

PERSONALITY FACTORS AND POSTTRAUMATIC STRESS: ASSOCIATIONS IN CIVILIANS ONE YEAR AFTER AIR ATTACKS

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There is an ongoing debate on which risk factors for developing posttraumatic stress symptoms are more important—personality traits reflecting vulnerability, previous stressful experiences or characteristics of the traumatic event. In this study, posttraumatic stress symptoms and their relationship with personality traits, previous stressful experiences and exposure to stressful events during air attacks in Yugoslavia were investigated. The Millon Clinical Multiaxial Inventory (MCMI; Millon, 1983), Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979), Life Stressor Checklist Revised (LSCL-R; Wolfe & Kimerling, 1997), and List of Stressors were administered to a homogeneous group of medical students 1 year after the attacks. In multiple regression analyses, compulsive and passive-aggressive personality traits and a higher level of exposure to stressors during air attacks independently predicted the degree of intrusion symptoms. Avoidance symptoms were predicted by avoidant personality traits and a higher exposure to stressors both previously in life and during the attacks. In the next step, we tested in analyses of variance whether personality traits, previous stressful experiences, and stressful events during attacks as independent variables interact in predicting intrusion and avoidance symptoms. For this, students were clustered into three groups depending on their predominant personality traits. In addition to direct predictive effects, there were significant interaction effects in predicting both intrusion and avoidance. The findings suggest that each of the tested factors, i.e., personality traits, previous stressful experiences, and exposure to traumatic events may have an independent and direct influence on developing posttraumatic stress. However, the effect of these factors cannot just be added up. Rather, the factors interact in their impact on posttraumatic stress symptoms. Bigger samples and longitudinal designs will be required to understand precisely how different personality traits influence response to stressful events.

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There is an ongoing debate about the risk factors for developing posttraumatic stress symptoms. Some authors claim that pre-trauma personality vulnerability is the most important, while others argue that type and degree of exposure to stressful events is the primary cause of posttraumatic stress.

Personality functioning in individuals with a history of severe or prolonged trauma is an area that has received increasing attention in recent years. The findings of Shea and Zlotnick (1999) as well as our own (Lecic-Tosevski et al., 1999) suggest that personality dimensions may be distinctly associated with the development of posttraumatic stress. Personality features have been suggested to be central in the "Complex Posttraumatic Stress Disorder" (Herman, 1992) and "Disorders of Extreme Stress Not Otherwise Specified" (DESNOS; Van der Kolk, et al., 1996).

Most of the studies have focused largely on two types of trauma samples—combat trauma (primarily Vietnam veterans with posttraumatic stress disorder [PTSD]), and childhood sexual or physical abuse. Combat veterans have been found to have particularly high rates of borderline, avoidant, and obsessive-compulsive personality disorders when assessed by structured interview (Southwick, Yehuda, & Giller, 1993). High rates of borderline, avoidant, passive-aggressive, and schizoid personality disorders have been found in combat veterans with PTSD when self-report measures of personality disorders are used (Sherwood, Funari, & Piekarski, 1990; Hyer, Davis, Albrecht, Boudewyns, & Woods, 1994). Thus, a link has been proposed in clinical, theoretical, and empirical reports between symptoms caused by stressful events and Axis II personality disorders. The nature and extent of this association remains unclear. One of the difficulties in comparing findings across studies is the use of different measures of Axis II disorders, which have been shown to have rather poor agreement (Perry, 1992).

Retrospective studies have to rely on posttraumatic personality measures, which may be problematic. However, prospective studies are rare and difficult to carry out since the trauma is often unpredictable and strikes suddenly. So far, prospective studies have only been conducted in military personnel with long and varying time intervals between combat and assessment of posttraumatic stress and personality. One such study (Schnurr, Friedman, & Rosenberg, 1993) found that both personality traits and stressor characteristics were important predictors for the development of posttraumatic stress. A more recent study (Bramsen, Dirkywager, & Van Der Ploeg, 2000) showed that exposure to traumatic events during deployment has the highest unique contribution to the prediction of PTSD symptoms severity, followed by the personality traits of negativism and psychopathology, followed by age. In summary, influential factors for the development of full PTSD and less severe forms of posttraumatic stress still remain unclear. With respect to methodology, many studies on the association of personality and posttraumatic stress are flawed because of several factors, such as the heterogeneity of the sample, the stressful events in question, or both.

