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Do personality traits predict post-traumatic stress?: a prospective study in civilians experiencing air attacks

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ABSTRACT

Background. Previous studies have suggested an association between personality traits and post-traumatic stress. These studies either focused exclusively on military veterans or assessed personality traits after the traumatic event. This study investigates to what extent personality traits as assessed before the traumatic experience predict post-traumatic stress in civilians experiencing air attacks at the end of the exposure to stressful events and 1 year later.

Method. The revised version of the NEO Personality Inventory was administered to 70 students in Belgrade, Yugoslavia. In 1999, 1 or 2 years after the assessment, all students were exposed to air attacks for 11 weeks. At the end of the attacks and 1 year later post-traumatic stress was measured on the Impact of Event Scale.

Results. Pre-trauma personality predicted 13% of the variance of intrusion scores 1 year after the attacks. There was no significant correlation between personality traits and subsequent avoidance scores at any point of time.

Conclusions. Personality traits that are assessed before a traumatic event can, to a limited extent, predict intrusive symptoms in a non-clinical sample of civilians. Pre-trauma assessments of personality might be less strongly associated with post-traumatic stress than personality traits obtained after the traumatic event.

INTRODUCTION

In the search for factors that predict response to traumatic events, various studies have investigated the relationship between personality traits and post-traumatic stress. They suggest that personality traits influence the response to traumatic events and predict the level of post-traumatic stress (e.g. Sutker *et al.* 1991, 1995; Bramsen *et al.* 2000; Lecic-Tosevski *et al.* 2003). More post-traumatic stress symptoms have been found in patients with higher scores of neuroticism – alone (Breslau *et al.* 1991; Hyer *et al.* 1994) or in combination with introversion (Davidson *et al.* 1987; McFarlane, 1988*b*; Fauerbach *et al.* 2000) – and negativism (McFarlane, 1988*a*), and with low agreeableness (Talbert *et al.* 1993). The findings on which personality factors are associated with post-traumatic stress have not been entirely consistent, which may be due to differences in the instruments used to assess personality. The amount of variance of post-traumatic stress explained by personality factors has been low to moderate.

Most studies in the field have serious methodological shortcomings, most notably that personality was assessed after the event when ratings may be influenced by psychological sequelae of the traumatic experience. One

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exception is a study on the sequelae of World War II combat (Lee *et al.* 1995), in which, however, personality was not directly measured with established and validated methods. Three other studies evaluated personality tests at the age of 15 years, entrance to undergraduate school or at selection for the Army, and linked the results to symptoms of post-traumatic stress after combat or peacekeeping missions respectively. In these studies, the interval between personality assessment and traumatic events varied, as did the time between combat experience and assessment of post-traumatic stress. The interval between assessment of personality and post-traumatic stress ranged between several years and more than two decades. Schnurr *et al.* (1993) and Bramsen *et al.* (2000) reported an association between personality – as assessed on the Minnesota Multiphasic Personality Inventory – and post-traumatic stress symptoms, whilst Card (1983) did not find any predictive value of personality traits for post-traumatic stress many years later. The impact of some personality traits on post-traumatic stress held true when the influence of exposure to traumatic events was controlled for.

This study investigated the impact of personality factors on post-traumatic stress in civilians who experienced air attacks in Belgrade, Yugoslavia. The attacks lasted for 78 days in spring 1999 and resulted in civilian casualties. In contrast to the aforementioned prospective studies, personality was assessed just 1 or 2 years before the events, all subjects were exposed to the same air attacks over a confined period of time, and post-traumatic stress was consistently assessed at the end of exposure and 1 year later.

METHOD

All subjects were psychology students at the University of Belgrade. They had filled in the NEO Personality Inventory (NEO-PI; Costa & McCrae, 1992) as part of a course in their second year, 1 or 2 years before spring 1999. Seventy students were contacted at the end of the air attacks in June 1999 (62 women, 8 men; age: mean = 22·4 years, S.D. = 1·6) and rated post-traumatic stress on the Impact of Event Scale (IES; Horowitz *et al.* 1979; Sundin & Horowitz, 2002). At that time they also filled in a 37-item checklist of stressful experiences relating to the air attacks that reflects the nature and degree of personal exposure to stressful events such as witnessing the death of and injuries to nearby persons, being close to powerful explosions or being in a bombed building (Gavrilovic *et al.* 2002). Fifty-four students re-rated the IES 1 year later. Written informed consent was obtained from all participants.

