

RELATIONSHIP BETWEEN SENSE OF COHERENCE AND POST-TRAUMATIC STRESS DISORDER SYMPTOMS AMONG FIREFIGHTERS

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Abstract. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), published by the American Psychiatric Association, the post-traumatic stress disorder (PTSD) is diagnosed when a person: (a) is exposed to a traumatic event that is well outside the range of usual human experience accompanied by intense fear or horror; (b) reexperiences the event in his/her thoughts, dreams and daily life; (c) avoids the stimuli associated with the trauma and numbs his/her emotions; (d) demonstrates symptoms of increased arousal; and (e) manifests these disturbances for a longer period than one month.

Since the 1980s, it has been pointed out that PTSD may occur not only among survivors of severe traumatic events but also among those who have rescued the victims of those events. Members of fire brigades constitute a large occupational group exposed to traumatic experiences.

The aim of our study was to find an answer to the question of what are the relationships between the level of PTSD symptoms and the sense of coherence (and its three dimensions). In all, 464 firemen were interviewed. PTSD-Interview developed by Watson et al. was used to assess the level of PTSD symptoms and the presence/absence of PTSD.

The higher level of PTSD symptoms was associated with the lower level of the sense of coherence. A small group (3.9%) of subjects who experienced traumatic events met DSM-IV diagnostic criteria for PTSD. The sense of coherence of these people was significantly lower than that of others.

INTRODUCTION

The term 'post-traumatic stress disorder' (PTSD) was incorporated in the psychiatric nomenclature of the third edition of the Diagnostic and Statistical Manual of Mental Disorders (5). Although the definition of PTSD varied in successive editions, in DSM-III-R (6) and DSM-IV (7), PTSD was characterised by: (a) exposure to a traumatic event; (b) persistent reexperiencing of the event in thoughts, dreams or daily life; (c) persistent avoidance of stimuli associated with the event or numbing of emotions and responsiveness; (d) persistent symptoms of increased arousal.

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Most of the studies on PTSD and the factors determining the severity of its symptoms have dealt with the victims of accidents, disasters, acts of terror, violence, and combats of war (3,4,10,11,16). But there are also some occupations in which workers are exposed to traumatic events during their duties (i.e. firefighters, policemen), which results in shock and suffering from PTSD symptoms (3,13).

Not all individuals exposed to traumatic events manifest PTSD symptoms. The onset of PTSD symptoms is determined by several factors: characteristics of traumatic events; personal relevance to a traumatic event; pre-existing risk factors; level of pre-trauma preparation; support resources available; and speed of implementation service (11). A set of pre-existing risk factors includes, among others, the personality characteristics of an individual.

The sense of coherence is a stable individual's trait which may have an impact on the process of post-traumatic reaction. The sense of coherence (SOC) is defined by Antonovsky (1) as "a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that 1) the stimuli deriving from one's internal and external environments in the course of living are structured, predictable and explicable; 2) the resources are available to one to meet the demands posed by these stimuli; and 3) these demands are challenges, worthy of investment and engagement". According to this definition the sense of coherence consists of three components that are termed comprehensibility, manageability and meaningfulness.

Following Antonovsky, persons with a strong sense of coherence can manage stress much better than do the individuals with a weak SOC. Since people with strong SOC seem to have a better comprehension of the world around them, as well as confidence in the availability of coping resources, they tend to classify fewer stimuli as stressors and perceive them as less conflict-inducing and threatening. In this group the emotions evoked by stressful events are more conscious and overt, and induce the individual to counteract the stressor. Under the same conditions the person with a weak SOC would make every effort to eliminate or diminish the resulting emotional tension by switching on the personal defense mechanism. This tendency derives from a distorted perception of reality.

The empirical data provide evidence supporting Antonovsky's hypothesis that the sense of coherence is a personality variable that may directly affect or modify the course of the stress process (8,9). We can expect that SOC will also affect the onset of PTSD and the severity of its symptoms. Our expectation may be supported by the fact that the concept of SOC has resulted from the studies on Holocaust victims, the persons after traumatic experience. Antonovsky (1) found that individuals who had gone through these tragic conditions without a dramatic collapse in their health had been characterised by a high level of SOC. Therefore, we assume that there may be a negative correlation between the level of SOC and PTSD symptoms (Hypothesis).

Following its definition SOC has three different components. Antonovsky (2) suggested to measure only a global SOC score. However, one can find empirical data, indicating that particular components of SOC correlate with such variables as anxiety, hostility and somatization, to a varying extent (15). If one considers only the global result of SOC determination one may miss the opportunity of having an insight into the role of particular SOC components in the stress process. In our opinion SOC components differ with respect to their moderating function, depending on the kind of stressors and the outcomes examined. Therefore, in our study we



would like to answer the question of what is the relationship between particular components of SOC and PTSD symptoms?

