

TEMPERAMENTAL CORRELATES OF TRAUMA SYMPTOMS IN FIREMEN, POLICEMEN AND SOLDIERS

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Abstract

Objectives: The main goal of the research was to assess temperamental determinants of trauma symptoms in firemen, policemen and soldiers. The temperament traits which were considered were those postulated by the Regulative Theory of Temperament (briskness, perseveration, sensory sensitivity, emotional reactivity, endurance and activity). **Material and Methods:** A cross-sectional study was run on non-clinical samples. The participants were 417 men, White-Caucasian only: 284 firemen (aged 21–55), 58 policemen (aged 22–45), and 75 soldiers (aged 21–42). Temperament was assessed using the Formal Characteristics of Behavior – Temperament Inventory. Intensity of trauma symptoms was assessed with the PTSD-Factorial Version Inventory, a quantitative measure of trauma-related symptoms. The respondents were examined in their place of work. The study included only men reporting at least 1 traumatic event during the year before the trauma diagnosis. **Results:** Emotional reactivity had a significant positive effect on the intensity of trauma symptoms only in the group of firemen. Emotional reactivity accounted for 16% of the variance of trauma intensity symptoms in this occupational group. Negative significant effect on trauma symptoms was found for briskness only in the soldiers group (briskness explained 20% trauma intensity variance in this group). **Conclusions:** Emotional reactivity was conducive to the increased trauma symptoms intensity in firemen, whereas briskness tended to reduce symptoms intensity only in the group of soldiers.

Key words:

Trauma, Temperament, Firemen, Policemen, Soldiers

INTRODUCTION

This is a study of the intensity of trauma symptoms (assessed psychometrically, not clinically) in individuals engaged in emergency-services and soldiers involved in military operations.

Research findings suggest that firemen, policemen and soldiers experience many potentially traumatic events and that some of them develop anxiety disorders, including post-traumatic stress disorder (PTSD) [1]. It is also known that various psychological and physical factors play

a significant role in the aetiology of trauma-related symptoms in these 3 occupational groups. These factors are, for example, burns and physical injuries, fire incidents with multiple deaths, motor vehicle accidents involving multiple deaths, suicides and others that may concern firemen and policemen [2,3]. On the other hand, combat experiences, number of times in combat, amputations, traumatic brain injuries, blast-related traumatic brain injuries and others are identified as factors affecting the symptoms of

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trauma in soldiers exposed to both, physical and emotional trauma in combat zones [4–7].

Some researchers suggest that temperament traits can play a significant role in responses to trauma both in emergency-services professionals as well as in soldiers. Most indicate that neuroticism and negative emotionality intensify symptoms of trauma [8–10], and extroversion and sensation seeking are buffers for its development [11–14]. The Regulative Theory of Temperament (RTT) [15] also emphasizes the role of temperament in human responses to stressful situations. Temperament traits can be observed in all human behaviours and in all situations, especially those highly arousing ones. The reason why these traits are important is that we are born with our temperaments and therefore, their underlying biological mechanisms help to regulate individual levels of arousal.

The structure of temperament is assumed to consist of 6 temperamental traits [16]:

- Briskness (BR) – defined as a tendency to react quickly, to maintain a high tempo in performing activities and to shift easily from one behavior (reaction) to another in response to changes in the surroundings.
- Perseveration (PE) – a tendency to continue and repeat behavior and to experience emotional states after cessation of the stimuli (situations) that evoke this behavior or these states.
- Sensory sensitivity (SS) – understood as an ability to react to sensory stimuli of low stimulative value.
- Emotional reactivity (ER) – a tendency to react intensively to emotion-generating stimuli expressed in high emotional sensitivity and low emotional endurance.
- Endurance (EN) – defined as ability to react adequately in situations demanding long-lasting or highly stimulative activity and/or under-intensive external stimulation.
- Activity (AC) – a tendency to undertake behaviors of a high stimulative value or to provide, by means of behavior, strong stimulation from the surroundings.

Emotional reactivity shows significant phenotypic and genetic links to neuroticism, while BR, EN and AC are phenotypically and genetically correlated with extraversion, as described in the 5-factor theory [17,18].

Taking the PTSD theoretical construct and its DSM-IV definition [19], we distinguished, using a factor analysis, 2 basic trauma symptoms: intrusion/arousal (I/A) and avoidance/numbing (A/N). The 1st symptom involves recurrent thoughts (flashbacks) about the traumatic event, which are a source of intensive psycho-physiological arousal, while the 2nd symptom involves avoidance of trauma-related stimuli and diminished reactions to these stimuli [20].