Pearson's correlation coefficients were calculated to test the association of personality traits and degree of exposure to stressful events with scores of intrusion and avoidance at the end of the attacks and 1 year later. The five pre-trauma personality traits were entered blockwise as predictors in multiple regression analyses with intrusion and avoidance scores as dependent variables. In a second step, the degree of exposure was also entered as a predictor to analyse the combined predictive power of personality traits and degree of exposure, and to test whether personality factors interact with degree of exposure in predicting post-traumatic stress.

RESULTS

Mean scores and standard deviations on NEO-PI were 78·8 (S.D. = 21·7) for neuroticism, 117·8 (S.D. = 18·1) for extraversion, 132·8 (S.D. = 16·2) for openness, 115·2 (S.D. = 16·2) for agreeableness and 118·8 (S.D. = 20·2) for conscientiousness. Intrusion scores on IES at the end of the attacks were 11·04 (S.D. = 7·15) and 4·67 (S.D. = 5·56) 1 year later (*t* test for dependent samples; $t = 6{\cdot}57$, df = 53, $p < 0{\cdot}001$). Avoidance scores were 11·96 (S.D. = 6·99) at the end of attacks and 6·38 (S.D. = 6·06) 1 year afterwards ($t = 4{\cdot}81$, df = 53, $p < 0{\cdot}001$). Intrusion scores at the two points were significantly correlated ($r = 0{\cdot}39$, $p = 0{\cdot}003$), whilst avoidance scores were not ($r = 0{\cdot}19$, $p = 0{\cdot}187$). At the end of the attacks, 10 out of the 54 students who were interviewed twice had an IES total score of > 34, which has been suggested as a threshold for clinically relevant symptoms (Neal *et al.* 1994) equivalent to a diagnosis of Post-traumatic Stress Disorder, although a diagnosis cannot be made on the basis of the IES alone. After 1 year, only two students had total IES scores above that threshold.

Table 1 shows how pre-trauma personality traits and degree of exposure to stressful events during attacks were associated with intrusion

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Table 1. *Associations of pre-trauma personality traits as assessed on the NEO-PI and degree of exposure to stressful events during air attacks with IES scores for intrusion and avoidance at the end of attacks (n = 70) and 1 year later (n = 54) (Pearsons's r and two-tailed p values)*

	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness	Degree of exposure
Intrusion at the end of attacks	0·23 (0·057)	−0·12 (0·338)	0·19 (0·123)	0·08 (0·499)	−0·07 (0·565)	0·20 (0·094)
Avoidance at the end of attacks	0·15 (0·206)	−0·10 (0·401)	−0·04 (0·753)	−0·10 (0·403)	0·03 (0·815)	0·12 (0·305)
Intrusion after 1 year	0·20 (0·072)	−0·06 (0·331)	0·30 (0·014)	0·14 (0·151)	−0·04 (0·393)	0·16 (0·124)
Avoidance after 1 year	0·18 (0·193)	−0·06 (0·680)	0·11 (0·448)	−0·03 (0·859)	0·17 (0·221)	−0·03 (0·843)

and avoidance scores at the end of attacks and 1 year later.

A higher degree of exposure to stressful events during the attacks tended to be correlated with higher intrusion scores at the end of attacks, but this correlation failed to reach statistical significance ($r = 0{\cdot}20$, $p = 0{\cdot}094$). Degree of exposure did not significantly predict intrusion after 1 year or avoidance at any point of time. With respect to personality traits, higher scores of neuroticism were associated with more intrusion symptoms at the end of attacks and 1 year later with the correlation coefficients just failing to reach statistical significance. Openness was moderately correlated with intrusion after 1 year. Other correlations were not significant.

In multiple regression analyses with all five personality traits and degree of exposure as predictors, there was no significant prediction of intrusion scores at the end of air attacks, or of avoidance scores at any time. Yet, when all personality traits were considered as predictors, intrusion scores 1 year after the air attacks were significantly predicted. The explained variance was 13% ($R = 0{\cdot}45$, $R^2 = 0{\cdot}21$, adjusted $R^2 = 0{\cdot}13$; $F = 2{\cdot}483$, df = 5, 48, $p = 0{\cdot}044$). In the regression function openness was identified as a significant predictor [$\beta = 0{\cdot}39$, $t(48) = 2{\cdot}833$, $p < 0{\cdot}001$], whilst the predictive value of neuroticism failed to reach statistical significance [$\beta = 0{\cdot}28$, $t(48) = 1{\cdot}885$, $p = 0{\cdot}06$]. The additional inclusion of the degree of exposure to stressful events as a potential predictor did not increase the amount of explained variance in intrusion scores 1 year after air attacks [$R = 0{\cdot}46$, $R^2 = 0{\cdot}21$, adjusted $R^2 = 0{\cdot}11$; $F = 2{\cdot}137$, df = 6, 47, $p = 0{\cdot}066$; degree of exposure $\beta = 0{\cdot}10$, $t(47) = 0{\cdot}729$, $p = 0{\cdot}47$]. There were no significant interaction effects between personality factors and degree of exposure.