This study investigated posttraumatic stress symptoms and their relationship with three factors that in the literature have been suggested to be of

predictive value (i.e. personality traits, previous life stressors, and exposure to a specific potentially traumatic event). We assume that each of the three factors may be directly associated with the degree of posttraumatic stress in people who have been subjected to a specific potentially traumatic event. Thus, personality traits, previous stressful experiences previously, and the level of exposure to the potentially traumatic event in question might independently of each other, predict a higher level of posttraumatic stress symptoms. Yet, as illustrated in Figure 1, these factors might also interact in their impact on posttraumatic stress. Personality traits are likely to influence how people expose themselves to and respond to stressful events in their lives. The degree of these stressful experiences earlier in life may then influence the response to a specific potentially traumatic event. In this study we therefore hypothesized that personality traits, previous stressful experiences, and exposure to the potentially traumatic event itself might interact in influencing posttraumatic stress in addition to direct effects of each of the three factors.

The sample was a relatively homogenous and nonselective group of medical students. They all experienced air attacks in Yugoslavia that lasted for 11 weeks in spring 1999. Estimates of casualties among civilians range around 1,500. We investigated the association of personality features, level of previous stressful experiences, and stressful experiences during attacks with levels of PTSD symptoms of intrusion and avoidance.

METHOD

SUBJECTS

One hundred and seven fourth-year medical students at a teaching hospital at Belgrade University, Yugoslavia, were included in the study. All of them had experienced air attacks as civilians in spring 1999. After a complete description of the study, written informed consent was obtained. Seventy-four of the students were female and 33 male. Their ages ranged from 21 to 28 years (mean = 23.8; $SD = 1.2$). At the time of the study, two participants lived with partners, none had children.

Students were assessed in March 2000 (i.e., 1 year after the beginning and 9 months after the end of air attacks). The assessment was organized and conducted by members of the Stress Clinic, which is part of the Institute of Mental Health, University of Belgrade. The confidentiality of the ratings was assured.

ASSESSMENTS

Personality traits were assessed by the Millon Clinical Multiaxial Questionnaire (MCMI; Millon, 1983), a self-report measure developed to assess the DSM-III personality disorders. The MCMI is a 175-item, self-administered, true/false instrument that measures 11 DSM-III personality disorders, plus the 9 clinical syndromes. Results from the MCMI can be appropriately interpreted as measures of personality dimensions, and not only disorders per se (Divac-Jovanovic, Svrakic, & Lecic-Tosevski, 1993). It has been shown that