The results of our previous studies showed that ER and PE intensified trauma symptoms in a group of disaster victims [21], in cancer patients [22] and in HIV+ individuals [23]. Both traits, ER and PE, were also positively correlated with somatic anxiety in students [24]. Emotional reactivity was also positively correlated, whereas BR was negatively correlated, with trauma symptoms in motor vehicle accident survivors [25]. Three other temperament traits i.e., BR, EN and AC are usually negatively correlated with the severity of trauma symptoms and likely act as resources that protect individuals against the risk of PTSD (the role of SS is unclear).

Based on the data from the literature concerning the role of neuroticism and extraversion in trauma development, and taking account of the RTT assumptions, we expected that a high level of trauma symptoms would be associated with high levels of ER and PE. We also supposed that BR, EN and AC would act as buffers to protect against the development of trauma in firemen, policemen and soldiers.

MATERIAL AND METHODS

Participants

The participants from non-clinical samples were 417 men, only White-Caucasians, including 284 firemen aged 21–55 years (mean (M) = 33.96; standard deviation

(SD) = 7.18), 58 policemen aged 22–45 years ($M = 33.78$; $SD = 5.26$) from a criminal investigation unit and 75 soldiers aged 21–42 years ($M = 29.08$; $SD = 4.11$) involved in military operations in Afghanistan. The respondents were examined in their place of work.

The participants were recruited through direct contact with fire brigades, a criminal investigation police unit as well as with a military unit. The firemen reported participation in actions aiming at rescuing victims of traffic accidents, policemen reported contact with dead victims of various accidents and soldiers participated in combat mission patrols. All groups had experienced at least one traumatic event during the year before the trauma diagnosis. The data were collected between 2009 and 2012. The study was anonymous and participation was voluntary. The participants were not paid.

Measures

Temperament traits were measured with the FCB-TI [26]. This questionnaire has 120 items, 20 items per scale, in a yes/no response format. The FCB-TI consists of the following scales (Cronbach's α are given in parentheses): briskness (0.77), perseveration (0.79), sensory sensitivity (0.73), emotional reactivity (0.83), endurance (0.85) and activity (0.84). Test-retest stability scores ranged from 0.69 (briskness) to 0.90 (activity).

The quantitative level of trauma symptoms was assessed using the PTSD-Factorial Version (PTSDF) inventory containing 30 items. Each item is rated on a 4-point scale where 1 means that a symptom is absent and 4 means that it is always present. This questionnaire has 2 subscales: intrusion/arousal (I/A) (Cronbach's $\alpha = 0.96$) and avoidance/numbing (A/N) (Cronbach's $\alpha = 0.92$). Both factors – I/A and A/N – are highly correlated with each other [20]. The scores on each subscale were added to calculate the general intensity of trauma symptoms (general scale: Cronbach's $\alpha = 0.96$). All analyses in the reported studies were based on the total score of the PTSDF

inventory, well reflecting the intensity of trauma symptoms. The validity of this scale was confirmed by correlating it with other clinical constructs and with the civilian version of the Mississippi PTSD [20].

Ethical approval

The research project was accepted by the Ethics Commission at the Faculty of Psychology, University of Warsaw, Poland.

Statistical analysis

Statistical analysis was performed by the use of IBM SPSS Statistics 21 [27]. The differences between groups were tested using 1-way ANOVA. Correlations between the variables were identified using Pearson product moment correlation coefficients. The validity of temperament traits as predictors of trauma intensity was estimated using hierarchical regression analysis.

RESULTS

The basic descriptive statistics and significance test outcomes for differences between the studied groups are presented in Table 1.

Scheffe's *post-hoc* test revealed a number of significant differences between the groups. A significant difference in the age between the firemen group as well as police officers group compared to the soldiers ($p = 0.000$) was shown, but no differences in the age between the firemen and police officers were reported.

