The Relations Between Posttraumatic Stress Disorder Symptoms and Disorder of Extreme Stress (Not Otherwise Specified) Symptoms Following War Captivity

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ABSTRACT

Objective: War captivity is a recognized pathogenic agent for both posttraumatic stress disorder (PTSD) symptoms and disorder of extreme stress not otherwise specified (DESNOS) symptoms, also known as Complex PTSD. However, the relationship between the two disorders remains unclear. While some scholars assume that the two diagnoses are overlapping and share the same predictors, others believe that the two diagnoses are relatively independent and differ in phenomenology and functional impairment. This study aims to assess both PTSD and DESNOS symptoms and their inter-relations among ex-prisoners of war (ex-POWs) and matched controls, 35 years after the end of the war.

Method: The sample included two groups of male Israeli veterans from the 1973 Yom Kippur War: ex-POWs (n = 176) and comparable veterans who had not been held captive (n = 118). PTSD and DESNOS symptoms, battlefield and captivity stressors, and ways of coping in captivity were assessed using self-report questionnaires in 2008.

Results: Ex-POWs reported a higher number of PTSD symptoms and higher rates of PTSD symptoms that fill criteria for the diagnosis of PTSD than controls. Furthermore, ex-POWs reported a higher number of DESNOS symptom clusters and higher rates of DESNOS symptoms that fill criteria for the diagnosis of DESNOS. Moreover, we found positive relationships between PTSD symptom clusters and DESNOS symptom clusters. Finally, weight loss and mental suffering in captivity, loss of emotional control and total number of DESNOS symptoms predicted total number of PTSD symptoms. However, only the total number of PTSD symptoms predicted the total number of DESNOS symptoms.

Conclusions: This study demonstrated the heavy and extensive toll of war captivity, three decades after the ex-POWs' release from captivity. Importantly, approaching the publication of DSM-5, this study depicts both the high number of DESNOS symptom clusters alongside PTSD symptoms and highlights the complex relationship between the two diagnostic entities. Thus, DESNOS characteristics might be viewed as associated features of PTSD but also that the symptoms of PTSD are the core foundations of DESNOS.

INTRODUCTION

Participation in war entails highly traumatogenic experiences (1). Combatants often face exposure to physical injury and potential loss of life. As compared to combat veterans who were not taken captive, former prisoners of war (ex-POWs) endure both the trauma of combat and the extreme nature of captivity trauma. Specifically, captivity trauma occurs in circumstances under which a victim cannot escape and is deliberately traumatized and controlled by his or her captors (2). Moreover, the

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use of psychological tactics aimed at breaking and altering the prisoner's psyche is common (3). Gradually a deep relationship between the captive and the captor is formed in which the captive is highly dependent on the captor for both survival and human communication. This pathological relationship sometimes results in a transformation of the perception of the captor from the threatening enemy into a benevolent-malevolent powerful source (4).

Research on adaptation following war captivity has found ex-POW's to be a high risk group for elevated psychological distress, including Posttraumatic Stress Disorder (PTSD). High rates of PTSD, ranging from 16% to 88%, were observed in ex-POWs samples (5, 6). Among Israeli veterans of the 1973 Yom-Kippur War, 23.2% of ex-POWs and only 4.3% of the matched group (i.e., veterans who participated in the same war and were not held captive) met PTSD criteria assessed as far as 30 years after the war (7).

Despite the significant utility of the PTSD diagnosis, since its formulation it has been consistently argued that it is not an exhaustive diagnosis and only partially covers the range of posttraumatic psychopathology (e.g., 8). Several prominent clinicians have argued that the current diagnosis does not address the complicated and enduring symptomatology associated with exposure to prolonged and repeated traumas such as child sexual abuse and war captivity (e.g., 9, 10). In the same vein, several empirical studies confirmed that exposure to severe inter-personal trauma was implicated in symptoms far more varied than those acknowledged by the current DSM diagnosis of PTSD (e.g., 11, 12).

To fill this gap, a new diagnosis termed "disorders of extreme stress not otherwise specified" (DESNOS) or "complex PTSD" (CPTSD) was suggested (13). While the exposure of "simple" or type I trauma is mostly a single event which is limited in time, the complex trauma occurs repeatedly and cumulatively, usually over a period of time. Furthermore, simple trauma usually develops following exposure to either a nature disaster (e.g., tsunami) or human-made aggression (e.g., rape), while DESNOS often results from more severe inter-personal trauma in a dose-respondent manner (14, 15). With regard to the clinical presentation, individuals with DESNOS suffer from characterological changes, beyond the PTSD symptoms (16).

According to the DSM-IV field trial (13, 17) DESNOS consists of chronic alterations in seven aspects of self-regulation and psycho-social functioning: (a) regulation of affect and impulses, (b) physical self-regulation (i.e., somatization), (c) attention or consciousness, (d) perception of perpetrator or perpetrators, (e) sense of self and identity, (f) relationships with others, and (g) systems of meaning or sustaining beliefs (i.e., hopelessness).

