

An Adaptational View of Trauma Response as Illustrated by the Prisoner of War Experience

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Accepted July 23, 1990

We propose a model of Post-Traumatic Stress Disorder (PTSD) symptoms in which they have positive evolutionary adaptational value in traumatic environments. The persistence of PTSD symptoms following return to more benign environments may result from biological changes within the organism, reflected by a primary response of increased levels of underlying traits such as Negative Affectivity. Secondary symptoms such as social withdrawal and substance abuse are conceptualized as subsequent coping with the primary trauma response. This model was tested using data on 413 former World War II Prisoners of War (POWs). The results were consistent with the model, indicating an enduring high level of Negative Affectivity as measured by scales on the MMPI. Captivity severity scores, developed using a factor analysis of POW experience variables, were related to lifetime and current diagnoses of PTSD, generalized anxiety disorder, and major or minor depression. They were not related to schizophrenia, alcohol abuse/dependence, bipolar I and II disorders, or organic mental disorders. Elevated Negative Affectivity indicators were proportional to the captivity severity scores.

KEY WORDS: evolutionary adaptation; prisoners of war; negative affectivity; post-traumatic stress disorder.

These studies showed clearly, first, that biological structure is unintelligible unless it is considered in terms of species survival within a very particular environment; and, second, that, once it is recognised that species survival is the outcome that all biological structures are adapted to attain, biological features that have appeared only as beautiful or curious or bizarre come to have a new meaning: each new feature is found to contribute, or to have contributed, to species survival in the environment inhabited by the species. (John Bowlby, 1969, p. 53, discussing Darwin)

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INTRODUCTION

Response to severe trauma with increased sensitivity to signals of danger, cognitive repetition of the trauma, and avoidance behavior has been characterized as post-traumatic stress disorder (PTSD; APA, 1980, 1987). This paper brings an evolutionary and individual differences perspective to these phenomena of trauma response, yielding a different and unifying viewpoint on some of the characteristic response patterns to severe trauma. Individual differences in trauma response within a sample of former prisoners of war (POWs) are presented and discussed from this perspective.

MODELS OF RESPONSE TO TRAUMA

Kardiner (1941) said that trauma response sufferers remain in a state of physiological preparedness for the return of the trauma that causes a persistent vigilance for and hypersensitivity to environmental threat. He called the trauma response a "physioneurosis" and proposed that it was an impairment of those personality functions that assist adaptation of the individual to the real external world, in contrast to the ordinary neurosis where the problem is adaptation to inner world representations of humanity and society. Grinker and Spiegel (1945) proposed a residual stress model, based on their work with traumatized WWII combat veterans. They found that airmen with significant combat exposure underwent marked personality changes that impeded their adaptation to civilian life and their symptoms were directly proportional to the severity of the stressors to which they were exposed. Beebe (1975) proposed an explanatory model for the persisting effects of trauma observed in American POWs that involved two types of injury: one is somatic and primarily short term, caused by malnutrition, infection, and physical injury; the other is psychological and essentially permanent. These injuries lead to a loss of ego strength and lowered thresholds for both physical and psychological distress.

Our view is that PTSD begins as an active adaptation to a traumatic environment. For many, this adaptation persists in the absence of the generating traumatic conditions, long after the environment has returned to a more benign state. A net increase in Negative Affectivity (NA; Tellegen, 1982; Watson and Clark, 1984) is a prominent feature of this adaptation to a traumatic environment. While NA is more fully described below, we note that Tellegen (1985, 1989) defined the *assimilative* features of high NA as "the tendency to construe everyday life occurrences as catastrophic events (1989, p. 9)," a characterization that is consistent with our adaptational interpretation of PTSD symptoms. The traumatized person, by

remaining in a state adapted to the no-longer present traumatic environment, exhibits patterns of affect, behavior, and cognition comprehensible from the evolutionary perspective in that it is geared toward survival. It is important to note that survival gains its importance (from the evolutionary rather than the personal perspective) as an obvious prerequisite for reproductive fitness.

