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## Seeing the silver lining: potential benefits of trauma exposure in college students

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In the current study we compare college students exposed to a potentially traumatic event (PTE) meeting self-report criteria for Posttraumatic Stress Disorder (PTSD), PTE-exposed students not meeting criteria for PTSD, and non-exposed students on measures of perceived social support, self-esteem, and optimism (i.e., personal resources) and report use of specific coping strategies. Results indicate that the PTE-exposed/probable PTSD group reported fewer personal resources, greater use of avoidance-focused coping, and less use of approach-focused coping than the other two groups. The PTE-exposed/no PTSD group reported greater perceived social support and less use of avoidance-focused coping than the non-exposed group. We discuss the findings' implications for the prevention and treatment of trauma-related psychopathology.

**Keywords:** trauma; coping; resilience; PTSD

The estimated lifetime prevalence of exposure to a potentially traumatic event (PTE) in college students ranges from 67% to 85% (Moser, Hajcak, Simons, & Foa, 2007; Schnider, Elhai, & Gray, 2007; Smyth, Hockemeyer, Heron, Wonderlich, & Pennebaker, 2008). Of students who report PTE exposure, approximately 10% meet probable or definite criteria for a current diagnosis of Posttraumatic Stress Disorder (PTSD; Moser et al., 2007; Schnider et al., 2007; Smyth et al., 2008) and suffer from debilitating symptoms defined by re-experiencing, avoidance, and physiological hyper-arousal that markedly impair general functioning (Nemeroff et al., 2006). These prevalence rates are somewhat higher than those reported in epidemiological studies of the normal population (i.e., 6–7%; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993), likely reflecting the disproportionately large number of women enrolled in college (Goldin, Katz, & Kuziemko, 2006). In general, however, these rates underscore the fact that most PTE-exposed individuals do not develop PTSD.

As several researchers have pointed out, the widespread resistance to trauma-related psychopathology implies a human capacity for psychological immunity that

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when uninhibited promotes wellness and healing in spite of adversity (Bonanno, Field, Kovacevic, & Kaltman, 2002; Gilbert, Lieberman, Morewedge, & Wilson, 2004; Kelley, 2005). This notion emerges in research on resilience and posttraumatic growth (PTG), two related but arguably different constructs. While resilience is defined as "... a stable trajectory of healthy functioning in both personal and interpersonal spheres across time [and despite PTE-exposure]" (Westphal & Bonanno, 2007, p. 420), PTG is described as an enhanced perception of self and understanding of one's place in the world, a more profound sense of life meaning, improved coping skills, and a stronger sense of connectedness with others following PTE exposure (Tedeschi & Calhoun, 2004). Thus, while resilience implies no change despite disruption, PTG implies gains, above and beyond what existed prior to the trauma (Tedeschi & Calhoun, 2004; Zoellner & Maercker, 2006). PTG is theorized by some to emerge from individuals' attempts to compensate for the loss of, or threat to, resources by adding to or replacing them, or by realizing personal resources and coping abilities they may not have known they had (Fontana & Rosenheck, 1998). Despite the richness of relevant theory, however, measurement of PTG is problematic, with self-report measures in particular plagued with weak validity (Frazier et al., 2009). This may help explain the mixed findings regarding the relationship between PTSD and PTG (Zoellner & Maercker, 2006).

Hobfoll's (1989) Conservation of Resources (COR) theory explains positive and negative responses to trauma as the gain or loss of resources, respectively. According to COR theory, trauma exposure precipitates resource loss, including external resources (e.g., transportation, health care), as well as internal or psychological resources (e.g., self-efficacy, sense of humor; Hobfoll, 1989). Research has shown that resource loss has a positive relationship with trauma-related psychopathology over and above the effect of trauma exposure alone (Hobfoll, 2001). In addition, evidence suggests that this relationship is negatively mediated by subsequent resource gain, which might be accomplished by replacing the loss or substituting the resource with one of greater or equal value (Hobfoll, 2001). An extension of this theory, Baltes and Baltes's (1990) theory of Selective Optimization with Compensation proposes that resource loss compels individuals to first attempt to optimize or enhance their remaining resources, then if unsuccessful, compensate for the loss through acquisition of new resources (Hobfoll, 2001).

These efforts, however, are costly and demand utilization of existing resources, and so individuals with sufficient resources may be proactive in terms of maintaining, acquiring, and enhancing resources, whereas those who lack resources may be more vulnerable to additional loss and deleterious consequences (Hobfoll, 2001). Moreover, it is theorized that individuals who successfully recover from resource loss following a stressful event may have established stronger resources, including coping strategies, than those who have not experienced resource loss (Aldwin, Sutton, & Lachman, 1996; Hobfoll, 2001; Meichenbaum & Deffenbacher, 1988). In contrast, multiple losses can generate what Hobfoll (1989) calls a "loss spiral," which accelerates the loss of resources and impending detriment.

In light of these theories, it would be interesting to compare PTE-exposed individuals who did not develop PTSD to non-exposed individuals. Although trauma control subjects have been included in numerous studies of PTSD, few report on the differences between PTE-exposed individuals who appear healthy vs. non-exposed individuals. These limited studies, however, largely report non-significant differences

between PTE-exposed/non-PTSD and non-exposed individuals on such variables as perceived self-efficacy (Saigh, Mroueh, Zimmerman, & Fairbank, 1995) and self-concept (Saigh, Yasik, Oberfield, Halamandaris, & McHugh, 2002), internalizing and externalizing problems (Saigh et al., 2002), and negative affect (Grasso et al., 2009). Although these comparisons suggest no advantage to PTE exposure, the constructs examined are limited and may not reflect the qualities we might expect PTE-exposed, resilient individuals to excel on or possess more of.