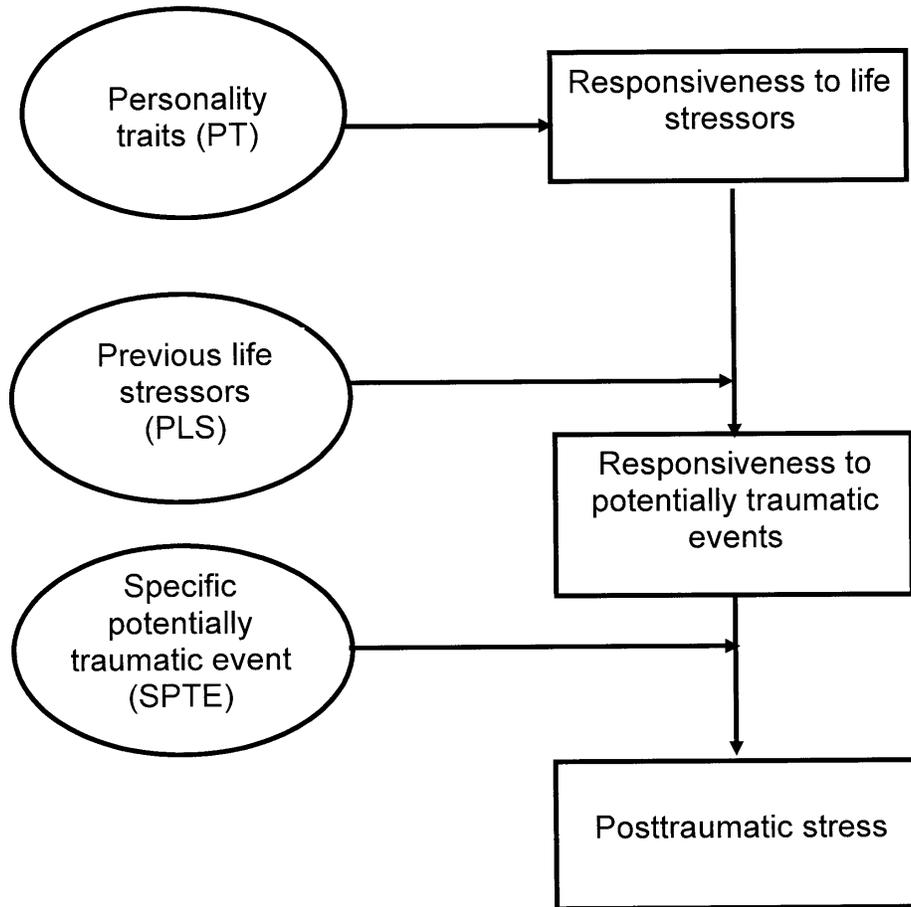


FIGURE 1. A theoretical model of how personality traits, previous life stressors and specific traumatic event might interact in predicting response to a specific traumatic event.

the MCMI has adequate test-retest reliability, especially the personality scales, with the exception of the borderline scale (Hyer, Woods, Bruno, & Boudewyns, 1989; Lecic-Tosevski & Divac-Jovanovic, 1996).

The Life Stressor Checklist-R (LSCL-R; Wolfe & Kimerling, 1997) was used for assessing previous life events that meet the definition of trauma in the DSM-IV. We added questions on previous war experience and experience of forced migration to the listed events. Following the same principle, we compiled the List of Stressors (LS) that were related to air attacks. It consists of items recording exposure to events such as air raid alarms, powerful detonations, death of or injury to a close person, and being in or close to a bombed building. Cumulative scores of stressful events were obtained as a measure of the level of exposure for each of the scales. Interval scaling and normal distribution cannot be assumed for either of these two question-

TABLE 1. Multiple Regression Analysis (Method Enter) with Intrusion Symptoms as Dependent Variable ($R = 0.592$, R -squared = 0.350 , adjusted R -squared = 0.260)

Predictor variable	Beta	<i>t</i>	<i>p</i>
Schizoid traits	-.063	-.477	.64
Avoidant traits	.331	1.943	.06
Dependent traits	-.097	-.672	.50
Histrionic traits	-.103	-.683	.50
Narcissistic traits	.238	1.290	.20
Antisocial traits	-.219	-1.578	.12
Compulsive traits	.261	2.084	.04
Passive-aggressive traits	.391	2.629	.01
Schizotypal traits	.135	.964	.34
Borderline traits	-.044	-.296	.77
Paranoid traits	.088	.623	.54
Previous life stressors	-.056	-.611	.54
Stressors during attacks	.240	2.720	.008

naires. We therefore formed groups depending on the degrees of reported stressors previously in life and during air attacks. Students were grouped into low- and high-intensity groups of previous life stressors according to the median of LSCL-R score, and into low- and high-intensity groups of specific potentially traumatic events according to the median LS score.

The Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) was used to assess posttraumatic symptoms of intrusion and avoidance.

