnam War (L. A. King, King, Fairbank, Keane, & Adams, 1995). Measuring coping closer to the time of the event, Sutker, Davis, Uddo, and Ditta (1995) reported an association between diagnosis of PTSD within one year of a soldier's return from the Gulf War and both more avoidance-based coping and less problem-focused coping during the war.

There are two notable exceptions to the use of coping reports collected months or years after the occurrence of traumatic events. Weisenberg and colleagues (Weisenberg, Schwarzwald, Waysman, Solomon, & Klingman, 1993) examined coping among Israeli children while the children were in sealed rooms during SCUD missile attacks. These researchers found that children who reported more symptomatology 3 weeks following the war also reported having used more problem-focused and fewer emotion-focused coping strategies during the uncontrollable missile attacks. Resick (1988) collected coping data 1 month following a sexual assault and prospectively assessed symptoms. In this study, use of more active resistance (i.e., behavioral approach coping) during the assault was related to less distress at 6 and 18 months following the assault and lower levels of PTSD symptoms at 12-months postassault.

In summary, most of these studies examining the effects of coping at the time of a severe stressor have found associations between the increased use of avoidance-based (or emotion-focused) coping at the time of the event and psychological distress. However, the Israeli study (Weisenberg et al., 1993) suggests that this association may be more complex and may depend on the type of stressor encountered and/or characteristics (e.g., age) of the respondents. The relationship between the use of problem-focused or approach-based coping at the time of extreme stressor and subsequent psychological symptomatology is also unclear and again may depend on the type of event, in addition to characteristics of the person. Consequently, these mixed results underscore the importance of Monat and Lazarus's (1991) call to "control for" the type of stressor when evaluating the effect of specific coping methods.

One of the problems in evaluating the effect of coping on psychological functioning is that higher levels of stress have been associated with the use of more coping strategies of all types (Holahan & Moos, 1987; Marmar, Weiss, Metzler, & Delucchi, 1996), and higher levels of symptoms have also been associated with increased use of coping strategies of different types (Leitenberg, Greenwald, & Cado, 1992). A number of authors have addressed this issue by using a measure of relative coping, indexed by the percentage of total coping strategies used that are approach-based (Holahan & Moos, 1990, 1991; Valentiner, Holahan, & Moos, 1994; Wolfe et al., 1998).

This article attempted to build on existing work and address some of the inherent problems in measuring and interpreting effects of coping. Specifically, we attempted to address difficulties involving collection of data months or years after the index event, the inclusion of multiple types of stressors in the same analyses, and the interpretation problems resulting from finding relationships between higher levels of stress and multiple coping methods. We studied the relationship between relative use of approach-based versus avoidance-based coping with combat-related stress among soldiers deployed to the Gulf War and psychological symptomatology immediately on return to the United States (cross-sectional analyses) and changes in symptoms 18 to 24 months later (longitudinal analyses). These data are unique in that we collected coping measures just after the soldiers' return stateside (within 5 days) and assessed method of coping in conjunction with the most severe personal wartime stressor, which for all individuals in the present study was a combat-related event.

In a review of the literature, Folkman and Lazarus (1991) suggested ways in which problem-focused coping (which, by extension, may be applied to approach-based coping) may be associated with reduced psychological distress. Dealing directly with a combat-related stressor or its physical aftermath (e.g., taking cover to protect oneself from a missile attack or providing first aid to the wounded) may ameliorate or change the nature of the stressor, thereby reducing its impact. Increased use of emotion-focused or avoidance-based coping in military personnel could be problematic for two reasons: (a) avoidance-based coping detracts from the use of approach-based coping strategies, and (b) there is some evidence that avoidance-based coping is linked to dissociation at the time of a traumatic event (Marmar et al., 1996), which has been associated with increased levels of PTSD symptoms (Koopman, Classen, & Spiegel, 1994) and increased rates of diagnoses (Shalev, Peri, Canetti, & Schreiber, 1996).

We reasoned that greater reliance on approach-based coping would be more effective in dealing with the stressor by decreasing the actual (i.e., objective) or perceived threat involved. Therefore, we hypothesized that the use of relatively more approach-based coping would be associated with better outcome (lower levels of reported PTSD and depression symptomatology). Further, al-

though we expected to find a relationship between coping and symptomatology at all levels of stress exposure, we predicted that the effects of approach-based coping would be moderated by level of combat exposure. Specifically, we predicted that approach-based coping would have a greater ameliorative effect on outcome at higher levels of stressor exposure based on prior research demonstrating this effect in community samples (Holahan & Moos, 1990, 1991). We controlled for coping resources: increased age, active duty versus Reserve or National Guard, and officer status. Resources are aspects of the person and the environment that may determine both the types of coping responses available and their likelihood of success (Folkman & Lazarus, 1991). Increased age has been characterized as a protective factor preventing the development of PTSD (Ullman & Siegel, 1994). Active duty status is thought to be associated with receiving better training and being more prepared for combat and has previously been associated with lower rates of PTSD and lower levels of symptomatology in other studies from our database (Wolfe, Erickson, Sharkansky, King, & King, 1999; Wolfe et al., 1998). We also expected that officer status would serve as a coping resource due to the increased control (Foa, Zinbarg, & Rothbaum, 1992) that officers are likely to have (compared with enlisted personnel) in a war zone situation. We predicted that degree of reliance on approach-based coping would mediate the relationship between these coping resources and outcome for our respondents. The latter prediction was derived from the research on nontraumatic stressors, demonstrating that approach-based coping mediates the relationship between resources and symptoms at higher levels of stress (Holahan & Moos, 1990, 1991).

The longitudinal analyses examining the effects of coping on change in symptomatology were more exploratory, as little evidence has addressed this issue. We wanted to examine if increased use of approach-based coping at the time of the stressor would be related to change in functioning over time. Preliminary support for a long-term effect of coping is indicated by the prospective link between peritraumatic dissociation and increased PTSD symptomatology several months later (Koopman et al., 1994; Shalev et al., 1996). Additional support is provided by Resick's (1988) results, showing that approach-based coping during a sexual assault (active resistance) was associated with less distress, an effect that lasted for at least 18 months. If we found an effect of coping on long-term changes in symptomatology, we wanted to explore whether this effect might be mediated by exposure to intervening life stressors. This would make sense if, as previous authors (Moos & Billings, 1993) have proposed, successful approach-based coping may lead to increased subsequent use of additional approach-based coping strategies, thereby preventing future stressors. Further, because other research from our database suggested that intervening stressors may mediate the relationship between prior sexual harassment and later symptomatology (Wolfe et al., 1998), we wanted to explore if intervening stressors would mediate the relationship between combat-related stress and changes in symptomatology.