DISCUSSION

To our knowledge, this is the first prospective study to investigate the impact of personality traits on post-traumatic stress that used the NEO-PI to assess personality traits, which may be regarded as one of the best-established instruments for that purpose at present. The study is also unusual in other respects: as a prospective study it is the only one that (*a*) investigated civilians and not military veterans, (*b*) had a mixed gender sample – in fact a predominantly female one, (*c*) assessed personality traits and post-traumatic stress at fixed points of time in relation to the stressful experience and a short period of time before and after it, and (*d*) obtained post-traumatic stress scores at two points of time, i.e. immediately after the end of exposure and 1 year later. In line with recommendations by Schnurr & Vielhauer (2000) the study followed 'the ideal non-experimental design … [with] multivariate statistical procedures, pre-traumatic personality measures and multiple posttraumatic assessments'. Moreover, the sample was homogeneous with respect to age, educational background, current occupation as well as the nature and duration of the stressful events. Thus, these potentially influential factors cannot have substantially confounded the findings.

Methodological weaknesses of the study are the small size and selective nature of the sample. The small sample size was due to the inevitably

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opportunistic nature of the study (exposure to traumatic events is difficult to anticipate in civilians) and has clearly limited the statistical power of the analysis.

When post-traumatic stress was assessed directly at the end of the 78-day period of attacks, acute stress reactions and post-traumatic stress may have overlapped in influencing IES ratings. This overlap at the end of the attacks and a favourable spontaneous course of post-traumatic stress are likely to have contributed to the significant decrease of intrusion and avoidance scores between the end of the attacks and the 1-year follow-up.

The only other significant result – in univariate and multivariate analyses – was that openness was a predictor of intrusion after 1 year. The predictive value of openness has so far not been reported in other studies. A higher degree of openness might increase the vulnerability to develop stress symptoms following a traumatic event. It might also interfere with denial as a successful coping mechanism, both processes resulting in a higher level of intrusion symptoms.

Supposing that openness might decrease as a result of post-traumatic stress, the association found in this prospective study would not necessarily be identified in cross-sectional studies after the trauma. Also, the level of openness in the sample of this study was relatively high (Card, 1983). The impact of openness on developing post-traumatic stress might – following a nonlinear association – be stronger at higher levels.

In general, the predictive power of personality variables in this study appears low. Avoidance scores were not predicted at all, and the variance of intrusion scores explained through personality traits did not exceed 13%. Most tested correlations were not significant, and adjustment for multiple testing of correlations would have made all significant results disappear. Even taking into account the limited statistical power of the study, the findings suggest that personality traits – although of importance – are not the main determinants of post-traumatic stress response. They appear to predict intrusion rather than avoidance. In this study, avoidance scores were less stable over time than intrusion, which might indicate a low reliability of the rating. A low reliability of the dependent variable, i.e. avoidance, makes it more difficult to identify significant predictors. It remains unclear to what extent the results are specific to the sample and the nature of the potentially traumatic events. The level of exposure to stressful events was measured, but is difficult to compare with levels of exposure to other types of events of samples in other studies. The level of stressful events did not predict post-traumatic stress, possibly because the nature and degree of exposure was relatively similar across the sample. Moreover, there was no significant interaction between personality traits and degree of exposure, as has been found in a study that investigated a similar sample with a retrospective design (Lecic-Tosevski *et al*. 2003).

The amount of explained variance is similar to the findings of Bramsen *et al*. (2000) in a much larger sample. Some cross-sectional studies with post-trauma assessments of personality suggest a much stronger association between personality and post-traumatic stress than found in the few prospective investigations (Lauterbach & Vrana, 2001). One may speculate as to whether studies with post-trauma personality assessments tend to overestimate the association between personality traits and post-traumatic stress because of post-traumatic personality changes or biases influencing all ratings done at the same time. This possibility should be considered in future studies on factors determining post-traumatic stress, many of which will – for various practical and ethical reasons – not be in a position to use pre-trauma assessments of personality.

DECLARATION OF INTEREST

None.

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