Only a few empirical studies have examined and validated DESNOS concept. Studies have shown that DESNOS is prevalent in severely traumatized samples such as borderline personality disorder patients (e.g., 18), but only a few studies examined DESNOS among combat veterans (e.g., 19). For example, in 84 non-acute residential inpatient male combat veterans, 58% met diagnostic criteria for life-time DESNOS (8). To the best of our knowledge there are no other studies that examined DESNOS symptoms among ex-POWs.

The association between DESNOS and PTSD diagnoses is somewhat unclear. One formulation suggests that DESNOS is an associated feature of PTSD. This formulation gained support from the DSM-IV field trial study that found a considerable overlap between DESNOS and PTSD (17). One prediction of this formulation is that the predictors of PTSD are also the predictors of DESNOS. Other studies, however, reported that the two diagnoses are relatively independent and differ in phenomenology and functional impairment (8). From this perspective one can argue that the predictors of PTSD would be different from the predictors of DESNOS. This study aims to clarify relations between PTSD symptoms and DESNOS symptoms with examination of the war-related risk factors of these two phenomena. With the publication of the DSM-5, understanding the relations between the two diagnoses can contribute to the formulation of a more comprehensive and clinically sensitive stress-related diagnosis (20). Moreover, understanding the differences and similarities between the two diagnoses might lead to the development of different treatment strategies (21).

The empirical literature identified several risk factors for post-captivity psychopathology. Among these factors are socio-demographic and military factors, such as lower level of education, younger age, and lower military rank (e.g., 22). Furthermore, the socio-political conditions of the war and the timing of captivity (23), captivity location and duration (e.g., 24), pre-captivity personality factors (25), and social support during and after captivity (26), were identified as significant factors impacting on post-captivity psychopathology.

It has been suggested that the strongest predictors of PTSD are the severity of captivity in the form of perception of torture experiences (27), and weight loss during

imprisonment (28). It is worth noting that it was suggested that the cumulative effect of captivity stressors is not simply additive but multiplicative. Thus, in conditions in which the ex-POWs experienced subjective lack of control, the captivity stressors of torture, humiliation and deprivation are greatly magnified (3). In some cases, the experience of lack of control might continue to accompany the ex-POW's posttraumatic reactions, even years after the release from captivity (2).

Far fewer studies examined risk factors for DESNOS. For example, a number of studies found a high incidence of DESNOS in women reporting childhood sexual abuse before the age of 13 (18). This relationship was found in both male and female participants, with various psychiatric disorders. Other studies found that along with early childhood trauma, the perceived psychological impact of exposure to the conflict in Northern Ireland and reduced inter-personal connectedness were significant risk factors for DESNOS (29). Ford (8) also found that participating in war-time atrocities was a significant risk factor for DESNOS. In spite of the proposed relational-based traumatic experience of captivity in DESNOS etiology, most of the studies were performed on children who were victims of repeated trauma, so captivity stressors were not examined as possible predictors of DESNOS symptoms.

The present study aims to assess PTSD and DESNOS symptoms and their inter-relationship among ex-POWs of the 1973 Yom-Kippur War and comparative veterans who fought in the same war but were not held in captivity. More specifically, we aim to assess group differences in (1) rates of PTSD and DESNOS symptoms that fill criteria for the diagnosis of PTSD and DESNOS, (2) total number of PTSD and DESNOS symptoms, (3) relationships between PTSD symptom clusters and DESNOS symptom clusters and captivity-related variables, and (4) predictors of both PTSD and DESNOS symptoms.

METHOD

PARTICIPANTS AND PROCEDURE

This study is part of a longitudinal study that examines the psychological and psychosocial consequences of captivity among Israeli ex-POWs (for more details see 30). This study is part of the third wave of measurement that was carried out in 2008. According to records of the Israeli Ministry of Defense, 240 soldiers serving in the Israeli Army land forces were taken prisoner in the 1973 Yom Kippur War. Of the 240 ex-POWs, 11 could not be located, 20 had died, 11 live abroad and 6 could not participate due to deterioration in their mental status. Of the remaining 192 ex-POWs, 176 participated in this study.

In addition, 280 veterans were sampled from the Israel Defense Forces (IDF) computerized database. These individuals also participated in the Yom Kippur War, but were not taken captive and were matched to ex-POWs on military background and socio-demographic status. Of these, 185 participated at first assessment and 118 took part in this study (20 could not be located/refused and 5 had died).

No significant differences were found between the ex-POWs and control groups in the following background variables: age, education, father's country of origin, military assignment during the war, and participation in war activity prior to the Yom Kippur War. The only significant difference was found in military rank, with a higher rate of soldiers (as opposed to officers or NCOs) among ex-POWs compared to controls (χ^2 (2) = 8.55, $P < 0.05$).

The two groups did not differ on socio-demographic variables such as age (M = 57.91, SD = 3.52, for ex-POWs and M = 57.89, SD = 3.57, for controls), length of marriage (M = 28.48, SD = 6.86, for ex-POWs, M = 26.44, SD = 6.41, for controls), divorce rate (5.5% of ex-POWs and 5% of controls had divorced), or number of children (M = 3.27, SD = 1.12, for ex-POWS, M = 3.24, SD = 1.33, for controls).