Because we were interested in coping with traumatic events, one obvious outcome was PTSD symptomatology. Additionally, we examined symptoms of a commonly comorbid condition, depression, that has also been associated with exposure to highly stressful events (see Kessler, 1997, for a review). The examination of symptoms of both PTSD and depression allowed us the opportunity to explore differences in the effects of coping and combat exposure across the two dependent measures and differences in the apparent processes underlying these relationships.

Method

Participants

The Fort Devens Operation Desert Storm Reunion Survey was designed to measure war zone stressors and their effects on military personnel following the Gulf War. A total of 2,949 U.S. Army personnel deployed from and returning to Fort Devens, Massachusetts, or approximately 60% of the military personnel deployed from Fort Devens, participated. Nonsurveyed units were those unavailable due to other outprocessing duties at the times of survey administration. Compared with the total U.S. forces deployed to the Gulf, our sample was significantly older (M = 30.16 vs. 28.0), $t(2879) = 13.78$, $p < .001$, and was significantly more likely to have been called from the Reserves or National Guard (72% vs. 17%), than from active duty status, $t(2948) = 67.05$, $p < .001$. Our sample did not differ from the national sample in terms of gender or marital status. Of the entire sample, we selected 1,058 (36%) for the present analyses. These respondents were those who identified a combat-related experience (e.g., SCUD missile attack, deaths of unit members) as their most stressful event during deployment in the Gulf region. Of this subset, 90% were men. Respondents ranged in age from 19 to 65 years ($M = 29.9$, $SD = 8.3$) and had an average education level of 13.4 years ($SD = 2.0$). The majority of participants (84%) were Caucasian, 8% were African American, 3% were Hispanic, and 5% were identified as "other." The largest proportion of the respondents were married at the time of the initial survey (48%), 38% were single, 7% were engaged, and the remaining 7% were either separated or divorced. The majority of the respondents (91%) were enlisted personnel. The length of stay overseas ranged from 1 to 9 months ($M = 4.1$, $SD = 1.4$).

There were a number of demographic differences between those who listed combat-related events as their most stressful (i.e., those who were included in our analyses) and those who listed other types of life stressors (e.g., separation from family) and were not included in the present analyses. Although both men and women were more likely to list noncombat-related stressors as their most stressful experiences, a higher proportion of women (44%) as compared with men (35%) listed combat-related events as most stressful, $\chi^2(1, N = 2{,}934) = 8.21$, $p < .01$. A larger proportion of commissioned officers listed combat-related stressors (42%) than enlisted personnel (35%), $\chi^2(1, N = 2{,}941) = 4.36$, $p < .05$. Participants who were members of the Reserves and National Guard were more likely to list combat-related stressors (39%) than those deployed from active duty status (29%), $\chi^2(1, N = 2{,}941) = 24.10$, $p < .001$. Single military personnel were more likely (40%) to list combat-related stressors than other respondents (34%), $\chi^2(1, N = 2{,}941) = 8.95$, $p < .01$. Individuals in our sample had received slightly more education ($M = 13.4$, $SD = 2.0$) than those not included in our sample ($M = 13.0$, $SD = 1.7$), $t(2870) = 4.82$, $p < .001$, and, as expected, reported experiencing higher levels of combat exposure ($M = 5.6$, $SD = 3.4$) than those who did not list a combat-related event ($M = 4.2$, $SD = 3.0$), $t(2937) = 11.43$, $p < .001$. There were no differences in age or ethnicity between those who did and did not list a combat-related event as their most stressful experience.

Respondent Attrition

Among the 1,058 participants included in the Time 1 analyses, there was an 80% completion rate for the second phase of the study (845 participants). Caucasians were more likely to complete both phases of the survey (82%) than members of other racial groups (70%), $\chi^2(1, N = 1{,}058) = 12.67$, $p < .001$. Members of the Reserves and National Guard were much more likely to provide Time 2 data (86%) than those on active

duty (58%), $\chi^2(1, N = 1{,}058) = 93.44$, $p < .001$. Those who completed both phases of the study were older at Time 1 ($M = 30.4$, $SD = 8.6$) than those who did not complete the second phase of the study ($M = 28.0$, $SD = 6.8$), $t(1027) = 3.73$, $p < .001$. There were no other differences between those who did and did not complete the second phase of the study in terms of demographics, level of combat exposure, or Time 1 symptoms.

Procedures

During both phases of the study, participants responded to a questionnaire containing several self-report measures, completion of which averaged 45 min. The first phase of the study (Time 1) included a section for participants' demographic information as well as a number of measures used to assess Gulf War combat exposure, symptoms of PTSD and depression, and methods of coping with serious life stressors. During Time 2 of the study, participants completed the same measures of symptomatology as well as measures that inquired about life stressors occurring since the war.

The Time 1 data collection was completed within 5 days of the military personnel's return to the United States in 1991. All participants were recontacted for a follow-up survey (Time 2) in 1992 and 1993 (18–24 months following the initial survey). Of the 845 participants included in our Time 2 sample, 323 (38%) completed the surveys during face-to-face unit meetings. Those participants who were unavailable at unit meetings were contacted by mail and 386 (46%) of our sample completed questionnaires in this manner. The remaining participants (135: 16%) did not return mailed surveys and were contacted and completed surveys during phone interviews. Participants responding by phone were younger ($M = 28.28$, $SD = 8.15$) than those responding by mail ($M = 31.42$, $SD = 8.83$), $F(2, 827) = 6.92$, $p < .01$; and had a significantly greater number of days between responding to the two surveys ($M = 713.26$, $SD = 42.10$) than those responding in person ($M = 361.55$, $SD = 64.57$), $F(2, 833) = 5.41$, $p < .01$. Individuals who responded to Time 2 surveys by phone also reported significantly lower levels of depression symptoms at Time 2 ($M = 0.42$, $SD = 0.61$) than those responding in person ($M = 0.64$, $SD = 0.76$) or by mail ($M = 0.78$, $SD = 0.82$); $F(2, 842) = 11.03$, $p < .001$, and they reported more intervening stressful events ($M = 1.56$, $SD = 1.31$) than those responding by mail ($M = 1.25$, $SD = 1.16$) or in person ($M = 1.04$, $SD = 1.14$), $F(2, 832) = 9.40$, $p < .001$. Those responding in person were less depressed at Time 1 ($M = 0.50$, $SD = 0.61$) than those responding by mail ($M = 0.61$, $SD = 0.66$) and were more likely to have been called from active duty status (23%) than those responding by mail (14%) or by phone (4%), $\chi^2(2, N = 844) = 26.66$, $p < .001$. Those responding by mail were more likely to be women (14%) than those responding by phone (8%) or in person (7%), $\chi^2(2, N = 844) = 10.45$, $p < .01$, and they were also more likely to be officers (13%) than those responding by phone (7%) or in person (6%), $\chi^2(2, N = 844) = 11.75$, $p < .01$. Because of these many differences method of survey completion was entered as a control variable into equations predicting Time 2 symptomatology. Two dummy variables were created to identify those completing surveys by mail (1 = yes, 0 = no) or by phone (1 = yes, 0 = no). Details on the full cohort may be found elsewhere (Wolfe, Brown, & Kelly, 1993).

