A Prospective Test of the Association Between Hyperarousal and Emotional Numbing in Youth With a History of Traumatic Stress

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Investigated the hypothesis that emotional numbing may develop as a result of hyperarousal using a prospective design. Forty-two children between the ages of 7 and 14 with a history of trauma and posttraumatic stress disorder (PTSD) symptoms were assessed with the Clinician-Administered PTSD Scale for Children and Adolescents (CAPS–CA; Nader et al., 1996) and were reassessed 1 year later. Results indicated that hyperarousal symptoms were concurrently positively correlated with emotional numbing at both time points. Moreover, Time 1 hyperarousal symptoms were associated with emotional numbing at Time 2 and predicted Time 2 emotional numbing even when controlling for each of the other symptom clusters of PTSD at Time 1 as well as other concurrent (i.e., Time 2) PTSD symptoms. Results are discussed in terms of the implications of the findings for enhancing the understanding of PTSD symptoms in youth.
associated with emotional numbing (i.e., a composite of emotional numbing items from symptom cluster C in DSM–IV) than other PTSD symptoms in a large sample ($N = 1,168$) of Vietnam-era veterans.

The purpose of this study was to explore the utility of extending this model to understanding the development of emotional numbing in youth. Overall, there has been a paucity of research on the construct in youth, with many studies reporting only the prevalence of PTSD (Ackerman, Newton, McPherson, Jones, & Dykman, 1998) or the prevalence of the combined avoidance and numbing symptoms of cluster C. This may be, in part, because of the combination of avoidance and emotional numbing symptoms in DSM–IV criteria C and because symptoms of emotional numbing are not typically the most prevalent symptoms of PTSD in youth exposed to trauma (Carrion, Weems, Ray, & Reiss, 2002; Cuffe et al., 1998; Lonigan, Anthony, & Shannon, 1998; Scheeringa, Peebles, Cook, & Zeanah, 2001; Scheeringa, Zeanah, Drell, & Larrieu, 1995). Symptoms of re-experiencing have often been found to be most prevalent in school-age children (Carrion et al., 2002; La Greca, Silverman, Vernberg, & Prinstein, 1996).

Evidence for the importance of emotional numbing in the phenomenology of PTSD in youth is emerging. There is factor analytic support that emotional numbing may represent a distinct facet of the symptoms of PTSD in youth (Sack, Seeley, & Clarke, 1997). In addition, emotional numbing symptoms have been observed in adolescent (e.g., Cuffe et al., 1998), school-age (e.g., Carrion et al., 2002; Graham-Bermann & Levendosky, 1998) and even preschool-age children (e.g., Scheeringa et al., 1995, 2001). Finally, symptoms of emotional numbing are not uncommon in school-age children (Green, Korol, & Gleser, 1999), have been found to be predictive of diagnostic status (Sack et al., 1997) with particularly high sensitivity and negative predictive power (Lonigan et al., 1998), and have been found to be associated with impairment in functioning (Carrion et al., 2002).

In this study, we were interested in adding to the literature by examining the symptom correlates of emotional numbing in a sample of school-age youth exposed to traumatic stress and by providing a prospective test of the hypothesis that emotional numbing may develop as a result of chronic hyperarousal in this population. Based on theory and the existing research (Flack et al., 2000; Litz, 1992; Litz et al., 1997), we hypothesized that hyperarousal symptoms would be significantly associated with emotional numbing and that hyperarousal would predict later emotional numbing (i.e., from Time 1 to Time 2) even when controlling for other symptoms of PTSD (e.g., avoidance and re-experiencing symptoms). The direction of the association was also explored by testing if emotional numbing predicted later hyperarousal.

**Method**

The sample was recruited from local social service departments and mental health clinics. All of the children in this sample were referred to the project due to exposure to some form of interpersonal trauma. Therapists and caseworkers were the referring sources. We recruited only children who had (a) at least one episode of exposure to trauma, as defined by DSM–IV criterion A1; (b) no known history of neurological disorders; and (c) no known history of alcohol or drug abuse or dependence. The data in this study were collected as part of a large-scale investigation of the biology and phenomenology of PTSD in youth (e.g., see Carrion et al., 2001). A prospective longitudinal design was used. Children were initially assessed after referral to the project and then were reassessed 1 year later. Families received $25 for their participation at each time point. Assessment took place in a medical center clinic.

