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The negative consequences of indirect trauma exposure in professionals – the psychometric properties of the *Secondary Traumatic Stress Inventory*

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Summary

Aim. The Secondary Traumatic Stress Inventory (STSI), which is a modified version of the PTSD Symptom List (PCL-5), is designed to assess the symptoms of secondary traumatic stress in professionals working with traumatized individuals. The aim of the study was to determine the psychometric properties of the STSI and establish diagnostic criteria allowing for the assessment of the severity of disorders following secondary traumatic stress.

Material and methods. The research was conducted among 900 people representing eight occupational groups exposed to secondary trauma. In total, data from 810 participants was analyzed, the majority of whom (64%) were women. The mean age of the subjects was 43.9 years (SD = 9.60). The STSI was performed in conjunction with several other measurement tools.

Results. STSI is characterized by a high reliability index (Cronbach's alpha = 0.94). Four factors were found to correspond to the main criteria of post-traumatic stress disorders, viz. intrusions, avoidance, changes in cognition and emotions, and increased arousal and reactivity. The confirmatory analysis confirmed the validity of adopting the four-factor structure. A cut-off point of 33 was found to be predictive of possible disorders after secondary traumatic stress. The highest risk of disorders was noted among medical personnel, the lowest among therapists and police officers.

Conclusions. STSI is an accurate and reliable tool for assessing secondary traumatic stress and can be used both in research and clinical practice as a predictor of disorders after secondary traumatic stress.

Key words: psychometric properties, secondary traumatic stress, Secondary Traumatic Stress Inventory

Introduction

People who have developed symptoms of posttraumatic stress disorder (PTSD) after traumatic events often seek help from various specialists, including medical staff, psychotherapists, social workers, or probation officers. However, these specialists, particularly the more empathetic ones who are committed to their work, through providing help and support for traumatized persons can often themselves become indirect victims of trauma experiencing secondary traumatic stress (STS). It could be said that the trauma of others becomes their own [1].

Secondary traumatic stress, has been defined as the emotional and behavioral consequences experienced by a helper after gaining knowledge of the stressful situation experienced by another individual [2, 3]. As such, STS could be regarded as a natural reaction experienced by a professional, as the "cost of caring" for others. The symptoms of STS reflect those of PTSD in people who have experienced trauma themselves [2, 4]. For this reason, STS is also referred to as secondary PTSD or secondary traumatic stress disorder (STSD). The term 'vicarious traumatization' is also used, which describes changes in the worldview of helpers, occurring as a result of their empathetic involvement with those they are caring for [5]. STS also resembles the phenomenon of compassion fatigue [2], which is a component of burnout.

Many studies have identified the presence of STS in professionals exposed to indirect trauma. These groups have included therapists, social workers, medical staff [1, 6], and policemen [7–10], as well as clergymen providing pastoral care in hospitals, hospices and prisons [11], and nuns caring for people with disabilities [12]. In a New Zealand study of doctors, nurses, psychologists, social workers, and counselors [6], the highest STS severity was observed among the social workers and the lowest among the psychologists. However, a Polish study of five occupational groups [1] found paramedics and nursing staff to have the highest severity of STS symptoms, and therapists the lowest.

It is important to note that the occurrence of STS can lead to many other negative consequences in the psychosocial functioning of professionals working with people after traumatic experiences; these can include disorders in their personal and professional identity, negative feelings such as anxiety and depression, sleep disorders, and decreased immunity [13]. STS can also reduce the work efficiency, work satisfaction and the overall quality of life of people working with traumatized persons [1]. Therefore, it is extremely important that in professionals providing traumatic care, STS symptoms should be detected as early as possible to prevent their further development and reduce the risk of secondary traumatic stress disorder.

Several measurement tools have been developed to assess the symptoms of STS; however, most do not take into account the introduction of the updated PTSD criteria specified by the DSM-5 classification in force since 2013 [14]. The aim of this article is to present the psychometric properties of a tool for assessing STS symptoms, i.e., the *Secondary Traumatic Stress Inventory* (STSI), based on the well-known and widely-

used *PTSD Symptom Checklist for DSM-5* (PCL-5) by Weathers et al. [15], adapted to Polish conditions [16, 17].