Measures

Combat exposure. The Laufer Combat Scale (Gallops, Laufer, & Yager, 1981) was used to measure combat exposure, with items added to assess distinctive experiences related to the Gulf War (e.g., being on alert for SCUD or biochemical attack). A count of all circumstances endorsed as having occurred was created. Previous analyses (Wolfe et al., 1998) have documented a relation between this 33-item scale and PTSD symptoms. Our sample demonstrated acceptable levels of internal consistency ($\alpha = .74$).

Coping was assessed using the Coping Responses Inventory (Moos, 1990). For this study, the survey asked participants to describe an event that occurred during their deployment. Participants were asked to identify the "most important experience or stressful situation experienced during Operation Desert Storm," and rate the frequency with which they used each of the 48 strategies to cope with this stressful event. The 48 items on the Coping Responses Inventory are divided into two scales assessing approach-based (24 items; $\alpha = .89$) and avoidance-based (24 items; $\alpha = .85$) methods of coping. The two scales were correlated, $r = .67$, $p < .01$. Approach-based strategies include analyzing and attempting to solve the problem, seeking guidance and support from others, and positively reappraising the situation (e.g., "Did you make a plan of action and follow it?"). Avoidance-based strategies include avoiding thinking about the problem, getting involved in distracting activities, letting off steam, and resigning oneself to the situation (e.g., "Did you try not to think about the problem?"). An index of percentage approach-based coping was computed by dividing the sum of respondents' scores on the approach-based items by the sum of their scores on all items, a procedure used previously (e.g., Holahan & Moos, 1990, 1991).

PTSD symptoms were evaluated using the Mississippi Scale for Combat-Related PTSD (Keane, Caddell, & Taylor, 1988). This scale is a well-regarded self-report measure of PTSD symptomatology known for its high reliability ($\alpha = .94$, test–retest [5–7 days]: $r = .97$) and excellent sensitivity (.93) and specificity (.89) in identifying combat-related PTSD (Keane et al., 1988). The scale is composed of 35 items scored using a 5-point Likert format. The wording of some of the items was slightly altered to refer specifically to Gulf War experiences and demonstrated good reliability ($\alpha = .86$) in our sample.

Depression symptoms were assessed using the depression scale of the Brief Symptom Inventory (BSI; Derogatis & Spencer, 1982). The scale is composed of 6 items scored on a 5-point Likert scale from 0 (*not at all*) to 4 (*extremely*). This widely used measure has established norms and psychometric properties including very good internal consistency ($\alpha = .85$; $\alpha = .82$ in our sample) and 2-week test–retest reliability ($r = .84$; Derogatis, 1993).

Intersurvey interval. We used the number of days between administration of Time 1 and Time 2 surveys as an approximate control for time from initial stressor exposure to Time 2 symptomatology. Previous studies (e.g., Kulka et al., 1990, Saigh, 1988) have documented the importance of the time interval between stress exposure and symptom assessment.

Intervening life stressors. A sum of all negative events endorsed as occurring between the Time 1 and Time 2 surveys was derived from an 8-item dichotomous checklist designed for this study with a format previously used by Norris (1990). The items asked participants about categories of events widely accepted as major life stressors ("death of a friend, family member, or loved one"; "very serious accident, illness, or a medical procedure involving self"; "very serious accident, illness, or medical procedure involving someone close to you"; "a separation/divorce/breakup from a long-term partner or spouse"; "loss of your home or property due to a fire, flood, or other natural or man-made disaster"; "an assault [including robbery, mugging, or rape] of yourself"; "an assault [including robbery, mugging, or rape] of someone close to you"; "an event where you saw someone you didn't know badly hurt or violently killed"). The internal consistency of this scale is low ($\alpha = .41$), but this could be anticipated as there is no reason to expect any high degree of covariation among the collection of stressors. These items are very similar to those used in Vietnam veteran research assessing events following the war (L. A. King et al., 1998) and in studies for the field trials for *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994) (DSM–IV) PTSD criteria (Falsetti, Resnick, Kilpatrick, & Freedy, 1994). Using their version of this measure, L. A. King and colleagues found that these events both directly and indirectly (through social support) predicted PTSD for both men and women, and for men, the level of combat exposure significantly predicted number of stressful life events.

Table 1
Descriptive Statistics

Variable	Cross-sectional analyses		Longitudinal analyses[a]	
	M	*SD*	*M*	*SD*
Active duty status[b]	0.22	0.41	0.16	0.37
Age at Time 1	30.00	8.34	30.43	8.62
Officer status[b]	0.10	0.29	0.10	0.31
Combat exposure	5.57	3.38	5.54	3.41
Percent approach coping	0.57	0.12	0.57	0.12
Gender[c]	0.10	0.30	0.10	0.31
Time 1 PTSD	63.32	14.28	63.12	14.17
Time 1 depression	0.56	0.64	0.56	0.62
Time 2 PTSD			68.45	17.94
Time 2 depression			0.66	0.76
Intervening life stressors			1.21	1.19
Interval between survey completions (in days)			460.78	356.32

Note. n = 973 for Time 1, 772 for Time 2. Empty cells indicate that data are not applicable.
[a] For the variables of active duty status, age, officer status, combat exposure, percent approach coping, gender, Time 1 posttraumatic stress disorder (PTSD), and Time 1 depression, the values in this column reflect listwise deletion for the reduced sample of 772 individuals who had complete data for the Time 2 variables. [b] 1 = yes, 0 = no. [c] female = 1.

Statistical Analyses

Hierarchical multiple regression was used to allow for the examination of main effects as well as mediators and moderators. In cross-sectional analyses, variables were entered in five steps: gender, combat exposure, the block of resources (increased age, active duty status, officer status), the main effect of percentage approach-based coping, and the Coping × Combat Exposure interaction in the final step. This order of entry allowed for the examination of coping as a mediator of the block of resources controlling for the effects of combat exposure and gender.