PROCEDURE

Subjects

The study was performed on 464 firefighters, aged 20–55 years ($M = 34.0$ $SD = 6.2$) employed in a regional fire department. The tenure of their jobs ranged from 1 to 30 years ($M = 10.7$, $SD = 5.6$). Most of the subjects (56%) represented low level of education (8–11 years of school); the majority (86%) was married. The participation in the study was on a voluntary basis.

Methods

A Polish version of the Orientation to Life Questionnaire (SOC-29), developed by Antonovsky, was used to assess the sense of coherence (1). Respondents were asked to select a response on a 7-point (1 = never to 7 = always) scale. The questionnaire consists of three sections regarding particular SOC components: comprehensibility (C) – 11 items; manageability (MA) – 10 items; and meaningfulness (ME) – 8 items. Four scores were calculated: one for each of the components and the global score (SOC). In terms of scoring, high scores indicate high level of global SOC and its components. The alpha internal consistency coefficients for the subscales and global score were: 0.89, 0.82, 0.80, 0.93, respectively.

PTSD-Interview (PTSD-I) developed by Watson et al. (18) was used to assess the level of PTSD symptoms and the presence/absence of PTSD. The contents of this interview reflect DSM-IV-R criteria and provide dichotomic statements on the presence/absence of the disorder and each of its DSM criteria. Furthermore, PTSD-Interview allows determining the severity and/or frequency of the disorder and each of its symptoms. In our study PTSD-I was used as a self-reported questionnaire which was completed during a group meeting where the aim of the study was presented and the subjects were motivated to give frank answers to the questions (13).

The first question of the PTSD-I asks whether the subject has experienced an unusual, extremely distressful event. Those individuals who gave a positive response were asked to describe this event and answer 17 questions concerning the severity/frequency of PTSD symptoms: reexperience (4 items), avoidance (6 items) and arousal (7 items). The subjects answered each question on a Likert rating scale from 1 (no/never) to 7 (extremely/always). According to Watson et al. (18) the score 4 (somewhat/commonly) is sufficient to meet the relevant DSM symptom criterion. Two additional questions were asked to determine whether the PTSD symptoms had occurred at least several times a week for at least one month.

Four scores were calculated: one for each group of symptoms (subscales: Reexperience, Avoidance, Arousal) and the global score (Trauma). The alpha internal consistency coefficients for these scales were 0.79, 0.74, 0.87 and 0.90, respectively.



RESULTS

Of all the subjects examined in our study, 385 (83%) firefighters reported to be exposed to one or more traumatic events during their duty. The mean and standard deviation values of SOC and its components, and PTSD-I scores are presented in Table 1.

Table 1. Means, standard deviation of Orientation to Life Questionnaire, and PTSD-Questionnaire

		Mean	SD
Orientation to Life Questionnaire	(n = 464)		
Comprehensibility		50.32	9.09
Manageability		53.01	7.40
Meaningfulness		45.12	5.89
SOC (global score)		148.46	19.58
PTSD-Questionnaire	(n = 378)*		
Reexperience		7.39	3.29
Avoidance		12.65	5.47
Arousal		10.80	5.60
PTSD (global score)		30.80	12.71

* Seven subjects did not complete the PTSD-Questionnaire.

Fifteen subjects (3.9% of the exposed) met the PTSD criterion proposed by Watson et al. (18). The mean values of PTSD-I for that group were as follows: Reexperience – 14.1 (SD = 5.1); Avoidance – 25.1 (SD = 5.1); Arousal – 24.1 (SD = 6.5); Trauma – 63.3 (SD = 10.6). The mean values for non-PTSD subjects were significantly lower and reached the following levels: 7.1 (SD = 3.0); 12.1 (SD = 4.9); 10.2 (SD = 4.8); and 29.4 (SD = 10.9), respectively.

The SOC level in the PTSD subjects was significantly lower than that in the non-PTSD ones. This difference was reflected mainly by the lower scores of PTSD subjects on the comprehensibility and manageability subscales (Table 2).

Table 2. The sense of coherence mean scores among PTSD and non-PTSD subjects (n = 378)

PTSD	Sense of coherence				
	Number	C	MA	ME	SOC
Yes	15	45.00	48.47	43.27	136.73
No	363	50.27	52.74	44.99	147.99
F		4.895	4.898	1.190	4.710
p <	0.03	0.03	N.S.	0.03	

Table 3 shows the relationship between the sense of coherence and the severity/frequency of PTSD symptoms. The findings point to a general tendency: the higher the sense of coherence the lesser the intensity of the disorder symptoms following the traumatic stress. The strongest relationship between PTSD symptoms and SOC dimensions refers to comprehensibility, while the weakest one to meaningfulness.