Method

Participants

Recruitment was by purposive selection aimed at people at risk of indirect trauma due to their work. The research was voluntary and anonymous, and each respondent was informed about its purpose and the possibility of withdrawal. In total, the study included 900 people representing eight groups of professionals; of these, 810 met the inclusion criteria (i.e., working with people who had experienced traumatic experiences for at least one year) and completed the questionnaires in full and were hence qualified for the analysis. The characteristics of the respondents are presented in Table 1.

Table 1. **Characteristics of the participants**

	Groups		Gender (%)		Age		Seniority	
		N	Men	Women	*M*	*SD*	*M*	*SD*
1.	Therapists	80	13.75	86.25	37.81	7.49	9.66	6.29
2.	Paramedics	120	61.67	38.33	41.28	9.05	16.57	9.38
3.	Nursing staff	65	9.23	90.77	44.48	8.36	13.42	9.87
4.	Social workers	95	4.21	95.79	44.32	10.94	16.89	11.70
5.	Probation officers	140	16.43	83.57	49.76	8.44	19.52	9.18
6.	Policemen	140	74.29	25.71	40.96	4.31	12.96	4.66
7.	Nuns	100	0.00	100.00	45.37	12.78	12.01	8.95
8.	Clergymen	70	100.00	0.00	46.19	9.95	18.80	9.47
	Total	810	36.05	63.95	43.95	9.60	15.19	9.30

Methods

Measures

All respondents completed the *Secondary Traumatic Stress Inventory* (STSI). Several other tools were used in selected groups of professionals working with people after traumatic experiences. They were applied to assess the accuracy of the STSI. All the tools used in the study are characterized by good psychometric properties. A brief description of them is presented below.

The Cognitive Processing of Trauma Scale

The *Cognitive Processing of Trauma Scale*, constructed by Williams, Davis, and Millsap and adapted to Polish conditions [18], contains 17 statements assessed on a 7-point scale. It consists of three subscales of positive cognitive processing (Positive cognitive restructuring, Resolution/acceptance, Downward comparison) and two negative subscales (Denial, Regret).

The Event-Related Rumination Inventory

The *Event-Related Rumination Inventory* was developed by Cann et al. and is available as a Polish adaptation [19]. The tool contains two subscales, each consisting of 10 statements assessed on a 4-point Likert-type scale, referring to intrusive and deliberate rumination.

The Empathic Sensitivity Scale

The *Empathic Sensitivity Scale* is a Polish modification of the *Interpersonal Reactivity Index*, developed by Davis [20]. The tool contains 28 items rated on a 5-point scale. It consists of three subscales, two of which (Empathic concern and Personal distress) refer to the emotional aspect of empathy, while one (Perspective taking) is related to its cognitive aspect.

The Secondary Trauma Self-Efficacy Scale

The *Secondary Trauma Self-Efficacy Scale***,** authored by Cieślak et al. [21], consists of seven items, assessed on a 7-point scale, which can indicate how the respondent copes with the appearance of thoughts or feelings related to emotional control, disturbing thoughts or the ability to help others, as a result of working with people who have experienced extreme events.

The Life Orientation Test

The *Life Orientation Test* was constructed by Scheier and Carver and adapted to Polish conditions [22]. It consists of ten items assessed on a 5-point scale. It is used to measure dispositional optimism.

The Secondary Posttraumatic Growth Inventory

The *Secondary Posttraumatic Growth Inventory* was constructed by Ogińska-Bulik and Juczyński [23]. It contains 12 statements, assessed on a 6-point scale, which correspond to four factors of secondary growth after trauma, i.e.: new challenges and an increase in professional competences, increase in spiritual experiences and a greater

sense of responsibility for others, greater confidence in oneself and life appreciation, and increased acceptance and actions for others.

Results

Data analysis strategy

The calculations were carried out using the SPSS statistical package (version 20). The distributions of the variables were checked for normality on the basis of skewness and kurtosis. Descriptive statistics were established; effect sizes for parametric data and relationships to other variables were calculated using the Pearson's correlation coefficient. The data were also submitted to exploratory and confirmatory factor analysis.

Factor structure of the STSI

One way of verifying the construct validity of a measurement tool is by analyzing its internal structure. The entire group of 810 subjects was divided into two groups (even and odd numbers). The data from the first group was used to conduct an exploratory factor analysis, and the second – a confirmatory factor analysis. First, the assumptions of the normal distribution and the strength of correlations between the variables were verified. Kaiser-Mayer-Olkin (KMO) and Bartlett tests were performed. The obtained sample adequacy indicators justified the use of the analysis. Principal component analysis with orthogonal rotation was performed. The number of factors was determined using the Kaiser criterion and the scree plot was analyzed. The four-factor solution was found to be the best possible model, and was consistent with the original structure of PTSD, based on the DSM-5 diagnostic criteria. The obtained STSI factor loadings are presented in Table 2.

