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Emotional Priming of Autobiographical Memory in Post-traumatic Stress Disorder

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Vietnam combat veterans with post-traumatic stress disorder (PTSD), with other psychiatric disorders, or with no disorder participated in an autobiographical memory experiment. Half of the subjects in each group viewed a combat-relevant videotape, whereas the others viewed a neutral videotape. Immediately after this emotional priming manipulation, subjects were asked to retrieve specific autobiographical memories in response to a series of neutral, positive, and negative cue words. The results revealed that PTSD patients experienced difficulty retrieving specific autobiographical memories, especially after having viewed the combat videotape. Overgeneral memory appears to characterise PTSD as much as it does depression, and a relative inability to retrieve specific autobiographical memories, especially of positive valence, may contribute to the maintenance of PTSD.

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INTRODUCTION

Post-traumatic stress disorder (PTSD) is characterised by the involuntary retrieval of disturbing memories, as evinced by intrusive thoughts, flashbacks, and nightmares (American Psychiatric Association, 1987). These re-experiencing phenomena suggest that traumatic memories are often highly accessible (McNally et al., 1987), at least when people with PTSD are in certain cognitive-affective states (Litz, 1992).

Indirect experimental evidence for enhanced accessibility of trauma-related material comes from research on the modified Stroop colour-naming paradigm. In this paradigm, subjects are shown words of varying emotional significance, and are asked to name the colours in which the words are printed while ignoring the meanings of the words (e.g. Mathews & MacLeod, 1985; Watts, McKenna, Sharrock, & Trezise, 1986). Delays in colour-naming occur when the meaning of the word becomes activated despite the subject's effort to attend to its colour. Consistent with the enhanced-accessibility-hypothesis, individuals with PTSD take much longer to name the colours of trauma-related words than to name the colours of either positive words or negative words unrelated to trauma (Cassiday, McNally, & Zeitlin, 1992; Foa, Feske, Murdock, Kozak, & McCarthy, 1991; Kaspi, McNally, & Amir, submitted; McNally, English, & Lipke, 1993; McNally, Kaspi, Riemann, & Zeitlin, 1990).

Despite reflecting processes relevant to intrusive cognition, the modified Stroop paradigm does not directly tap memory. Surprisingly, given its prominence in PTSD, memory has been studied systematically in only two experiments. Zeitlin and McNally (1991) reported that Vietnam veterans with combat-related PTSD exhibited poor explicit memory on a cued recall task for all material except that related to trauma, and exhibited enhanced implicit memory for trauma material on a stem completion task. Litz, Weathers, and Keane (1992), however, failed to find superior recognition memory for trauma material in this population.

Although methodologically rigorous, many laboratory paradigms lack ecological validity. Indeed, PTSD patients suffer from recall of vivid autobiographical memories concerning trauma, not from recall of single unpleasant words (e.g. BODYBAGS). Remembering of single trauma-related words is, at best, a proxy for the involuntary explicit retrieval of traumatic memories that characterises the disorder.

Williams (1992) and his colleagues have devised ecologically valid autobiographical memory procedures relevant to PTSD. These investigators have applied variants of Robinson's (1976) cue word paradigm to elucidate disturbed memory in depressed and suicidal patients (Brittlebank, Scott, Williams, & Ferrier, 1993; Evans, Williams, O'Loughlin, & Howells, 1992; Moore, Watts, & Williams, 1988; Williams & Broadbent,

1986; Williams & Dritschel, 1988; Williams & Scott, 1988). In this paradigm, subjects are asked to retrieve a specific personal memory in response to a cue word having either positive, negative, or neutral valence. Unlike healthy control subjects, depressed patients and suicide attempters typically retrieve overgeneral memories, especially to positive cues. For example, in response to the cue HAPPY, control subjects usually retrieve a specific event (e.g. "the day we left to go on holiday"), whereas patients often retrieve an overgeneral memory unrelated to any specific event (e.g. "when I play squash"; Evans et al., 1992). Moreover, the latency to retrieve specific memories in response to positive cues is sometimes longer in patients than in healthy control subjects (Williams, in press).

Overgenerality may contribute to the maintenance of emotional disorder in several ways. First, if dysphoric patients cannot retrieve specific positive memories about themselves, they may experience difficulty altering their negative self-concepts during cognitive therapy. Indeed, overgenerality strongly predicts failure to recover from depression (Brittlebank et al., 1993). Secondly, because the emotional richness of a retrieved memory is related to its specificity (Rubin, 1986), an inability to retrieve specific positive memories ought to reduce positive affect. Thirdly, overgenerality is related to poor problem-solving skills (Evans et al., 1992), a deficit strongly linked to depression (Schotte & Clum, 1987; Schotte, Cools, & Payvar, 1990).