To develop this model of trauma response, it is necessary to describe the three different environments that play a role: (a) the traumatic environment; (b) the post-traumatic environment; and (c) the environment of evolutionary adaptedness. The *traumatic environment* is that set of circumstances experienced by the person that is "outside the range of usual human experience and that would be markedly distressing to almost anyone, e.g., serious threat to one's life or physical integrity; serious threat or harm to one's children, spouse, or other close relatives and friends; sudden destruction of one's home or community; or seeing another person who has recently been, or is being, seriously injured or killed as the result of an accident or violence (APA, 1987, p. 250)." The *post-traumatic environment* is that relatively safe haven within which we encounter the survivor of a traumatic experience. The post-traumatic environment is discontinuous with the traumatic environment: the danger levels are qualitatively lower. Both the traumatic and post-traumatic environments are current, modern environments, unlike the environment that will be described next.

The *environment of evolutionary adaptedness*, to use the term suggested by Bowlby (1969), has never been and never will be experienced by the person, but has been experienced by the person's ancestors. As Bowlby noted, "the only relevant criterion by which to consider the natural adaptedness of any particular part of present-day man's behavioral equipment is the degree to which and the way in which it might contribute to population survival in man's primeval environment (p. 59)." Since the time of Bowlby's work, the emphasis has shifted from population selection to individual selection, and as noted above, survival is seen merely as a prerequisite for reproduction. Consistent with our thesis, the concept of the environment of evolutionary adaptedness has been elaborated in studies of hunter-gatherer life. These studies offer a picture of the environment in which the greatest amounts of human evolutionary change occurred (see e.g., Lee and Devore, 1976; Konner, 1972).

A fundamental feature is that the great shifts in relative danger that are found in the modern world when moving from the traumatic to the post-traumatic environment represent a discontinuity that would have been unlikely in the environment of evolutionary adaptedness. We hypothesize that the organism guarding the particular gene set (thrown into question by the trauma) responds to the life-threat by making the safest possible

bet: by behaving *as though the danger is still present*. A chronic adaptation to life-threat initially would have fostered the survival of the individual in the environment of evolutionary adaptedness where, when once encountered, life-threat periodically might be reencountered. In the shorter life-spans of the environment of evolutionary adaptedness, a chronic adaptation might encompass a 5- to 10-year span rather than a 20- to 40-year span in the modern world. The situation of a POW returned to relative safety or that of a military draftee whose obligation has been discharged is fundamentally different from that of their ancestors, where such shifts to safety would have been unlikely. A nest of snakes or an ambush once encountered might be encountered again in the environment of evolutionary adaptedness; medical evacuation, repatriation, discharge from service to a far safer civilian world are all features foreign to a brief life in the primeval environment experienced by our ancestors. Note that we only claim that the environment of evolutionary adaptedness had greater *consistency* than modern environments. We are not claiming that all of the modern world is safer; for example, nothing in the environment of evolutionary adaptedness could compare with the lethality of a modern battlefield. On the other hand, nothing in the environment of evolutionary adaptedness could compare with the safety of a modern hospital room. Thus it is in its discontinuity, not in its safety that the modern world surpasses the historical. The following features of the trauma response become more comprehensible when one distinguishes the consistency of the environment of evolutionary adaptedness from the discontinuities of modern environments, and when one notes the adaptational features of trauma response.

THE ADAPTATIONAL NATURE OF PTSD SYMPTOMS

(A) Increased Responsiveness to Trauma Signals

The increased unpleasantness of affect (NA) experienced in traumatic adaptation increases the likelihood of avoidance and escape behavior. This is made possible through the lowered thresholds for trauma-relevant stimuli (hypervigilance) that permit ready detection of danger and its signals. Previously nonthreatening stimuli that share qualities with trauma-relevant stimuli may come to elicit avoidance and escape behavior (stimulus generalization). Responsiveness to stimuli with no relevance to the trauma may diminish (numbing of responsiveness). These increased thresholds for non-trauma-relevant stimuli combined with lowered thresholds for trauma-

relevant stimuli may in their net effect yield an overall sharpened gradient of response to trauma signals.

