

Alternative Explanations of Emotional Numbing of Posttraumatic Stress Disorder: An Examination of Hyperarousal and Experiential Avoidance

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Accepted October 25, 2002

The mechanisms that underlie the emotional numbing symptoms associated with PTSD are not well understood. Studies of Vietnam combat veterans have demonstrated that hyperarousal symptoms predict emotional numbing symptoms more strongly than do other symptoms of PTSD. This study sought to extend these findings through the self-report of 170 female sexual assault survivors. The study also examined whether the relationship between hyperarousal and emotional numbing symptoms was the result of the relationship of each of these to another variable, the tendency to engage in experiential avoidance. Results were consistent with and extended previous findings. Hyperarousal symptoms were also found to predict emotional numbing symptoms above and beyond experiential avoidance, as well as all other symptoms of PTSD.

KEY WORDS: posttraumatic stress disorder; emotional numbing; experiential avoidance; sexual assault.

Individuals suffering from posttraumatic stress disorder (PTSD) often experience deficits in the ability to express and experience emotion, otherwise referred to as emotional numbing. The Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (American Psychiatric Association [APA], 1994) describes emotional numbing as a composite of three symptoms: a markedly diminished interest in significant activities (Criterion C-4), feelings of detachment or estrangement from others (C-5), and restricted range of affect (C-6). Though many symptoms of PTSD (i.e., hyperarousal, intrusive thoughts, and avoidance) are shared with other anxiety disorders, emotional numbing symptoms are a characteristic feature of PTSD that distinguish it from the other anxiety disorders (Foa, Zinbarg, & Rothbaum, 1992).

Research has demonstrated that emotional numbing symptoms play an integral role in the development and maintenance of posttraumatic psychopathology. Reports

of emotional numbing 1 month following traumatic exposure have been found to be the strongest predictor of PTSD 5 months later (Harvey & Bryant, 1998). Severity of emotional numbing symptoms 2 weeks after a traumatic incident has been found to predict severity of PTSD 3 months later (Feeny, Zoellner, Fitzgibbons, & Foa, 2000). Foa, Riggs, and Gershuny (1995) found that emotional numbing symptoms, as compared to all other symptoms of PTSD, best distinguished individuals with a PTSD diagnosis from those without, and Jaycox, Foa, and Morrall (1998) demonstrated that low levels of emotional engagement in exposure therapy (which can be conceptualized as reflecting emotional numbing) are associated with poor treatment outcomes. Despite these preliminary findings, the emotional numbing symptoms associated with PTSD, as well as the mechanisms underlying these symptoms, remain largely underresearched and not well understood.

In the *DSM-IV* (APA, 1994), emotional numbing symptoms are included with the avoidance symptoms of PTSD. Researchers have suggested, however, that emotional numbing and avoidance symptoms of PTSD are distinct, with separate mechanisms underlying each. Several studies analyzing the factor structure of PTSD symptoms have demonstrated that emotional numbing symptoms

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are separate from avoidance symptoms (e.g., Foa et al., 1995; King & King, 1994). It has also been suggested that avoidance behaviors may be driven by strategic psychological processes (i.e., the chronic, active avoidance of cues that elicit painful emotions) while emotional numbing may be operating through a more automatic and passive psychobiological mechanism such as catecholamine depletion (e.g., van der Kolk, Greenberg, Boyd, & Krystal, 1985) or conditioned opioid-mediated analgesia (Foa et al., 1992).

Litz (1992) has proposed that emotional numbing may occur as a result of attempts to manage the reexperiencing and hyperarousal symptoms that accompany PTSD. He suggests that individuals with PTSD expend considerable cognitive, behavioral, and emotional energy in an attempt to manage their hyperarousal symptoms associated with reexposure. These individuals may reduce their emotional resources to such an extent that a loss or reduction of emotional responsiveness and affective capacity, or emotional numbing, is experienced. Consistent with this theory, studies have shown that hyperarousal symptoms of PTSD predict emotional numbing symptoms more strongly than do active avoidance symptoms (and all other symptoms associated with PTSD) in samples of Vietnam combat veterans (Flack, Litz, Hsieh, Kaloupek, & Keane, 2000; Litz et al., 1997).