Unlike individuals never exposed to potential trauma, these individuals' perceptions of the self and world are critically challenged by new information generated by the stressful event. While PTE-exposed individuals who develop PTSD succumb to new information that either shatters particularly rigid perceptions that the self is wholly competent and the world entirely safe, or validates rigid perceptions that the self is wholly incompetent and the world entirely unsafe, resilient individuals maintain flexible knowledge structures that can accommodate new information from a traumatic experience (Foa & Cahill, 2001). Thus, resilient individuals effectively manage the intense cognitive and emotional demands put forth by the traumatic event. This process may involve recruitment and development of new, or realization and reinforcement of existing, resources (Hobfoll, 2001; Taylor & Stanton, 2007). Relative to individuals who have never had to respond to such demands, it is plausible that resilient individuals might show enhanced resources and healthy coping. Hobfoll's (2001) COR theory and other theories (e.g., Meichenbaum & Deffenbacher, 1988; Updegraff & Taylor, 2000) are consistent with this notion and suggest that individuals who experience a significant life stressor and resource loss, but then are proactive in establishing a strong reserve of resources (e.g., personal, social, coping strategies), may partially inoculate themselves against other major stressors.

Personal resources that have been associated with resiliency include perceived social support, self-esteem, and dispositional optimism. Low perceived social support has been identified as the strongest predictor of PTSD in two meta-analyses (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003) and may contribute to an individual's (in)ability to regulate intense emotions associated with the PTE (Charuvastra & Cloitre, 2008). Global self-esteem, defined as an attitude toward the self as competent and worthy of respect and acceptance (Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995), has been negatively associated with PTSD (Adams & Boscarino, 2006; Sutker, Corrigan, Sundgaard-Riise, Uddo, & Allain, 2002) and shown to predict psychological well-being more generally (Rosenberg et al., 1995). Finally, self-esteem and optimism are key elements in the personality construct of hardiness, which reflects the tendency to perceive life events as manageable, and challenges as opportunities for growth, and is associated with lower rates of PTSD following combat (Ginzburg, Solomon, Kekel, & Neria, 2003; Vogt, Rizvi, Shepherd, & Resick, 2008; Whealin, Ruzek, & Southwick, 2008).

Use of specific coping strategies is another variable that influences reactions to traumatic events (Schnider et al., 2007). Coping strategies have been described as approach-focused and avoidance-focused (Folkman & Moskowitz, 2004; Taylor & Stanton, 2007). Approach-focused coping strategies involve advancing toward the source or are action-oriented, whereas avoidance-focused strategies are aimed at evading the problem (e.g., distraction; Littleton, Horsley, John, & Nelson, 2007). Research has shown that while avoidance-focused strategies may prove beneficial

when a stressor is short term or unpredictable (e.g., waiting for test results), they are maladaptive in the long term and are associated with greater symptoms of depression, anxiety, and stress sensitivity (Taylor & Stanton, 2007), as well as posttraumatic stress (King, King, Foy, Keane, & Fairbank, 1999; Schnider et al., 2007). Avoidance is thought to impede one's ability to reconcile new information from the PTE with preexisting beliefs and subsequent experiences, and to perpetuate the association between trauma-related stimuli and the fear response (Whealin et al., 2008). In contrast, though less consistent, research has shown that approach-focused coping strategies are associated with long-term physical and psychological health benefits (Taylor & Stanton, 2007). Further, exposure-based treatments for PTSD and other anxiety disorders embrace approach-focused strategies – combating avoidance – and incorporate them into treatment modules and encourage clients to utilize them outside of sessions (Cahill, Rothbaum, Resick, & Follette, 2009).

In sum, there is a large literature linking personal resources and coping strategies to psychological outcomes following PTE exposure. Unlike risk/protective factors that are static (e.g., gender, race, age, history of mental illness), these sociocognitive-behavioral factors are malleable and dynamic, capable of influencing and being influenced by external events. The interactive nature of these factors implies that the PTE itself may bolster personal resources and healthy coping in some individuals, such that they transcend those of individuals never exposed to that level of stress. We were interested in examining PTE-exposed/non-PTSD and non-exposed individuals on measures of personal resources and coping strategies to identify potential benefits of PTE exposure. As part of a larger prospective study of undergraduate students' stress and coping, we examined several personal resources and coping strategies among three categories of students: (1) those reporting exposure to a range of PTEs and meeting self-reported diagnostic criteria for PTSD; (2) PTE-exposed students not meeting criteria for PTSD; and (3) non-exposed students. To evaluate personal resources, we administered measures of perceived social support, self-esteem, and optimism. To evaluate coping strategies, we administered a measure that assessed participants' use of various coping strategies for a significant stressful life event.

We hypothesized that the probable PTSD group would report greater use of avoidance-focused coping strategies (i.e., self-distraction, denial, substance use, behavioral disengagement, self-blame) and less use of approach-focused coping strategies (i.e., active coping, emotional support, instrumental support, religion, venting, acceptance, planning, humor, positive reframing) compared to the PTE-exposed/non-PTSD and non-exposed groups. Secondly, we were interested in comparing the PTE-exposed/non-PTSD and non-exposed groups to see if they would be similar on measures of personal resources and coping strategies, as some research would suggest (Saigh et al., 2002), or if the PTE-exposed/non-PTSD group would show enhanced resources and more adaptive coping strategy use (Hobfoll, 2001; Tedeschi & Calhoun, 2004).

## **Method**

### ***Participants and procedure***

Participants were 3119 undergraduate college students from a mid-size university in the mid-Atlantic region (45.4% women, 34.47% men, 20.14% unknown). These

students were recruited during a span of 6 years (2002–2008). Their ages ranged from 18 to 21 ( $M = 18.52$ ,  $SD = .98$ ), and all were enrolled in an Introductory Psychology class and received course credit for their participation. The majority of participants classified themselves as European American (67.52%), followed by African American (3.46%), Hispanic (2.44%), Asian (2.34%), and other (1.76%). In addition, 22.48% did not indicate their racial identity. Participants completed a battery of questionnaires that required approximately 1 hour to complete. The majority of participants completed these questionnaires in large lecture halls (approximately 300 students per session) proctored by small groups of graduate and undergraduate research assistants, whereas the most recent cohort of students ( $n = 468$ ) completed these questionnaires at an Internet-accessible location of their choice using Qualtrics online survey software ([www.qualtrics.com](http://www.qualtrics.com)). Although these data were collected as part of an ongoing longitudinal study with follow-up occurring 2 years after initial assessment, only data collected at baseline are presented in the current study.