Table 2. **STSI: Factors loading**

STS symptoms	**Factors**			
	1	**2**	**3**	**4**
B1. Intrusive thoughts			**0.67**	
B2. Nightmares			**0.74**	
B3. Flashbacks			**0.70**	
B4. Emotional cue reactivity			**0.69**	
B5. Physical cue reactivity			**0.64**	
C1. Avoidance of thoughts		**0.78**		
C2. Avoidance of reminders		**0.79**		
D1. Trauma-related amnesia				**0.65**

table continued on the next page

D2. Negative beliefs				**0.47**
D3. Distorted blame				**0.74**
D4. Persistent negative emotional state				**0.44**
D5. Lack of interest				**0.63**
D6. Feeling detached	0.45			**0.61**
D7. Inability to experience positive emotions	0.54			**0.60**
E1. Irritable/ angry	**0.56**			0.50
E2. Recklesness	**0.63**			0.43
E3. Hypervigilance	**0.62**			
E4. Exaggeratet state	**0.70**			
E5. Difficulty concentrating	**0.72**			
E6. Sleep disturbance	**0.69**			

Loadings below 0.40 are omitted from the table

Factor 1 represents the symptoms of criterion E (Arousal and reactivity), factor 2 – criterion C (Avoidance), factor 3 – criterion B (Intrusion), and factor 4 – criterion D (Negative cognitive and emotional changes). Two symptoms of factor 4 (D6 and D7) correlate highly with factor 1, while two symptoms of factor 1 (E1 and E2) correlate with factor 4[1]. All four factors explain more than 67% of the total variance, with factor 1 being the most important, including symptoms from criterion E (51%).

Confirmatory analysis (GLS), performed on the results of the second sample ($N = 405$), confirmed the data demonstrated the best fit to the 4-factor model, taking into account such descriptive indicators as goodness of fit index GFI = 0.86; adjusted AGFI = 0.83; Steiger Lind test RMSEA = 0.05. A large sample size affects the significance of the chi-square statistic (533.22; $p < 0.001$), however, its ratio adjusted by degrees of freedom does not exceed the permissible value, i.e., 3.

Reliability of the STSI

The internal consistency is high, as established on the entire sample for the overall STSI score (Cronbach's $\alpha = 0.94$). The following Cronbach's alpha values were obtained for individual criteria: for Intrusion (B) = 0.88; Avoidance (C) = 0.77; Changes in cognition and emotions (D) = 0.87 and Arousal/reactivity (E) = 0.87. The stability

[1] These symptoms represent different factors in other models. In the 6-factor model, arousal symptoms fall into two subcategories: anxiety arousal and dysphoric arousal. In the hybrid model, on the other hand, a factor called externalizing behavior stands out. It includes symptoms of irritability/anger and self-destructive/reckless behaviors that occur in models of dysphoric arousal and anhedonia [17].

of the results was determined in the test-retest study, conducted three weeks apart in a group of 25 social workers. The stability coefficient of the entire inventory is high (0.84), as well as its B – E criteria (respectively: 0.88, 0.79, 0.86, 0.82).

Validity of the STSI

Several different types of validity were evaluated. The results of the exploratory and confirmatory factor analysis confirm the construct validity of the STSI. Most of the required fitting criteria were satisfied by the identified 4-factor model, which was analogous to the four criteria of PTSD defined by the PCL-5.

The occurrence of STS is primarily associated with the cognitive processing of trauma. This is most often expressed in the form of cognitive coping strategies, as well as rumination about traumatic events experienced by clients. Therefore, it was assumed that STS would correlate negatively with positive coping strategies and positively with negative coping strategies on the *Cognitive Trauma Processing Scale*. STSI results would also positively correlate with rumination, both intrusive and deliberate, as measured by the *Event-Related Rumination Inventory*. It is also reasonable to assume that STS would be associated negatively with personal resources, including life optimism and self-efficacy, and positively with empathy, which according to Figley [2] increases the susceptibility of professional helpers to compassion fatigue. In addition, STS may be positively associated with secondary posttraumatic growth, as indicated by the PTG model [24] and a meta-analysis of 20 studies by Cohen and Collens [25] indicating that the negative consequences of indirect exposure to trauma are accompanied by positive ones.