Litz et al. (1997) have also noted that the demonstrated relationship between hyperarousal and emotional numbing may be explained by the relationship of each of these to another variable—strategic emotional suppression or, more generally, experiential avoidance. Experiential avoidance is a general term that includes both cognitive and emotional avoidance and refers to any attempt to alter the form or frequency of internal experiences (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Although experiential avoidance may initially result in reduced distress (and thereby be negatively reinforced), the chronic use of experiential avoidance is likely to have a paradoxical, negative effect, as attempts to avoid or alter internal experiences may actually increase the intensity and severity of the very emotions and thoughts being avoided (Hayes, Strosahl, & Wilson, 1999; see also Gross & Levenson, 1993, 1997; Wegner, Schneider, Carter, & White, 1987).

In regard to the relationship of experiential avoidance to emotional numbing, a process similar to strategic emotional suppression has been observed among individuals suffering from PTSD. Roemer, Litz, Orsillo, and Wagner (2001) found that Vietnam combat veterans with PTSD, as compared to well-adjusted veterans, reported intentionally withholding their emotions with greater frequency and intensity. As a result of this chronic, intentional avoidance

of emotions (i.e., experiential avoidance), individuals with PTSD may exhibit symptoms of emotional numbing. As for the relationship between experiential avoidance and hyperarousal symptoms, hyperarousal may also be associated with experiential avoidance. The suppression of emotional expression has been found to result in increased physiological arousal (Gross & Levenson, 1993, 1997), and therefore, it is possible that this form of experiential avoidance among individuals suffering from PTSD may be accompanied by (or contribute to) hyperarousal symptoms.³

The above findings suggest an alternative explanation for the relationship between hyperarousal and emotional numbing symptoms of PTSD. Experiential avoidance, rather than hyperarousal, may serve as a major risk factor for the development of emotional numbing among individuals who have experienced a potentially traumatic event. Hyperarousal may only be found to be associated with emotional numbing as a result of its relationship with experiential avoidance. That is, hyperarousal may be a proxy risk factor. According to Kraemer, Stice, Kazdin, Offord, and Kupfer (2001), any variable (in this case, hyperarousal) that is associated with a strong risk factor (experiential avoidance) may also be found to have a relationship with the same outcome (emotional numbing). However, in actuality, the relationship between this variable or proxy risk factor and the outcome only exists as a result of both being associated with the strong risk factor. This type of third variable relationship is different from that explained through a mediator or moderator model. In a mediational model, a variable (i.e., a mediator) is found to account for the relationship between a predictor and an outcome (in that the predictor is thought to cause the mediator, which in turn causes the outcome) whereas in a moderation model, a third variable (i.e., a moderator) determines under what conditions another variable will be associated with an outcome (Baron & Kenny, 1986; Kraemer et al., 2001). A third variable relationship involving a proxy risk factor, on the other hand, explains a relationship where a variable is found to be highly associated with an outcome only because of its relationship to

³It is important to note that the studies described (i.e., Gross & Levenson, 1993, 1997; Roemer et al., 2001) do not directly examine the construct of experiential avoidance. Instead, they describe the deliberate withholding of emotion or the suppression of emotional expression, which may not be the same as the avoidance of emotional experience or experiential avoidance (a relatively new and recently researched construct). However, even though few studies have examined the direct consequences of engaging in experiential avoidance, one can assume that a similar effect is occurring as that observed among individuals who withhold the expression of emotion, as withholding expression is likely an important component of avoiding emotional experience.

another variable strongly associated with that outcome. In terms of the present study and according to Kraemer and colleagues' guidelines (Kraemar et al., 2001) for testing whether or not a variable is a proxy risk factor, if experiential avoidance is the dominant risk factor for emotional numbing and hyperarousal is only associated with emotional numbing as a proxy risk factor, then the predictive ability of hyperarousal should disappear or be weakened when experiential avoidance is taken into account.