Although nominally an anxiety disorder, PTSD shares features with depression, and, like patients with primary depression, those with PTSD may be characterised by overgeneral memory, at least for events having neutral or positive valence. But unlike depression, PTSD is a chronic disorder marked by phasic exacerbations triggered by exposure to reminders of traumatic events, and such exposure may worsen overgenerality for at least two reasons. First, reminders may prompt intrusive recollections that consume cognitive capacity, making it difficult for patients to conduct an effortful search for memories having sufficient specificity. Secondly, reminders cue negative affect, making it difficult for patients to access personal memories having positive valence.

In the present study, we used a cue word paradigm to investigate emotional priming of autobiographical memory in Vietnam combat veterans with a primary diagnosis of PTSD, in combat veterans with other mental disorders, and in well-adjusted combat veterans. The priming manipulation was an audiovisual presentation related either to combat or to a neutral theme. Immediately thereafter subjects were asked to retrieve a specific autobiographical memory in response to cue words having positive (e.g. HUMOUR), negative (e.g. SADNESS), or neutral valence (e.g. BACKGROUND). Phenomenology suggests that PTSD patients ought to retrieve overgeneral memories to positive and neutral cues. Indeed,

emotional numbing, a cardinal feature of PTSD, may be related to a relative inability to retrieve specific personal memories having positive valence. That is, although PTSD patients may be plagued by specific memories of traumatic events, their autobiographical memory may be otherwise overgeneral. Finally, the aforementioned predicted effects for the PTSD group ought to be enhanced for those patients who view the combat video. Thus, exposure to reminders of the trauma should increase the difficulty of retrieving specific autobiographical memories in response to cues thematically inconsistent with the combat video, and may also produce long retrieval latencies.

METHOD

Design

A 3 (Group: PTSD, Psychiatric Control, Well-adjusted Control) × 2 (Prime: Combat, Neutral) × 3 (Cue Word: Negative, Positive, Neutral) factorial design was used. The first two factors were measured between subjects, whereas the third factor was measured within subjects.

Subjects

Post-traumatic Stress Disorder (PTSD) Group. The PTSD group consisted of 39 male Vietnam combat veterans recruited from the National Center for PTSD at the Boston Veterans Affairs Medical Center (VAMC). To confirm the diagnosis, an experienced clinician used the PTSD module of the Structured Clinical Interview for DSM-III-R (SCID-R; Spitzer, Williams, Gibbon, & First, 1990), which was developed for the National Vietnam Veterans Readjustment Study (Kulka et al., 1990). Patients were randomly assigned to either the combat prime condition (n = 18) or the neutral prime condition (n = 21).

SCID interviews uncovered the following current comorbid diagnoses in the PTSD group: major depression (n = 20), dysthymia (n = 9), generalised anxiety disorder (GAD) (n = 4), drug dependence (n = 12), alcohol dependence (n = 6), bipolar II disorder (n = 4), delusional disorder (n = 1), psychotic disorder NOS (n = 1), panic disorder (n = 10), simple phobia (n = 6), social phobia (n = 5), obsessive-compulsive disorder (n = 3).

Psychiatric Control (PC) Group. The PC group consisted of 20 male Vietnam combat veterans recruited from the Boston VAMC. Patients were randomly assigned to either the combat prime condition (n = 10) or the neutral prime condition (n = 10).

SCID interviews established the following current diagnoses in this group: major depression (n = 6), dysthymia (n = 3), GAD (n = 3, including one probable case), drug dependence (n = 4), alcohol dependence (n = 7), bipolar disorder (n = 1), delusional disorder (n = 1), panic disorder (n = 1), Tourette's syndrome (n = 1), simple phobia (n = 1), and social phobia (n = 1). Multiple diagnoses were common. Most patients had sought treatment for mood disorder, substance abuse, or both.

Well-adjusted Control (WAC) Group. The WAC group consisted of 23 male Vietnam combat veterans recruited from the Boston metropolitan area through newspaper notices. Subjects were randomly assigned to either the combat prime condition (n = 13) or the neutral prime condition (n = 10). SCID interviews confirmed the absence of current psychiatric disorder.

Subjects completed the Mississippi Scale for Combat-related Posttraumatic Stress Disorder (M-PTSD; Keane, Caddell, & Taylor, 1988), the Combat Exposure Scale (CES; Keane et al., 1989), the Beck Depression Inventory (BDI; Beck & Steer, 1987), the State-Trait Anxiety Inventory-Trait Form (STAI-T; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), and the Shipley estimate of full-scale IQ (Zachary, Crumpton, & Spiegel, 1985).