The relationship between STS and cognitive coping strategies was tested among five studied groups of professionals working with traumatized people. The obtained correlation coefficients are presented in Table 3.

Table 3. **Correlation coefficients of STS with cognitive coping strategies and secondary posttraumatic growth**

	Total (*N* = 500)	Therapists (*N* = 80)	Paramedics (*N* = 120)	Nursing staff (*N* = 65)	Social workers (*N* = 95)	Probation officers (*N* = 140)
Denial	0.49***	0.30**	0.52***	0.22	0.22*	0.36***
Cognitive restructuring	0.15***	0.06	0.11	0.13	0.32***	-0.14
Resolution/acceptance	-0.05	0.06	-0.12	-0.12	0.04	-0.06

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Regret	0.47***	0.44***	0.52***	0.35**	0.24*	0.35***
Downward comparison	0.27***	0.22	0.25**	0.00	0.26*	0.10
Secondary posttraumatic growth	0.22***	0.12	0.34***	0.47***	0.33***	0.11

*** p <0.001; ** p <0.01; * p <0.05

Two negative coping strategies, i.e., denial and regret, and one positive, i.e., downward comparison, correlate positively with STS, with the latter relationship being weaker. In addition, STS was positively related to the use of the regret strategy in all five analyzed groups, with the strongest relationship applying to paramedics, and the weakest to social workers. Denial was positively associated with STS in all groups except nurses, while downward comparison positively correlated with STS in paramedics and social workers. No significant associations were found between STS and other positive cognitive strategies, *viz*. cognitive restructuring, and resolution/acceptance.

STS was positively correlated with intrusive ruminations ($r = 0.68$; $p < 0.001$) and deliberate ruminations ($r = 0.69$; $p < 0.001$) among the probation officers ($N = 55$). STS was also positively correlated with empathic concern, both in the group of therapists ($N = 80$; $r = 0.38$; $p < 0.001$) and priests ($N = 70$; $r = 0.33$; $p < 0.01$). Finally, STS correlated positively with personal distress and perspective taking, but only among the group of therapists ($r = 0.46$; $p < 0.05$ and $r = 0.33$; $p < 0.01$, respectively).

The relationship between dispositional optimism and STS was established in a group of nuns caring for people with disabilities ($N = 100$). Higher life optimism appeared to be associated with lower STS severity ($r = -0.40$; $p < 0.001$). The relationship between STS and belief in one's own effectiveness in coping with the trauma of others was tested in police officers ($N = 140$). Negative relationship was found between secondary self-efficacy and STS severity ($r = -0.33$; $p < 0.001$).

Positive associations between STS and secondary posttraumatic growth were confirmed among the five groups of professionals ($N = 500$). The higher the severity of STS, the greater the secondary growth after trauma. The strongest links were found in the group of nurses, paramedics, and social workers.

Diagnosis of secondary traumatic stress

The STSI is designed to measure the negative consequences of helping or caring for people who have directly experienced a traumatic event, and can be used to establish an initial diagnosis of secondary traumatic stress disorder as part of screening. Table 4 presents the mean results obtained by representatives of eight different occupational groups.