Past studies have not specifically examined whether the demonstrated relationship between hyperarousal and emotional numbing symptoms is actually the result of the relationship of both sets of symptoms to experiential avoidance. Given that an understanding of the precise nature of the relationship between hyperarousal and emotional numbing symptoms would likely have implications for treatment, research investigating the nature of this relationship is important. Using a sample of female sexual assault survivors, this study was conducted to extend the previously demonstrated findings of a relationship between hyperarousal and emotional numbing symptoms within a sample of combat veterans. This study also explored whether the association between hyperarousal and emotional numbing symptoms is best explained by the relationship of each of these symptoms to experiential avoidance (i.e., whether hyperarousal serves as a proxy risk factor in the potential relationship between experiential avoidance and emotional numbing).

METHODS

Participants

This study included 170 female sexual assault survivors who were a subset of a larger sample ($N = 924$ women) that participated in a questionnaire study at the University of Massachusetts Boston. Within the current sample, 49.4% reported experiencing sexual assault in childhood only, 37.1% in adulthood only, 11.2% in both childhood and adulthood, and 2.4% reported the experience of a sexual assault though not the age in which it had occurred. In terms of frequency of assault, 69.4% reported experiencing one incident of sexual assault, 11% reported two separate incidents, 8.2% reported three separate incidents, and 12.2% reported experiencing continuous sexual assault, or greater than three incidents. Participants ranged in age from 18 to 61 years with an average age of 24 ($SD = 6.88$). The racial/ethnic background of participants was 59.4% White, 18.2% Black/African American, 6.5% Hispanic, 2.9% Asian, 0.6% Native American, 5.9% biracial, and 6.5% of another or unspecified racial/ethnic background.

Measures

PTSD Checklist

The PTSD Checklist (PCL; Orsillo, 2001; Weathers, Litz, Herman, Huska, & Keane, 1993) is a self-report measure including 17 statements that each correspond to a PTSD symptom as outlined by the *DSM-IV*. The measure assesses the severity of intrusive (e.g., repeated distressing memories, thoughts, or images about the potentially traumatic event), hyperarousal (e.g., hypervigilance, difficulty concentrating), avoidance (i.e., efforts made to avoid situations or thoughts associated with the potentially traumatic event), and emotional numbing (i.e., loss of interest or pleasure, feelings of detachment, restricted range of affect) symptoms that may occur as a result of experiencing a stressful life event. Using a 5-point Likert scale (1 = *not at all*, 5 = *extremely*), participants rate each question according to the extent to which the symptom has bothered them in the past month. Strong internal consistency has been found among a variety of populations including Vietnam and Persian Gulf veterans, motor vehicle accident victims, and sexual assault survivors (r 's range from .94 to .97; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Weathers et al., 1993). The PCL has been demonstrated to have strong test-retest reliability across a 3-day period ($r = .96$) as well as moderate to strong correlations with other PTSD measures (Weathers et al., 1993). A cutoff score of 50 has been used with military samples to predict PTSD diagnoses (Weathers et al., 1993); however, Blanchard et al. (1996) found a lower cutoff score of 44 to be associated with greater diagnostic efficiency among a predominantly female population of trauma victims (motor vehicle accident victims and sexual assault survivors).

Acceptance and Action Questionnaire

The Acceptance and Action Questionnaire (AAQ; Hayes et al., 2003), is a self-report measure of experiential avoidance, or the tendency of an individual to avoid unwanted internal experiences, such as emotions, thoughts, or bodily sensations. This study uses an earlier 16-item version of the measure, which has been found to be highly correlated with the final 9-item version (Hayes et al., 2003). Higher scores on the AAQ correspond to high experiential avoidance, or the unwillingness to experience certain thoughts and feelings. Sample items include, "If I could magically remove all the painful experiences I've had in my life, I would do so" and "Anxiety is bad" (Hayes et al., 2003). The AAQ has adequate internal