Sixty youth were referred to the study. Consent was obtained from the participating counties’ courts for those participants in foster placement ($n = 27$). Most cases had prior child protective services involvement ($n = 35$). A procedure was in place to report any suspected ongoing maltreatment; however, no cases were identified. All participants and their caretakers, regardless of prior court consent, completed a written informed consent sheet at a scheduled visit and agreed to participate. All participants were given a copy of the consent. Child assent was also required for participation. The final sample at initial assessment consisted of 34 boys and 25 girls for a total sample of 59 children. One child was not able to complete the clinical assessment due to scheduling difficulties. Most children (55%) experienced multiple traumatic events. Traumatic events included separation and loss (55%), witnessing violence (40%), physical abuse (37%), sexual abuse (20%), physical neglect (12%), and emotional abuse (7%).

Forty-two children completed the Time 2 assessment protocol approximately 1 year later. Analyses comparing completers and noncompleters on demographic and PTSD symptom variables indicated that there were no significant differences between the groups. Demographic characteristics of the sample at Time 1 and 2 are presented in Table 1. Participants’ caregivers were asked at Time 2 about any treatment the child or family had received in the intervening year, and 69% of study completers reported some form of intervention between the two evaluations. Of those reporting receiving services, 90% reported that the family or their child had received family or individual counseling, and 65% of those who started therapy indicated that they were still involved. Additionally, 41% reported that they had been prescribed psychotropic medication.

To assess emotional numbing and hyperarousal symptoms, we used the Clinician-Administered PTSD Scale for Children and Adolescents (CAPS–CA;
The CAPS–CA has adequate internal consistency estimates ranging from .75 to .81 for the symptom clusters (see Carrion et al., 1995; Elana Newman) who rated videotaped recordings of 10 interviews.

Means and standard deviations for each of the measures and correlations among the measures are presented in Table 2. Examination of the emotional numbing, hyperarousal, avoidance, and re-experiencing symptom scores’ range and skew indicated acceptable levels for the planned analyses. Thirty-seven percent of the sample at Time 1 and 33% of the sample at Time 2 had a frequency rating of 2 or greater (corresponding to some of the time, once or twice a week) of at least one symptom of emotional numbing. The percentage of children reporting any restriction of affect, feelings of detachment from others, and diminished interest in activities within the month prior to assessment was 49%, 50%, and 33% at Time 1 and 23%, 35%, and 30% at Time 2, respectively.

Results

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Results of correlation analyses are reported in Table 2 and indicated that emotional numbing was significantly concurrently associated with hyperarousal, avoidance, and re-experiencing symptoms at both time...
points. Time 1 emotional numbing was prospectively associated with Time 2 emotional numbing, hyperarousal, and re-experiencing symptoms. Time 1 hyperarousal was prospectively associated with all the Time 2 variables. The largest prospective correlation was between Time 1 hyperarousal and Time 2 emotional numbing.

Hierarchical regression analyses were conducted to determine if hyperarousal at Time 1 predicted emotional numbing at Time 2 while controlling for each of the other symptom cluster scores, and results are summarized in Table 3. In the first model, Time 2 emotional numbing scores were used as the criterion variable, and then Time 1 emotional numbing, avoidance, re-experiencing, and hyperarousal symptom scores were stepped into the model hierarchically as predictors. Hyperarousal added in Step 4 produced a significant change in $R^2$, suggesting that Time 1 hyperarousal predicts Time 2 emotional numbing even when controlling for other Time 1 symptoms.

A similar regression was run to assess the influence of concurrent symptoms. Time 2 emotional numbing scores were again used as the criterion variable. Time 1 emotional numbing, avoidance, and re-experiencing scores were stepped into the model hierarchically as predictors followed by each of the other Time 2 symptoms (i.e., Step 4 had Time 2 avoidance, re-experiencing, and hyperarousal scores) and, finally, in Step 5, Time 1 hyperarousal symptom scores. Hyperarousal added in Step 5 produced a significant change in $R^2$, suggesting that Time 1 hyperarousal predicted Time 2 emotional numbing even when controlling for the other Time 1 symptoms as well as other concurrent (i.e., Time 2) PTSD symptoms.