(B) Cognitive Resimulation

Intrusive replaying of trauma in dreams and while awake allows the organism to rehearse covertly alternative responses and to contemplate the overall unpleasantness of the situation so that avoidance or escape from the life-threatening situation becomes more likely if encountered again. This view is not in great disagreement with the psychoanalytic view of the need for ego-mastery through repetition compulsion. However, the need emphasized here is indeed a "reality principle need": survival chances are enhanced by resimulation that allows the formation of imagined alternative behavioral responses to the trauma and further increases the likelihood of future avoidance responses. The combination of dream resimulation and lowered thresholds for trauma-relevant stimuli is reflected in the sleep disturbances that may be the hallmark of PTSD (Ross *et al.*, 1989). They note that behaviors that may be considered continuous alerting (orienting, searching, startle, or aggressive displays) have been observed during the REM sleep of subjects with PTSD. However, they also note disagreement about whether such REM sleep mechanisms represent an effective processing of stressful material or, alternatively, reflect a central impairment in those with PTSD.

(C) Emotional Isolation

In addition to the suggestion above that numbing is a byproduct of a sharpened gradient of response to traumatic stimuli, the avoidant symptom of numbing is akin to the defense mechanism of isolation, in which the emotional response is cut off from nonemotional information or is reduced so that the organism can continue to function adaptively. Table I lists the major DSM-III-R PTSD symptom classes along with (a) the adaptive function the symptom serves in the traumatic environment and (b) the postulated maladaptive nature of the symptom in a benign environment. This table presents the costs and benefits of stress adaptations that differ with the environment in which the subject finds him or herself. In the traumatic environment, the person gains the benefits listed in the left "advantages" column but also must endure the disadvantages listed in the right column. It is our thesis that in the traumatic environment, the net sum is one of benefit. However, in the post-traumatic environment, none

Table I. Possible Adaptive and Maladaptive Functions of the DSM-III-R PTSD Symptom Classes

DSM-III-R Symptom Category	Advantage in Traumatic Environment	Disadvantage in Traumatic and Post-traumatic Environment
B. Reexperiencing (cognitive resimulation)	Rehearsing alternatives increases likelihood of escape-avoidance	Increasing distress, sleep disturbance
C. Avoidance of trauma-related stimuli	Decreased morbidity and mortality	Narrowing of options, constricted lifestyle
D. Increased arousal	Early detection of danger	Exhaustion, sleep disturbance, inappropriate responses

of the benefits in the left column pertain but all of the costs do. The net outcome is cost. Seen only from the perspective of the post-traumatic environment, this is a disorder.

PRIMARY VERSUS SECONDARY FEATURES OF TRAUMA RESPONSE

The *primary* adaptation syndrome is characterized by cognitive resimulation of the event and an increased level of NA (discussed below). Because the primary adaptation syndrome is accompanied by greater vigilance, greater generation of behavioral alternatives, and greater likelihood of escape in the environment of evolutionary adaptedness, it can yield certain highly detrimental *secondary* symptoms in a modern environment. In a benign environment, the organism's "safe bet" (that things are worse than they appear) is *not* adaptive. For example, the person's chronic increased level of arousal or numbing of responsiveness could reduce others' desire to affiliate with him or her. The social withdrawal becomes a secondary consequence of the primary adaptation. As another example of a secondary consequence, the traumatized person might increasingly self-administer mood-altering substances for short-term reduction of arousal or intrusive experiences. Avoidant symptoms (defensive responses to the tendency to reenact the trauma) also are considered secondary symptoms, representing the person's attempts to cope with the aversive features of the primary adaptation syndrome.