The M-PTSD is a 35-item self-report instrument that measures the symptoms and associated features of combat-related PTSD. Respondents indicate the frequency with which they experience each symptom on a Likert scale ranging from 1 ("Never") to 5 ("Very Frequently"). Items include, for example: "It seems as if I have no feelings" (emotional numbing) and "I wonder why I am still alive when others died in the military" (survivor guilt). Scores can range from 35 to 175, and scores of 107 or higher generally indicate the presence of PTSD (Keane et al., 1988).

The CES is a 7-item questionnaire designed to evaluate the extent of combat exposure. Each item is scored on a 5-point Likert scale. Items include, for example: "How often did you see someone hit by incoming or outgoing rounds?" and "How often were you in danger of being injured or killed (i.e. pinned down, over-run, ambushed, near miss, etc.) ?" For both of these items, 1 = "Never" and 5 = "51 or more". Scores can range from 7 to 35, and scores higher than 24 indicate high levels of combat exposure (personal communication, T.M. Keane, October 1991, cited in Bremner, Southwick, Johnson, Yehuda, & Charney, 1993).

We submitted these data to analyses of variance (ANOVAs), and explored significant effects with *post hoc* comparisons. As with all statistical tests in this study, alpha = 0.05. As shown in Table 1, PTSD patients reported more symptoms of PTSD, anxiety, and depression than did PC patients, who, in turn, reported more of these symptoms than did WAC

TABLE 1
Mean Questionnaire Scores for Subjects in the PTSD, Psychiatric Control, and Well-adjusted Groups

	Group		
	PTSD	*Psychiatric*	*Well-adjusted*
M-PTSD	127.5_a	98.0_b	75.6_c
	(19.6)	(21.0)	(17.2)
CES	27.3_a	15.6_b	19.3_b
	(8.4)	(10.8)	(9.6)
BDI	29.3_a	18.1_b	6.1_c
	(11.5)	(11.0)	(7.3)
Trait	58.4_a	49.2_b	35.1_c
	(10.0)	(10.8)	(10.1)
IQ	93.5_a	95.8_a	106.5_b
	(14.7)	(12.4)	(8.5)

Notes. M-PTSD, Mississippi Scale for Combat-Related Posttraumatic Stress disorder; CES, Combat Exposure Scale; BDI, Beck Depression Inventory; Trait, Spielberger State-Trait Anxiety Inventory-Trait Form; IQ, Shipley estimated intelligence quotient. Standard deviations are in parentheses. Between-group means sharing a subscript do not differ significantly ($P < 0.05$).

subjects. Not surprisingly, PTSD patients reported more combat exposure than did either of the other two groups. Although all groups had average intelligence, the WAC subjects scored higher than either of the two psychiatric groups.

Materials

Emotional Priming Videotapes.. We constructed two videotapes; one involving scenes from the Vietnam War (*combat* prime), and one involving furniture (*neutral* prime). Each tape was approximately 5–6 minutes long. Each comprised 20 coloured photographs; a variety of combat sounds accompanied the combat video, and classical piano music accompanied the neutral video.

Cue Words. There were 10 *positive*, 10 *negative*, and 10 *neutral* cue words. Each word was typed on a card. The word types did not differ (*F*s < 1) in terms of imageability, concreteness, or frequency of usage (Paivio, Yuille, & Madigan, 1968). The positive and negative words were those of Williams and Dritschel (1988). Words appeared in the following order for all subjects: COMRADESHIP (positive; p), BOREDOM (negative; neg), MATHEMATICS (neutral; n), SICKNESS (neg), HUMOUR (p), AMAZEMENT (n), ANXIETY (neg), DEVOTION (p), BACKGROUND (n), MISERY (neg), GAIETY (p), DETERMINATION (n), FATIGUE (neg), INTIMATE (p), REFLECTION (n),

SHAME (neg), KINDNESS (p), ILLUSION (n), PANIC (neg), HAPPINESS (p), HIERARCHY (n), SADNESS (neg), LOYALTY (p), AGREEMENT (n), IGNORANCE (neg), AFFECTION (p), GRAVITY (n), HOSTILITY (neg), BRAVERY (p), and APPEARANCE (n).

There were four practice words (AUTOMOBILE, TELEPHONE, CLOCK, WINTER) that were presented immediately before the experimental words.

