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Anhedonia and emotional numbing in combat veterans with PTSD

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Abstract

We explored relationships between anhedonia and posttraumatic stress disorder (PTSD) symptom clusters, including their role in predicting psychiatric comorbidity. Our measure of anhedonia was derived from an examination of the latent structure of the Beck Depression Inventory. We found evidence for a two-factor solution, leading to anhedonia and undifferentiated, global depressive symptoms scales. In primary analyses, anhedonia had a unique positive relationship with PTSD's emotional numbing symptoms and minimal relationships with other PTSD symptoms. Upon examining the incremental validity of appetitive functioning (i.e., anhedonia, emotional numbing) over and above aversive functioning (i.e., re-experiencing, avoidance, and hyperarousal PTSD symptoms) variables, greater emotional numbing increased the likelihood of being diagnosed with a major depressive disorder, and greater anhedonia increased the likelihood of being diagnosed with additional anxiety disorders and to a lesser extent, psychotic disorders. Results were consistent with research on the distinction of appetitive and aversive functioning, providing insight into the nature of PTSD.

Keywords: Posttraumatic stress disorder; Anhedonia; Emotional numbing; Assessment

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Introduction

Research demonstrates substantial comorbidity between major depressive disorder (MDD) and posttraumatic stress disorder (PTSD). In fact, 48% of PTSD-diagnosed individuals from the general population (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995), and 26% of Vietnam veterans with PTSD (Kulka et al., 1990) also met criteria for MDD. Even higher comorbidity rates have been found in clinical samples (e.g., 65% of PTSD-diagnosed patients also met criteria for current MDD; Brown, Campbell, Lehman, Grisham, & Mancill, 2001).

One plausible reason for these high comorbidity rates is the presence of conceptually overlapping symptoms (Franklin & Zimmerman, 2001; Keane, Taylor, & Penk, 1997; O'Donnell, Creamer, & Pattison, 2004). For example, given anhedonia's symptom overlap between PTSD and MDD, it may be useful in understanding the substantial diagnostic comorbidity. Our interest was in the overlap between anhedonia and PTSD symptoms of emotional numbing.

Emotional numbing is unique among PTSD's symptom clusters. In contrast to the PTSD symptoms of re-experiencing, avoidance, and hyperarousal that focus on negative affect, emotional numbing focuses on (diminished) positive affect (American Psychiatric Association, 1994; Litz, 1992). Emotional numbing consists of disinterest in activities, detachment from others, and a restricted range of emotional expressiveness. Relatedly, low levels of positive affect and disinterest in pleasurable activity characterize the depressive symptom of anhedonia. Both emotional numbing and anhedonia appear to reflect diminished appetitive functioning. Further examinations of anhedonia, emotional numbing, and other PTSD symptom clusters can evaluate whether symptoms related to appetitive functioning are distinct from those related to negative affect.

The framework of our study was based on the tripartite (Clark & Watson, 1991) and approach-avoidance models (Davidson, 1994). The tripartite model postulates that the dimensional structure of anxiety and depression includes a shared, core negative affective component (i.e., negative affectivity) and two specific factors, positive affectivity and physiological hyperarousal, that distinguish depression and anxiety, respectively. Our focus is on diminished positive affectivity or appetitive functioning, that is purportedly unique to depression, and not anxiety conditions. The approach-avoidance withdrawal model is compatible, suggesting that relatively independent biobehavioral systems (i.e., behavioral approach and avoidance systems) underlie the expression of positive and negative affect. Similar to the tripartite model, whereas both depression and anxiety are proposed to have overactive avoidance systems that facilitate withdrawal in response to punishment, pain, and novelty, only depression has an additional underactive approach system. This underactive approach system is proposed to reduce reward responsivity, positive affect, and movement toward appetitive goals. Existing data tend to support these models (e.g., Burns & Eidelson, 1998; Watson, Clark, & Carey, 1988). Yet, prior studies have excluded individuals with PTSD. Thus, questions remain as to the potential centrality of appetitive functioning (i.e., anhedonia and emotional numbing) in the phenomenology of PTSD. Based on our theoretical framework, it is hypothesized that emotional numbing, an index of diminished appetitive functioning in PTSD, will be the only PTSD symptom to be uniquely related to anhedonic symptoms of depression and the presence of comorbid depressive disorders. Moreover, considering the orthogonal nature of approach and avoidance, anhedonia is expected to have minimal relationships with PTSD symptoms reflecting negative emotions (i.e., re-experiencing, avoidance, hyperarousal).