THE TRAIT OF NEGATIVE AFFECTIVITY

As noted above, a fundamental mechanism of adaptation to the traumatic environment, and therefore at the core of the primary symptoms, is a rise in a person's NA level. The trauma is thought to alter the personality trait of NA, i.e., something within the organism. NA was developed initially as the construct of neuroticism (Eysenck and Eysenck, 1968), and was clarified and elaborated by Tellegen (1982, 1985). As an individual differences variable, it has been researched widely in psychology and relevant reviews were presented by Watson and Clark (1984) and Watson *et al.* (1988). It is one of two dominant dimensions that consistently emerge in studies of personality, the second being Positive Affectivity, the extent to which a person feels enthusiastic, positive, and alert. Although the terms Positive Affectivity and Negative Affectivity might suggest that these two factors are opposites (that is, strongly negatively correlated), they are distinctive and independent personality measures. We shall limit our attention to NA which is defined as a general predisposition to experience subjective distress and unpleasurable engagement. High NA is characterized by a variety of emotions, including guilt, fear, and nervousness, and low NA is experienced as calmness and serenity. Tellegen (1985) linked the trait of NA to psychobiological and psychodynamic constructs of sensitivity to signals of punishment.

We hypothesize that the experience of severe, life threatening trauma can shift the survivor along the curve of individual differences from an initial premorbid NA level to a new higher level in which the nervous system regards the world as more dangerous than before. The persistence of trauma syndromes (Speed *et al.*, 1989; Tennant *et al.*, 1986) may result from a "ratchet-like" feature of NA increase for some people: once the sensitivity to danger is increased, substantial decreases become less likely. Thus, knowing the individual's starting position on the NA curve would be necessary for understanding the post-trauma outcome. This could account in part for individual variability in trauma response.

Studies of twins (Tellegen *et al.*, 1988) yielded a heritability estimate of 0.55 (+/-0.11) for NA, suggesting that in normal samples, 55% of the observed variation in the NA trait indicator is attributable to genetic factors. This probably is an overestimate for traumatized samples, as heritability estimates are specific to a group's environment. The traumatic experience is by definition outside the normal realm of experience; it is at the extremes of environmental variation. Thus, environmental factors would be more important determinants of NA values in traumatized samples, as we illustrate below.

Many POWs were subjected to the types of traumatic experience that could lead to persistent increased levels of NA. Through an examination of the severity of the POW experience and its relation to NA as indexed by the outcome variables of trauma response, we can begin to assess the plausibility of the adaptational viewpoint of trauma response. Many POWs display a variety of psychological symptoms upon release from captivity that subside with time (Beebe, 1975). Others suffer persistent psychiatric disorders, with PTSD, anxiety disorders, and depressive disorders the most common (Kluznik *et al.*, 1986). Studies of these men afford unique opportunities to observe the effects of severe trauma sustained in adulthood upon later adjustment.

TRAUMA RESPONSE AMONG POWs

Evidence from both case control and correlational studies consistently supports the conclusion that POW captivity trauma can cause later psychopathology. Cohen and Cooper (1954) found a four- to five-fold excess of hospitalizations for psychoneurosis but not psychosis among American POWs held by Germany and Japan during World War II (WWII) relative to their non-POW combatant controls. Beebe (1975) reported more hospitalizations of POWs for a variety of psychiatric illnesses, including schizophrenic disorders, anxiety reactions without somatization, alcoholism, "nervousness and debility," and other psychoneurotic reactions. He found POWs of the Japanese to be more physically and psychiatrically disabled than their counterparts held by the Germans, which he attributed to the harsher treatment suffered at the hands of the Japanese, characterized by a higher incidence and greater severity of beatings, starvation, and untreated diseases. In an Australian WWII POW sample matched with a non-POW combatant sample, Tennant *et al.* (1986) found significantly more anxiety and depressive disorders among the POWs. They attributed their findings to the prolonged psychological stress and severe physical deprivation suffered by the POWs. Ursano *et al.* (1981) attributed the greater degree of psychiatric readjustment problems observed among American POWs of the Vietnamese captured before 1969 relative to that observed among those captured after 1969 to the harsher conditions under which those captured earlier were held.