DATA ANALYSIS

The aim was to test the hypothesis that personality traits (PTs), previous life stressors (PLS), and specific potentially traumatic event (SPTE; i.e., air attacks) would all directly impact the development of posttraumatic stress, as well as interact in influencing posttraumatic stress. In order to avoid multiple testing with the need to adjust the level of significance of a high number of bivariate analyses, we performed four multivariate analyses. Bivariate analyses were conducted only post hoc to identify differences between specific subgroups.

In order to assess the direct impact of the three factors, we computed multiple regression analyses (method enter) with intrusion and avoidance as dependent variables. Independent variables were the 11 personality traits, the degree of previous stressful experiences, and the level of exposure to stressful events during air attacks.

However, the sample size was not sufficient to test different interaction effects using the same method. In order to identify interaction effects, we conducted analyses of variance, again with the level of intrusion and avoidance symptoms as independent variables. For this, subjects had to be allocated to a small number of distinct categories regarding their PTs. Thus, we first applied a cluster analysis that attempted to group patients based on their PTs. The exact statistical procedures were as follows: the clustering method

TABLE 2. Multiple Regression Analysis (Method Enter) with Avoidance Symptoms as Dependent Variable ($R = 0.602$, R -squared = 0.363 , Adjusted R -squared = 0.273)

Predictor variable	Beta	t	p
Schizoid traits	-.087	-.665	.51
Avoidant traits	.557	3.304	.001
Dependent traits	-.189	-1.322	.19
Histrionic traits	.238	1.591	.12
Narcissistic traits	-.099	-.539	.59
Antisocial traits	.010	.073	.94
Compulsive traits	.159	1.286	.20
Passive-aggressive traits	.036	.245	.81
Schizotypal traits	-.009	-.067	.95
Borderline traits	-.005	-.036	.97
Paranoid traits	.215	1.531	.13
Previous life stressors	-.220	-2.439	.02
Stressors during attacks	.428	4.899	<.001

used to identify meaningful groupings of the subjects depending on their PTs was based on Euclidean distances among subjects, which optimizes Ward criterion. Due to the sample size, we established in advance that the number of clusters to be extracted should not exceed three.

Three-way ANOVAs were conducted to assess whether personality traits, level of exposure to previous life stressors, and potentially traumatic events during air attacks, as well as their interaction, predicted development of posttraumatic stress. Independent variables in these ANOVAs consisted of the following groupings: on personality traits, on the level of PLS (low or high), and on the level of exposure to SPTE (i.e., air attacks)—low or high. The dependent variables were continuous scores of intrusion and avoidance on the IES. Two-way interactions indicate the interaction between two out of three influential factors, and three-way interactions indicate the interaction between all three of them.

RESULTS

The mean score of exposure on the LSCL-R was 3.1 ($SD = 2.3$, median = 3) and on LS 17.3 ($SD = 4.4$, median = 17). On the LSCL-R, 47 students were in the “low-” and 60 in the “high-” intensity group. On the LS 51 students were in the “low-intensity group” and 56 were in the “high-intensity group.” The IES mean scores for the whole group (107 students) were 5.5 ($SD = 6.7$) on intrusion and 8.4 (8.5) on avoidance.

Tables 1 and 2 show the results of multiple regression analyses with intrusion and avoidance as dependent variables.

A higher degree of compulsive traits, passive-aggressive traits, and exposure to stressful events during air attacks each was significantly and independently associated with a higher level of intrusion. The predictive value of avoidant traits just failed to reach statistical significance. Together the predictor variables explained 26% of the variance of intrusion.