To derive a measure of anhedonia for our primary interests, we initially sought to replicate recent findings suggesting that the Beck Depression Inventory (BDI) is composed of two factors with anhedonia loading independently from other undifferentiated depressive symptoms (Joiner, Brown, & Metalsky, 2003). This two-factor model fits with theory and research on the relative independence of positive and negative affect (e.g., Carver, Sutton, & Scheier, 2000).

Following initial analyses, we addressed two primary issues. First, we examined the relative independence of measures related to appetitive functioning and negative affectivity. We hypothesized that anhedonia would have a stronger relationship with emotional numbing compared to other PTSD symptom clusters (i.e., re-experiencing, avoidance, hyperarousal). Second, we examined the roles of anhedonia and emotional numbing in predicting the presence of comorbid psychiatric disorders over and above PTSD diagnoses and other PTSD symptom clusters. Based on theory and data, anhedonia was expected to be most relevant to predicting the presence of comorbid MDD. However, despite less scientific attention, diminished appetitive functioning is also relevant to the "negative" symptoms of schizophrenia and other psychotic disorders (Aghevli, Blanchard, & Horan, 2003; APA, 1994; Blanchard, Horan, & Brown, 2001) and excessive social anxiety (Brown, Chorpita, & Barlow, 1998; Kashdan 2002, 2004). Thus, it seemed plausible that anhedonia and emotional numbing would also serve as unique predictors of comorbid psychotic and additional anxiety disorders in combat veterans.

Method

Participants

Archival data were drawn from the charts of 310 consecutive male combat veterans who were age 18 or older. Veterans were presenting to an outpatient specialty program for treatment of combat-related PTSD at a Veterans Affairs Medical Center (VAMC) in the southeastern United States. Due to missing data on the BDI, our examination focused on archival data on 246 male veterans (79.4% of the initial sample).[1] To examine the generalizability of our sample, we conducted group comparisons between veterans who were excluded from the final 246 veterans, with no significant ($p < .05$) differences on demographic or clinical symptom measures ($ds < .20$).

Participants' ages ranged from 27 to 78 years ($X = 49.16$, $SD = 7.06$). The majority of veterans was either Caucasian (55.7%) or African American (42.3%), and married (60.6%). Number of completed years of education ranged from 5 to 18 ($X = 12.38$, $SD = 2.27$) and approximately half reported being unemployed (49.6%). Veterans primarily served in the Vietnam War (80.1%), with a minority serving in the Korean (4.1%) and 1991 Gulf (8.1%) Wars.

Procedure and instruments

The VAMC's PTSD clinical team, consisting of a psychiatrist, psychologist, psychology intern, and social worker, formulated diagnoses based on *Diagnostic and Statistical Manual of Mental*

[1] A portion of this archival data was used in Frueh et al. (2003). Nevertheless, the present study addressed unique, non-overlapping hypotheses (i.e., the constructs of anhedonia and emotional numbing were not previously examined).

Disorders-4th Edition (*DSM-IV*) criteria (APA, 1994). All PTSD diagnoses were reached by team consensus after a thorough evaluation, including a chart review, psychosocial history interview, military history interview, and structured PTSD clinical interview (Clinician Administered PTSD Scale, CAPS; Blake et al., 1990). Team members met routinely to discuss issues related to correctly coding the CAPS to prevent rater shift.

The presence of comorbid Axis I diagnoses was based on comprehensive, non-standardized clinical evaluations, involving team consensus. There were no differences between participants meeting and failing to meet PTSD diagnostic criteria for additional diagnoses (p-values ranged from .50 to .78). Methodologies used to collect supplemental clinical information are described below.

Demographic Information: Participants were asked about socio-demographic information using interviews and self-report questionnaires.

The Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990): The CAPS is a structured clinical interview designed to rate the frequency and intensity of the 17 *DSM-IV* PTSD symptoms. Based on the F1/I2 CAPS scoring rule (i.e., a symptom is coded as present if frequency is rated 1 or higher, and intensity is rated 2 or higher) (Blake et al., 1990), veterans were categorized as PTSD (+) if they met *DSM-IV* criteria B, C, and D, and the duration of symptoms was greater than one month.