Correlational studies of POWs' postcaptivity adjustment show a positive relationship between the degree of trauma and psychopathology. Speed *et al.* (1989) found that the experience of torture and/or beatings, and weight loss experienced during captivity were the strongest predictors of persistent PTSD. Family history of mental illness, pre-service adjustment

problems, and severe childhood trauma were not predictive of PTSD development. Sutker *et al.* (1986) and Sutker *et al.* (1988) identified two types of Minnesota Multiphasic Personality Inventory (MMPI) profile patterns that were defined by unique clinical symptom clusters and differed in "confinement stress severity": the experiences of being wounded at capture, beaten, tortured, threatened with death, and/or witnessing the torture of others were associated with greater psychopathology. Engdahl *et al.* (1991) found significant psychiatric comorbidity among the lifetime diagnoses of PTSD, generalized anxiety disorder, and depressive disorders in a sample of WWII POWs, with 61% having a combination of at least two of these disorders at some point in their lives. These findings of elevated post-traumatic psychopathology are consistent with a model of increased NA as a consequence of the POW experience.

The present study examines the relationships among aspects of POW captivity experiences, and through factor analysis develops a common dimension to index the overall severity of the POW trauma. We label this a severity factor and examine its relationships to NA as it is manifested after release from captivity. We describe the elevated frequencies of psychiatric disorders and the elevated MMPI scale scores found in our sample, and we interpret these findings as markers of increased NA. Finally, we use the common dimension of NA to help integrate the findings and provide a more global conceptualization of post-traumatic psychopathology.

METHOD

The enactment of the 1981 Former Prisoners of War Act (Public Law 97-37) provided impetus for increased research and clinical services focused on American POWs. It offered complete health examinations and particular benefits to all POWs. Using repatriation records, all surviving locatable former POWs were contacted directly to request their participation in thorough, free examinations and follow-up treatment. An estimated 73,435 American POWs were alive in 1990 (Stenger, 1990), many of whom suffered malnutrition, untreated disease, torture, beatings, and related psychological trauma during imprisonment. Nearly 27,000 former POWs have completed a specialized medical examination offered by the Department of Veterans Affairs since late 1983 (VA, 1988). A standard examination protocol, the MMPI, and a detailed former POW Medical History form were used. The catchment area of the VA Medical Center, Minneapolis, was thoroughly canvassed and each POW was sent a letter requesting his participation in this nationwide evaluation. A high participation rate (approximately 75% of all known living POWs) yielded a sample of more than

500 to date. Data from the total region's population of POWs were available for comparative purposes and indicated that participating and non-participating POWs had similar lengths of captivity, comparable marital and family status, and similar rates of service-related disability. All 413 POWs in the present sample completed the entire protocol; the remainder had not completed the MMPI.

Thirty-five history questions elicited information on the circumstances of capture and experiences, illnesses, and adjustment during captivity. Copies of the questionnaire and the coding scheme for the history variables are available from the first author. Variable selection was based on the captivity maltreatment literature (see Engdahl and Eberly, 1990, for a review) and extensive preliminary data analyses. Initial data analyses clearly suggested that a large general factor was underlying the POW experience variables, therefore we selected an unrotated principle components factor analysis approach to most clearly define the factor.

Sixty-seven percent (276) of the POWs were interviewed using a symptom check list based on the DSM-III criteria for PTSD and the Schedule for Affective Disorders and Schizophrenia — Lifetime version (SADS-L; Spitzer and Endicott, 1979), yielding the Research Diagnostic Criteria (RDC; Spitzer *et al.*, 1978). For the remaining 33%, the first and third authors reviewed the narrative psychiatric, social and medical histories, and examination findings for each POW to derive the RDC and PTSD diagnoses. Agreement was reached independently in 111 cases, and a consensus was reached with the remaining 26. Frequencies of the diagnoses obtained with the SADS-L were comparable to frequencies obtained via chart review (e.g., for PTSD at time of examination: 37.3% vs. 29.2%; for generalized anxiety disorder, lifetime: 42.7% vs. 51.1%; and for alcoholism/alcohol abuse, lifetime: 22.8% vs. 19.0%; respectively). Both rating methods were used for a sample of 30 cases, achieving complete agreement as to presence or absence of the eight diagnostic categories used in this report in 23 cases (77%), and partial agreement (for three or more categories) in the remaining seven cases.