PROCEDURE

All of the participants had taken part in a 2008 study by Solomon et al. (31). Approval for this study was given by both IDF and Tel Aviv University human subject committees. The names of ex-POWs were passed on by IDF authorities as part of the periodic examination of veterans after their military service. We contacted the participants by telephone and, after explaining the purpose of our study, asked them to take part in it. Questionnaires were administered in the participants' homes or in other locations of their choice. Before filling out the questionnaires, the participants signed an informed consent agreement.

MEASURES

The Posttraumatic Stress Disorder (PTSD) Inventory (32) taps the 17 PTSD symptoms listed in the DSM-IV (33). Participants were asked to rate how often they suffered from each symptom in the previous month on a scale ranging from 0 (not at all) to 4 (very often). The number of positively endorsed symptoms (participants

who choose only 3 (often) or 4 (very often)) was calculated and the symptom count was used to operationalize PTSD both as a continuous variable of number of posttraumatic symptoms and as a dichotomized DSM diagnosis. We operationalized the PTSD diagnosis, using DSM-IV symptom criteria; that is, at least one intrusion symptom, three avoidant symptoms and two hyperarousal symptoms. The inventory has proven psychometric properties in terms of high test-retest reliability (α=0.93), concurrent validity, and convergent validity compared with structured clinical interviews conducted by trained psychiatrists and mental health professionals (34). In this study, the inventory had high internal consistency (α Cronbach= 0.96 for total posttraumatic symptoms, 0.93 for intrusion, 0.90 for avoidance, 0.91 for hyper-arousal).

DSM-IV-TR also specified the F criterion as clinically significant distress or impairment in the social area, occupational area, or other important areas of functioning. In order to follow DSM-IV-TR PTSD diagnosis F criteria we used one more index of work dysfunction. We defined work dysfunction as not working in the time of the study.

Disorders of Extreme Stress-NOS questionnaire. In the absence of a widely used standardized self-report questionnaire that taps characteristics of DESNOS or complex PTSD, we constructed a self-report questionnaire for the purpose of the present study. The questionnaire is based on a translation and adaptation of the Revised Structured Interview for Disorders of Extreme Stress-NOS (SIDES-R) (13, 35). Participants were asked to note if they have undergone the mentioned experience the previous month (yes vs. no). The questionnaire consists of 38 items that form six theoretically-based categories: *Alteration in the regulation of affect and impulses* (15 items; Cronbach's alpha, α = .80); *Alterations in attention and consciousness* (3 items; α = .52); *Alterations in self-perception* (5 items; α = .69); *Alteration in relationships with others* (5 items; α = .55); *Somatization* (3 items; α = .50); and *Alterations in systems* of *meaning* (4 items; α = .72). Cronbach's alpha for the total scale in the current study was .88.

Severity of captivity. This was assessed using two measures: first, participants were asked about injuries in combat and captivity (yes/no). Second, in the absence of medical records after release, participants were asked to report on the amount of weight lost in captivity, which has been documented to be a valid indicator of the physical severity of captivity (36).

Subjective suffering during captivity. Participants were asked to rate on a scale of 1-5, (a) the severity of physical abuse, (b) the severity of psychological abuse, and (c) the severity of humiliation to which they had been subjected. The score for each respondent was the average of these three.

Psychological responses during captivity. In the absence of any valid and reliable standardized measure, we constructed a 23-item self-report questionnaire, based on both clinical interviews with ex-POWs and a literature review. Factor analysis with Varimax rotation revealed three main factors that explained 38.1% of the variance. Factor 1 explained 14.6% of the variance and consisted of nine items describing active coping (e.g., "I was busy learning new things"). Factor 2 explained 12.14% of the variance and consisted of six items describing a loss of emotional control (e.g., "I felt I was going crazy"). Factor 3 explained 11.4% of the variance and consisted of eight items describing detachment (e.g., "I closed myself off from the world").

Socio-demographic background. Items assessed included: age, father's country of origin, family status, religiosity, education and income level.

RESULTS

Rates of PTSD symptoms that fill criteria for the diagnosis of PTSD and number of PTSD symptoms

Among the ex-POWs, 58 participants (34.7%) met the criteria for PTSD diagnosis by composition of PTSD symptoms compared to 3 participants (2.5%) among the controls (χ^2 (1) = 45.58, p<0.00). We also performed MANOVA analysis in order to assess group differences in the total number of PTSD symptoms and the number of symptoms in each of the PTSD clusters. As can be seen in Table 1, ex-POWs reported more PTSD symptoms and more symptoms on each of the PTSD symptom clusters (F (3,290) = 59.55, p<.00, $\eta^2\rho$ =.38).