Beck Depression Inventory (BDI): The 21-item BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) was used to assess mood, cognitive, and somatic symptoms of depression. The BDI has demonstrated excellent psychometric properties and appears sensitive to depressive severity in a broad range of college, community, and clinical populations (Beck, Steer, & Garbin, 1988).

Results

Preliminary analyses

The vast majority of the sample met criteria for PTSD (92.3%). We retained the remaining 7.7% of the sample because of an absence of group differences on continuous measures and symptom counts of PTSD symptoms, and the BDI total ($ds < .15$). Comorbid diagnoses included current MDD (68.3%), additional anxiety disorders (20.3%), and psychotic disorders (11.4%).[2] These prevalence rates are consistent with prior comorbidity findings using veterans with combat-related PTSD (Keane & Wolfe, 1990).

On average, veterans reported a large number of CAPS Cluster B re-experiencing symptoms ($X = 4.20$, $SD = .96$), Cluster C avoidance symptoms ($X = 3.71$, $SD = 1.29$), Cluster C emotional numbing symptoms ($X = 1.72$, $SD = 1.09$), and Cluster D hyperarousal symptoms ($X = 4.34$, $SD = .94$), and elevated scores on the BDI total ($X = 28.72$, $SD = 11.40$).

[2]Sample sizes for comorbidity analyses varied as a function of missing data on diagnoses. We failed to find statistically significant differences between veterans with and without data on comorbid diagnoses on PTSD diagnoses, PTSD symptom clusters, or BDI subscales.

Latent structure of the BDI: Developing an anhedonia subscale

We tested the validity of a two-factor model of the BDI (three-item anhedonia and 18-item global depression subscales) compared to the dominant one-factor model. We conducted confirmatory factor analyses (CFA) with AMOS 4.0 (Arbuckle & Wothke, 1999). For all analyses, model fit was examined using chi-square tests, the Tucker–Lewis index (TLI), comparative fit index (CFI), root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) (see Kline, 1998 for details).

The proposed two-factor model with anhedonia and undifferentiated depressive symptoms as separate, but correlated components of depression, fit the data very well, $\chi^2(188) = 386.40$, $p < .001$, $\chi^2/df = 2.06$, $TLI = .97$, $CFI = .98$, $RMSEA = .06$, $SRMR = .057$. We compared two-factor and one-factor models using a nested model comparison procedure (Bollen, 1980). There was an acceptable fit to the data when anhedonia and undifferentiated depression were constrained to unity, $\chi^2(189) = 490.96$, $p < .001$, $\chi^2/df = 2.60$, $TLI = .96$, $CFI = .97$, $RMSEA = .08$, $SRMR = .16$. However, allowing anhedonia and undifferentiated depression to covary freely resulted in a significant improvement in model fit, $\chi^2(1) = 104.57$, $p < .001$. The internal consistency of the anhedonia ($\alpha = .65$), undifferentiated depressive symptoms ($\alpha = .87$), and BDI total ($\alpha = .80$) scores were acceptable; with only three items, the lower alpha for anhedonia was not surprising. Replicating Joiner et al. (2003), our data indicated that the BDI assesses two distinct, related, depressive components.

Measurement model of emotional numbing

Emotional numbing has been previously measured as a composite of three defined symptoms of emotional numbing in the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition* (APA, 1994) (e.g., Cook, Riggs, Thompson, Coyne, & Sheikh, 2004; Litz et al., 1997). Despite the recent increase in attention to the study of emotional numbing, there are no data on the structural validity of this variable. This may be more relevant than other symptoms of PTSD because of the unique focus on deficits in positive functioning. Thus, before examining emotional numbing relationships, we examined the structural validity of emotional numbing using a confirmatory factor analysis.

We operationalized emotional numbing with three frequency and three intensity CAPS items: markedly diminished interest in significant activities (item 8), feelings of detachment or estrangement from others (item 9), restricted range of affect (item 10). Frequency and intensity error terms for the same items were set to covary (i.e., three error covariances). Results revealed that all item loadings on the latent emotional numbing variable were strong; βs ranged from .48 to .86. Upon examining overall model fit, our measure of emotional numbing fit the data very well, $\chi^2(6) = 17.23$, $p = .01$, $\chi^2/df = 2.87$, $TLI = .99$, $CFI = 1.00$, $RMSEA = .09$, $SRMR = .03$. Thus, the six CAPS items formed a structurally sound measure of emotional numbing.