RESULTS

Table II presents the intercorrelations among the POW experience variables. All but 4 of the 28 comparisons were significantly positively intercorrelated. In particular, the experience of delirium and nightmares during captivity was highly correlated ($r = 0.565$) with a recall of psychological suffering (fear, depression, and anxiety). Being subjected to torture was correlated ($r = 0.552$) with witnessing the torture of others.

Table II. Intercorrelations among POW Experience Variables ($n = 413$)^a

	Injured	Psychic suffer	Delirium	Tortured	Witness torture	Intimidated	Weight lost	Forcibly relocated
Injured as a POW	—							
Recalled psychological suffering	0.205	—						
Experienced delirium and/or nightmares	0.238	0.565	—					
Subjected to torture	0.375	0.267	0.260	—				
Witnessed torture	0.224	0.300	0.284	0.552	—			
Experienced intimidation	0.240	0.330	0.298	0.376	0.328	—		
Percent of body weight lost	0.118 ns	0.310	0.194	0.401	0.338	0.178	—	
Forcibly relocated	0.047 ns	0.234	0.121 ns	0.330	0.326	0.085 ns	0.372	—

^aNote: For values of $r \geq 0.127, p \leq 0.01$.

Table III. Severity of POW Experience Factor -- Unrotated
Factor Loadings ($n = 413$)

POW Experience Variable	Loading
Subjected to torture	0.750
Witnessed torture	0.711
Recalled psychological suffering	0.662
Experienced delirium &/or nightmares	0.607
Percent of body weight lost	0.595
Experienced intimidation	0.579
Forcibly relocated	0.493
Injured while a POW	0.470

Table III presents the loadings of the POW experience variables on a single unrotated factor derived through a principle components analysis. They all exceed the customary absolute value range of 0.300 to 0.350. Theoretically and methodologically, it is not surprising that all loadings were strong and in the same direction. The personal experience of torture and witnessing the torture of other POWs head the list of variables defining the factor.

Table IV presents the MMPI data for this sample. MMPI scales have a mean of 50, a standard deviation of 10, and scores above 70 typically are considered to be clinically significant. Although the clinical scales of Hypochondriasis and Depression are clinically elevated, these two plus the clinical scale scores of Hysteria, Psychasthenia, and Schizophrenia are well above the means of comparably aged Minnesota males as reported by Colligan *et al.* (1984). Ego Strength is low. The comparison values are displayed in parentheses. The Wiggins content scales (1966) have a mean of 50 and become clinically meaningful at scores above 60; thus the scales of Poor Health, Organic Symptoms, Phobias, and Social Maladjustment are elevated. Table IV also displays the POW experience severity factor's correlations with MMPI scale scores. Each POW's experience severity score was calculated as a sum (a "factor score") weighted in accord with the variable loadings developed in the initial factor derivation. Moderate positive correlations (> 0.275) are noted between the severity factor and the F (psychic distress), Hypochondriasis, Psychasthenia, and Schizophrenia scales (the MMPI Schizophrenia scale was derived using the 1940's notion of schizophrenia and contains items related to feeling alienated, to fears and anxieties, to emotional constriction, as well as "the positive" symptoms of schizophrenia; therefore the Schizophrenia scale retains a large relationship with measures of anxiety which will be described later). Turning to

the special scales, we note that Ego Strength is negatively correlated with the severity factor. The Anxiety (or A Factor, Welsh, 1956), Poor Health, Depression, Organic Symptoms, Phobias, and Psychoticism scales are all positively correlated with the severity factor.

Table V outlines the severity factor's correlations with the presence or absence of the eight psychiatric diagnostic categories assessed in this study. A lifetime diagnosis of PTSD, the presence of PTSD at the time of examination, and lifetime diagnoses of generalized anxiety disorder and/or depressive disorder were moderately and positively correlated with the severity factor.