In longitudinal analyses, variables were also entered in five steps: autoregression effects (Time 1 symptoms), a block of control variables (intersurvey interval and method of completion), a block of all Time 1 predictor variables, intervening life stressors, and the Combat × Coping interaction. This order permitted the examination of intervening life stressors as a mediator of the effects of Time 1 variables on changes in symptomatology.

The analyses testing moderating and mediating effects used the analytic techniques popularized by Baron and Kenny (1986). A moderator is indicated if the relationship between a predictor and criterion differs in magnitude or sign across levels of the moderator variable. To test for a moderator, we regressed the criterion on the moderator, the predictor, and the interaction between the moderator and predictor. A significant interaction term indicates moderation (Baron & Kenny, 1986). In the current set of analyses, the extent to which level of combat exposure moderates the relationship between coping and psychological symptomatology on return was evaluated.

A mediator is a variable that accounts for the relation between the predictor and criterion. Full mediation is indicated if a previously significant relationship between the predictor and criterion becomes zero when the mediator is added into the model. This suggests the predictor is related to the criterion through its influence on the mediator. Partial mediation is suggested when the mediator accounts for some of the relation between the predictor and criterion (as indicated in an attenuation of the relationship between the predictor and criterion when the mediator is added). The relative magnitude and statistical significance of the mediated effect can be calculated (MacKinnon, Warsi, & Dwyer, 1995).[1]

Two separate mediation models were examined. The first mediation hypothesis tested whether approach-based coping mediated the relationship between resources (active duty status, age, and officer status) and psychological symptomatology. A second mediation hypothesis, using the longitudinal data, tested whether intervening stressors (measured at Time 2) mediated the relationships between combat exposure and/or approach-based coping and changes in psychological symptomatology.

Results

Descriptive Statistics

Table 1 contains means and standard deviations for all variables, and Table 2 contains correlations between variables in the cross-sectional and longitudinal analyses. Note that there was no relationship between percentage of approach-based coping and combat exposure.

Cross-Sectional Analyses

Predictors of Time 1 PTSD symptomatology. The final model predicting Time 1 PTSD symptomatology accounted for 22% of the variance in Time 1 Mississippi Scale scores. Significant predictors were combat exposure ($pr = .16, p < .001$), female gender ($pr = .14, p < .001$), officer status ($pr = -.10, p < .01$), coping ($pr = -.09, p < .01$), and the Combat Exposure × Coping interaction ($pr = -.10, p < .01$).

[1] The mediated effect can be expressed as either the change in the direct effect from the predictor to the criterion after controlling for the mediator or the product of the path from the predictor to the mediator and the path from the mediator to the criterion. Using a formula for estimating the variance of the mediated effect (Goodman, 1960), the statistical significance of the mediated effect can be computed. Furthermore, the relative magnitude of the mediated effect can be calculated. One such measure is the proportion of the total effect being mediated, calculated as the ratio of the mediated effect to the total effect (see MacKinnon et al., 1995). Using this measure of relative magnitude, 0% would indicate no mediation and 100% would indicate perfect mediation.

Table 2
Correlations Between Variables in Cross-Sectional (Above Lines) and Longitudinal (Below Lines) Analyses

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Gender[a]	—	−.01	−.05	−.10**	.02	−.06	.15***	.14***						
2. Combat exposure	.01	—	.07*	−.02	.12***	.02	.15***	.27***						
3. Active duty status[b]	−.04	.09*	—	−.07*	.06	.13***	−.07*	−.03						
4. Age	−.11**	−.04	−.05	—	.21***	.14***	−.09**	−.08**						
5. Officer status[b]	.03	.13***	.06	.21***	—	.20***	−.07*	−.13***						
6. Approach coping %	−.03	.04	.07*	.12**	.21***	—	−.26***	−.33***						
7. Time 1 depression	.14**	.16***	−.05	−.08*	−.06	−.25***	—	.59***						
8. Time 1 PTSD	.14**	.27***	−.02	−.08*	−.14***	−.32***	.61***	—						
9. Administration interval	−.08*	.03	−.03	−.004	.02	.05	.01	−.09**	—					
10. Administration: mail[b]	.10**	.07**	−.05	.11**	.11**	−.06	.09*	.07*	−.003	—				
11. Administration: phone[b]	−.02	.01	−.14***	−.12**	−.03	.02	−.01	−.004	.30***	−.40***	—			
12. Intervening stressors	.11**	.16***	.01	−.05	−.02	−.02	.19***	.20***	.06	.03	.13***	—		
13. Time 2 depression	.11**	.14***	−.03	−.01	−.06	−.21***	.51***	.48***	−.06	.14***	−.14***	.28***	—	
14. Time 2 PTSD	.12**	.26***	−.06	−.04	−.11**	−.24***	.47***	.64***	−.05	.06	−.06	.29***	.74***	—

Note. n = 973 above lines, 772 below; PTSD = posttraumatic stress disorder.
[a] female = 1. [b] 1 = yes, 0 = no.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The significant Combat Exposure × Coping interaction indicated that level of combat exposure moderated the effects of coping on Time 1 symptoms. Consistent with our hypothesis, increasing levels of combat exposure were accompanied by a stronger inverse relationship between percentage of approach-based coping and Time 1 PTSD symptomatology. Approach-based coping accounted for 5% of the variance in Mississippi Scale scores at one standard deviation below the mean level of combat exposure, 10% of the variance at the mean, and 16% of the variance in Mississippi Scale scores at one standard deviation above the mean of combat exposure.

In order to test the mediating effect of coping on resources, we first examined whether resources would serve as predictors of coping. When controlling for the nonsignificant variables of combat exposure and gender, and any colinearity among the predictors, the block of resources accounted for an additional 6% of the variance in coping, represented by the squared partial correlation. All three individual resources were significant predictors of coping: active duty status ($pr = .13, p < .001$), age ($pr = .10, p < .01$), and officer status ($pr = .17, p < .001$). We next examined the effects of resources before and after entering coping (the potential mediator) into the regression predicting Time 1 PTSD symptoms. The block of resources contributed a significant amount of variance in PTSD symptom scores when entered before (3%) and after (1%) coping. Prior to entering coping into the model, the only significant individual resource variable was officer status, which dropped from $pr = -.16, p < .001$ to $pr = -.11, p < .01$ after adding the potential mediator. Using an unbiased variance estimator (Goodman, 1960; MacKinnon et al., 1995), this difference represents a significant reduction in predictive power ($z = -4.87$, $p < .05$). Coping mediated 35% of the total effect of officer status on PTSD symptoms. These results indicate that officer status had a direct effect on Time 1 PTSD symptomatology, but that coping partially mediated this effect.