Examining relationships betweeen anhedonia and PTSD symptom clusters

Bivariate relationships: Having established the structural validity of anhedonia and emotional numbing, we examined relationships between anhedonia and PTSD symptom clusters. Both

anhedonia and emotional numbing reflect diminished appetitive functioning. Thus, we hypothesized that anhedonia would have stronger, positive relationships with emotional numbing compared to other PTSD symptom clusters (i.e., Cluster B re-experiencing, Cluster C emotion numbing, Cluster C avoidance, and Cluster D hyperarousal). Bivariate relationships between anhedonia and the intensity and frequency of PTSD symptoms endorsed on the CAPS are shown in Table 1. Bivariate correlations indicated that each of the PTSD symptom clusters was positively related to anhedonia, *r*s ranged from .32 to .42, with emotional numbing having the largest relationship with anhedonia, $r = .42$. These data suggest that anhedonia has moderately positive relationships with emotional numbing. However, this bivariate relationship was not significantly stronger than correlations between anhedonia and other PTSD symptom clusters.

Unique relationships: A subsequent question is whether anhedonia relationships with re-experiencing, avoidance, and hyperarousal symptoms are a spurious function of shared variance with emotional numbing. To examine the unique relationship between anhedonia and emotional numbing, a linear regression model was conducted with anhedonia as the dependent variable. As a single step, for each PTSD symptom cluster, the frequency and intensity of CAPS symptoms were entered as predictors.

Results are shown in Table 1. After controlling for shared variance among PTSD symptom clusters, the only statistically significant predictor of anhedonia was the intensity and frequency of emotional numbing symptoms, $t(238) = 3.91$, $pr = .25$, $p < .001$. Relationships between anhedonia and other PTSD symptom clusters were minimal to near-zero (*pr*s ranged from .07 to .12). These data indicate that anhedonia is uniquely related to emotional numbing. In contrast, the initial positive bivariate relationships between other PTSD symptom clusters and anhedonia were substantially reduced after statistically controlling for emotional numbing (suggesting the presence of initially spurious findings).

Predicting the presence of comorbid psychiatric diagnoses

Our final analyses assessed the relative contribution of anhedonia and emotional numbing in predicting the presence of comorbid psychiatric diagnoses compared to other PTSD symptom clusters. It was hypothesized that anhedonia and emotional numbing would be most relevant to the presence of MDD. However, data suggest that anhedonia might also be relevant to psychotic disorders (APA, 1994; Joiner et al., 2003) and some anxiety disorders (Brown et al., 1998). We

Table 1
Unique contributions of the intensity and frequency of PTSD symptom clusters in predicting anhedonia

Predictors	β	*t*-test	*r*	*pr*	R^2
Cluster B re-experiencing	.13	1.78	.32	.12	
Cluster C emotional numbing	.28	3.91***	.42	.25	
Cluster C avoidance	.08	1.12	.34	.07	
Cluster D hyperarousal	.11	1.32	.37	.09	
Total R^2					.22***

Notes: $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Variables reflect measures of the intensity and frequency of symptoms endorsed on the CAPS.

Table 2
Unique contributions of PTSD symptom clusters and anhedonia in predicting the presence of major depressive disorder

Step	Variable	β	*SE*	Wald	*Step OR*	*Final OR*	Final *p*-value
1	PTSD diagnoses	1.25	.56	5.04	3.49*	4.62*	.01
2	Cluster B Re-experiencing	.08	.04	4.37	1.09*	1.09*	.04
	Cluster C Emotional numbing	.13	.05	6.88	1.14**	1.14**	.01
	Cluster C Avoidance	.01	.04	.08	1.01	1.01	.78
	Cluster D Hyperarousal	−.04	.05	.65	.96	.96	.42
	BDI-Anhedonia	−.03	.12	.08	.97	.97	.77

Notes: $n = 200$ as a result of missing data. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Analyses reflect a logistic regression model predicting the presence or absence of major depressive disorder. The presence of major depressive disorder was coded "1" for absent and "2" for present; thus, odds ratios reflect an increased likelihood of meeting diagnostic criteria. PTSD variables at Step 2 are measures of the intensity and frequency of symptoms endorsed on the CAPS.

used a series of logistic regression models to predict the presence of comorbid MDD, additional anxiety disorders, and psychotic disorders. In each model, at step one, the presence of PTSD was entered, at step two, the frequency and intensity of CAPS symptoms, and anhedonia, were entered.