Table 3. Correlation coefficients between the sense of coherence and PTSD symptoms ($n = 378$)

Sense of coherence components	PTSD symptoms			
	Trauma reexperiencing	Avoidance	Arousal	Trauma (global score)
Comprehensibility	-.21 ^{xx}	-.33 ^{xx}	-.24 ^{xx}	-.30 ^{xx}
Manageability	-.19 ^{xx}	-.22 ^{xx}	-.24 ^{xx}	-.24 ^{xx}
Meaningfulness	-.07	-.12 ^x	-.15 ^x	-.13 ^x
SOC (global score)	-.19 ^{xx}	-.27 ^{xx}	-.24 ^{xx}	-.27 ^{xx}

^x $p < 0.01$ ^{xx} $p < 0.001$

DISCUSSION AND CONCLUSIONS

The results obtained from the present study confirmed our hypothesis. The sense of coherence appeared to be an important factor mitigating the adverse effects of exposure to traumatic events. The strongest correlation was found between comprehensibility and avoidance. Relatively, the lowest contribution to the development of PTSD symptoms was that of meaningfulness.

There are two possible explanations of the relationship between the sense of coherence, the manifestation of PTSD and the intensity of its symptoms.

1) The sense of coherence determines the perception of traumatic events. The individuals with a strong sense of coherence are inclined to perceive the traumatic events as less terrifying than do the persons with a weak sense of coherence. This biased perception may reduce the amount of stress and, consequently, hinders the development of PTSD symptoms.

For persons with a high level of comprehensibility it is easier to incorporate traumatic events, such as a directly witnessed death or human suffering (an 'unfair' suffering) which often affects the children, into the 'natural' order of things. The individuals with a high sense of manageability probably have a stronger sense of their causative power and stronger conviction about the possibility of changing the course of events. People with a high sense of meaningfulness tend to perceive a traumatic event rather as a challenge than danger. The tragic events they experience provide just a stronger stimulus for them to behave more actively instead of being merely a passive witness of the tragedy. This allows them to avoid an experience of helplessness and shame for not having done something that should have been done. Emotions of this kind may facilitate the onset of PTSD (12).

If it were possible to establish in further research the differences in the level of activity and types of behaviour under traumatic conditions, between the rescuers with a high and low sense of coherence, we could obtain more evidence to support the hypothesis that a high sense of coherence immunizes an individual against traumatic stimuli and therefore diminishes the manifestation of PTSD symptoms.

2) Another possible explanation of the influence of SOC on the PTSD symptoms is related to the fact that individuals with a strong sense of coherence can better cope with the consequences of stress caused by exposure to traumatic events. The individuals with a strong and weak sense of coherence may differ in their approach to the experienced trauma. The high SOC subjects can easily reevaluate

(reinterpret) the experienced horror and are more inclined to use the available coping resources in order to counteract the consequences of the trauma.

A positive impact of SOC on PTSD may be explained in terms of the control mechanism. Many researchers point to this phenomenon as a factor mitigating the level of stress (16,17). Two components of SOC, comprehensibility and manageability, seem to be very closely related to "a subjective evaluation reflecting an individual's judgement about the extent to which his or her work situation is amenable to control" (16). Individuals with a high level of comprehensibility who used to perceive the world as structured, predictable and explicable should have a stronger belief in cognitive control. Similarly, persons with a high sense of manageability who are convinced that they have various important resources at their disposal should also have a strong sense of control over the situation they experience. We have not, however, found a relationship between meaningfulness, the third SOC component, and control. Meaningfulness is a motivational element of SOC and tends to determine rather the emotional investment of a given individual in his/her activities.

Control is perceived as an antidote to stress and anxiety (16), and PTSD is one of anxiety disorders. It is not surprising, therefore, that the closest correlations found in our study were those between the control-related SOC components of comprehensibility and manageability and the intensity of PTSD symptoms.

The interpretation of the results presented above is based on an assumption that the sense of coherence is a stable individual characteristics (1). Our findings make us convinced that SOC can influence the perception and/or coping with traumatic life events. However, we cannot exclude a possibility that the relationship between SOC and PTSD may have the opposite direction, i.e. PTSD may affect somebody's SOC. Antonovsky supposed that a traumatic experience could sometimes even destroy one's sense of coherence. Unfortunately, the cross-sectional design of our study does not allow to draw any definite conclusions about the direction of the relationship between both variables analysed and to verify this assumption.

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