Rate of DESNOS total symptoms and DESNOS symptom clusters

We used the SIDES-R recommendations for the determination of a "case" or "diagnosis" of DESNOS (for full details please see 19, 22). As can be seen in Table 2, among the ex-POWs, 23 participants (13.1%) met the full DESNOS criteria by composition of DESNOS symptoms compared to one participant (1%) among the controls (χ^2 (1) = 13.94, p<.00). Furthermore, we assessed the prevalence of DESNOS symptom clusters and subcategories among ex-POWs and controls. As can be seen

Table 1. *Means, Standard Deviations and F values for total number of PTSD symptoms, PTSD symptom clusters and total number of DESNOS symptom clusters by study group*

	Ex-POWs (N=175)		Controls (N=117)			
	M	SD	M	SD	F (1,291)	$\eta^2\rho$
Total PTSD symptoms	9.54	5.15	2.27	3.52	178.41***	0.38
Intrusion	2.64	1.98	0.27	0.80	122.99***	0.44
Avoidance	3.60	2.22	0.77	1.44	149.16***	0.34
Hyper-arousal	3.29	1.1.69	1.08	1.59	125.72***	0.30
Total DESNOS Symptoms	3.63	1.56	1.52	1.41	136.29***	0.32

***p<.001

in Table 2, ex-POWs reported significantly higher rates in all DESNOS symptom clusters and specifically high rates of alterations in relations, alterations in system of meanings with others symptoms and alterations in attention or consciousness. In addition, a MANOVA analysis showed that ex-POWs reported general higher number of DESNOS symptoms compared to the controls (see Table 1).

Relationships between PTSD and DESNOS symptom clusterss among ex-POWs

In this section we examined the inter-relations between the study variables among ex-POWs. Specifically, we examined Pearson correlations between PTSD symptoms clusters and DESNOS symptoms clusters. As can be seen in Table 3, results revealed significant positive inter-relations between PTSD symptom clusters (r=0.61 to r=0.70). Significant positive inter-relations were also observed between DESNOS symptom clusters (r=0.17 to r=0.50). It is worth noting that significant relations were not found between altered affect regulation and somatization and between somatization and altered relationships. Furthermore, the altered beliefs cluster was found to relate only to altered relationships. Most importantly, we found a set of significant interrelations between posttraumatic symptom clusters and DESNOS symptom clusters apart from altered beliefs. The range of inter-relations was between r=0.15 to r=0.55 with stronger relations between intrusion, avoidance and hyper-arousal clusters and altered affect regulation, dissociation and altered self-perception clusters.

In addition, as can be seen in Table 3, all the "subjective suffering in captivity" variables were positively associated with PTSD symptom clusters (r=0.33 to r=0.57) and the altered affect regulation, dissociation and altered

Table 2. *Prevalence of DESNOS assessment and DESNOS clusters by study group*

	Ex-POWs (N=175)		Controls (N=117)		
	N	Yes (%)	N	Yes (%)	χ^2 (1)
DESNOS total	23	13.1	1	0.9	13.94***
Alternations in regulation of affect and impulses	89	51.1	20	17.1	34.63***
Affect regulation	110	63.2	26	22.2	47.23***
Anger modulation	47	27	18	15.4	5.45*
Self destructiveness	26	14.9	9	7.7	3.47
Suicidal preoccupation	18	10.8	2	1.8	8.34**
Sexual preoccupation	99	56.9	34	29.1	21.8***
Alternations in Attention or Consciousness	66	67.9	15	12.8	23.07***
Amnesia	62	37.3	12	10.4	26.41***
Dissociative episodes	66	37.9	15	12.8	21.96***
Alternations in self perceptions	94	54	15	12.8	50.69***
No control over life	118	70.7	18	16.1	80.94***
Permanently damaged	42	25.1	5	4.3	22.39***
Guilt	41	24.8	11	9.6	11.69**
Shame	15	8.9	2	1.7	7.62*
Different than others	73	44	23	20.4	17.70***
Alternations in relations with others	161	92.5	68	58.1	49.40***
Inability to trust	96	57.8	15	13.3	56.44***
Avoid people	81	48.5	19	16.5	31.36***
Conflicts with others	96	58.5	45	39.5	10.80**
Re-victimization	72	43.4	21	18.3	20.38***
Victimizing others	34	20.5	14	12.3	4.54
Symptoms of somatization	78	47	22	19.3	22.57***
Somatic diseases	78	47	22	19.1	23.98***
Sought medical care	76	45.8	41	36	3.50
No medical explanation	58	36.9	10	9.4	26.05***
Alterations in system of meanings	144	82.8	39	33.3	73.22***
Pessimistic about the future	96	57.8	14	12.4	58.85***
Pessimistic about relationships	113	69.8	13	11.8	88.90***
Satisfaction with work	103	64.4	17	15.2	65.26***
Loss of beliefs	108	67.1	20	17.9	66.48***

*=p<.05; **=p<.01; ***=p<.001

self-perception clusters (r=0.17 to r=0.37), but not with the other three DESNOS clusters. With regard to the psychological responses during captivity, we found positive interrelations between the factor named "loss of emotional control" and PTSD symptom clusters (r=0.41 to r=0.62) and DESNOS symptom clusters (r=0.18 to r=0.52) beside altered beliefs.