consistency ($\alpha = .70$) and has been found to be correlated with a tendency to engage in the suppression of thoughts in both clinical and nonclinical populations (r 's = .44 to .50; Hayes et al., 2003). The AAQ has also been found to be correlated with a number of measures of general psychopathology, including measures of depression (average $r = .57$), anxiety (average $r = .47$), specific fears (average $r = .47$), and trauma-related beliefs ($r = .68$) and symptoms ($r = .55$; Hayes et al., 2003). Providing evidence for its discriminant validity, the AAQ is negatively correlated with escape-avoidant coping ($r = -.38$), suggesting that the AAQ measures a general tendency to avoid internal experience, regardless of the context, in contrast to avoidance behaviors that are contextually determined (Hayes et al., 2003).

Life Events Checklist

Participants also completed a life events checklist (LEC; Blake et al., 1995). The checklist describes a variety of potentially traumatic events (e.g., combat exposure, natural disasters, motor vehicle accidents, sexual assault, etc.). Participants were asked to indicate which events they had experienced, the number of times the events were experienced, and whether the events occurred during childhood, adulthood, or both. Of particular interest to this study were participants' responses to whether a sexual assault had been experienced. On the checklist, sexual assault was defined as forced, unwanted oral, anal, or vaginal penetration. As assessed with the LEC, approximately 18.4% of the total sample ($N = 924$) reported experiencing a sexual assault at some point in their life. This rate is consistent with previous findings obtained from a large national sample of higher education female students (15.4%; Koss, Gidycz, & Wisniewski, 1987) using a validated assessment of sexual assault, the Sexual Experiences Survey (SES; Koss & Gidycz, 1985; Koss & Oros, 1982).

Procedure

Students and staff from the University of Massachusetts Boston were recruited through questionnaire distribution tables located in public areas on the university campus. Prior to participation, participants were informed fully, both verbally and in writing, about the purpose of the study and potentially distressing subject matter of the questionnaires. Students who chose to participate in the study filled out a battery of questionnaires that included the PCL (Weathers et al., 1993), the AAQ (Hayes et al., 2003), and the LEC (Blake et al., 1995). Inclusion in the present study required

endorsement of at least one sexual assault experienced in childhood, adulthood, or both.

RESULTS

Within the current sample of female sexual assault survivors, 34.9% of the sample met or exceeded the cutoff score of 44 on the PCL, thereby suggesting that these individuals may experience trauma-related symptoms to such severity that a diagnosis of PTSD is warranted.

As assessed by the PCL, all of the PTSD symptoms (avoidance, intrusion, hyperarousal, and emotional numbing) were significantly and positively correlated. All of the PTSD symptoms were significantly and positively associated with experiential avoidance, as assessed by the AAQ (see Table I).

In order to determine whether a relationship between hyperarousal and emotional numbing symptoms existed among female sexual assault survivors similar to that previously found among combat veterans (see Flack et al., 2000; Litz et al., 1997), a hierarchical regression analysis was performed. Severity of emotional numbing symptoms was the dependent variable while the other PTSD symptom clusters served as the predictor variables. The predictor variables entered in the first step of the equation were severity of intrusion and avoidance symptoms. Similar to analyses performed by Litz et al. (1997), severity of hyperarousal symptoms was entered in the final step so as to provide the most conservative test of the relationship between emotional numbing and hyperarousal symptoms. Results demonstrate that severity of hyperarousal symptoms significantly predicted emotional numbing above and beyond the avoidance and intrusion symptoms of PTSD ($\beta = .41$, $p < .001$; see Table II), accounting for an additional 10% of the variance in the severity of emotional numbing symptoms. Intrusion, though not avoidance, symptoms were also found to be a significant predictor of emotional

Table I. Correlations Between PTSD Symptoms and Experiential Avoidance

Variable	Avoidance	Intrusion	Hyperarousal	EN	Experiential avoidance
Avoidance	1.00				
Intrusion	.72*	1.00			
Hyperarousal	.60*	.57*	1.00		
EN	.53*	.61*	.63*	1.00	
Experiential avoidance	.42*	.40*	.42*	.37*	1.00

* $p < .01$.