The firemen had significantly higher levels of BR compared to the soldiers ($p = 0.005$) and lower levels compared to the police officers ($p = 0.000$). They also had higher levels of PE in comparison with the police officers ($p = 0.003$), lower levels of SS compared to the police officers ($p = 0.000$) and soldiers ($p = 0.000$), higher levels of ER compared to the police officers ($p = 0.034$), as well as lower levels of EN compared to the police officers

Table 1. Means and standard deviations comparisons for age and temperament traits and trauma symptoms in the groups of firefighters, policemen and soldiers

Variable	Firefighters (N = 284) M±SD	Policemen (N = 58) M±SD	Soldiers (N = 75) M±SD	F	p
Age	33.96±7.18	33.78±5.26	29.08±4.11	17.21	0.000
Temperament traits					
briskness	16.65±3.03	20.19±6.59	15.00±3.78	30.91	0.000
perseveration	9.18±4.64	7.00±4.08	7.91±3.88	7.09	0.001
sensory sensitivity	9.13±1.88	14.97±3.49	13.88±3.56	196.91	0.000
emotional reactivity	6.21±4.34	4.57±4.68	5.48±4.27	3.74	0.025
endurance	10.15±1.75	14.03±5.32	13.85±4.43	68.23	0.000
activity	11.51±4.29	10.12±4.72	13.09±3.67	8.20	0.000
PTSD scales					
intrusion/arousal	23.04±6.46	21.16±5.48	27.19±9.75	14.09	0.000
avoidance/numbing	19.67±4.92	20.09±4.91	27.05±10.24	42.74	0.000
global score	42.70±10.30	41.24±9.74	54.33±19.32	28.81	0.000

PTSD – PTSD-Factorial Version.

M – mean; SD – standard deviation.

df = 2.416.

($p = 0.000$) and soldiers ($p = 0.000$) and lower levels of AC compared to the soldiers ($p = 0.017$).

The policemen, compared to the soldiers, had significantly higher levels of BR ($p = 0.000$) and SS ($p = 0.049$) and lower levels of AC ($p = 0.000$). No significant differences were found in the other temperament traits between the groups. The highest level of trauma symptoms was observed in the group of soldiers. It was significantly higher

in comparison with the firemen ($p = 0.000$) and policemen ($p = 0.000$). The soldiers also had a significantly higher level of intrusion/arousal ($p = 0.000$) and avoidance/numbing ($p = 0.000$) compared to the firemen and policemen. No significant difference in trauma symptoms between the firemen and police officers was shown.

The results of the correlation analysis are shown in Table 2.

Table 2. Pearson-r correlations between age and temperament traits and trauma symptoms in the study groups (N = 417)

Variable	Intrusion/arousal	Avoidance/numbing	Global scale
Age	0.03	-0.02	0.01
Briskness	-0.29***	-0.31***	-0.32***
Perseveration	0.36***	0.17**	0.28***
Sensory sensitivity	-0.06	0.04	-0.01
Emotional reactivity	0.38***	0.32***	0.38***
Endurance	-0.16**	-0.03	-0.10*
Activity	-0.12*	-0.15**	-0.14**

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.000$.

All trauma symptoms correlated negatively with BR, EN and AC and positively with PE and ER. There was a lack of correlation with SS. There was also no correlation with age.

In order to determine the extent to which specific temperament traits can be viewed as predictors of trauma symptoms or protective buffers, a hierarchical regression analysis was conducted in all the respondents. The variables, which were most strongly correlated with the PTSDF global score were accepted as possible

predictors of trauma symptoms or protective buffers in the three study groups. The results are presented in Table 3.

Emotional reactivity was a significant predictor of intensity of trauma symptoms in the firemen group only. This trait accounted for 16% of the variance in the firemen group. Briskness explained 20% of intensity of trauma symptoms only in 1 group, i.e. soldiers. PE as a temperament trait was not critical for predicting the intensity of trauma symptoms in either studied group.

Table 3. Hierarchical regression analyses with selected temperament traits as predictors of trauma symptoms separately for each of the study group

Model	F	F ΔR^2	R	R ²	Predictor	Semi-partial correlation
Firemen						
ER	56.98 ^{a,***}	–	0.41	0.16	ER	0.41***
+PE	29.98 ^{b,***}	2.65	0.42	0.17	ER	0.26***
					PE	0.09
+BR	20.86 ^{c,***}	2.34	0.43	0.17	ER	0.21***
					PE	0.09
					BR	–0.08
Policemen						
ER	6.30 ^{c,*}	–	0.32	0.08	ER	0.32*
+PE	4.71 ^{e,*}	2.90	0.38	0.11	ER	0.12
					PE	0.21
+BR	3.97 ^{f,*}	2.27	0.42	0.13	ER	0.17
					PE	0.18
					BR	0.19
Soldiers						
ER	30.18 ^{g,***}	–	0.54	0.28	ER	0.54***
+PE	14.90 ^{h,***}	0.02	0.54	0.27	ER	0.37***
					PE	0.02
+BR	22.91 ^{i,***}	27.83***	0.70	0.47	ER	0.08
					PE	0.07
					BR	–0.45***

ER – emotional reactivity; PE – perseverance; BR – briskness.