Visual Analogue Mood Scale (VAMS). A Visual Analogue Mood Scale (VAMS) provided measures of mood (Bond & Lader, 1974). The VAMS consisted of 7 horizontal lines drawn on paper and anchored from 0 ("not at all") to 100 ("extremely"). There was a mood adjective for each line, and subjects placed a vertical mark along each line to indicate their current mood. The adjectives were: happy, anxious, sad, angry, emotionally aroused, in a positive mood, and in a negative mood.

Procedure

Subjects completed the VAMS before and after the priming manipulation. We had subjects place their second set of marks with a different coloured pen on the same sheet as their first set of marks. This procedure ensures that subjects remember how they rated themselves prior to the emotional priming manipulation, and ensures that they use the scales consistently. It seems unlikely that this procedure is any more vulnerable to demand effects than are other ways of administering visual analogue mood scales.

The experimenter, who was blind to group status, then read the following instructions to the subject:

> I'll be showing you a series of words. Each word is printed on a separte card. When I show you a word, I'd like you to think of the first *specific* personal memory that comes to mind. So, for example, if the word were "car", you might think of the day on which you purchased your first automobile. Or if the word were "relaxation", you might think of the fishing trip you took last summer. As soon as you think of a memory, I want you to describe it out loud. I'll be timing how quickly you can recall a specific personal memory with this stopwatch. I'll also record your responses on this tape recorder. Before you begin, I'll give you four words for practice. Any questions?

The experimenter read each word aloud as she showed it to the subject. The experimenter prompted each subject until he provided a specific autobiographical memory to each of the practice cards. She presented the experimental words only when the subject had retrieved a specific memory to each of the practice words. Subjects were allowed 60 seconds to retrieve a specific personal memory to each of the experimental words (Williams & Scott, 1988). All sessions were audiotaped.

Data Reduction

The first author listened to each audiotape, and judged whether the first memory retrieved to each cue was specific or general. A second rater scored a random sample of 6 responses from 10 of the audiotapes, resulting in a kappa coefficient of reliability of 0.80. The first author also recorded the latency to retrieve a specific memory, irrespective of whether it was the first one retrieved. The third and fourth authors noted whether each memory was related to Vietnam, and consensually classified each memory as positive, negative, mixed, or neutral in valence. All raters were blind to group status.

RESULTS

Manipulation Check

To determine whether exposure to the combat prime produced greater emotional changes relative to the neutral prime, we submitted the VAMS change scores to a series of 3 (Group) × 2 (Prime) ANOVAs. These analyses revealed significant effects for prime type, but no significant group or Group × Prime interactions. Relative to the neutral prime, the combat prime produced greater increases on the following scales: ANXIETY $F(1,72) = 11.06$, $P < 0.001$; SAD $F(1,75) = 28.58$, $P < 0.001$; ANGER $F(1,73) = 39.10$, $P < 0.001$; EMOTIONALLY AROUSED $F(1,73) = 15.99$, $P < 0.001$; NEGATIVE MOOD $F(1,74) = 19.77$, $P < 0.001$; and greater decreases on the HAPPY $F(1,73) = 26.99$, $P < 0.001$; POSITIVE MOOD scales $F(1,72) = 15.05$, $P < 0.001$. These findings are shown in Fig. 1. These data clearly indicate that the priming manipulation changed self-reported mood in the expected direction for all groups. It is unclear why the magnitude of change was no greater in the PTSD group than in the control groups.

Overgenerality

For each subject, we calculated the percentage of first memories retrieved that were overgeneral, and submitted these data to a 3 (Group) × 2 (Prime Type) × 3 (Cue Type) ANOVA. This analysis yielded a significant effect of cue type, $F(2,152) = 9.44$, $P < 0.0001$, and a marginally significant Group × Prime Type × Cue Type interaction, $F(4,152) = 2.30$, $P < 0.06$. To investigate this near-significant interaction further, we conducted Prime Type × Cue Type ANOVAs within each subject group. The effect of cue type was significant in the WAC group, $F(2,42) = 5.49$, $P < 0.008$, and marginally so in the PC group, $F(2,36) = 2.93$, $P < 0.07$. Subsequent comparisons revealed that WAC subjects were more overgeneral in