In addition to the 3119 participants mentioned earlier, there were 102 students who had excessive missing data on the measure used to establish groups [i.e., Posttraumatic Diagnostic Scale (PDS)], making it impossible to accurately categorize these participants. These participants were eliminated from the current analyses.

All questions on the survey presented the option to refuse to answer that question. This option, as well as some unintentional skipping of items, resulted in missing data. On any given measure, if missing data accounted for <15% of a participant's total for a particular scale, then the missing data points were replaced with that participant's mean on completed items on that scale. However, if missing data accounted for 15% or greater of the participant's total for that scale, then that participant's data were omitted from the analyses involving that scale.

## **Measures**

### *Posttraumatic Diagnostic Scale*

The PDS (Foa, 1995) is a 31-item self-report questionnaire measuring exposure to a broad range of PTEs and symptoms of posttraumatic stress with reference to the PTE identified as most bothersome. The PDS includes a list of 12 PTEs (i.e., serious accident, natural disaster, non-sexual assault by family or friend, non-sexual assault by stranger, sexual assault by family or friend, sexual assault by stranger, military combat, child sexual abuse, imprisonment, torture, life-threatening illness, and other trauma) and participants indicate whether they have ever lived through or personally witnessed any of the events during their lifetime. Next, participants are asked to choose the PTE that bothers them the most and respond to items regarding symptoms experienced in the past month. Symptoms are measured on a 4-point Likert-type scale ranging from 0 (*not at all*) to 3 (*almost all the time*). The PDS has been widely used in the trauma and PTSD research literature. It has excellent internal and test–retest reliability as well as convergent validity with regards to other PTSD measures (Foa, Cashman, Jaycox, & Perry, 1997). Numerous studies support a symptom cut-off score of 15 for classification of probable PTSD (Brewin et al., 2002; Ehrling, Kleim, Clark, Foa, & Ehlers, 2007; Foa et al., 1997). Internal consistency (Cronbach's alpha) in the current sample was .92.

*Social Provisions Scale (SPS)*

The SPS (Cutrona & Russell, 1987) is a 24-item questionnaire measuring perceived social support. Each item is rated on a 5-point Likert-type scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). The SPS has good internal and test–retest reliability (Cutrona & Russell, 1987). Internal consistency (Cronbach’s alpha) in the current sample was .90.

*Rosenberg Self-Esteem Scale (RSES)*

The RSES (Rosenberg, 1965) is a 10-item questionnaire measuring self-esteem. Each item is rated using a 4-point Likert-type scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). The RSES has good internal and test–retest reliability and validity (Blascovich & Tomaka, 1991). Internal consistency (Cronbach’s alpha) in the current sample was .85.

*Life Orientation Test (LOT)*

The LOT (Scheier, Carver, & Bridges, 1994) is a five-item questionnaire measuring generalized optimism (vs. pessimism) using a 7-point Likert-type scale ranging from 0 (*strongly disagree*) to 6 (*strongly agree*). Internal and test–retest reliability are good and convergent validity is indicated via significant correlations with constructs, such as depression, hopelessness, self-esteem, and perceived stress (Scheier et al., 1994). Internal consistency (Cronbach’s alpha) in the current sample was .79.

*Brief COPE Inventory*

The Brief COPE (Carver, 1997) is a shortened version of the original COPE questionnaire (Carver, Scheier, & Weintraub, 1989), with 14 two-item subscales reflecting a variety of coping strategies. Specifically, the Brief COPE includes subscales for (1) active coping; (2) planning; (3) instrumental support; (4) religion; (5) venting; (6) positive reframing; (7) humor; (8) acceptance; (9) emotional support; (10) self-distraction; (11) denial, (12) behavioral disengagement; (13) self-blame; and (14) substance use. Each item is rated on a 4-point scale (1 = *not at all*, 4 = *a lot*). The Brief COPE has good test–retest reliability and validity (Cooper, Katona, & Livingston, 2008). In the current study, the internal consistency (Cronbach’s alpha) of the subscales ranged from .64 (venting) to .91 (substance use).

Although the COPE scales were intended to be examined independently (Carver, 1997), research suggests that the scales for self-distraction, denial, behavioral disengagement, self-blame, and substance use capture avoidant coping, whereas the scales for active coping, planning, instrumental support, religion, venting, positive reframing, humor, acceptance, and emotional support capture approach coping, broadly defined (Kershaw, Northouse, Kritpracha, Schafenacker, & Mood, 2004; Oxman, Hegel, Hull, & Dietrich, 2008; Schnider et al. 2007). Participants were instructed to refer to their most stressful event in the past 2 years when rating the 28 COPE items. For 44.81% of the PTE-exposed sample, their most stressful event of the two past 2 years was the same as the PTE endorsed in the PDS.

### **Statistical analyses**

All analyses were conducted using SAS JMP Version 8.0.1 (SAS Institute Inc.). We used a PDS symptom score of 15 or greater to determine participants' PTSD status (Foa, 1995). Chi-square goodness-of-fit tests and independent groups *t*-tests were used to examine potential demographic differences between groups (PTE-exposed without PTSD vs. probable PTSD vs. non-exposed). To demonstrate the size of effects of chi-square tests, phi, or Cramer's phi if there were more than two levels in a variable, are reported, where .1 represents a small effect, .3 a medium effect, and .5 a large effect (Cohen, 1988). To demonstrate the size of effects of independent groups *t*-tests, Cohen's *d* values are reported, where .2 represents a small effect, .5 a medium effect, and .8 a large effect (Cohen, 1988).