Predicting total numbers of PTSD and DESNOS symptoms

Three-step hierarchical regression analyses were conducted to examine the unique contribution of adaptation to captivity variables to the total number of PTSD and DESNOS symptoms among ex-POWs. In the first step of the regressions, we entered six variables that tap the

Table 3. *Pearson correlation coefficients among PTSD and DESNOS symptom clusters and captivity experiences variables among ex-POWs*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. PTSD total symptoms	-																
2. Intrusion	.88***	-															
3. Avoidance	.87***	.62***	-														
4. Hyper-arousal	.86***	.70***	.61***	-													
5. DESNOS total symptoms	.59***	.53***	.47***	.54***	-												
6. Affect regulation	.54***	.55***	.36***	.53***	.72***	-											
7. Dissociation	.51***	.51***	.45***	.38***	60***	.50***	-										
8. Altered self-perception	.43***	.34***	.41***	.37***	.63***	.34***	.41***	-									
9. Altered relationships	.19**	.15*	.19**	.16*	.49***	.25***	.19**	.28***	-								
10. Somatization	.22**	.17*	.20**	.20**	.31***	.10	.20**	.17*	.06	-							
11. Altered beliefs	.09-	-.07	-.10	-.09	.19***	.01	-.05	.05	.41***	.01	-						
12. Physical suffering in captivity	.48***	.48***	.33***	.48***	.28***	.33***	.17*	.24**	.05	.11	-.08	-					
13. Mental suffering in captivity	.58**	.57***	.42***	.53***	.37***	.37***	.25**	.25**	.11	.15*	-.09	.78***	-				
14. Humiliation in captivity	.45***	.41***	.37***	.41***	.33***	.36***	.22**	.21**	.07	.09	.03	.50***	.66***	-			
15. Active coping	.01-	-.07	.02	.04	.05	-.14	-.11	.08	.15	-..02	.13	-.69	-.03	-.01	-		
16. Loss of emotional control	.58***	.62***	.41***	.51***	.55***	.38***	.52***	.33***	.18*	.22**	.08	.22**	.25**	.30***	.00	-	
17. Detachment	.13	.10	.14	.10	.08	.16*	-.04	.08	.15	-.10	.05	.22**	.25***	.30***	.00	.00	-

Note: *$p < .05$, **$p < .01$, ***$p < .001$

captivity experiences: being wounded during capture and during captivity, weight loss (kg), physical and mental suffering, and humiliation during captivity. In the second step, we entered the three factors of coping in captivity: active coping, loss of emotional control and detachment coping. In the third step, we entered the total number of DESNOS symptoms (when predicting PTSD symptoms) or alternatively we entered the total number of PTSD symptoms (when predicting DESNOS symptoms). Table 4 presents regression coefficients for the total number of PTSD and DESNOS symptoms.

The total set of variables explained 58.7% of the variance of the total number PTSD symptoms (F (10, 101) = 16.75, p<.00). As can be seen in Table 4, in the last model weight lost during captivity, mental suffering during captivity, loss of emotional control as a way of coping, and total number of DESNOS symptom clusters in the last month were associated with an increased probability to report more PTSD symptoms.

With regards to DESNOS, the total set of variables explained 43.5% of the variance (F (10, 101) = 9.56, p<.00). As can be seen in Table 4, only the total number of PTSD symptoms in the last month was associated with increased probability to report DESNOS symptoms. It is worth noting that in the model of the second step physical injury and humiliations, and loss of emotional control as way of coping, were all positively related to the total number of DESNOS symptoms. These results suggest that PTSD symptoms (entered in the third step) might mediate the relationship between captivity experience variables and DESNOS symptoms.

DISCUSSION

The present study reveals that Israeli ex-POWs, 35 years after their release from captivity, display a higher number of PTSD and DESNOS symptoms, in comparison to veterans of the control group. Furthermore, significant relationships between captivity-related variables and PTSD symptom clusters and DESNOS symptom clusters were found. Most importantly, we found that weight loss, mental suffering and loss of emotional control in

Table 4. *Hierarchical regressions predicting total number of PTSD and DESNOS symptoms among ex-POWs*