Table II. Hierarchical Regression Analysis Predicting Emotional Numbing With Avoidance, Intrusion, and Hyperarousal Symptoms

Step and predictor variables	Adj. R^2	ΔR^2	β (final step)
Step 1	.38	.39*	
Avoidance			.01
Intrusion			.37*
Step 2	.48	.10*	
Hyperarousal			.41*

* $p < .001$.

numbing in the final model ($\beta = .37, p < .001$). Given this finding, an additional hierarchical regression analysis was performed where severity of hyperarousal symptoms was entered in the first step followed by the avoidance and intrusion symptom severity scores in the second step. Severity of emotional numbing symptoms was again the dependent variable. This analysis served to further test the strength of the relationship between hyperarousal and emotional numbing symptoms by examining whether symptoms of avoidance and intrusion make a significant contribution to the prediction of emotional numbing above and beyond that of hyperarousal. Symptoms of avoidance and intrusion significantly improved the model above and beyond severity of hyperarousal symptoms ($\Delta R^2 = .09, p < .001$) though this was largely due to the fact that severity of intrusion, not avoidance, symptoms was found to be a highly significant predictor of emotional numbing symptoms in the final model ($\beta = .37, p < .001$; see Table III). Severity of hyperarousal symptoms also remained a significant predictor of emotional numbing in the final model ($\beta = .41, p < .001$).

To examine if the demonstrated relationship between hyperarousal and emotional numbing symptoms was a result of hyperarousal serving as a proxy risk factor in the relationship between experiential avoidance and emotional numbing, participants' scores on the AAQ were introduced in the second step of the regression equation

Table III. Hierarchical Regression Analysis Predicting Emotional Numbing With Hyperarousal Symptoms Entered First Followed by Avoidance and Intrusion Symptoms

Step and predictor variables	Adj. R^2	ΔR^2	β (final step)
Step 1	.39	.39*	
Hyperarousal			.41*
Step 2	.48	.09*	
Avoidance			.01
Intrusion			.37*

* $p < .001$.

Table IV. Hierarchical Regression Analysis Predicting Emotional Numbing With Avoidance, Intrusion, and Hyperarousal Symptoms and Experiential Avoidance

Step and predictor variables	Adj. R^2	ΔR^2	β (final step)
Step 1	.37	.38**	
Avoidance			-.02
Intrusion			.35**
Step 2	.39	.02*	
Experiential avoidance			.07
Step 3	.48	.10**	
Hyperarousal			.42**

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

(i.e., after the intrusion and avoidance symptoms). As before, severity of hyperarousal symptoms was entered in the final (third) step. If the relationship between hyperarousal and emotional numbing symptoms was merely the result of the relationship of each of these to experiential avoidance, hyperarousal symptoms would not continue to predict emotional numbing symptoms (or the relationship would weaken) when controlling for experiential avoidance. Results indicate that, without the inclusion of hyperarousal symptoms, experiential avoidance significantly predicted emotional numbing above and beyond the avoidance and intrusion symptoms of PTSD ($\beta = .14, p < .05$), accounting for an additional 2% of the variance in the severity of emotional numbing symptoms. When severity of hyperarousal symptoms was entered into the model in the third and final step of the regression equation, experiential avoidance no longer remained a significant predictor of emotional numbing. Instead, the severity of hyperarousal symptoms once again significantly predicted emotional numbing symptoms above and beyond the avoidance and intrusion symptoms of PTSD, as well as experiential avoidance ($\beta = .42, p < .001$; see Table IV), again accounting for an additional 10% of the variance in the severity of emotional numbing symptoms. As before, intrusion, but not avoidance, symptoms remained a significant predictor of emotional numbing in the final model ($\beta = .35, p < .001$).