Two multivariate analyses of variance (MANOVA) evaluated potential group differences on: (1) the three scales measuring personal resources (i.e., SPS, LOT, RSES) and (2) the 14 subscales of the Brief COPE. We conducted these two MANOVAs for three major reasons: (1) the specific variables in each of the two groups (personal resources, coping) are conceptually interrelated and (2) moderately intercorrelated (see Table 1); and (3) compared to a series of univariate ANOVAs, a MANOVA is a more conservative test in that Type 1 errors are minimized (Huberty & Morris, 1989). If a MANOVA was significant, subsequent one-way analyses of variance (ANOVA) were conducted to evaluate potential group differences on the individual measures. For ANOVAs revealing significant effects, three pairwise post-hoc comparisons (PTE-exposed without PTSD vs. probable PTSD; PTE-exposed without PTSD vs. non-exposed; and probable PTSD vs. non-exposed) were conducted using Hochberg's (1988) modified Step-Up Bonferroni procedure.<sup>1</sup> Omega-squared ( $\omega^2$ ) values are reported to demonstrate the size of effects in ANOVA models, where .02 represents a small effect, .13 a medium effect, and .26 a large effect (Cohen, 1988).

## **Results**

### **Descriptive statistics**

We compared the 102 recruited students who were eliminated from the study due to excessive missing data on the PDS, with the 3119 participants on the 17 dependent variables (3 personal resources and 14 coping strategies). Only one comparison was significant, with the former group scoring lower on positive reframing coping than the latter group ( $p < .001$ ).

In the three groups (PTE-exposed/no PTSD, probable PTSD, non-exposed), gender, ethnic identity, and age were comparable ( $p$ 's  $> .07$ ). Of the 3119 respondents, 49.92% reported experiencing at least one PTE. The four most frequent types of PTEs were (1) illness/death of a loved one (29.16%); (2) accident (27.17%; e.g., "was a passenger in a car accident that killed my friend"); (3) other (10.98%; e.g., "found a family friend dead on the bedroom floor after he died of a heart attack"); and (4) disaster (7.13%; e.g., home burned down).

Of the PTE-exposed students, 16.69% scored at or above the diagnostic cut-off of 15 on the PDS, meeting diagnostic criteria for PTSD (Foa, 1995). The mean PDS score of the group meeting diagnostic criteria for PTSD ( $M = 23.41$ ,  $SD = 7.71$ ) was significantly greater than that of the PTE-exposed group not meeting criteria ( $M = 3.66$ ,  $SD = 4.02$ ),  $t(1555) = 23.21$ ,  $p < .001$ ,  $d = 3.21$ . There were no significant

Table 1. Correlations among coping strategies and personal resources.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Optimism																
Self-esteem	0.57**															
Social support	0.37**	0.43**														
Self-distraction	-0	-0	0.07													
Active coping	0.01	0.02	0.06	0.29**												
Denial	-0.2	0.15	-0.1	0.24*	0.1											
Substance use	-0.2	-0.2	-0.2	0.19*	0.1	0.27**										
Emotional support	0.04	0.04	0.24*	0.42**	0.34**	0.24*	0.09									
Instrumental support	0.01	0.01	0.19*	0.4**	0.43**	0.2*	0.09	0.75**								
Behavioral disengagement	0.22*	0.25**	-0.22*	0.21*	0.04	0.35**	0.41**	0.05	0.08							
Venting	-0.1	-0.1	0.03	0.35**	0.35**	0.33**	0.27**	0.43**	0.49**	0.27**						
Positive reframing	0.05	0.04	0.05	0.3**	0.4**	0.11	0.1	0.32**	0.25**	0.06	0.22**					
Planning	-0	-0	0.03	0.3**	0.66**	0.13	0.13	0.35**	0.5**	0.13	0.4**	0.43**				
Humor	-0	-0	-0.1	0.17	0.24*	0.01	0.19*	0.07	0.17	0.16	0.27**	0.25**	0.28**			
Acceptance	0.06	0.07	0.08	0.28**	0.25**	-0.1	0.02	0.28**	0.28**	-0	0.26**	0.3**	0.27**	0.18		
Religion	0.05	0.02	0.02	0.19*	0.13	0.19*	0.04	0.23*	0.26**	0.07	0.16	0.25**	0.19*	0.03	0.16	
Self-blame	-0.21	-0.22*	-0.2	0.19*	0.28**	0.23*	0.29**	0.14	0.22*	0.4**	0.37**	0.19*	0.4**	0.28**	0.09	0.08

\* $p < .05$ , two-tailed; \*\* $p < .01$ , two-tailed.

differences between males and females in PTE exposure,  $\chi^2 = 1.09$ ,  $p = .296$ ,  $\phi = .02$  (47.01% vs. 43.41%, respectively), or in meeting self-reported criteria for PTSD within the PTE-exposed sample,  $\chi^2 = .458$ ,  $p = .498$ ,  $\phi = .01$  (16.67% vs. 19.11%, respectively).

The highest percentage of participants reported target PTEs that occurred more than 3 years ago (40.1%), followed by 6 months to 3 years ago (35.77%), and <6 months ago (24.13%). While the probable PTSD group was essentially evenly divided among these three time points (31.68% vs. 33.21% vs. 35.11%, respectively), the PTE-exposed/non-PTSD group had more traumas that occurred more than 3 years ago (41.82%), followed by 6 months to 3 years ago (36.29%), and <6 months ago (21.88%),  $\chi^2 = 20.76$ ,  $p < .0001$ ,  $\phi_c = .12$ . Students who reported a PTE occurring <6 months ago ( $M = 8.53$ ,  $SD = .44$ ) had higher symptom severity scores on the PDS than students who reported a PTE occurring 6 months to 3 years ago ( $M = 6.88$ ,  $SD = .36$ ) and more than 3 years ago ( $M = 6.11$ ,  $SD = .34$ ),  $F(2,1543) = 9.4$ ,  $p < .001$ ,  $\omega^2 = .02$ . The same model with group type (probable PTSD vs. no PTSD) added as an independent variable revealed a group type  $\times$  time point interaction,  $F(2,1540) = 4.65$ ,  $p = .01$ ,  $\omega^2 = .01$ . For the exposed/no PTSD group, PDS scores were lower for students who reported a PTE occurring more than 3 years ago ( $M = 3.39$ ,  $SD = .2$ ), relative to 6 months to 3 years ago ( $M = 3.91$ ,  $SD = .22$ ) and <6 months ago ( $M = 4.1$ ,  $SD = .28$ ). However, for the probable PTSD group, PDS scores were higher for students who reported a PTE occurring more than 3 years ago ( $M = 23.75$ ,  $SD = .52$ ), relative to 6 months to 3 years ago ( $M = 22.78$ ,  $SD = .51$ ) and <6 months ago ( $M = 22.07$ ,  $SD = .49$ ).