Results for MDD are shown in Table 2. Specifically, over and above the presence of PTSD, both re-experiencing, $\beta = .08$, $OR = 1.09$, $p = .04$, and emotional numbing, $\beta = .13$, $OR = 1.14$, $p = .009$, symptom clusters were associated with an increased likelihood of meeting criteria for MDD. For comorbid anxiety disorders, greater anhedonia increased the likelihood of meeting criteria for an additional anxiety disorder, $\beta = .22$, $OR = 1.25$, $p = .03$; no other variables were significant. For comorbid psychotic disorders, the only predictor that approached significance was anhedonia ($p = .12$). After removing non-significant predictors from the model, anhedonia was associated with an increased likelihood of meeting criteria for a psychotic disorder, $\beta = .26$, $OR = 1.30$, $p = .01$ (using the same strategy for other variables, no other significant predictors were found). Overall, emotional numbing was associated with an increased risk for MDD and anhedonia was associated with an increased risk for additional anxiety disorders and to a lesser extent, psychotic disorders.

Discussion

Using a sample of veterans with military-related trauma, our data provide support for the relative independence of symptoms reflecting aversive functioning (e.g., high levels of negative affect) and appetitive functioning (e.g., low levels of positive affect). Anhedonia symptoms had a stronger positive relationship with emotional numbing than other PTSD symptom clusters. As for incremental validity, greater emotional numbing increased the likelihood of being diagnosed with a MDD, and greater anhedonia increased the likelihood of being diagnosed with anxiety disorders and to a lesser extent, psychotic disorders over and above other PTSD symptom clusters. To summarize our key findings, diminished appetitive functioning provides additional information

above and beyond symptoms reflecting negative affect in understanding the nature and correlates of PTSD.

Our findings fit with work on the tripartite and approach-withdrawal models. Supportive research provides evidence for two distinct systems of human behavior, appetition and aversion, accounting for the relative independence of positive and negative affect, respectively (e.g., Clark & Watson, 1991). Over a decade of data on the tripartite model suggests that anhedonia distinguishes depression from anxiety disorders. Our data indicate that diminished appetitive functioning is also relevant to PTSD, and may account for elevated comorbidity rate between PTSD and depression.

Fitting with the relative independence of appetition and aversion, anhedonia, reflecting a loss of interest and pleasure in previously enjoyable activities, was related to emotional numbing and not other PTSD symptoms. Emotional numbing reflects attenuated goal-directed behavior in response to incentives and positive stimuli at the cognitive-experiential level (and when primed with trauma cues, the behavioral/expressive level; Litz, Orsillo, Kaloupek, & Weathers, 2000). In contrast, the persistent re-experiencing, avoidance, and increased arousal PTSD symptoms are responsible for the generation of negative subjective, behavioral, and physiological experiences. Our data converge with other works, suggesting that negatively valenced and avoidance-related symptoms fail to converge with emotional numbing (Litz et al., 1997). Alternatively, anhedonia has been conceptualized as an inability to generate emotional reactions that are sensitive to objectively positive stimuli (Rottenberg, Kasch, Gross, & Gotlib, 2002). In essence, anhedonia and emotional numbing may both reflect broad emotion regulation deficits: insensitivity to emotional stimulation and emotional inexpressiveness. Multimodal approaches with measurements of immediate and delayed subjective, behavioral, and physiological reactions to negative *and* positive stimuli can offer further insights into relationships among PTSD and depressive symptoms. Additionally, whereas support for the tripartite model mostly derives from factor analytic approaches to self-report scales, this multimodal approach can advance the tripartite and approach-withdrawal models by investigating the three facets of the emotional response system.

Theory and data suggest that anhedonia and emotional numbing are relevant to several psychiatric conditions. Anhedonia is part of the diagnostic criteria for MDD (APA, 1994). As for psychotic disorders, anhedonia is not part of the criterion set but it is relevant to their phenomenology (e.g., Blanchard et al., 2001). Similarly, anhedonia appears to be part of the phenomenology of social anxiety disorder (e.g., Brown et al., 1998; Watson et al., 1988), and emotion expression and regulation deficits may be relevant to generalized anxiety disorder (e.g., Mennin, Heimberg, Turk, & Fresco, in press). Extending this line of inquiry, we found emotional numbing to predict an increased risk for comorbid MDD, and anhedonia to predict an increased risk for comorbid anxiety disorders and to a lesser extent, psychotic disorders in veterans suffering from PTSD. In contrast, other PTSD symptom clusters had no relationship with these comorbid conditions with the exception of re-experiencing symptoms predicting MDD. These data suggest that deficits in appetitive functioning are distinct from other psychiatric symptoms. Nonetheless, it is important to mention that our cross-sectional design precludes any interpretation beyond covariation. It will be important to examine whether anhedonia and emotional numbing play unique roles in the prospective generation of psychopathology in combat veterans.