	Total number of PTSD symptoms									Total number of DESNOS symptoms								
	Model 1			Model 2			Model 3			Model 1			Model 2			Model 3		
Variables	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β
Wounding during capture (yes/no)	.07	.07	.07	.04	.07	.04	.05	.06	.05	.01	.09	.01	-.02	.08	-.02	-.04	.07	-.04
Wounding during captivity (yes/no)	.19	.08	.19*	.18	.07	.18*	.10	.07	.10	.24	.08	.24**	.23	.09	.23**	.13	.07	.13
Weight lost (Kg)	.14	.07	.14	.11	.07	.11	.14	.07	.14*	-.04	.09	-.04	-.06	.08	.03	-.12	.07	-.12
Physical suffering in captivity	-.07	.11	-.07	-.01	.10	-.05	-.01	.09	-.01	-.04	.12	.02	.03	.10	-.05	.03	.11	.03
Mental suffering in captivity	.49	.14	.45**	.27	.14	.25*	.25	.12	.27*	.25	.15	.24	.06	.15	.06	-.08	.14	-.07
Humiliation in captivity	.16	.11	.15	.13	.10	.12	.04	.09	.03	.12	.14	.26*	.25	.12	.23*	.18	.10	.17
Active coping				.01	.07	.01	.01	.06	-.01				.03	.07	.03	.03	.07	.03
Loss of emotional control				.37	.08	.35***	.23	.08	.22**				.34	.09	.33***	.15	.09	.15
Detachment				.07	.07	.07	.06	.07	.07				.02	.08	.03	.01	.07	-.01
Total number of DESNOS symptoms							.38	.08	.37***									
Total number of PTSD symptoms																.50	.10	.51***
Adjusted R^2	40.7%			49.2%			58.7%			23.6%			30.7%			43.5%		
F change	*F*(6,105)=13.69***			*F*(3,102)=6.87***			*F*(1,101)=24.29***			*F*(6,105)=6.70***			*F*(3,100)=4.58**			*F*(1,101)=24.29***		

Note: *$p < .05$, **$p < .01$, ***$p < .001$

captivity, and the total number of DESNOS symptoms significantly contribute to the total number of PTSD symptoms. However, the total number of PTSD symptoms concealed the contribution of captivity-related variables and left PTSD symptoms to be the exclusive predictor of DESNOS symptoms.

These findings once again demonstrate the potent pathogenic effects of war captivity that often follow highly traumatic combat experiences (e.g., 37). This finding is in line with previous studies, showing that war captivity often results in long-term traumatic consequences ranging from specific posttraumatic symptoms (6) to general psychiatric symptomatology (27). As compared to combat veterans who were not taken captive, ex-POWs endure both the trauma of combat and the trauma of captivity. In addition to extending the duration of the traumatic experience, a factor that is known to affect the severity of one's psychological reaction (38), the trauma of captivity draws on the possibly depleted coping resources (29). Therefore, the vulnerability of ex-POWs to PTSD symptoms lends support to the clinical observation that multiple, recurrent and long-lasting traumatic experiences are associated with negative outcomes in the form of anxiety disorders (e.g., 6).

One of the innovations of this study was the assessment of characterological changes in the form of DESNOS symptoms among ex-POWs. Although it was previously suggested that ex-POWs might suffered from DESNOS symptoms similar to childhood sexual abuse survivors (6), to the best of our knowledge this is the first empirical study that assessed and found higher numbers of DESNOS symptoms among ex-POWs than combat veterans. Specifically, we found that about half of the ex-POWs reported alterations in each of the DESNOS six symptom clusters with higher rates of alterations in inter-personal relations, system of meanings and in attention or consciousness.

These findings lend support to clinical observations suggesting that repeated and prolonged trauma may lead to major personality changes, including significant changes in relationships and identity (9). These findings are also in line with previous empirical research showing that war captivity can lead to alterations in basic attachment orientation (31) and in social and marital functioning

and satisfaction (39). The trauma of captivity is deeply inter-personal, as it occurs within the relationship between captive and captor. Torture and humiliation are intentional efforts to "break" one's spirit (40), inflicted by people one gets to know and on whom one is dependent for survival on a daily basis. According to Herman (4), this kind of ongoing and directed abuse may entail serious damage to one's self, as well as to one's inter-personal life.

Consistent with our third hypothesis we found significant associations between PTSD and DESNOS symptom clusters and captivity-related variables. This study revealed moderate relations between the total number of PTSD symptoms and DESNOS symptoms and weak to moderate relations between PTSD symptom clusters and DESNOS symptom clusters (besides the alterations in the system of meanings). These findings were inconsistent with the DSM–IV field trial showing a 92% comorbidity rate between DESNOS and PTSD (17). Alternatively, several studies – mostly among abused women samples – suggested that despite a substantial overlap between PTSD and DESNOS, the two conditions were substantially different in terms of symptoms and functional impairment, with DESNOS relating to a more extensive impact (8). These findings, therefore, call into consideration the complex sequela of captivity that specifically affect inter-personal domains such as psychotherapy and social relations that are not fully captured by PTSD.

This study also pointed to differential captivity-related predictors of PTSD and DESNOS symptoms. We found that weight loss, mental suffering and loss of emotional control in captivity, and the total number of DESNOS symptoms significantly contributed to the total number of PTSD symptoms. These results are consistent with other studies that revealed that the strongest predictors of PTSD are the severity of captivity in the form of captivity tortures (e.g., 27) and weight loss during imprisonment (e.g., 28). Our results point to identification of both "objective" risk factors (i.e., weight loss) and "subjective" risk factors such as the reports of mental suffering during captivity.