Predictors of Time 1 depression symptoms. The final model predicting Time 1 depression symptoms explained 11% of the variance in depression scores; the Combat Exposure × Coping interaction was not significant. There were three significant predictors in the final model: combat exposure ($pr = .17, p < .001$), approach-based coping ($pr = -.24, p < .001$), and female gender ($pr = .14, p < .001$).

In order to test whether coping mediated the effects of resources, we repeated the analyses involving the regression of resources on coping because listwise deletion mandated a slightly different sample when using depression symptoms as the outcome. Controlling for the nonsignificant variables gender and combat exposure, the block of resources significantly added 7% to the variance in predicting coping. All three individual resources were significant predictors: active duty status ($pr = .13, p < .001$), age ($pr = .10$, $p < .01$), and officer status ($pr = .17$, $p < .001$). We next examined the effects of resources before and after entering coping (the potential mediator) into the regression predicting Time 1 depression scores. As a block, the resources contributed a significant 2% of the variance in depression symptom scores when entered prior to the coping variable but did not add a significant amount of variance (.4%) when entered after the coping variable. An examination of the individual variables indicated that both active duty status ($pr = -.08, p < .05$) and officer status ($pr = -.07, p < .05$) significantly predicted depression symptoms, and

the effect of age ($pr = -.06, p < .06$) was marginal when added prior to the coping variable, but none approached significance ($prs = -.05; -.04; -.03$, respectively) after adding coping to the model. These differences reflect significant reductions in predictive power ($zs = -3.57, -4.46$, and -2.81, all $ps < .05$ for active duty status, officer status, and age, respectively). Coping mediated 55% of the total effect of officer status on Time 1 depression symptoms and 40% of the total effects of both age and active duty status on depression symptoms. These results indicate that coping mediated the effects of all three resources on Time 1 depression symptom scores with no direct effect of resources.

Longitudinal Analyses

Predictors of change in PTSD symptomatology. In the regression analyses predicting Time 2 Mississippi Scale scores the block containing the Combat Exposure × Coping interaction was not significant, indicating an absence of a moderating effect. After controlling for autoregression effects ($pr = .56, p < .001$) and the nonsignificant block of control variables (interval between surveys and method of completion), the remaining Time 1 predictors together accounted for 3% of the variance in Time 2 Mississippi Scale scores. Significant individual Time 1 variables included being called from active duty status ($pr = -.10, p < .01$) and combat exposure ($pr = .14, p < .001$). The final model including intervening stressors accounted for 45% of the variance in Time 2 PTSD symptom scores (8% controlling for the effects of autoregression and controls). In this final model, significant individual variables were Time 1 PTSD scores ($pr = .55, p < .001$), completion of Time 2 surveys by phone ($pr = -.13, p < .001$), active duty status ($pr = -.10, p < .01$), combat exposure ($pr = .12, p < .01$), and intervening stressors ($pr = .22, p < .001$).

Because coping did not significantly predict change in PTSD symptoms prior to the addition of intervening stressors, we did not conduct further tests of mediation for this variable. However, in order to test the possibility that intervening stressors mediated the effects of combat exposure on change in PTSD symptoms, we first examined whether combat exposure predicted intervening stressful events. When controlling for the effects of Time 1 PTSD symptoms ($pr = .15, p < .001$), the block of control variables ($pR^2 = .02, p < .001$), and the block of remaining Time 1 predictors ($pR^2 = .01$, *ns*), combat exposure significantly predicted ($pr = .10, p < .01$) intervening stressors. We next examined the difference between the effects of combat exposure when entered before ($pr = .14$) and after ($pr = .12$) intervening stressors. This difference represented a significant reduction in predictive power ($z = 2.62, p < .05$). The proportion of the total effect of combat exposure that was mediated by exposure to intervening stressful events was 16%. These results indicate that combat exposure had a direct effect on Time 2 PTSD symptomatology, and that intervening stressors served as a partial mediator of this effect.

Predictors of change in depression symptomatology. The regression analyses predicting Time 2 depression scores also indicated a lack of a moderating effect as the Combat Exposure × Coping interaction did not achieve statistical significance. After controlling for autoregressive effects ($pr = .47, p < .001$) and the control variables, the remaining Time 1 predictors together accounted for an additional 2% of the variance in Time 2 depression scores. Significant predictors included combat exposure ($pr = .08, p < .05$) and approach-based coping ($pr = -.10, p < .01$). The final model including intervening stressors accounted for 32% of the variance in Time 2 depression scores (7% controlling for the effects of autoregression and controls). Significant predictors included approach-based coping ($pr = -.10, p < .01$) and intervening life stressors ($pr = .23, p < .001$). Combat exposure ($pr = .05$) was no longer a significant predictor of depression scores after controlling for the effect of intervening stressors.

To examine whether intervening stressors mediated the relationships between changes in depression symptom scores and either coping or combat exposure, we first examined whether the latter two variables predicted intervening stressors. When controlling for the significant effects of Time 1 depression scores ($pr = .16, p < .001$), completing surveys by phone ($pr = .13, p < .001$), gender ($pr = .09, p < .05$) and the remaining Time 1 variables, none of which were significant, combat exposure ($pr = .13, p < .001$) but not coping ($pr = .02$, *ns*) significantly predicted intervening stressors. As combat exposure passed our first test of mediation by intervening stressors, we examined the effects of combat exposure on change in depression scores before ($pr = .08, p < .05$) and after ($pr = .05$, *ns*) the variable of intervening stressors was added into the model. This difference represented a significant drop in predictive power ($z = 3.28, p < .05$). The proportion of the total effect of combat exposure on Time 2 depression scores that was mediated by intervening stressors was 36%. These results indicate that intervening stressors mediated the effect of combat exposure on change in depression symptomatology with no direct effect of combat exposure.

Discussion

In this study, we examined the effects of method of coping with combat-related stress during the Gulf War on symptomatology both cross-sectionally and longitudinally. As predicted, individuals who used higher percentages of approach-based coping strategies to deal with combat-related stress reported lower levels of psychological symptoms both immediately on return from the Gulf region and 18 to 24 months later. These data suggest that soldiers who actively attempt to cope with combat-related stress during a war by analyzing and making efforts to solve the problem, seeking guidance and support from others, and positively reappraising the situation fared better initially and in the long run than those who coped by avoiding thinking about the situation, getting involved with distracting activities, letting off emotional steam, or resigning themselves to the situation.