Finally, the probable PTSD group ( $M = 3.18$ ,  $SD = 2.22$ ) reported a greater number of PTEs than the PTE-exposed/non-PTSD group ( $M = 2.37$ ,  $SD = 1.44$ ),  $t(1555) = 7.51$ ,  $p < .0001$ ,  $d = .43$ . The number of reported PTEs was positively associated with PTSD symptom severity on the PDS,  $r(1555) = .22$ ,  $p < .0001$ . Examining the potential interaction between group type  $\times$  the number of reported PTEs in a linear regression analysis of PDS scores resulted in a non-significant finding ( $p = .992$ ).

### *Correlations among the study variables*

Table 1 presents the correlations among the personal resource and coping variables ( $n = 2513$ ). As is evident from this table, the three personal resources were moderately positively intercorrelated, but were not strongly correlated with the coping variables. The avoidance-focused coping strategies (e.g., behavioral disengagement, denial, substance use, and self-blame) were moderately positively intercorrelated. Similarly, the approach-focused coping strategies (e.g., emotional-support, active coping, instrumental support, positive reframing, and planning) were positively intercorrelated. Finally, in general, the avoidance-focused coping strategies were not significantly related to the approach-focused strategies.

### *Group differences in personal resources*

The MANOVA examining personal resources was statistically significant and group means on the three measures are presented in Table 2. A subsequent one-way ANOVA revealed that the groups significantly differed on perceived social support,

Table 2. Results of MANOVA comparing groups on personal resources.

	Non-exposed ( <i>n</i> = 1562)		Probable PTSD ( <i>n</i> = 264)		PTE-exposed/no PTSD ( <i>n</i> = 1293)		<i>F</i>	<i>p</i>	$\omega^2$
	<i>n</i>	M (SD)	<i>n</i>	M (SD)	<i>n</i>	M (SD)			
Personal Resources (Pillai's Trace approximate $F(6,5024) = 18.85, p < .0001$ )									
SPS <sup>abc</sup>	1246	54.62 (10.4)	209	50.11 (12.99)	1062	56.48 (8.66)	37.9	<.001	.04
RSES <sup>ab</sup>	1248	27.36 (7.77)	208	23.71 (6.68)	1062	28.9 (7.85)	36.12	<.001	.05
LOT <sup>ab</sup>	1248	14.76 (4.99)	208	12.48 (5.3)	1062	15.01 (4.91)	29.46	<.001	.02

Note: *n* sizes in parentheses are the total number of possible participants in each group. SPS, Social Provisions Scale; RSES, Rosenberg Self-Esteem Scale; LOT, Life Orientation Test; PTE, potentially traumatic event; PTSD, Posttraumatic Stress Disorder.

<sup>a</sup>Probable PTSD significantly differs from non-exposed per Hochberg post-hoc tests.

<sup>b</sup>Probable PTSD significantly differs from PTE-exposed/no PTSD per Hochberg post-hoc tests.

<sup>c</sup>PTE-exposed/no PTSD significantly differs from non-exposed per Hochberg post-hoc tests.

such that the PTE-exposed/non-PTSD group reported significantly greater support than the non-exposed group, who reported significantly greater support than the probable PTSD group. Additional subsequent ANOVAs indicated that the PTE-exposed/non-PTSD group and the non-exposed group each had significantly higher self-esteem and optimism scores than the probable PTSD group (see Table 2).

To establish that differences in the reported length of time of the PTE were not a significant source of variance in the model, a subsequent MANOVA was conducted with PTE time (<6 months vs. 6 months to 3 years vs. >3 years), group type (PTE-exposed/non-PTSD vs. probable PTSD), and group type  $\times$  PTE time as between-subject variables and the three personal resources (perceived support, self-esteem, and optimism) as dependent variables. The main effect for group type remained significant,  $F(3,1251) = 36.79, p < .0001, \omega^2 = .02$ , while the main effect for PTE time and the group type  $\times$  PTE time interaction were both non-significant ( $p$ 's  $> .83$ ).

To examine the role of the number of reported PTEs in personal resource differences between the two groups exposed to PTEs (PTE-exposed/non-PTSD and probable PTSD), we conducted three linear regression analyses, with each one predicting a personal resource variable (perceived support, self-esteem, optimism). In each analysis, the predictor variables were (1) the number of reported PTEs; (2) group type (PTE-exposed/ non-PTSD = 0; probable PTSD = 1); and (3) the  $a \times b$  interaction. For both perceived support and optimism, the only significant effects were main effects for group type ( $p$ 's  $< .0001$ ), with the non-PTSD group scoring higher than the probable PTSD group on both personal variables. For self-esteem, both group type ( $p < .0001$ ) and the number of reported PTEs ( $p < .05$ ) had significant main effects. Specifically, the non-PTSD group scored higher than the probable PTSD group on self-esteem. In addition, the number of reported PTEs was a positive predictor of self-esteem. The  $a \times b$  interaction variables were non-significant,  $p$ 's  $> .30$ .

### **Group differences in coping strategies**

There were no significant group differences among the PTE-exposed participants in whether the most stressful event in the past 2 years on the COPE was the PTE or a different stressful event,  $\chi^2 = .89, p < .153, \phi_c = .01$ . Results of the Brief COPE MANOVA and group means on the specific coping scales are presented in Table 3. Subsequent one-way ANOVAs revealed that the probable PTSD group reported significantly greater use of self-distraction, denial, substance use, behavioral disengagement, venting, self-blame, and instrumental support, and less use of active coping, than the PTE-exposed/non-PTSD group and the non-exposed group. The non-exposed group, on the other hand, reported significantly greater use of self-distraction, denial, behavioral disengagement, venting, and self-blame than the PTE-exposed/non-PTSD group. However, the PTE-exposed/non-PTSD group reported less use of positive reframing, planning, and humor than the non-exposed group (see Table 3).