DISCUSSION

Using a sample of female sexual assault survivors, this study extended Litz and colleagues' previous findings (Litz et al., 1997) obtained from a sample of Vietnam combat veterans. Symptoms of hyperarousal significantly predicted emotional numbing above and beyond the avoidance and intrusion symptoms of PTSD. Results further

demonstrated that hyperarousal symptoms remained a significant predictor of emotional numbing when controlling for the relationship between emotional numbing and experiential avoidance, suggesting that experiential avoidance is not a major risk factor for the development of emotional numbing symptoms with hyperarousal serving only as a proxy risk factor due to its association with experiential avoidance. In other words, the relationship between hyperarousal and emotional numbing symptoms is not the result of the relationship of each of these to experiential avoidance. The present study does not provide support for an alternative explanation of the proposed and previously demonstrated relationship between hyperarousal and emotional numbing symptoms. Despite this, it warrants mention that experiential avoidance was found to explain a significant (albeit minimal) percentage of the variance in emotional numbing symptoms above and beyond the intrusion and avoidance symptoms of PTSD (although it did not remain a significant predictor upon inclusion of hyperarousal symptoms in the model).

Despite consistency with previous findings, several limitations need to be taken into consideration when interpreting results. Information pertaining to participants' sexual assault histories, PTSD symptoms, and experiential avoidance was obtained through self-report data. Individuals who have encountered a potentially traumatic event may experience difficulty, or even unwillingness, in openly expressing their thoughts and feelings about that event through self-report. A tendency to engage in experiential avoidance may also interfere with awareness of internal experiences and, subsequently, accurate reporting of these experiences. However, it appears as though the use of self-report data was not associated with any more limitations than those present in interview data, especially given that results were consistent with previous studies using interview data to examine the relationship between hyperarousal and emotional numbing symptoms (e.g., Flack et al., 2000; Litz et al., 1997).

Even though all of the participants reported experiencing a sexual assault, they were not required to respond to the PCL for symptoms specifically related to their sexual assault. The PCL asks participants to rate the extent to which they experience a variety of symptoms associated with PTSD but does not require participants to specify the traumatic event to which those symptoms are related. Participants in this study may have been describing symptoms associated with another traumatic event. This is possible given that the majority of the participants in the current sample reported at least one other stressful experience on the LEC. For example, 4.1% reported past combat exposure, 67.1% reported experiencing a physical assault at

some point in their life, and 22.9% reported experiencing an assault involving a weapon (although it is important to keep in mind that the latter two may have been experienced concurrent with the sexual assault). Even though the results would still provide support for the previously demonstrated relationship between hyperarousal and emotional numbing symptoms, the relationship may not be exclusive to the experience of sexual assault, but instead, to a wide variety of traumatic events.

Results indicated that 34.9% of the present sample experienced PTSD-related symptoms to such severity that a diagnosis of PTSD may be warranted, as based upon the cutoff score proposed for nonmilitary populations on the PCL. While this percentage is similar to previously reported rates from the National Comorbidity Study (45.9% of women who reported rape as their most upsetting trauma developed PTSD; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995), it is important to note that the PCL is a self-report measure of symptom severity only and therefore, cannot be used to diagnose PTSD. However, this finding does speak to the extent of symptom severity experienced by the present sample.

Another limitation concerns the measure of experiential avoidance, the AAQ. Given theoretical support for the role of experiential avoidance in the development and maintenance of a variety of psychological disorders (see Hayes et al., 1996) and its theoretical relevance to the development and maintenance of PTSD in particular, it seemed important to explore the role of experiential avoidance in the relationship between hyperarousal and emotional numbing symptoms. However, though experiential avoidance is receiving increasing attention as a construct of empirical interest, it is still a relatively new construct, and therefore, the only measure developed thus far to assess it, the AAQ, is not yet published. Preliminary data (Hayes et al., 2003) nonetheless support its validity, suggesting it is an adequate measure of an individual's tendency to avoid emotional experiences.

Individuals suffering from PTSD may not always be in an emotionally numb or unresponsive state. Litz (1992) has suggested that deficits in emotional processing (or emotional numbing) occur as a result of episodes of hyperemotionality associated with exposure to a trauma cue. This study assessed trait rather than state levels of these symptoms and thus may have obscured important relationships between state occurrences of hyperarousal, emotional numbing, and experiential avoidance. Experimental studies where hyperarousal, emotional numbing, and experiential avoidance are assessed after the presentation of a trauma-related cue would aid in determining the exact nature of the relationship between these phenomena in a trauma-cued state.