On soldiers' return from the Gulf region, women and those who reported higher levels of combat exposure tended to have higher levels of PTSD and depression symptomatology. Increased use of approach-based coping strategies to deal with combat-related stress was associated with lower levels of depression symptomatology. However, in predicting PTSD symptoms, combat exposure moderated this relationship such that the effects of method of coping with combat-related stress was dependent on the level of combat exposure experienced. Use of relatively more approach-based coping was associated with lower levels of PTSD symptoms for all respondents. Nonetheless, the use of approach-based coping strategies appeared to be most effective in producing lower levels of PTSD symptoms for those who reported higher levels of combat exposure. This finding is consistent with the general coping liter-

ature in which coping has a greater impact at higher levels of stress (Holahan & Moos, 1990, 1991; Parkes, 1990). Interestingly, level of combat exposure did not moderate the effects of coping on Time 1 depression symptoms and there were no moderating effects on changes in symptomatology over time. The absence of a moderating effect on Time 1 depression symptoms, combined with a large direct effect of coping, suggests that the level of stress experienced by our respondents may have been high enough for method of coping to influence depression symptoms at all levels of combat encountered.

In contrast to the mixed findings for moderating effects, the relationship between resources and both PTSD and depression symptoms at Time 1 was mediated by greater use of approach-based coping strategies. Higher levels of resources (active duty status as opposed to Reserve or National Guard, being older, and being an officer) were associated with use of relatively more approach-based coping strategies, which in turn predicted lower levels of both PTSD and depression symptoms. These findings are consistent with prior literature suggesting that when stress is high (Holahan & Moos, 1990, 1991) and/or controllable (Valentiner et al., 1994), resources may allow for more effective coping strategies which in turn alleviate the effects of stress. Although all three of our resources predicted depression symptoms, it was only officer status that predicted PTSD symptoms. Officer status was also the resource most highly associated with coping, suggesting that these individuals may be more prepared to deal with the stressors of combat. These individuals may be better trained, may come into the military with greater personal resources, and/or have increased control in combat situations allowing them to make use of coping strategies unavailable to subordinates. The fact that individuals called to the Gulf region from active duty status also used more effective coping mechanisms supports the notion that increased training or readiness may be instrumental in the accessibility of approach-based coping strategies in combat situations. It is unclear why resources were differentially predictive of the two types of symptoms. This finding does suggest, however, that there may be different risk and protective factors for symptoms of depression and PTSD. Nonetheless, the overall importance of resources both in predicting coping and coping's effect on symptomatology suggests the potential value of training military personnel in more active methods of coping with war zone stress to aid in the prevention of some combat-related disorders.

Although the cross-sectional analyses did not allow us to examine mechanisms by which coping was associated with Time 1 symptoms, existing literature permits speculation about the nature of these effects. It is possible that the success of coping efforts during the war led to a reduction in the level of subsequent stressors that could secondarily increase perceived control and self-efficacy. Furthermore, acting effectively to reduce a stressor is likely to be associated with less guilt about failure to act, a symptom which is often reported among combat veterans (e.g., Kubany, Abueg, Kilauano, Manke, & Kaplan, 1997; Kubany et al., 1995). Also, the use of more approach-based coping may be associated with using less avoidance-based coping, and prior research has found avoidance-based coping to have deleterious effects (Santello & Leitenberg, 1993). Finally, the evidence suggesting that avoidance-based coping is linked to dissociation at the time of a traumatic event (Marmar et al., 1996), which is associated with increased levels of PTSD symptoms (Koopman et al., 1994; Marmar et al., 1994) and increased rates of PTSD diagnoses (Shalev et al., 1996), has lead to suggestions that dissociative features may prevent more complete processing and integration of the event with other experiences (Marmar et al., 1994; Shalev et al., 1996; Spiegel & Cardeña, 1991; van der Kolk & van der Hart, 1989).

The ways in which soldiers coped with combat-related stress during the Gulf War appeared to have an effect on further changes in psychological functioning 18 to 24 months after their homecoming. Degree of approach-based coping had a direct negative relationship with changes in depression symptomatology but not with changes in PTSD symptoms. This direct effect on change in level of depression persisted even after controlling for life stressors occurring since return from the war. In contrast, combat exposure had a direct impact on changes in PTSD symptoms but not on changes in level of depression.

We had originally predicted that any effect of coping on changes in symptomatology might be due to continued use of more effective coping leading to exposure to fewer intervening stressors. However, coping was not related to exposure to future stressful events. Thus, a different explanation for the relationship between coping and change in depression symptoms must be sought. Perhaps earlier methods of coping are related to similar types of later coping when encountering subsequent stressful events. This could be due to dispositional styles of coping, an increase in self-efficacy associated with memories of successful earlier coping efforts, or other unmeasured factors.[2] Future longitudinal studies could examine the mechanisms by which coping exerts an effect on depression symptoms over time. In contrast to these findings, we found no long-term effects of coping on changes in PTSD symptoms.

Although combat stress was positively associated with both types of symptoms measured at Time 1, after controlling for number of life stressors occurring since return from the war, only change in PTSD symptomatology was predicted by level of combat exposure. This difference in effects on change, along with the aforementioned finding that coping only had an effect on changes in depression symptoms, suggests that symptoms of PTSD and depression may be precipitated by different factors, providing some support for discriminant validity. These differences in effects across the two types of symptoms over time makes sense if PTSD symptoms occur in response to both distal and more proximal stressors, whereas depression symptoms are primarily associated with more proximal stressful events.

Another interesting outcome of this study was that soldiers who reported higher levels of combat exposure also tended to report more life stressors occurring after their homecoming. This finding lends further support for the proposition that trauma leads to more trauma (Bremner, Southwick, & Charney, 1995; L. A. King et al., 1998). Furthermore, our finding demonstrating that exposure to a group event (combat) is associated with later exposure to unrelated, more personal stressors does not support the hypothesis that dispositional factors are responsible for this relationship (see Footnote 2). The two types of Time 1 symptomatology assessed were related to both combat exposure and to intervening life stressors, suggesting that earlier symptoms may somehow place individuals at risk for exposure to subsequent life stressors. Contrary to expectations, there was no association between approach-based coping with combat-related stress and subsequent exposure to life stressors. Thus, our data do not

[2] We thank an anonymous reviewer for making this point.

suggest that coping mediates relationships between earlier symptomatology or stress and subsequent stress exposure.