To establish that differences in the reported length of time of the PTE were not a significant source of variance in the model, a subsequent MANOVA was conducted with PTE time (<6 months vs. 6 months to 3 years vs. >3 years), group type (PTE-exposed/non-PTSD vs. probable PTSD), and group type  $\times$  PTE time as between-subject variables and the 14 COPE scales as dependent variables. The main effect for group type remained significant,  $F(14,1238) = 7.68, p < .0001, \omega^2 = .02$ , while the

Table 3. Results of MANOVA comparing groups on brief COPE scales.

	Non-exposed ( <i>n</i> = 1244)	Probable PTSD ( <i>n</i> = 209)	PTE-exposed/ no PTSD ( <i>n</i> = 1060)			
	M (SD)	M (SD)	M (SD)	<i>F</i>	<i>p</i>	$\omega^2$
Brief COPE (Pillai's Trace approximate $F(28,4994) = 5.06, p < .0001$ )						
Active coping <sup>ab</sup>	2.82 (1.75)	2.31 (1.83)	2.53 (1.94)	7.42	<.001	.01
Emotional support	3.56 (1.9)	3.51 (1.96)	3.45 (1.99)	2.45	.086	<.001
Instrumental support <sup>ab</sup>	3.28 (1.98)	3.07 (2.03)	2.94 (2.04)	5.53	.004	<.001
Positive reframing <sup>c</sup>	2.48 (1.85)	2.22 (2.07)	2.13 (1.94)	4.56	.01	<.001
Planning <sup>c</sup>	2.8 (1.89)	2.51 (2.06)	2.35 (1.98)	8.34	<.001	.01
Humor <sup>c</sup>	1.88 (1.96)	1.87 (2.07)	1.66 (2.04)	5.69	.003	<.001
Acceptance	3.81 (1.64)	3.78 (1.79)	3.81 (1.76)	.14	.873	<.001
Religion	2.02 (2.01)	2.6 (2.1)	1.93 (2.04)	.75	.475	<.001
Self-distraction <sup>abc</sup>	3.36 (1.75)	3.7 (1.69)	3.04 (1.94)	16.96	<.001	.01
Denial <sup>abc</sup>	1.94 (1.99)	3 (2.02)	1.84 (1.84)	30.78	<.001	.02
Substance use <sup>ab</sup>	1.25 (1.83)	1.86 (2.17)	.92 (1.63)	15.69	<.001	.02
Behavioral disengagement <sup>abc</sup>	1.51 (1.63)	2.32 (1.85)	1.04 (1.46)	29.4	<.001	.05
Venting <sup>abc</sup>	2.7 (1.7)	3.15 (1.78)	2.48 (1.88)	9.28	<.001	.01
Self-blame <sup>abc</sup>	2.28 (2.03)	2.6 (2.32)	1.59 (1.95)	18.26	<.001	.04

Note: PTE, potentially traumatic event; PTSD, Posttraumatic Stress Disorder.

<sup>a</sup>Probable PTSD significantly differs from non-exposed per Hochberg post-hoc tests.

<sup>b</sup>Probable PTSD significantly differs from PTE-exposed/no PTSD per Hochberg post-hoc tests.

<sup>c</sup>PTE-exposed/No PTSD significantly differs from non-exposed per Hochberg post-hoc tests.

main effect for PTE time and the group type  $\times$  PTE time interaction were both non-significant ( $p$ 's  $> .12$ ).

To examine the role of the number of reported PTEs in coping differences between the two groups exposed to PTEs (PTE-exposed/non-PTSD and probable PTSD), we conducted eight linear regression analyses, with each one predicting a coping variable that previous analyses showed were differentially reported by the two PTE-exposed groups (self-distraction, denial, substance use, behavioral disengagement, venting, self-blame, instrumental support, and active coping). In each analysis, the predictor variables were (1) the number of reported PTEs; (2) group type (PTE-exposed/ non-PTSD = 0; probable PTSD = 1); and (3) the  $a \times b$  interaction. There was a significant main effect for group type ( $p$ 's  $< .05$ ) in the prediction of self-distraction, behavioral disengagement, venting, self-blame, instrumental support, and substance use, with the probable PTSD group scoring higher than the non-PTSD group on each coping strategy. For substance use, there was also a significant main effect ( $p < .01$ ) for the number of reported PTEs, which was a positive predictor of this coping strategy. The  $a \times b$  interaction effects were non-significant ( $p$ 's  $> .40$ ).

### **Predictors of PTSD symptom severity**

Our next series of regression analyses evaluated the role of personal resources (perceived support, optimism, self-esteem) and coping in the prediction of PTSD

Table 4. Personal resource predictors of PTSD symptom severity in PTE-exposed students.

Variable	<i>B</i>	SE	<i>sr</i> <sub><i>Y</i>(1.23)</sub>	<i>t</i> -Statistic	<i>p</i>
Constant	21.88	1.43		15.34	<.0001
SPS	-.13	.03	-.123	-4.66	<.0001
RSES	-.22	.04	-.147	-5.61	<.0001
LOT	-.10	.06	-.049	-1.76	.078
<i>R</i> <sup>2</sup>	.10				
<i>F</i>	49.41*				

Note: Participants were students in the PTE-exposed/no PTSD group and the Probable PTSD group. PTE, potentially traumatic event; PTSD, Posttraumatic Stress Disorder; SPS, Social Provisions Scale; RSES, Rosenberg Self-Esteem Scale; LOT, Life Orientation Test.