TABLE 3. Means, Standard Deviations (SD) and F Values of Three Clusters of Personality Traits

Personality traits	Cluster I n = 71	Cluster II n = 19	Cluster III n = 17	F
Schizoid	30.3 (15.6)	61.0 (16.1)	19.1 (8.1)	42.3***
Avoidant	20.1 (13.4)	58.0 (14.3)	31.7 (15.4)	54.4***
Dependent	37.8 (18.6)	72.0 (17.7)	46.2 (23.0)	23.9***
Histrionic	73.3 (15.0)	52.4 (20.5)	88.0 (11.0)	24.2***
Narcissistic	74.3 (16.8)	57.8 (17.6)	78.4 (11.0)	24.4***
Antisocial	66.8 (13.4)	54.4 (24.0)	72.0 (11.0)	6.6**
Compulsive	69.4 (7.0)	65.4 (9.5)	53.9 (14.1)	21.1***
Passive-aggressive	24.6 (12.6)	54.4 (20.6)	69.2 (11.8)	84.6***
Schizotypal	31.5 (15.2)	54.5 (8.1)	27.7 (14.5)	22.6***
Borderline	30.3 (15.8)	57.6 (9.4)	55.1 (9.9)	40.9***
Paranoid	58.7 (17.3)	65.9 (15.9)	68.1 (17.2)	2.8

** $p < 0.01$, *** $p < 0.001$

Significant independent predictors of higher avoidance scores were a greater extent of avoidant personality traits, more exposure to stressful events during the attacks, and a smaller number of previous stressful life events, which together explained 27% of the variance.

For testing the interaction effects that personality traits, previous stressful life experiences, and exposure to stressful events during attacks have in predicting posttraumatic stress, analyses of variance were computed. This required forming groups of students on the basis of their personality traits, for which a cluster analysis was conducted. The cluster analysis identified three personality clusters and the grouping was confirmed by discriminant function analysis, as shown in Table 3.

The actual number of cluster memberships for personality are 71 for Cluster 1 (predicted 67), 19 for Cluster 2 (predicted 17), and 17 for Cluster 3 (predicted 16). We named the three clusters "Balanced" (Cluster 1), "Detached" (Schizoid-avoidant; Cluster 2), and "Self-absorbed" (Histrionic/narcissistic; Cluster 3). The percentage of correctly classified "grouped" cases was 93.5%.

The "Balanced" cluster scored 3.7 ($SD = 5.1$) on intrusion and 7.4 ($SD = 8.1$) on avoidance. Scores for the "Detached" cluster were 10.3 ($SD = 8.0$) for intrusion and 10.6 ($SD = 8.5$) for avoidance, and for the "Self-absorbed" cluster 7.4 ($SD = 8.2$) and 10.1 (9.9) on intrusion and avoidance respectively.

IMPACT OF PERSONALITY TRAITS, PREVIOUS STRESSFUL EXPERIENCES, AND STRESSFUL EXPERIENCES DURING ATTACKS ON INTRUSION AND AVOIDANCE SYMPTOMS

Table 4 shows the mean scores of intrusion depending on personality traits (PT), level of previous life stressors (PLS), and level of specific potentially traumatic event (SPTE) (i.e., air attacks).

A three-way ANOVA with the IES intrusion score as the dependent variable showed a significant main effect of all three factors (i.e., personality

TABLE 4. Means, Standard Deviations and Number of Students (M/SD/N) on Intrusion Depending on Personality Traits (PT – Three Clusters), Level of Previous Life Stressors (PLS – Two Groups with Low and High Levels) and Exposure to Specific Potentially Traumatic Event (SPTE – Two Groups with Low and High Levels)