DISCUSSION

Scale Elevations as Markers of Increased Negative Affectivity

The MMPI item pool is heavily saturated with items representing NA. Several elevated MMPI scales can be interpreted as markers of elevated NA. Watson and Clark (1984) report the best markers among the standard scales to be (in decreasing order of association with NA): (1) Psychasthenia, (2) A Factor (Anxiety), (3) Schizophrenia, (4) Ego Strength (negatively correlated), and (5) K (negatively correlated). All but the K scale are skewed in the direction of high NA in our sample. This suggests that many POWs in our sample are distressed and upset and have a negative view of themselves (these are core features of elevated NA).

A group of four related scales is elevated. This group includes Hypochondriasis, Hysteria, Poor Health, and Organic Symptoms. The Hypochondriasis and Hysteria scales are heterogenous in content. They correlate moderately in general population samples and their elevations reflect physical health concerns, complaints of weakness and fatigue, and an emphasis on socially appropriate behaviors. Elevated Poor Health scores reflect concerns with difficulties in digestion and elimination, plus pulmonary and cardiac complaints. Organic Symptoms reflect possible neurological problems including headaches, dizziness, nausea, and tingling sensations, many of which could be related to maltreatment and illness suffered during captivity. The cognitive difficulties it reflects (poor concentration, memory loss, speaking or reading problems) may accompany the psychic distress of elevated NA. Nichols (1987) suggests that pain (including joint, headache, and chest pain) and problems of motor control associated with fears of somatic injury are common when the scales of Organic Symptoms, Poor Health, and Phobias are jointly elevated, as they are for our group as a whole. The interpretation of the chronic war neurosis observed by Kardiner (1941) as

Table IV. MMPI Scale Scores and Their Correlations with the POW Experience^a

	Severity Factor				Correlation with Severity Factor
	Mean	MN males Age 60-69	S.D.	Range	
Clinical scales					
L	51.1	(53.0)	7.71	37-77	-0.161*
F	58.0	(53.3)	8.77	44-90	0.279*
K	53.7	(55.5)	9.59	29-79	-0.203*
Hypochondriasis	74.2	(55.4)	17.10	34-116	0.301*
Depression	71.0	(57.5)	15.40	39-115	0.230*
Hysteria	67.5	(56.7)	12.20	33-100	0.239*
Psychopathic Deviate	57.4	(58.0)	11.10	29-93	0.145*
Masculinity-femininity	55.2	(55.7)	8.76	30-84	0.008
Paranoia	55.9	(52.3)	9.51	35-96	0.141*
Psychasthenia	63.2	(52.8)	13.80	28-120	0.286*
Schizophrenia	62.1	(50.3)	14.40	28-134	0.330*
Mania	54.2	(49.4)	10.50	29-89	0.154*
Social Introversion	55.9	(54.3)	9.85	21-89	0.163*
Special scales					
Ego Strength	44.7	(52.9)	12.10	6-70	-0.327*
Anxiety (A Factor)	52.0	(47.1)	10.60	35-82	0.295*
Repression (R Factor)	55.7	(55.7)	10.40	26-86	-0.056
MacAndrews Alcoholism	53.2	—	14.70	17-79	0.000
Social Responsibility	51.0	—	9.38	21-74	-0.134*
Wiggins Content scales					
Poor Health	62.5	—	13.70	37-99	0.311*
Depression	52.4	—	10.70	36-89	0.286*
Organic Symptoms	64.6	—	15.00	4-110	0.334*
Family Problems	48.9	—	10.10	34-86	0.140*
Authority Conflict	50.6	—	9.80	26-76	0.226*
Feminine Interests	51.2	—	8.44	30-80	0.070
Religious Fundamentalism	50.6	—	9.63	26-69	0.060
Manifest Hostility	48.4	—	8.96	31-82	0.240*
Poor Morale	50.1	—	10.10	30-80	0.196*
Phobias	57.2	—	11.30	35-104	0.280*
Psychoticism	49.7	—	9.41	4-86	0.320*
Hypomania	51.5	—	9.26	28-75	0.211*
Social Maladjustment	55.3	—	11.80	25-88	0.092

^aNote. Values reported are *t* scores, K-corrected where appropriate. Mean values shown in parentheses are for males aged 60-69 reported by Colligan *et al.* (1984). For the correlations, * = $p \leq 0.01$.