^a df = 1,282; ^b df = 2,281; ^c df = 3,280; ^d df = 1,56; ^e df = 2,55; ^f df = 3,54; ^g df = 1,73; ^h df = 2,72; ⁱ df = 3,71.

* p < 0.05; *** p < 0.001.

DISCUSSION

The results of our earlier studies [22,23,25] suggested that tendency for strong emotional reactions fosters development of trauma symptoms. Therefore, we expected that emotional reactivity, as the trait associated with neuroticism is important for increasing trauma symptoms, not only in clinical groups (cancer patients or HIV+ people) but also in professional groups.

The results of our current study partially confirmed the importance of ER for intensity of trauma symptoms. However, regardless of other traits, ER explains some of the trauma symptoms variance, but among other predictors, its importance is significantly reduced. Only in the group of firemen ER proved to be a significant predictor of trauma symptoms, explaining 16% of the variance of trauma intensity symptoms. It is also worth noting that the firemen, compared to the police officers, had higher levels of ER and a low level of BR. Despite these differences in temperament, there was no significant difference in the severity of trauma among the firemen and policemen. Both groups are exposed to similar sources of emotional trauma, such as contact with corpses. Psychological significance of these sources may be similar in both groups.

Despite the differences in the temperament traits between the firemen and policemen, traumatic factors are probably not strong enough to cause various symptoms of trauma among these groups (like frequent and immediate life threats, as in the case of soldiers). Although we cannot rule out possible future consequences of firemen and police officers' jobs on their health, this hypothesis would require longitudinal studies.

In the group of policemen ER itself explains a small part of trauma symptoms, but when we added the 2 other traits: BR and PE to the analysis, the importance of all 3 traits has decreased to a negligible level. Most likely in this group, other factors, such as coping strategies or other personality traits play an important role.

The most interesting result obtained in this study was indication that BR may serve as a protective buffer against intensification of trauma symptoms. In this study, BR served this role only in the group of soldiers. Briskness explained 20% of the variability of trauma symptoms in this group.

It should be noted that the group with the highest severity of trauma was the group of soldiers exposed to particularly strong physical and psychological trauma in combat zones and the lowest level of BR was also observed in the group of soldiers. Strong traumatic experiences and low-level BR as a protective buffer may likely intensify the severity of trauma in a group of soldiers. Additionally, they showed not more ER compared to the firemen and policemen. Soldiers were the youngest group, but age was not related to trauma symptoms (Table 2). It seems that the main source of the high level of trauma in the group was the experience of combat trauma and other uncontrollable factors, such as emotional ambivalence (EA), i.e. the occurrence of conflicting emotions towards a specific object. In young soldiers, EA may be related to curiosity about war and at the same time the fear of death or mutilation. Other studies have shown that EA coincides with posttraumatic stress in military personnel [28]. In this context, low BR, unfavourable for fast adaptation, may be an additional risk factor for soldiers' trauma development.

Although SS levels were not related to the severity of trauma in the study groups, it is worth noting that its highest level was seen in the groups of police officers and soldiers and their lowest level in the group of firemen. In our earlier study [23], a low level of SS was associated with trauma resulting from stigma associated with HIV+. In the case of police officers and soldiers, high levels of SS may be due to the specificity of their investigative work (police) or long-term stays in military camps (soldiers). Reduced social stimulation in both groups may lead to an increase in SS. This change may confirm

the compensatory role of temperament. In conclusion, the lack of significance of perseveration for the development of trauma symptoms in the 3 studied groups, unlike the clinical groups we studied earlier, is worth noting. It appears that specific, well-organised professional activity of the studied groups modifies and/or potentially limits the persistence of emotional reactions, contrary to the people suffering from chronic, long-lasting disease with uncertainty about development and consequences of the disease.

The present study was not free from certain limitations. The study groups, due to the number of participants and the manner of their selection, were not representative of their professions. They did not have the same number of participants, and we did not control a number of other important factors such as demographic variables, health problems, coping with stress and social support as important variables. Nevertheless, the results indicate the need for good counselling organisations for all the study groups, with a particular emphasis on soldiers.

CONCLUSIONS

The highest level of trauma symptoms was observed in the soldiers with experience of military operations. Emotional reactivity was conducive to the increased trauma symptoms intensity in the firemen, whereas BR tended to reduce symptoms intensity only in the soldiers. It seems that BR, ER, and PE are negligible for trauma symptoms in the group of policemen.

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