PT	PLS	SPTE	
Balanced 3.7 / 5.1 / 71	Low level PLS	Low level of SPTE	2.5 / 2.8 / 22
	3.6 / 4.6 / 36	High level of SPTE	5.4 / 6.3 / 14
	High level of PLS	Low level of SPTE	2.5 / 4.9 / 13
	3.9 / 5.6 / 35	High level of SPTE	4.7 / 5.8 / 22
		Low level of SPTE	2.5 / 3.7 / 35
		High level of SPTE	5.0 / 6.0 / 36
Detached 10.3 / 8.0 / 19	Low level of PLS	Low level of SPTE	15.0 / 9.4 / 4
	11.4 / 8.9 / 7	High level of SPTE	6.7 / 6.6 / 3
	High level of PLS	Low level of SPTE	4.5 / 5.7 / 4
	9.7 / 7.7 / 12	High level of SPTE	12.2 / 7.6 / 8
		Low level of SPTE	9.7 / 9.1 / 8
		High level of SPTE	10.7 / 7.5 / 11
Self-absorbed 7.4 / 8.2 / 17	Low level of PLS	Low level of SPTE	3.6 / 4.7 / 3
	9.0 / 11.3 / 4	High level of SPTE	25.0 / * / 1
	High level of PLS	Low level of SPTE	2.2 / 2.7 / 5
	6.8 / 7.4 / 13	High level of SPTE	9.7 / 8.1 / 8
		Low level of SPTE	2.7 / 3.3 / 8
		High level of SPTE	11.4 / 9.1 / 9

*Not applicable.

traits ($F(2.95) = 10.7, p < .001$), previous stressful life events ($F(1.95) = 5.3, p < .05$), and stressful events during air attacks ($F(1.95) = 12.1, p = 0.001$). A significant two-way interaction effect of personality traits and stressful experiences during air attacks ($F(2.95) = 5.6, p < .01$) was found. Finally, there was a significant interaction effect of all three factors ($F(2.95) = 5.9, p < .01$).

Post hoc analyses using a Bonferroni test at an α level of .05 revealed a significant difference between “Balanced” personalities with either low or high levels of previous life stressors (and low levels of stressors during air attacks) and “Detached” personalities experiencing either low levels of stressors during air attacks (and low levels of previous life stressors) or high levels of stressors during air attacks (and high levels of previous life stressors). A significant difference was also found between “balanced” personalities with low or high levels of previous life stressors (and low levels of stressors during air attacks), and “Self-absorbed” personalities with low levels of previous life stressors (and high exposure to air attacks).

The results of the three-way ANOVA with the IES avoidance score as the dependent variable are summarized in Table 5.

The analysis showed a significant main effect of both previous life stressors and stressful events during air attacks ($F(1.95) = 5.5, p < .05$; $F(1.95) = 12.2, p = .001$), but no significant main effects of personality traits. An interaction effect of personality traits and stressful events during air attacks was

TABLE 5. Means, Standard Deviations and Number of Students (M/SD/N) on Avoidance Depending on Personality Traits (PT - Three Clusters), Level of Previous Life Stressors (PLS - Two Groups with Low and High Levels) and Specific Exposure to Potentially Traumatic Event (SPTE - Two Groups with Low and High Levels), and Two Groups on Level of Life Stressors and Stressful Experiences During Air Strikes

PT	PLS	SPTE	
Balanced 7.4 / 8.1 / 71	Low level of PLS	Low level of SPTE	4.0 / 6.2 / 22
	7.7 / 8.7 / 36	High level of SPTE	13.5 / 9.0 / 14
	High level of PLS	Low level of SPTE	3.6 / 3.8 / 13
	7.1 / 7.7 / 35	High level of SPTE	9.2 / 8.7 / 22
		Low level of SPTE	3.9 / 5.4 / 35
		High level of SPTE	10.9 / 8.9 / 36
Detached 10.6 / 8.5 / 19	Low level of PLS	Low level of SPTE	18.0 / 10.2 / 4
	14.9 / 10.2 / 7	High level of SPTE	10.7 / 10.5 / 3
	High level of PLS	Low level of SPTE	3.0 / 2.3 / 4
	8.2 / 6.5 / 12	High level of SPTE	10.7 / 6.4 / 8
		Low level of SPTE	10.5 / 10.6 / 8
		High level of SPTE	10.7 / 7.1 / 11
Self-absorbed 10.1 / 9.9 / 17	Low level of PLS	Low level of SPTE	4.7 / 6.4 / 3
	9.5 / 11.0 / 4	High level of SPTE	24.0 / * / 1
	High level of PLS	Low level of SPTE	4.2 / 3.6 / 5
	10.3 / 10.0 / 13	High level of SPTE	14.1 / 11.0 / 8
		Low level of SPTE	4.4 / 4.4 / 8
		High level of SPTE	15.2 / 10.8 / 9

*Not applicable.

of a borderline significance ($F(2.95) = 2.9, p = 0.058$), while the interaction between all three factors was statistically significant ($F(2.95) = 5.9, p < .01$).