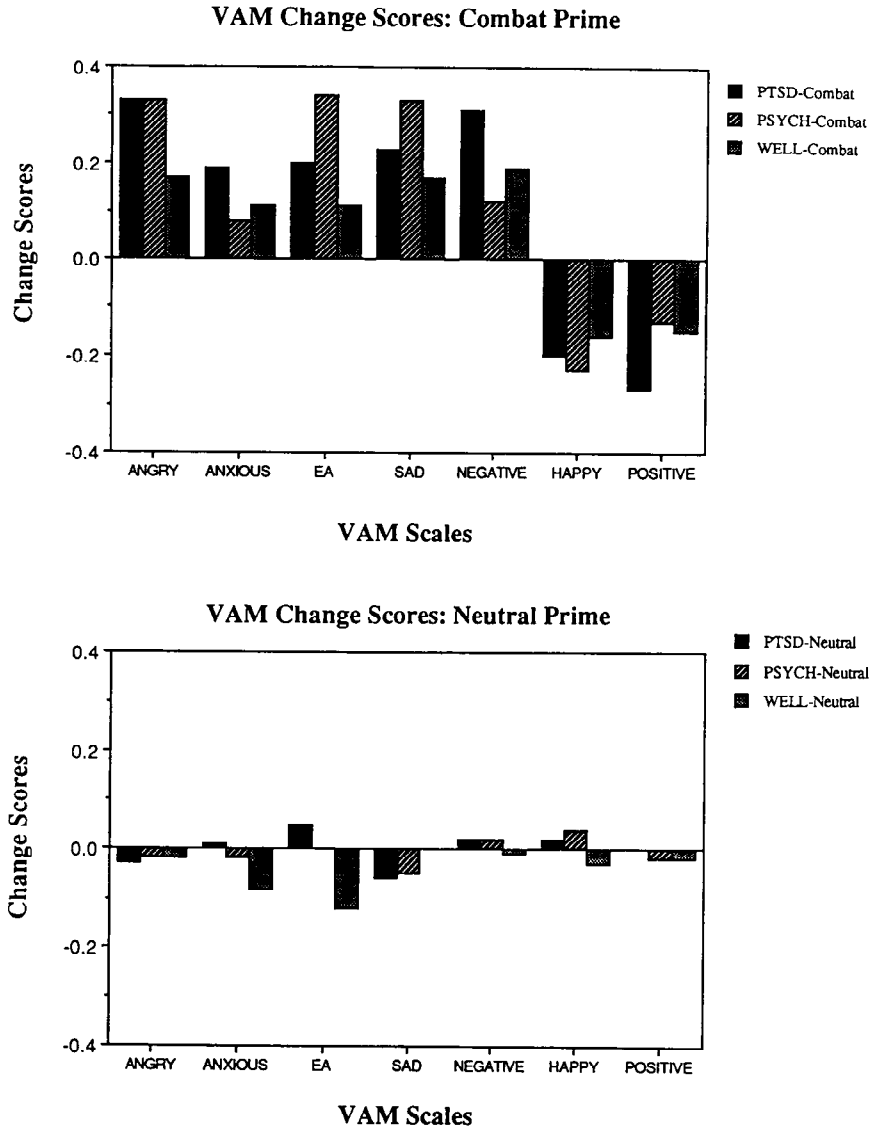

FIG. 1. Visual Analogue Mood Scale change scores as a function of group and prime condition.

response to neutral cues than to positive [$t(22) = 2.20$, $P < 0.04$] and negative [$t(22) = 3.59$, $P < 0.002$] cues, and that PC subjects were more overgeneral in response to neutral cues than to negative [$t(19) = 2.12$, $P < 0.05$] but not to positive [$t(19) = 1.53$, $P < 0.14$] cues. These data are shown in Figs 2 and 3.

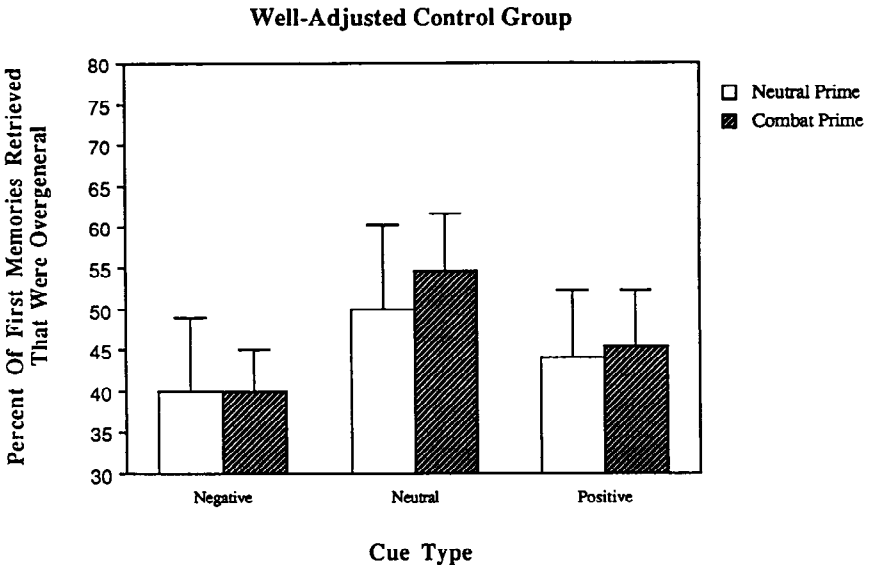

FIG. 2. Mean percentage of first memories retrieved that were overgeneral in the well-adjusted group as a function of cue type and prime type.