The present study has a number of strengths over existing work in this area. Prior work (e.g., Valentiner et al., 1994) has suggested that the type of stressor is associated with differences in response to coping efforts. We were able to exert some degree of control over the type of stressor by focusing on respondents who listed a combat-related event as the most stressful experience during the Gulf War. Respondents completed the measure of coping very soon after the event, and we used a prospective design to examine the effects of coping during the war on change in psychological functioning over time.

However, as is characteristic of almost all studies in the trauma field, we are limited by our lack of information about preexposure baseline functioning. Furthermore, the use of a large sample size, although a strength, precluded the use of nonself-report measures. Retrospective self-report methods such as those used in the present study always present some threat to internal validity and temper the certainty of conclusions that can be drawn (Cook & Campbell, 1979). Moreover, our control over the type of stressor necessarily limits our conclusions to the effects of coping with the types of combat and other life-threatening stressors that occurred during the Gulf War. Likewise, our sample differed in a number of ways from the larger Gulf War forces, and as such, conclusions may not be generalizable even to this larger group. Future research should examine these processes in other populations. Although our significant findings were generally in the predicted directions, many of our effect sizes, especially for mediating hypotheses, were small; thus results should be interpreted with some caution.

Numerous studies have documented the importance of the time interval between stress exposure and assessment in predicting symptomatology (Saigh, 1988). As we did not assess the time interval between stress exposure and initial assessment, we were unable to control for the effects of this variable. However, we did use the time interval between Time 1 and Time 2 assessments as a control variable in the analyses predicting Time 2 symptomatology, and this variable was not a significant predictor of changes in either PTSD or depression symptomatology. Future studies examining the effects of particular stressors over time should be sure to include this variable.

Finally, the coping measure we used was developed using community samples and thus may not be entirely applicable to combat-related stressors. Although most items (e.g., "Did you tell yourself things to make yourself feel better?") seem applicable in almost any situation, including combat, other items (e.g., "Did you spend more time in recreational activities?") are less likely to be available methods of coping during deployment, and some (e.g., "Did you make a plan of action and follow it?") may be available methods of coping for officers but less so for enlisted personnel. Ideally, future studies should derive coping measures specifically geared to index events. Alternatively, the relevance of existing coping items could be considered to enhance generalizability.

Despite some weaknesses, this study was able to demonstrate an effect of coping during combat on changes in functioning using a prospective design and to suggest factors that may enhance the ability to use effective methods of coping in these situations. We believe that these findings call not only for further study of the effects of coping during combat and other stressful situations but also for the examination of how military personnel and others likely to be exposed to trauma can be trained to engage in more active methods of coping during these very stressful events. Future work could also examine how individuals perceive the effectiveness of coping methods, which might provide more information about the ways in which approach-based coping is associated with longer term functioning. Finally, additional information about the controllability of the particular stressor may allow for the identification of discrete groups for whom different methods of coping may be more likely to enhance psychological outcome.

References

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

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.

Billings, A. G., & Moos, R. H. (1984). Coping, stress, and social resources among adults with unipolar depression. *Journal of Personality and Social Psychology, 46,* 877–891.

Bremner, J. D., Southwick, S. M., & Charney, D. S. (1995). Etiological factors in the development of posttraumatic stress disorder. In C. M. Mazure (Ed.), *Does stress cause psychiatric illness?* (pp. 149–185). Washington, DC: American Psychiatric Press.

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues.* Chicago: Rand McNally.

Derogatis, L. R. (1993). *Brief symptom inventory: Administration, scoring and procedures manual* (3rd ed.). Minneapolis, MN: National Computer Systems.

Derogatis, L. R., & Spencer, P. M. (1982). *Brief symptom inventory: Administration, scoring and procedures manual-I.* Baltimore: Clinical Psychometric Research.

Falsetti, S. A., Resnick, H. S., Kilpatrick, D. G., & Freedy, J. R. (1994). A review of the "Potential Stressful Events Interview": A comprehensive assessment instrument of high and low magnitude stressors. *The Behavior Therapist, 17,* 66–67.

Florian, V., Mikulincer, M., & Taubman, O. (1995). Does Hardiness contribute to mental health during a stressful life situation? The roles of appraisal and coping. *Journal of Personality and Social Psychology, 68,* 687–695.

Foa, E. B., Zinbarg, R., & Rothbaum, B. O. (1992). Uncontrollability and unpredictability in posttraumatic stress disorder: An animal model. *Psychological Bulletin, 112,* 218–238.

Folkman, S., & Lazarus, R. S. (1991). Coping and emotion. In A. Monat & R. S. Lazarus (Eds.), *Stress and coping: An anthology* (3rd ed., pp. 207–227). New York: Columbia University Press.

Gallops, M., Laufer, R. S., & Yager, T. (1981). The combat scale revised. In A. Egendorf, C. Kadushin, R. S. Laufer, G. Rothbart, & L. Sloan (Eds.), *Legacies of Vietnam: Comparative adjustment of veterans and their peers* (Part III, Appendix I, pp. 125–129). New York: Center for Policy Research.

Goodman, L. A. (1960). On the exact variance of products. *Journal of the American Statistical Association, 55,* 708–713.

Haley, W. E., Levine, E. G., Brown, S. L., & Bartolucci, A. A. (1987). Stress, appraisal, coping, and social support as predictors of adaptational outcome among dementia caregivers. *Psychology and Aging, 2,* 323–330.

Holahan, C. J., & Moos, R. H. (1987). The personal and contextual determinants of coping strategies. *Journal of Personality and Social Psychology, 52,* 946–955.

Holahan, C. J., & Moos, R. H. (1990). Life stressors, resistance factors, and improved psychological functioning: An extension of the stress resistance paradigm. *Journal of Personality and Social Psychology, 58,* 909–917.

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.

Kessler, R. (1997). The effects of stressful life events on depression. *Annual Review of Psychology, 48,* 191–214.

King, D. W., King, L. A., Foy, D. W., & Gudanowski, D. M. (1996). Prewar factors in combat-related posttraumatic stress disorder: Structural equation modeling with a national sample of female and male Vietnam veterans. *Journal of Consulting and Clinical Psychology, 64,* 520–531.

King, L. A., King, D. W., Fairbank, J. A., Keane, T. M., & Adams, G. A. (1995, November). *Coping, social support, and additional stressors in predicting combat-related PTSD.* Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, Boston, MA.

King, L. A., King, D. W., Fairbank, J. A., Keane, T. M., & Adams, G. (1998). 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, 74,* 420–434.