Table V. Correlations of the POW Experience Severity Factor with Lifetime Psychiatric Diagnosis for 413 POWs^a

Diagnosis	<i>r</i>	Percentage with diagnosis
PTSD (history of)	0.359*	70.9
PTSD (present at exam)	0.278*	34.6
Generalized anxiety disorder	0.200*	45.5
Major or minor depression	0.196*	25.7
Schizophrenia	0.072	3.4
Alcohol abuse/dependence	0.098	21.5
Bipolar I and II disorders	0.068	1.2
Organic mental disorder	-0.046	4.4

^aNote: * = $p \leq 0.01$. For correlation calculation, presence of a diagnosis was coded as 2, absence as 1.

a “physioneurosis” is consistent with this portion of the MMPI findings. To Kardiner, the war neurosis was different from social neurosis in that the central focus of distress in war neurosis rested in the individual’s difficulty with his body image—his somatic functioning—and not with social conflict.

The Phobias scale reflects phobic concerns, fears, harm avoidance, and discomfort and admitted fears of people, especially in crowds. It suggests “developmentally more advanced mechanisms for the management of anxiety based on repression and displacement” (Nichols, 1987, p. 14). Social Maladjustment indicates discomfort in social interactions, shyness, and consequent social isolation. Links to the avoidant symptoms of PTSD seem highly likely and warrant further study.

CORRELATIONAL EVIDENCE FOR THE LINKS BETWEEN TRAUMA SEVERITY AND NEGATIVE AFFECTIVITY

As shown in the last column of Table IV, the pattern of correlations of the severity factor with the MMPI scales follows the POW group’s pattern of elevated and depressed scores, the exceptions being Psychoticism and Social Maladjustment. The correlations suggest that, relative to their fellow POWs, those who experienced greater captivity severity are more likely to display elevations on the scales of Hypochondriasis, Depression, Hysteria, Psychasthenia, Schizophrenia, Ego Strength (-),

Anxiety, Poor Health, Depression, Organic Symptoms, Phobias, and Psychoticism. As noted above, the scales of Psychasthenia, Schizophrenia, Ego Strength, and Anxiety may be interpreted most clearly as reflecting the presence of elevated NA.

Table V presents the correlations of the POW experience severity factor with various lifetime psychiatric diagnoses and the percentage of the sample found to have these diagnoses. Departures from a 50-50 split on the dichotomous criterion variable would, of course, attenuate observed correlations. Nonetheless, the severity factor displays moderate and positive relationships with the lifetime prevalences of PTSD, generalized anxiety disorder, and major or minor depression, as well as with PTSD at the time of examination. The severity factor is not correlated with the lifetime prevalences of schizophrenia, alcohol abuse/dependence (despite its high base rate), bipolar I and II disorders, and organic mental disorders.

CONCLUSION

The relationship of the physical insults sustained during captivity to POWs' current symptoms (Speed *et al.*, 1989) must be acknowledged. The etiology of persistent psychological distress in this sample has a significant biological component. The physical nature of POW captivity trauma may have direct effects on the organism, but it must also be noted that stimulus trauma alone may lead to cortical neuronal and synaptic changes (Kolb, 1987). Clinical and laboratory findings have demonstrated both functional and neuronal change following high-intensity stimulation of the peripheral nervous system in otherwise intact organisms. An evolutionary adaptational view proposes that such changes had survival value for the species during an earlier era and may have become an innate response predisposition as a result of this increased survival value. However, the concept of NA can add to this biological substrate by providing a unifying framework for the range of responses observed among trauma survivors. NA appears to serve as a useful organizing construct in our sample, explaining much of the observed psychopathology as reflected in psychiatric diagnoses and MMPI scores, and we believe that this would in large part generalize to other traumatized samples. More importantly, this increased NA is largely proportional to the severity of the captivity experience, and is most clearly and usefully understood when viewed as an adaptational response to traumatic experiences.

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