Similar to previous studies, the correlational and cross-sectional nature of the data prohibits stating with certainty the actual direction of the relationship between hyperarousal and emotional numbing symptoms. Experimental studies where hyperarousal is actively manipulated in the lab would further elucidate the role of hyperarousal symptoms in the development and maintenance of emotional numbing symptoms in PTSD. Longitudinal studies would also aid in determining the developmental course of trauma symptoms and their interrelationships.

Despite these limitations, the findings from the present study suggest that high levels of arousal may result in the depletion of emotional resources, thereby leading to emotional numbing, consistent with Litz (1992). Symptoms of intrusion were also found to be a significant predictor of emotional numbing symptoms suggesting that their role in the development and maintenance of emotional numbing symptoms warrants further investigation. Although the present study does not provide support for the exclusive role of experiential avoidance in emotional numbing, it would be premature to rule out the importance of the intentional avoidance of emotional experience in emotional numbing symptoms, as well as PTSD in general. The intentional suppression or avoidance of distressing thoughts or emotions may become automatic over time, such that individuals may not be able to accurately report the extent of their engagement in these strategies. Experimental studies in which suppression is actively manipulated may shed further light on the role of emotional suppression or avoidance in the development and maintenance of emotional numbing symptoms. Experiential avoidance also demonstrated modest correlations with all PTSD symptom clusters suggesting that a tendency to avoid internal experience may be related to all aspects of PTSD. Consequently, further research on the relationship between experiential avoidance and all PTSD symptoms (for example, intrusions, given evidence from the thought suppression literature that intrusions may occur as a result of suppression attempts) is warranted. Experiential avoidance is a broad term encompassing avoidance of a variety of internal experiences (e.g., emotions, thoughts, and bodily sensations), and future studies may benefit from focusing on more specific aspects of experiential avoidance and their possible influence on the relationship between hyperarousal and emotional numbing symptoms.

ACKNOWLEDGMENTS

This research was supported in part by National Institute of Mental Health grant MH-59044 and an internal grant from the University of Massachusetts Boston

(both to the last author). Portions of this study were presented at the 35th Annual Convention of the Association for Advancement of Behavior Therapy in Philadelphia, PA (2001). We thank Sue Orsillo, Amy Wagner, and Kim Gratz for their valuable suggestions in the preparation of this manuscript.