A post hoc analysis using a Bonferroni test at an α level of .05 revealed a significant difference between “balanced” personalities with low levels of stressors during air attacks (and low levels of previous life stressors) and “balanced” personalities with high levels of stressors during air attacks (and low levels of previous life stressors).

DISCUSSION

Since only a proportion of persons exposed to stressful events develop symptoms of posttraumatic stress, it is important to elucidate factors that increase the risk, as well as the factors that might serve to protect individuals from developing this condition. This was the primary aim of our study.

In multiple regression analyses, the level of exposure to stressful events during attacks was the strongest predictor of both intrusion and avoidance symptoms. The more students had been exposed to such events the more likely they were to have posttraumatic stress symptoms 1 year later. A higher number of previous stressful experiences was associated with lower scores on avoidance, but not intrusion. Avoidant personality traits predict avoidant behavior, which appears to be a plausible result. However,

avoidant personality traits also had a tendency to be associated with intrusion. This might indicate a negative impact of avoiding behavior on general recovery from posttraumatic stress. Intrusion was predicted by compulsive and passive-aggressive traits. Both traits may be associated with a higher degree of cognitive rigidity and anger, which might interfere with successful coping with posttraumatic symptoms.

For further analysis we identified three personality clusters (i.e., a "Balanced," "Detached," and "Self-absorbed" cluster. The "Balanced" cluster includes the majority of students. This group had lower scores on avoidant, dependent, passive-aggressive, and borderline traits, and higher scores on compulsive traits than the other two clusters. The "Detached" cluster scored significantly higher on schizoid, avoidant, dependent, schizotypal, and borderline traits, and significantly lower on histrionic, narcissistic, and antisocial traits than the other two clusters. And finally, the "Self-absorbed" cluster had the highest scores on histrionic, narcissistic, antisocial, and passive-aggressive traits, and the lowest scores on schizoid traits. The "Detached" and "Self-absorbed" clusters scored significantly higher on the borderline traits than the "Balanced" cluster. Although that trait was not prominent, it might indicate a tendency toward personality disturbance or proneness to psychopathology in these two clusters (Millon, 1983; Divac-Jovanovic et al., 1993).

It should be noted that all three clusters scored relatively high on the compulsive traits (see Table 3). This is in accordance with our previous findings, in which these traits were consistently high in traumatized individuals, possibly showing denial and isolation of affect as healthy defence mechanisms after traumatic experiences (Lecic-Tosevski et al., 1999).

The results of the analyses of variance are consistent with the general hypothesis that influential factors would interact in predicting posttraumatic stress. Personality traits, previous life stressors, and exposure to stressful events during air attacks may have a direct impact on posttraumatic stress. However, they also interact in influencing posttraumatic stress.

Personality had a main (i.e., direct) effect only on intrusion but not on avoidance. The "Balanced" cluster had the lowest scores on intrusion, followed by the "Self-absorbed" cluster, while the "Detached" cluster had the highest score. It seems that the more disturbed the personality is, the more it is prone to the development of intrusion, the most difficult symptom of posttraumatic stress due to impaired cognition and less successful coping strategies.

We believe that the principle of establishing a significant interaction between the assessed influential factors is important for understanding the complex process leading to higher or lower degrees of posttraumatic stress in individuals exposed to stressful events. However, the precise nature of these interactions is difficult to interpret based on our findings due to the small sample size. This difficulty has been underlined by the post hoc analyses that identified only a small number of specific differences that reached the level of statistical significance. Thus, any explanation of specific interactions has to be speculative at this stage of research.