Koopman, C., Classen, C., & Spiegel, D. (1994). Predictors of posttraumatic stress symptoms among survivors of the Oakland/Berkeley, Calif., firestorm. *American Journal of Psychiatry, 151,* 888–894.

Kubany, E. S., Abueg, F. R., Kilauano, W. L., Manke, F. P., & Kaplan, A. S. (1997). Development and validation of the Sources of Trauma-Related Guilt Survey—War-Zone Version. *Journal of Traumatic Stress, 10,* 235–258.

Kubany, E. S., Abueg, F. R., Owens, J. A., Brennan, J. M., Kaplan, A. S., & Watson, S. B. (1995). Initial examination of a multidimensional model of guilt: Applications to combat veterans and battered women. *Journal of Psychopathology and Behavioral Assessment, 17,* 353–376.

Kulka, R. A., Schlenger, W. E., Fairbank, J. A., Hough, R. L., Jordan, B. K., Marmar, C. R., & Weiss, D. S. (1990). *Trauma and the Vietnam War generation: Report of findings from the National Vietnam Veterans Readjustment Study.* New York: Brunner/Mazel.

Leitenberg, H., Greenwald, E., & Cado, S. (1992). A retrospective study of long-term methods of coping with having been sexually abused. *Child Abuse and Neglect, 16,* 399–407.

MacKinnon, D. P., Warsi, G., & Dwyer, J. H. (1995). A simulation study of mediated effect measures. *Multivariate Behavioral Research, 30,* 41–62.

Marmar, C. R., Weiss, D. S., Metzler, T. J., & Delucchi, K. (1996). Characteristics of emergency services personnel related to peritraumatic dissociation during critical incident exposure. *American Journal of Psychiatry, 153 (Suppl.),* 94–102.

Marmar, C. R., Weiss, D. S., Schlenger, W. E., Fairbank, J. A., Jordan, B. K., Kulka, R. A., & Hough, R. L. (1994). Peritraumatic dissociation and posttraumatic stress in male Vietnam theater veterans. *American Journal of Psychiatry, 151,* 902–907.

Monat, A., & Lazarus, R. S. (1991). Stress and coping: Some current issues and controversies. In A. Monat & R. S. Lazarus (Eds.), *Stress and coping: An anthology,* (3rd ed., pp. 1–15). New York: Columbia University Press.

Moos, R. (1990). *Coping Responses Inventory Manual.* Palo Alto, CA: Stanford University and Department of Veterans Affairs Medical Centers.

Moos, R. H., & Billings, A. G. (1993). Conceptualizing and measuring coping resources and processes. In L. Goldberger & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects* (2nd ed., pp. 212–230). New York: Free Press.

Moos, R. H., Brennan, P. L., Fondacaro, M. R., & Moos, B. S. (1990). Approach and avoidance coping responses among older problem and nonproblem drinkers. *Psychology and Aging, 5,* 31–40.

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.

Parkes, K. R. (1990). Coping, negative affectivity, and the work environment: Additive and interactive predictors of mental health. *Journal of Applied Psychology, 75,* 399–409.

Resick, P. A. (1988). *Reactions of female and male victims of rape or robbery* (Final report, Grant 85-IJ-CX-0042). Washington, DC: National Institute of Mental Health.

Saigh, P. A. (1988). Anxiety, depression, and assertion across alternating intervals of stress. *Journal of Abnormal Psychology, 97,* 338–342.

Santello, M. D., & Leitenberg, H. (1993). Sexual aggression by an acquaintance: Methods of coping and later psychological adjustment. *Violence and Victims, 8,* 91–104.

Shalev, A. Y., Peri, T., Canetti, L., & Schreiber, S. (1996). Predictors of PTSD in injured trauma survivors: A prospective study. *American Journal of Psychiatry, 153,* 219–225.

Solomon, Z., Mikulincer, M., & Flum, H. (1988). Negative life events, coping responses, and combat-related psychopathology: A prospective study. *Journal of Abnormal Psychology, 97,* 302–307.

Spiegel, D., & Cardeña, E. (1991). Disintegrated experience: The dissociative disorders revisited. *Journal of Abnormal Psychology, 100,* 366–378.

Sutker, P. B., & Allain, A. N. (1996). Assessment of PTSD and other mental disorders in World War II and Korean Conflict POW survivors and combat veterans. *Psychological Assessment, 8,* 18–25.

Sutker, P. B., Davis, J. M., Uddo, M., & Ditta, S. R. (1995). War zone stress, personal resources, and PTSD in Gulf War returnees. *Journal of Abnormal Psychology, 104,* 444–452.

Ullman, S. E., & Siegel, J. M. (1994). Predictors of exposure to traumatic events and posttraumatic stress sequelae. *Journal of Community Psychology, 22,* 328–338.

Valentiner, D. P., Foa, E. B., Riggs, D. S., & Gershuny, B. S. (1996). Coping strategies and posttraumatic stress disorder in female victims of sexual and nonsexual assault. *Journal of Abnormal Psychology, 105,* 455–458.

Valentiner, D. P., Holahan, C. J., & Moos, R. H. (1994). Social support, appraisals of event controllability, and coping: An integrative model. *Journal of Personality and Social Psychology, 66,* 1094–1102.

van der Kolk, B. A., & van der Hart, O. (1989). Pierre Janet and the breakdown of adaptation in psychological trauma. *American Journal of Psychiatry, 146,* 1530–1540.

Weisenberg, M., Schwarzwald, J., Waysman, M., Solomon, Z., & Klingman, A. (1993). Coping of school-age children in the sealed room during scud missile bombardment and postwar stress reactions. *Journal of Consulting and Clinical Psychology, 61,* 462–467.

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

Wolfe, J., Erickson, D. J., Sharkansky, E. J., King, D. W., & King, L. A. (1999). Course and predictors of posttraumatic stress disorder among Gulf War veterans: A prospective analysis. *Journal of Consulting and Clinical Psychology, 67,* 520–528.

Wolfe, J., Keane, T. M., Kaloupek, D. G., Mora, C. A., & Wine, P. (1993). Patterns of positive readjustment in Vietnam combat veterans. *Journal of Traumatic Stress, 6,* 179–193.

Wolfe, J., Sharkansky, E. J., Read, J. P., Dawson, R., Martin, J. A., & Ouimette, P. C. (1998). Sexual harassment and assault as predictors of PTSD symptomatology among U.S. female Gulf War military personnel. *Journal of Interpersonal Violence, 13,* 40–57.

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