Several additional exploratory analyses were conducted to test the robustness and direction of the effect. Specifically, similar to the previous analyses, hierarchical regression analyses were conducted predicting Time 2 hyperarousal with emotional numbing. However, Time 1 emotional numbing did not significantly predict hyperarousal at Time 2 when controlling for other Time 1 variables or when controlling for other concurrent symptoms. In addition, we conducted a regression analysis predicting Time 2 emotional numbing and entered Time 1 hyperarousal in first, then stepped in the other Time 1 variables. None of the other Time 1 symptom variables (i.e., Time 1 re-experiencing, avoidance, and emotional numbing) predicted Time 2 emotional numbing beyond hyperarousal. Finally, because the time between children’s trauma and our initial assessment of PTSD symptoms varied widely, we conducted regression analyses controlling for the time since the trauma reported; however, no effect of the time since the trauma was found on the results.

## Discussion

This study examined the correlates of emotional numbing and tested the applicability of Litz et al.’s (1997) theory in youth. The percentage of children reporting symptoms of emotional numbing in this sample was similar to previous research (Cuffe et al., 1998;
Lonigan et al., 1998, Sack et al., 1997). For example, Cuffe et al. and Lonigan et al. reported that of those reporting a traumatic event, 30% and 25%, respectively, reported symptoms of emotional numbing. Significant concurrent correlations among the symptom clusters were observed, and the symptom cluster ratings showed moderate stability from Time 1 to Time 2. Moreover, there was a general decrease in the number of youth meeting criteria for the various symptom clusters over time. Overall, these results are consistent with previous research (Famularo, Fenton, Augustyn, & Zuckerman, 1996; see also American Academy of Child and Adolescent Psychiatry, 1998) and add to the existing data pointing toward the importance of understanding emotional numbing in youth (Lonigan et al., 1998; Sack et al., 1997).

Results in this sample provided support for the theory that emotional numbing may develop as a result of chronic hyperarousal in youth. Symptoms of emotional numbing were related to hyperarousal, and Time 1 hyperarousal predicted Time 2 emotional numbing even when controlling for other symptoms of PSTD. Such results are consistent with findings employing Vietnam-era war veterans (e.g., Flack et al., 2000). The prospective design used in this study added to an understanding of the association between hyperarousal and emotional numbing by showing that emotional numbing was not a robust prospective predictor of hyperarousal. Such findings suggest the direction of the association. That is, hyperarousal is associated with later emotional numbing, but emotional numbing does not robustly predict later hyperarousal. Taken together, these results provide preliminary support for the theory that emotional numbing may result from emotional exhaustion or the depletion of cognitive and emotional resources due to prolonged hyperarousal in youth.

This investigation is not without limitations, and the data should be viewed only as preliminary evidence. Although the results are consistent with the theory and suggest the direction of the association, the design of the study does not preclude the possibility that some other variable or variables are responsible for the association between hyperarousal and emotional numbing. Moreover, the specificity of the association is not clear from these results because hyperarousal appeared to be a fairly strong predictor of other PTSD symptoms in addition to emotional numbing. Future research could improve on this simple prospective design by examining potential mediators and moderators of the association. For example, certain resilience factors, such as perceptions of control or family support, may influence the effect of hyperarousal on later emotional numbing. In addition, facets of the trauma, such as the type, duration, or intensity of the traumatic experience, may impact the association between hyperarousal and emotional numbing. Future knowledge development may also benefit from examining if an intervention aimed at reducing hyperarousal prevents the development of emotional numbing. In this way, the specificity of the relation between emotional numbing and hyperarousal might be more clearly defined and understood.

The relatively small sample size and sample characteristics, such as the wide time frame since the most recent trauma and diversity in the types of traumas (i.e., inclusion of children with both chronic stress and single incident stressors), suggest that it will be prudent to replicate these findings in additional samples of children exposed to trauma. For example, it will be important to test the association between hyperarousal and emotional numbing in samples of youth whose reaction to the trauma was assessed at or more closely to the initial time of the traumatic experience and also to examine if the association holds in samples of children with other types of traumatic experiences. Finally, we relied solely on children for symptom information in this study. Although previous investigations have shown youth to be as accurate informants of internalizing symptoms, such as fear, as their parents (Weems, Silverman, Saavedra, Pina, & Lumpkin, 1999), researchers may wish to use additional informants (e.g., parents) to assess symptoms or other methodology (e.g., physiological assessment) in future studies examining the association between hyperarousal and emotional numbing.

References


EMOTIONAL NUMBING AND HYPERAROUSAL


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