REFERENCES

- American Psychiatric Association [APA] (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.
- Blake, D. D., Weathers, F. W., Nagy, L. M., Kaloupek, D. G., Gusman, F. D., Charney, D. S., et al. (1995). The development of a Clinician Administered PTSD Scale. *Journal of Traumatic Stress, 8*, 75–90.
- Blanchard, E. B., Jones-Alexander, J., Buckley, T. C., & Forneris, C. A. (1996). Psychometric properties of the PTSD Checklist (PCL). *Behaviour Research and Therapy, 34*, 669–674.
- Feeny, N. C., Zoellner, L. A., Fitzgibbons, L. A., & Foa, E. B. (2000). Exploring the roles of emotional numbing, depression, and dissociation in PTSD. *Journal of Traumatic Stress, 13*, 489–498.
- Flack, W. F., Jr., Litz, B. T., Hsieh, F. Y., Kaloupek, D. G., & Keane, T. M. (2000). Predictors of emotional numbing, revisited: A replication and extension. *Journal of Traumatic Stress, 13*, 611–618.
- Foa, E. B., Riggs, D. S., & Gershuny, B. S. (1995). Arousal, numbing, and intrusion: Symptom structure of PTSD following assault. *American Journal of Psychiatry, 152*, 116–120.
- Foa, E. B., Zinbarg, R., & Rothbaum, B. O. (1992). Uncontrollability and unpredictability in post-traumatic stress disorder: An animal model. *Psychological Bulletin, 112*, 218–238.
- Gross, J. J., & Levenson, R. W. (1993). Emotional suppression: Physiology, self-report, and expressive behavior. *Journal of Personality and Social Psychology, 64*, 970–986.
- Gross, J. J., & Levenson, R. W. (1997). Hiding feelings: The acute effects of inhibiting negative and positive emotion. *Journal of Abnormal Psychology, 106*, 95–103.
- Harvey, A. G., & Bryant, R. A. (1998). The relationship between acute stress disorder and posttraumatic stress disorder: A prospective evaluation of motor vehicle accident survivors. *Journal of Consulting and Clinical Psychology, 66*, 507–512.
- Hayes, S. C., Bissett, R. T., Strosahl, K., Follette, W. C., Polusney, M. A., Pistorello, J., et al. (2003). *Psychometric properties of the Acceptance and Action Questionnaire (AAQ)*. Manuscript submitted for publication.
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behavior change*. New York: Guilford.
- Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology, 64*, 1152–1168.
- Jaycox, L. H., Foa, E. B., & Morral, A. R. (1998). Influence of emotional engagement and habituation on exposure therapy for PTSD. *Journal of Consulting and Clinical Psychology, 66*, 185–192.
- Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52*, 1048–1060.
- King, L. A., & King, D. W. (1994). Latent structure of the Mississippi Scale for Combat-related Posttraumatic Stress Disorder: Exploratory and higher-order confirmatory factor analyses. *Assessment, 1*, 275–291.

- Koss, M. P., & Gidycz, C. A. (1985). Sexual Experiences Survey: Reliability and validity. *Journal of Consulting and Clinical Psychology, 53*, 422–423.
- Koss, M. P., Gidycz, C. A., & Wisniewski, N. (1987). The scope of rape: Incidence and prevalence of sexual aggression and victimization in a national sample of higher education students. *Journal of Consulting and Clinical Psychology, 55*, 162–170.
- Koss, M. P., & Oros, C. J. (1982). Sexual Experiences Survey: A research instrument investigating sexual aggression and victimization. *Journal of Consulting and Clinical Psychology, 50*, 455–457.
- Kraemer, H. C., Stice, E., Kazdin, A., Offord, D., & Kupfer, D. (2001). How do risk factors work together? Mediators, moderators, and independent, overlapping, and proxy risk factors. *American Journal of Psychiatry, 158*, 848–856.
- Litz, B. T. (1992). Emotional numbing in combat-related post-traumatic stress disorder: A critical review and reformulation. *Clinical Psychology Review, 12*, 417–432.
- Litz, B. T., Schlenger, W. E., Weathers, F. W., Caddell, J. M., Fairbank, J. A., & LaVange, L. M. (1997). Predictors of emotional numbing in posttraumatic stress disorder. *Journal of Traumatic Stress, 10*, 607–618.
- Orsillo, S. M. (2001). Measures for acute stress disorder and posttraumatic stress disorder. In M. M. Antony, S. M. Orsillo, & L. Roemer (Eds.), *Practitioner's guide to empirically based measures of anxiety* (pp. 255–307). New York: Kluwer.
- Roemer, L., Litz, B. T., Orsillo, S. M., & Wagner, A. W. (2001). A preliminary investigation of the role of strategic withholding of emotions in PTSD. *Journal of Traumatic Stress, 14*, 143–150.
- Weathers, F. W., Litz, B. T., Herman, D. S., Huska, J. A., & Keane, T. M. (1993, November). The PTSD Checklist (PCL): *Reliability, validity, and diagnostic utility*. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, Chicago, IL.
- Wegner, D. M., Schneider, D. J., Carter, S. R., & White, T. L. (1987). Paradoxical effects of thought suppression. *Journal of Personality and Social Psychology, 53*, 5–13.
- van der Kolk, B., Greenberg, M., Boyd, H., & Krystal, J. (1985). Inescapable shock, neurotransmitters, and addiction to trauma: Toward a psychobiology of posttraumatic stress. *Biological Psychiatry, 20*, 314–325.