With regard to the loss of emotional control in captivity, we found that it predicted both PTSD and DESNOS symptoms. This finding points to the importance of that experience in the negative ramifications of war captivity. Clinical observations reported that after a period of time POWs stop thinking about release from prison but rather focus on ways to survive in captivity. Two main coping modes are "emotional defeat" and development of "control strategies" (e.g., 41). The loss of emotional control – as manifested by a wish to die or by the feeling that one is going insane – reflects the loss of emotional autonomy and the acceptance of defeat. A few studies documented the association between loss of emotional control and PTSD (3) and between catastrophic appraisals and PTSD (42). It is important to note that there is also a possibility that the ex-POW's current psychological state of considerable distress colored his memory of having a lack of control in captivity.

Importantly, in the final model for prediction of DESNOS symptoms the inclusion of the total number of PTSD symptoms concealed the contribution of captivity-related variables. First, PTSD symptoms are the sole predictor of DESNOS symptoms, but not vice versa. These differential patterns suggest that DESNOS characteristics might be viewed as associated features of PTSD but also that the symptoms of PTSD are the core foundations of DESNOS. Second, these results suggest that PTSD symptoms might mediate the relations between captivity-related variables and DESNOS.

The current study suffers from several limitations. First, this study is cross-sectional, and therefore causal interpretations should be made with caution. Furthermore, shared method variance should also be suspected in the analyses. Second, we used self-report measures that, although commonly used in trauma studies, may suffer from report biases. When dealing with clinical diagnoses, it should be noted that there might be differences between the rates derived from clinical diagnosis and self-reports. Third, this is the first study to use the SIDES structural interview as a self-report measure in this format. Hence, the results should be taken as preliminary results until this measure would be validated. Fourth, this study lacks spouse reports concerning the significant inter-personal effects of captivity on ex-POWs' lives. This is particularly relevant to the DESNOS symptoms of "alteration in relations with others."

Despite these limitations, the findings of the current study make an important contribution to the clinical knowledge regarding enduring changes in the personality of ex-POWs. This study demonstrates the heavy toll of war captivity decades after release. Importantly, with the publication of DSM-5, this study emphasizes the high rates of DESNOS symptom clusters which are comorbid with PTSD symptoms and the differential risk factors of the two phenomena.

References

1. Vogt D, Smith B, Elwy R, Martin J, Schultz M, Drainoni M, Eisen S. Predeployment, deployment, and post deployment risk factors for posttraumatic stress symptomatology in female and male OEF/OIF veterans. J Abnorm Psychol 2011; 120: 819-831.