Only recently have scientists begun to delineate differential correlates, concomitants, and consequences of diminished appetitive functioning. As such, it remains unclear as to how

anhedonia and emotional numbing contribute to the heterogeneity of PTSD and depressive disorders. Some research demonstrates distinct differences between persistently anhedonic and other clinically depressed individuals (Chen, Eaton, Gallo, & Nestadt, 2000; Gallo, 1999; Gallo & Coyne, 2000), with anhedonic clients having a later onset and fewer depressive episodes (Chen et al., 2000). In contrast to depression, there are no data on the role of emotional numbing in understanding the possible heterogeneity of clients with PTSD. Because the prototypical client with depression tends to be melancholic and sad, and clients with PTSD tend to be anxious and hyperaroused, there is merit in exploring the heterogeneity of these conditions. Anhedonic non-sad depression has a unique clinical profile and tends to be mis- and under diagnosed (Gallo, 1999). Our current data add to the importance of examining the clinical utility of diminished appetitive functioning in understanding PTSD and depression.

This study has several limitations. First, all of the limitations of a cross-sectional study are relevant. Second, despite replicating prior work, our measure of anhedonia was derived from an examination of the latent structure of the BDI; more refined instruments are necessary. Although self-reported anhedonia and emotional numbing are useful starting points, the validity of these symptoms should be further examined using laboratory tasks of sensitivity and reactivity to rewarding stimuli (see work by Litz et al. (2000)). Finally, our assessment of comorbid diagnoses was conducted with unstructured clinical interviews. Although structured clinical interviews were not used, diagnoses were based on assessments from several trained clinical personnel and staff meetings were conducted to derive consensual diagnoses. Although this assessment strategy may deviate from research clinics, the infrastructure, number of clients, and available resources (e.g., staff, time) in a VA medical center increase the difficulty of administering structured interview assessments for diagnoses other than PTSD. However, there is a growing body of evidence that self-reported distress is a fallible indicator of psychological disorders in non-psychiatric populations such as primary care patients (e.g., Coyne & Schwenk, 1997). Clinician-administered semi-structured interviews are the gold standard to assess psychological disorders. Research with these instruments for other Axis I disorders remains necessary to better understand the phenomenology and comorbidity of PTSD.

Besides furthering understanding on the phenomenology and course of PTSD, we believe there is clinical utility in furthering the study of anhedonia and emotional numbing. In contrast to negative emotions, positive emotions are related to greater social activity (e.g., Watson, Clark, McIntyre, & Hamaker, 1992), the broadening of psychological resources (e.g., attention, knowledge), and the mobilization and pursuit of incentive-based goals (Fredrickson, 1998). Consequently, diminished appetitive functioning in PTSD can be expected to have a considerable impact on the ability to thrive in society. Exposure is the central ingredient for efficacious treatments for PTSD, focusing on the alleviation of anxiety (and other aversive symptoms). Exposure-based therapies may also improve appetitive functioning, but this will remain unknown until outcome measures are broadened to reflect positive emotions, reward responsivity, and approach-oriented motivation. Alternatively, traditional PTSD interventions may need enhancements. This includes the potential value of behavioral activation, which focuses on increasing pleasant activities in hope of enhancing reward responsivity. Novel clinical research is warranted that challenges the current zeitgeist on how we intervene and what outcomes capture the nature of living a satisfying and meaningful life.

The positive relationship between anhedonia and emotional numbing, as opposed to relationships with other PTSD symptoms, suggests that anhedonia and emotional numbing are functionally related. The functional importance of anhedonia and emotional numbing was supported by their minimal roles in predicting comorbid MDD, additional anxiety disorders, and psychotic disorders. Other PTSD symptom clusters failed to uniquely predict these comorbid conditions. Fitting with work in other areas of psychology, our data support the relative independence of appetition and aversion and the unique value of examining the interface of appetition and psychopathology.

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