\**p* < .0001.

severity (PDS score) for the two groups exposed to PTEs (PTE-exposed/non-PTSD, probable PTSD). In the first regression analysis, the three personal resource variables were entered as simultaneous predictors of students' PDS score, and in the second regression analysis, the 14 coping variables were entered as simultaneous predictors of students' PDS score. The analysis involving the personal resource variables revealed significant unique effects for perceived support and self-esteem, with each a negative predictor of PDS score, as expected (see Table 4). The analysis involving the coping variables revealed significant unique effects for avoidance-focused coping strategies, specifically, self-distraction, denial, substance abuse, behavioral disengagement, and self-blame, with each a positive predictor of PDS score, as expected (see Table 5). Adding the number of reported PTEs as a predictor of PTSD severity in each of these analyses did not significantly change the results; tests of each of the

Table 5. Coping predictors of PTSD symptom severity in PTE-exposed students.

Variable	<i>B</i>	SE	<i>sr</i> <sub><i>Y</i>(1.2-14)</sub>	<i>t</i> -Statistic	<i>p</i>
Constant	3.51	.66		5.35	<.0001
Active coping	-.35	.17	-.05	-1.85	.064
Emotional support	.02	.19	<.01	.12	.906
Instrumental support	.06	.19	.01	.31	.754
Positive reframing	-.09	.15	-.02	-.61	.543
Planning	.07	.18	.01	.4	.69
Humor	-.05	.13	-.01	-.38	.705
Acceptance	.004	.15	<.01	.02	.981
Religion	-.002	.12	<-.01	-.01	.989
Self-distraction	.35	.15	.07	2.41	.016
Denial	.68	.14	.12	4.81	<.0001
Substance use	.41	.15	.07	2.81	.005
Behavioral disengagement	.68	.19	.10	3.58	.0004
Venting	-.17	.16	-.03	-1.02	.308
Self-blame	.48	.14	.09	3.32	.0009
<i>R</i> <sup>2</sup>	.12				
<i>F</i>	11.7*				

Note: Participants were students in the PTE-exposed/no PTSD group and the Probable PTSD group. PTE, potentially traumatic event; PTSD, Posttraumatic Stress Disorder.

\**p* < .0001.

aforementioned predictors (i.e., personal resources and coping strategies) remained statistically significant ( $p$ 's < .05). In addition, these results were maintained after the inclusion of dummy predictor variables dichotomizing the three categories defining the reported length of time since the PTE.

## Discussion

Consistent with previous studies, approximately half of the college students in the current sample reported PTE exposure and about 18% of these students met probable criteria for PTSD based on self-report (Moser et al., 2007; Schnider et al., 2007; Smyth et al., 2008). PTE-exposed students reported a range of trauma types including the sudden death or illness of a loved one, a serious accident, disaster, physical and sexual assault, child sexual abuse, incarceration, torture, and combat.

In support of our first hypothesis, students with probable PTSD reported fewer personal resources (i.e., perceived social support, self-esteem, optimism) than PTE-exposed students without PTSD and non-exposed students. In addition, for the two groups of students with PTE exposure, perceived support and self-esteem were unique negative predictors of PTSD severity (PDS score). These findings are compatible with research demonstrating the PTSD-risk status of low social support (Brewin et al., 2000; Charuvastra & Cloitre, 2008), low self-esteem (Adams & Boscarino, 2006; Sutker et al., 2002), and low dispositional optimism (Whealin et al., 2008).

Evidence that students with probable PTSD reported greater use of avoidance-focused coping strategies (i.e., self-distraction, denial, substance use, behavioral disengagement, and self-blame), and less use of approach-focused coping strategies (i.e., active coping), than PTE-exposed students without PTSD and non-exposed students provided additional support for our first hypothesis. In addition, for the two groups of students with PTE exposure, greater utilization of avoidance-focused coping strategies (i.e., self-distraction, denial, substance abuse, behavioral disengagement, and self-blame) positively predicted PTSD symptom severity (PDS) scores. In general, the use of more avoidance-focused coping strategies, both emotion/cognitive avoidance (i.e., denial, self-blame) and problem/behavioral avoidance (i.e., self-distraction, substance use, and behavioral disengagement), in the probable PTSD group may reflect these individuals' efforts to avoid trauma reminders and their struggle to reconcile incongruent information related to the trauma with pre-trauma perceptions of the self and the world. Though data from the current study cannot determine whether these avoidance-focused coping strategies existed prior to the traumatic event, emotional processing theory suggests that cognitive/emotional avoidance is a key ingredient in the etiology of PTSD. Emotional processing theory explains posttraumatic stress as emerging from a so-called pathological fear network consisting of three interconnected components: sensory-based perception of trauma-related stimuli, physiological/behavioral fear responses, and unhealthy cognitive representations such that the world is unsafe, the self is incompetent, and others are untrustworthy (Foa & Kozak, 1986). According to emotional processing theory, the act of avoiding trauma reminders only strengthens and perpetuates the pattern of intrusive emotions/cognitions and subsequent avoidance strategies (Foa & Kozak, 1986). Thus, one might also predict a progressive increase in avoidance over time. Of note, however, given that effect sizes were small,

ranging from  $\omega^2 = .02$  to  $.05$ , and sample size was large, increasing risk of Type I error, these results should be interpreted with caution.

In regards to our second aim, PTE-exposed students without PTSD reported greater perceived social support and less use of avoidance-focused coping strategies (i.e., self-distraction, denial, behavioral disengagement, and self-blame) relative to the non-exposed students. The enhanced perceived social support in the PTE-exposed/non-PTSD group may suggest that PTE exposure for some individuals is associated with an increased utilization and realization of existing social resources, or an increased reliance on social support, which in turn motivates efforts to develop or reinforce social resources. Similarly, less utilization of avoidance-focused coping strategies in the PTE-exposed/non-PTSD group may suggest that the benefits of an open and conscious approach to addressing stressful life events have become salient and relied upon for some individuals who experience potential trauma. This idea fits nicely with Hobfoll's COR theory. PTE-exposed individuals who have successfully recovered from the initial resource loss have theoretically either replaced the loss or compensated for the loss with resource substitutions (Hobfoll, 2001). In turn, these processes may have enhanced their reserve of resources and coping strategies, reinforcing these individuals' ability to cope with and recover from future stressors and resource loss.