2. Başoğlu MA. Multivariate contextual analysis of torture and cruel, inhuman, and degrading treatments: Implications for an evidence-based definition of torture. Am J Orthopsychiatry 2009; 79: 135-145.
3. Punamaki RL, Qouta SR, El Sarraj E. Nature of torture, PTSD, and somatic symptoms among political ex-prisoners. J Trauma Stress 2010; 23: 532-536.
4. Herman JH. Trauma and recovery. New York, N.Y.: Basic Books, 1992.
5. Al-Turkait FA, Ohaeri JU. Prevalence and correlates of posttraumatic stress disorder among Kuwaiti military men according to level of involvement in the first Gulf War. Depress Anxiety 2008; 25: 932-941.
6. Rintamaki LS, Weaver FM, Elbaum PL, Klama EN, Miskevics SA. Persistence of traumatic memories in World War II prisoners of war. J Am Geriatr Soc 2009; 57: 2257-2262.
7. Neria Y, Solomon Z, Dekel R. An eighteen-year follow-up study of Israeli prisoners of war and combat veterans. J Nerv Ment Dis 1998; 186: 174-182.
8. Ford JD. Disorders of extreme stress following war-zone military trauma: Associated features of posttraumatic stress disorder or comorbid but distinct syndromes? J Consult Clin Psychol 1999; 67: 3-12.
9. Herman JL. Complex PTSD: A syndrome in survivors of prolonged and repeated trauma. J Trauma Stress 1992; 5: 377-391.
10. Finkelhor D. The traumatic impact of child sexual abuse: A conceptualization. J Orthopsychiatry 1985; 55: 530–541.
11. Ford JD, Kidd P. Early childhood trauma and disorders of extreme stress as predictors of treatment outcome with chronic PTSD. J Trauma Stress 1998; 11: 743-761.
12. Van der Kolk BA, Courtois AC. Editorial comments: Complex developmental trauma. J Trauma Stress 2005; 18: 385-388.
13. Pelcovitz D, Van der Kolk BA, Roth S, Mandel FS, Kaplan S, Resick PA. Development of a criteria set and a structured interview for disorders of extreme stress (SIDES). J Trauma Stress 1997; 10: 3-17.
14. Courtois CA. Complex trauma, Complex reactions: Assessment and treatment. Psychol Trauma 2008; 1: 86-100.
15. Terr LC. Childhood traumas: An outline and overview. Am J Psychiatry 1991; 148: 10-20.
16. Taylor S, Asmundson GJG, Carelton RN. Simple versus complex PTSD: A cluster analytic investigation. Anxiety Disord 2006; 20: 459-472.
17. Roth S, Newman E, Pelcovitz D, Van der Kolk BA, Mandel FS. Complex PTSD in victims exposed to sexual and physical abuse: Results from DSM-IV field trial for posttraumatic stress disorder. J Trauma Stress 1997; 10: 539-555.
18. McLean LM, Gallop R. Implications of childhood sexual abuse for adult borderline personality and complex posttraumatic stress disorder. Am J Psychiatry 2003; 160: 369-371.
19. Newman E, Orsillo SM, Herman DS, Niles BL, Litz B. The clinical presentation of disorders of extreme stress in combat veterans. J Nerv Ment Dis 1995; 183: 664-668.
20. Friedman, MJ, Resick, PA, Bryant, RA, Brewin, CR. Considering PTSD for DSM. Depress Anxiety 2011, 28: 750-769.
21. Luterek, JA, Bittinger, JN, Simpson, TL. Posttraumatic sequelae associated with military sexual trauma in female veterans enrolled in VA outpatient mental health clinics. J Trauma Dissociation 2011; 12: 261-274.
22. Sutker PB, Vasterling JJ, Brailey K, Allain A. Memory, attention, and executive deficits in POW survivors: Contributing biological and psychological factors. Neuropsychology 1995; 9:118-125.
23. Ursano RJ, Wheatley RD, Carlson EH, Rahe AL. The prisoner of war: Stress, illness and resiliency. Psychiatr Ann 1987; 17: 532-535.
24. Sutker PB, Allain AN. Assessment of PTSD and other mental disorders in World War II and Korean Conflict POW survivors and combat veterans. Psychol Assess 1996; 8:18-25.
25. Schnurr PP, Friedman MJ, Rosenberg SD. Preliminary MMPI scores as predictors of combat-related PTSD symptoms. Am J Psychiatry 1993; 150: 479-483.
26. Ursano RJ, Rundell JR, Fragala MR, Larson SG, Wain HJ, Brandt GT, Beach BL. The prisoner of war. In: Ursano RJ, Norwood AE, editors. Emotional aftermath of the Persian Gulf War. Washington: DC: American Psychiatric, 1996: pp. 443-476.
27. Beal AL. Post-traumatic stress disorder in prisoners of war and combat veterans of the Dieppe Raid: A 50-year follow-up. Can J Psychiatry 1995; 40; 177-184.
28. Speed N, Engdahl B, Schwartz J, Eberly R. Posttraumtic stress disorder as a consequence of POW experience. J Nerv Ment Dis 1989; 177: 147-153.
29. Dorahy MJ, Corry M, Shannon M, MacSherry A, Hamilton G, McRobert G, Elder R, Hanna D. Complex PTSD, interpersonal trauma and relational consequences: Findings from a treatment receiving northern irish sample. J Affect Disord 2009; 112: 71-80.
30. Solomon Z, Dekel R. PTSD among Israeli ex-Prisoners of war: 18 and 30 years after release. J Clin Psychiatry 2005; 66: 1031-1037.
31. Solomon Z, Dekel R, Mikulincer M. Complex trauma of war captivity a prospective study of attachment and PTSD. Psychol Med 2008; 38: 1427-1434.
32. Solomon Z, Benbenishty R, Neria Y, Abramowitz M, Ginzburg K, Ohry A. Assessment of PTSD: Validation of the revised PTSD inventory. Isr J Psychiatry Relat Sci 1993; 30:110-115.
33. American Psychiatric Association. Diagnostic and statistical manual of mental disorder (4th ed.).Washington DC: Author. 1994.
34. Solomon Z. Convergent validity of posttraumatic stress disorder (PTSD) diagnosis: Self-report and clinical assessment. Isr J Psychiatry Relat Sci 1988; 25:46-55.
35. Van der Kolk B, Pelcovitz D, Herman JL, Roth S, Kaplen S, Spitzer RL. The disorders of Extreme Stress Inventory. Unpublished Manuscript, 1992.
36. Myers M, Kimbrell TA, Booe LQ, Freeman TW. Weight loss and PTSD symptom severity in former POWs. J Nerv Ment Dis 2005; 193: 278-280.
37. Favaro A, Tenconi E, Colombo G, Santonastaso P. Full and partial post-traumatic stress disorder among World War II prisoners of war. Psychopathology 2006; 39: 187-191.
38. Hunter JA. A comparison of the psychosocial maladjustment of adult males and females sexually molested as children. J Interpers Violence 1991; 6: 205-217.
39. Cook JM, Thompson R, Riggs DS, Coyne JC, Sheikh JI. Posttraumatic stress disorder and current relationship functioning among World War II ex-prisoners of war. J Family Psychol 2004; 18: 36-45.
40. Molica RF, Wyshak G, Lavelle J, Truong T. Assessing symptom change in Southeast Asian refugee survivors of mass violence and torture. Am J Psychiatry 1990; 147: 83-88
41. Avneri A. Coping in prison. MA thesis unpublished. Hebrew University, Jerusalem. 1982.
42. Bryant R, Guthrie R. Maladaptive appraisals as a risk factor for posttraumatic stress: A study of trainee firefighters. Psychol Sci 2005; 16: 749-752.