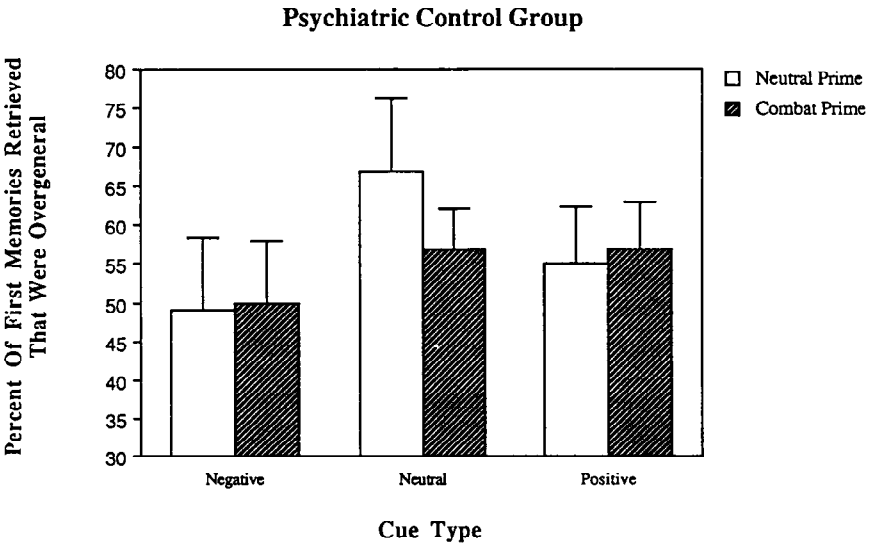

FIG. 3. Mean percentage of first memories retrieved that were overgeneral in the psychiatric control group as a function of cue type and prime type.

Within the PTSD group, a significant cue type effect, $F(2,74) = 4.79$, $P < 0.01$, was modified by a Prime Type × Cue Type interaction, $F(2,74) = 5.79$, $P < 0.005$. Planned comparisons revealed that PTSD patients were more overgeneral in response to positive than to negative cues [$t(38) = 2.99$, $P < 0.005$], and that PTSD subjects in the combat prime condition were more overgeneral in response to neutral cues than were PTSD subjects in the neutral prime condition [$t(37) = 2.16$, $P < 0.04$]. PTSD subjects in the combat prime condition were nonsignificantly more overgeneral in response to positive cues than were PTSD subjects in the neutral prime condition [$t(37) = 1.39$, $P < 0.17$]. PTSD subjects in the combat prime condition were no more overgeneral in response to negative cues than were PTSD subjects in the neutral prime condition [$t(37) = 0.38$, $P < 0.70$]. These data are shown in Fig. 4.

Latency

We analysed the mean latency to retrieve a specific autobiographical memory via a 3 (Group) × 2 (Prime Type) × 3 (Cue Type) ANOVA. Only the effect of cue type was significant, $F(2,152) = 4.19$, $P < 0.02$. Subsequent comparisons revealed that all subjects were faster in retrieving a specific memory in response to negative cues relative to positive and neutral cues.

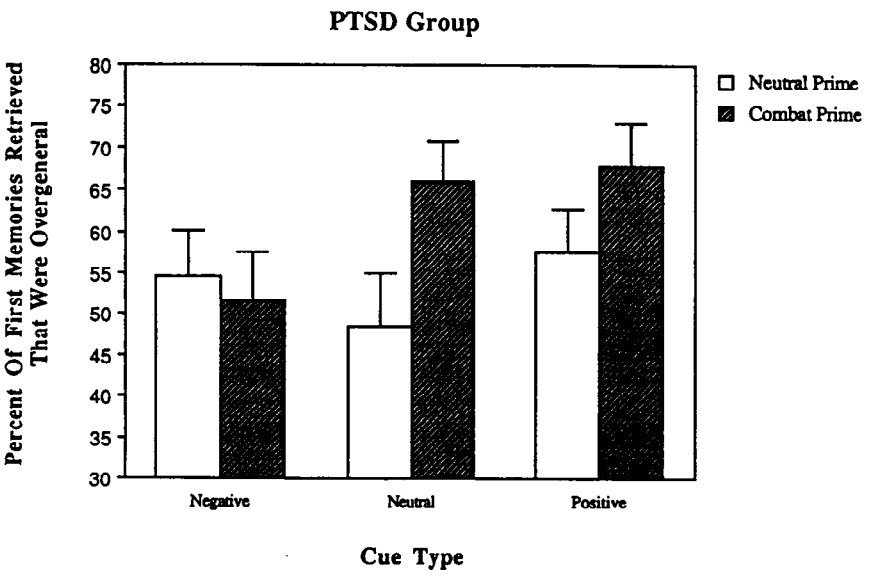

FIG. 4. Mean percentage of first memories retrieved that were overgeneral in the PTSD group as a function of cue type and prime type.