An alternative explanation for these findings, however, is that PTE-exposed individuals who did not develop PTSD perceived greater social support and relied less on avoidance-focused coping strategies prior to the potential trauma, perhaps contributing to their apparent resiliency. This explanation would also fit with COR theory and previous research suggesting that individuals who recover from a PTE possess a greater store of resources and are proactive in recovering or compensating for the resource loss (Hobfoll, 2001). The current data cannot reconcile these possibilities but suggest directions for future research.

These findings highlight perceived social support and less reliance on avoidance-focused coping strategies as attributes that may be important to resilient functioning post-trauma and suggest these might be areas worth targeting. High perceived social support may facilitate the natural course of recovery from trauma exposure by fostering the perception that one is part of a solid social network, and challenging perceptions that the world is hostile and dangerous (Charuvastra & Cloitre, 2008). The perception that one belongs to a safe and protective social network may also promote greater use of approach-based coping strategies and reduce avoidance by providing a secure base from which to cognitively and emotionally recall and process traumatic memories (Brewin et al., 2000; Charuvastra & Cloitre, 2008). Less reliance on avoidance-focused coping strategies, which inhibit effective cognitive and emotional processing, permits one to effectively process new information from a traumatic experience – drawing upon preexisting knowledge structures to temper trauma-related perceptions that the self is incompetent and the world unsafe (Foa & Cahill, 2001). Again, given that effect sizes were small, ranging from  $\omega^2 = .02$  to  $.05$ , and sample size was large, increasing risk of Type I error, these results should be interpreted with caution.

This study had a number of limitations that should be acknowledged. Although the undisclosed gender of 20% of the participants and the undisclosed racial identity of 22% of the participants are limitations of the current study, these percentages were distributed evenly across the three groups. Also, it is important to note that most

participants in the sample were first semester freshman, undergoing a life transition, suggesting that their scores on perceived social support, self-esteem, and optimism might be more fluid than if measured later in their college careers.

Due to excessive missing data on the PDS, used to categorize participants into groups (probable PTSD vs. PTE-exposed/non-PTSD vs. non-exposed), 102 recruited students were omitted from the analyses. However, as reported previously, of the 17 dependent variables (3 personal resources and 14 coping strategies), there was only one (positive reframing coping) whose scores distinguished these 102 students, who were eliminated from the study, from the 3119 students who were included in the study.

An additional limitation concerns the 44.81% of PTE-exposed participants who responded to the Brief COPE items in reference to a stressful event that was not the PTE endorsed on the PDS – namely because the PTE occurred more than 2 years ago. To address this issue, we conducted a  $2 \times 2$  MANOVA using Brief COPE event type (PTE vs. other) as a variable along with group status (probable PTSD vs. non-PTSD) in the multivariate analysis of the 14 Brief COPE scores. Results from this MANOVA revealed a significant effect ( $p < .001$ ) for group status, as expected, but nonsignificant effects for event type ( $p > .10$ ) or its interaction with group status ( $p > .82$ ). These nonsignificant effects suggest that whether or not PTE-exposed students used their PTE as their reference event for the Brief COPE did not influence their reported use of specific coping strategies for a highly stressful event. Thus, although it would have been ideal if all PTE-exposed students referred to their PTE for the Brief COPE, the fact that 45% of these students did not, apparently did not influence the coping scores reported.

A related issue concerns the coping comparison between the PTE-exposed/no PTSD and non-exposed groups. The majority of the former group based their Brief COPE responses on a PTE, whereas the non-exposed group based their responses on, arguably, a less severe stressful event. Thus, group status is somewhat confounded with type of event (i.e., more vs. less severe) for the Brief COPE, complicating interpretation of the coping comparisons. However, one group difference on coping is noteworthy: the PTE-exposed/no PTSD students reported less avoidance-focused coping strategies than the non-exposed students, even though the former students' coping reports were based on more severe events and research has shown that avoidance coping is used more frequently for PTEs compared to less serious events (Plumb, 2004; Taylor & Stanton, 2007). Thus, for the no PTSD versus non-exposed comparison on avoidance coping, our finding is the opposite of what would expect if the group comparison merely reflected a confound involving event severity.

Finally, as mentioned earlier, because the data were cross-sectional in nature, we were unable to evaluate the causal direction of the measured variables. As a result, for example, we cannot conclude that coping behaviors contributed to the development of PTSD; it is possible that PTSD symptoms contributed to participants' use of specific coping strategies.

Understanding the relations among personal resources, coping strategies, and PTSD may prove particularly valuable given the potential malleability of these factors and the promise of program development aimed at preventing or treating PTSD in PTE-exposed populations. Though well-established risk factors such as female gender, previous trauma exposure, and history of psychiatric illness (Brewin et al., 2000) may help target specific vulnerable populations, they are static or non-malleable and

therefore unaffected by intervention. In contrast, factors amenable to modification via intervention provide the opportunity to equip individuals at-risk of trauma exposure with the facility to survive PTEs without developing posttraumatic stress. Indeed, a number of preparatory programs already in existence target hazardous-duty employees and military personnel anticipating exposure to aversive stimuli such as handling dead corpses or witnessing violence. Few, however, are based on cognitive-behavioral principles, which might help to improve their effectiveness and efficiency (Whealin et al., 2008). Further, such programs might help individuals identified as at-risk for PTE exposure (e.g., high-violence communities, inner-city schools) to establish personal resources with protective properties and adopt coping strategies that might promote healthy post-trauma behavior and circumvent trauma-related psychopathology should trauma exposure ever occur.

### Note

1. The first step is to test the largest  $p$ -value in the set of comparisons. If  $p < .05$  then all subsequent  $p$ -values  $< .05$  are considered significant. The next largest  $p$ -value  $> .05$  is then compared to  $.05/(\text{no. of comparisons}) - (\text{no. of comparisons} - 1)$ . All subsequent  $p$ -values less than this new critical value are considered significant. These steps continue, increasing the denominator at each step [i.e.,  $\text{no. of comparisons} - (\text{no. of comparisons} - n)$ ], for  $n = 1, 2, \dots$  no. of comparisons], until  $n$  reaches its maximum.

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