With respect to the two-way interactions between personality and potential traumatic events during air attacks, a similar tendency has been ob-

served both on intrusion and on avoidance. “Balanced” personalities responded to higher exposures during air attacks with higher intensities of symptoms. Such “dose-related responses” were even more prominent in “Self-absorbed” personalities. “Detached” personalities had similar degrees of posttraumatic stress regardless of the level of exposure during air attacks.

The significant three-way interaction is consistent with the theoretical model shown in Figure 1. As in two-way interactions, results on intrusion were similar to those on avoidance. In the “Balanced” cluster the level of previous life stressors does not appear to interact with the degree of exposure to potentially traumatic events in predicting symptom level. When exposure during air attacks was higher, the level of symptoms was also higher, in line with the already mentioned “dose-related response.”

The “Self-absorbed” cluster tended to score higher when the exposure to air attack was higher, as did the “Balanced” personalities. Interestingly, when the level of exposure during air attacks was high, students with fewer previous life stressors scored significantly higher than students with high levels of life stressors. This is consistent with the results of the multiple regression analysis, which suggest a protective effect of a greater number of previous life stressors for developing avoidance symptoms, when the influence of other factors has been controlled for. The “Detached” cluster showed a different tendency—previous life stressors clearly influenced the level of symptoms in the sense that higher exposures to air attacks produced higher levels of symptoms only when the levels of previous life stressors were high. Paradoxically, in the case of low levels of previous life stressors, a lower exposures to air attacks were associated with more symptoms than the higher exposures.

Having coped with previous stressful events in a positive way might help people to adapt to potentially traumatic events in the future as was noted in some other studies (Aldwin, 1993; Burt & Katz, 1987), but only when the exposure to these new events is low. When exposure is high, the “protective” value of having coped with previous life stressors seems to disappear. Also, it has been suggested (Priebe, Bolze, & Rudolf, 1994; Gavrilovic, Lecic-Tosevski, Knezevic, & Priebe, 2002) that previous experience with trauma may qualitatively change the way subjects respond to further traumatic events.

The methodological strengths of our study include the relative homogeneity of the sample with respect to age, educational background, and current occupation so that there was no need to control for the influence of these potentially influential factors. Moreover, the response rate was relatively good with little selection bias, and the time interval between exposure to potential trauma and the assessment was identical in all subjects. The shortcomings of the study might be that stressful experience prior to the air attacks and exposure during the attacks were assessed retrospectively. But, the sample was a nonclinical one, which to some extent prevented state-trait dependence, i.e. influence of current symptomatology on personality ratings. In some studies, retrospective accounts of traumatic events have been shown to be influenced by current posttraumatic stress (Harvey & Bryant, 2000; Roemer, Litt, Orsillo, Ehlich, & Friedman, 1998), while other studies have

found retrospective reports to be relatively accurate (Henry, Moffit, Caspi, Langley, & Silva, 1994; Wagenaar & Groenweg, 1990).

The cross-sectional design of the study makes it, strictly speaking, impossible to draw conclusions on causal relationships. However, since personality traits are supposed to be consistent over time, one might assume that our study replicated findings by other authors, namely that pre-trauma personality as well as the type of stressful events may be important predictors for developing posttraumatic stress symptoms.

The most important finding of this study, i.e., that influential factors interact in their impact on the development of posttraumatic stress after a stressful event, is consistent with the assumption that processes leading to posttraumatic stress may be complex and that the influence of personality traits can be direct as well as indirect. This may have implications for understanding the role of personality factors in posttraumatic stress both in clinical practice and further research. Although personality, previous stressful life events, and exposure to potentially traumatic events are each significant predictive factors in their own right, looking at these factors separately may be insufficient. Their interaction needs to be considered. Studies to identify and understand the nature of specific interactions are likely to require larger sample sizes, preferably in longitudinal designs and possibly complemented by qualitative assessments of the mediating cognitive processes and coping strategies.

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