Valence of Retrieved Memories

The proportion of negatively valent memories was analysed via a 3 (Group) × 2 (Prime Type) × 3 (Cue Type) ANOVA. The results revealed significant effects of Group, $F(2,76) = 3.43$, $P < 0.04$, and Cue Type, $F(2,152) = 108.16$, $P < 0.0001$. Subsequent comparisons revealed that PTSD subjects retrieved more negative memories (0.37) than psychiatric control subjects (0.31), but not more than well-adjusted subjects (0.33). Not surprisingly, subjects retrieved more negative memories in response to negative cues (0.66) than to neutral cues (0.23) and to positive cues (0.14).

Vietnam-related Memories

The proportions of Vietnam-related memories were analysed via a 3 (Group) × 2 (Prime Type) × 3 (Cue Type) ANOVA. The results revealed significant effects of Group, $F(2,76) = 5.37$, $P < 0.007$, and cue type, $F(2,152) = 4.90$, $P < 0.009$. Subsequent comparisons revealed that PTSD subjects retrieved more Vietnam-related memories (0.14) than psychiatric control subjects [0.05; $t(57) = 3.43$, $P < 0.01$] but not more than well-adjusted subjects [0.09; $t(60) = 1.76$, $P < 0.08$], and that negative cues provoked more Vietnam-related memories than did neutral cues [0.13 vs. 0.07; $t(81) = 3.30$, $P < 0.01$].

Correlational Analyses

We conducted several correlational analyses to investigate predictors of overgenerality. Percentage of overgeneral memories collapsed across groups, cue type, and prime type, was correlated with PTSD symptoms (M-PTSD) [$r(77) = 0.31$, $P < 0.004$], depression (BDI) [$r(77) = 0.23$, $P < 0.04$], trait anxiety (STAI-T) [$r(77) = 0.27$, $P < 0.02$], but not combat exposure (CES) $r(70) = -0.01$. The correlation between overgenerality and PTSD symptoms remained significant when the effects of depression were partialled out [$r(76) = 0.23$, $P < 0.05$], but not when the effects of trait anxiety were partialled out [$r(76) = 0.17$, $P < 0.15$].

Conceptual Replication of Williams and Dritschel (1988)

Because our positive and negative cue words were identical to those of Williams and Dritschel (1988), we conducted a conceptual replication of their experiment by comparing overgenerality to these cues in PTSD and WAC subjects exposed to the combat and neutral primes. A 2 (Group) ×

2 (Prime Type) × 2 (Cue Type) ANOVA revealed significant effects of group, $F(1,58) = 7.03$, $P < 0.01$, and cue type, $F(1,58) = 8.66$, $P < 0.005$. PTSD patients were more overgeneral than WAC subjects, and positive cues provoked more overgeneral responses than did negative cues. Unlike Williams and Dritschel, we found no interaction between group and cue type; PTSD patients were not more overgeneral to positive versus negative cues relative to WAC subjects. Differential overgenerality as a function of cue valence is, however, not an especially robust phenomenon (Williams, in press); dysphoric subjects are not invariably more overgeneral to positive than to negative cue words.

DISCUSSION

The chief findings can be summarised as follows: (1) exposure to reminders of traumatic events produced equivalent self-reported increases in negative mood across all three groups of combat veterans, but exacerbated overgenerality only in the PTSD group; (2) exposure to reminders in the PTSD group exacerbated overgenerality to neutral cues and nonsignificantly to positive cues, but not to negative cues; (3) PTSD patients were more overgeneral than were well-adjusted combat veterans; (4) overgenerality was related to PTSD symptoms, depression, and anxiety; (5) retrieval latencies were unaffected by diagnostic status or priming condition; all groups were faster to retrieve memories to negative cues relative to positive or neutral cues; and (6) PTSD patients retrieved more memories related to Vietnam than did other psychiatric patients, but not more than well-adjusted veterans.

The present findings are generally in accord with those of Williams and Dritschel (1988) who studied patients who had recently attempted suicide. Their patients had mean overgenerality scores of 57% and 50% in response to positive and negative cues, respectively, whereas our PTSD patients in the neutral priming condition had scores of 58% and 55%, respectively, in response to the identical cue words. Their normal control subjects, however, were less overgeneral than were our well-adjusted combat veterans who viewed the neutral prime. In response to positive and negative cues, their control subjects had overgenerality scores of 27% and 33%, respectively, whereas the corresponding values for our control subjects were 44% and 40%. These comparisons must be interpreted cautiously because of potential cultural differences between British and American subjects, and because Williams and Dritschel did not expose their subjects to any priming manipulations. Nevertheless, it suggests that combat exposure or residual PTSD symptoms may affect autobiographical memory processes. Even though our well-adjusted subjects qualified for no current psychiatric diagnosis, their mean M-PTSD score was a nontrivial 75.6.

PTSD patients were not uniquely fast in retrieving memories in response to negative cues, nor uniquely slow in retrieving memories to positive cues. Indeed, all three groups of subjects were faster in responding to negative cues than to positive or neutral cues. Unlike healthy control subjects in studies on depression, our well-adjusted combat veterans responded like psychiatric patients. Latency of memory retrieval, in any event, may have less clinical relevance than overgenerality. That disturbed patients are several seconds slower to respond to positive cues or several seconds faster to respond to negative cues probably has less impact on functioning than a persistent inability to retrieve specific, especially positive, memories.

As is usually the case (e.g. Kulka et al., 1990), our PTSD patients were characterised by considerable comorbidity. Although PTSD was the primary diagnosis, every patient had at least one other psychiatric disorder, often depression. Accordingly, it is impossible to determine what condition(s) contributed to overgenerality, although correlational analyses suggested that PTSD symptoms are related to overgenerality even when the effects of depressive (but not anxiety) symptoms are controlled. Because comorbid diagnoses are not routinely reported in autobiographical memory research, it is unclear whether depression, for example, in suicide attempters is the key factor. Because parasuicidal behaviour is common in borderline personality disorder patients (who often have trauma histories; van der Kolk, Perry, & Herman, 1991), previous results with suicide attempters might reflect trauma history as much as depression. Indeed, Kuyken and Brewin (in press) found that depressed female patients who exhibited marked overgenerality effects (W. Kuyken & C.R. Brewin, cited in Williams, in press) reported high levels of PTSD symptoms on the Impact of Events Scale (Horowitz, Wilner, & Alvarez, 1979). These findings suggest that overgenerality may be at least as much a function of a history of trauma as of a history of depression.

It is impossible to determine whether overgenerality in PTSD patients is an antecedent or consequence of the disorder. On the one hand, overgenerality may result from intrusive memories consuming cognitive capacity, rendering specific retrieval especially effortful and difficult. That exposure to reminders of trauma in this study worsened overgenerality in PTSD patients is consistent with this possibility. On the other hand, overgenerality may have preceded exposure to combat and the development of PTSD. For example, Williams (in press) has suggested that overgenerality may have its origins in childhood trauma. As children grow older, they ordinarily develop the ability to retrieve specific autobiographical memories. But traumatised children may be disinclined to cultivate this ability because their early memories are so often emotionally painful.

There are several lines of evidence consistent with Williams's (in press) hypothesis. First, W. Kuyken and C.R. Brewin (cited in Williams, in press) discovered that depressed women with histories of childhood sexual abuse were more overgeneral than were depressed women without histories of abuse. These findings suggest that people who have suffered childhood trauma continue to retrieve overgeneral memories, perhaps as a means of blunting their emotional significance. Secondly, Vietnam combat veterans with PTSD more often report histories of childhood physical abuse than do Vietnam combat veterans without psychiatric disorder (26% vs. 7%; Bremner et al., 1993). These groups do not significantly differ, however, in rates of childhood sexual abuse (8% vs. 0%). Thirdly, adults with severe dissociative disorders (who nearly always have childhood histories of horrific abuse) do not merely have difficulty retrieving specific autobioraphical memories; they are often entirely amnestic for large segments of their childhood history (e.g. Loewenstein, 1991; Putnam, Guroff, Silberman, Barban, & Post, 1986).

In summary, overgeneral autobiographical memory seems to characterise patients with primary PTSD just as it does patients with primary major depression. A relative inability to retrieve specific personal memories having positive emotional valence may be related to emotional numbing, and to the extent that inability to retrieve episodes from the past hampers one's ability to envision the future (i.e. future foreshortening), overgenerality may be implicated in the problem-solving deficits that occur in combat veterans with PTSD (Nezu & Carnevale, 1987).

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