Table 4. **Comparison of STSI results in the study groups**

Groups	*N*	STS		Factors							
				B		C		D		E	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1. Therapists	80	11.55	11.44	3.19	3.01	0.94	1.23	3.64	4.01	3.79	4.67
2. Medical rescuers	120	31.92	18.28	7.77	4.71	3.09	2.07	10.76	6.80	10.30	5.97
3. Nursing staff	65	28.22	15.44	7.68	4.43	3.43	2.18	8.66	5.60	8.45	5.49
4. Social workers	95	25.31	13.64	6.88	4.18	2.92	1.93	7.66	5.28	7.84	5.06
5. Probation officers	140	22.00	13.38	6.25	3.76	3.15	2.07	5.76	4.67	6.84	5.34
6. Policemen	140	13.11	12.67	3.51	3.35	1.60	2.00	3.73	4.11	4.27	4.89
7. Nuns	100	21.26	14.14	5.32	4.34	2.30	2.04	6.70	5.44	6.94	4.75
8. Clergymen	70	22.43	13.98	5.89	4.63	3.09	2.65	6.91	5.70	6.49	5.78
Total	810	21.73	15.66	5.57	4.33	2.47	2.11	6.55	5.71	6.80	5.62
Gender											
Men	292	21.09	16.36	4.98	4.31	2.28	2.13	6.41	5.96	6.46	5.87
Women	518	22.10	15.26	5.90	4.31	2.57	2.10	6.63	5.56	6.99	5.47
t-test/*p*		-0.88; ns.		-2.92; <0.005		-1.88; <0.05		0.59; ns.		0.19; ns.	
Age											
Younger (up to 43 years)	399	19.29	15.54	4.95	4.28	2.05	2.02	5.84	5.55	6.12	5.50
Older (over 43)	411	24.11	15.43	6.17	4.30	2.88	2.13	7.24	5.78	7.46	5.66
t-test/p		-4.32; <0.001		-4.05; <0.001		-5.70; <0.001		-3.50; <0.001		-3.44; <0.001	
Seniority											
Shorter (up to 13 years))	394	19.19	15.24	4.92	4.24	1.99	1.95	5.85	5.50	6.08	5.39
Longer (over 13)	416	24.14	15.70	6.18	4.33	2.92	2.17	7.22	5.82	7.48	5.75
t-test t/*p*		-4.55; <0.001		-4.19; <0.001		-6.36; <0.001		-3.43; <0.001		-3.56; <0.001	

The overall STS score differed significantly between the study groups ($F = 24.66$; $p < 0.001$). Significantly lower STS was observed for therapists and police officers ($p < 0.01$) compared to the other groups, while the highest STS was noted for paramedics and nursing staff. The effect of sex on STS turned out to be insignificant: the only differences were noted for the factor of intrusion and changes in cognition and emotions,

with women exhibiting slightly higher severity than men. However, the severity of STS, was influenced by age and seniority[2], with older people demonstrating higher severity than younger ones; this applies to both the overall score and the symptoms that fall under all four criteria. Similarly, employees with less seniority exhibited lower severity of STS symptoms for all four considered criteria.

Criterion validity plays a key role in establishing differential diagnosis. As such, it is important to determine an optimal cut-off point with regard to sensitivity and specificity. In this case, the cut-off point for the STSI was established based on the rules for the diagnosis of PTSD; these were based on a study of 60 people who survived traffic accidents and underwent psychiatric and psychological examinations [17]. The maximum specificity and sensitivity values (0.90 and 0.82, respectively) were obtained for a threshold of 33 points. An alternative cut-off procedure based on assessing the severity of symptoms in each of the four PTSD criteria was also used. Based on this procedure [15], a probable diagnosis of PTSD was indicated by scores of two points or above relating to at least one of the symptoms of intrusion (criterion B) and avoidance (C), and at least two symptoms expressing changes in the cognitive and emotional sphere (D) as well as in arousal and reactivity (E).

The results of the classification based on the two approaches *viz.* overall score and individual STS criteria, for the studied groups are given in Table 5. Overall, 25% of the surveyed professionals working with traumatized clients can be diagnosed with secondary traumatic stress disorder. The diagnosis rate in both diagnostic procedures is almost identical, with a compatibility rate of up to 90%. The highest percentage of probable STSD diagnoses concerns paramedics and nursing staff, while the lowest percentage concerns therapists and police officers.

Table 5. **Psychometric diagnosis of STS**

Groups		STS overall score ≥33 points	Criteria B, C, D, E rating ≥2
	N	%	%
1.Therapists	80	7.50	5.00
2. Medical rescuers	120	45.83	49.17
3. Nursing staff	65	40.00	47.69
4. Social workers	95	27.37	34.74
5. Probation officers	140	22.86	22.14
6. Policemen	140	9.29	10.71
7. Nuns	100	25.00	21.00
8. Clergymen	70	22.86	17.14
Total	810	24.57	25.43

[2] The division was made based on the median.

Discussion of results

The psychometric properties of the *Secondary Traumatic Stress Inventory* (STSI) presented above appear fully satisfactory. The reliability of the tool, as assessed by Cronbach's α index, is high (0.94), as is its stability measured by test-retest ($r = 0.84$). Exploratory factor analysis indicated the tool to have a four-factor structure, which is consistent with the original version of the PCL-5, used to assess PTSD symptoms based on diagnostic criteria according to the DSM-5. All four factors (Intrusion, Avoidance, Changes in cognition/emotion, and Arousal/reactivity) explain more than 67% of the total variance, with arousal/reactivity contributing the most. The four-factor solution was confirmed by confirmatory analysis.

The conducted research confirmed the validity of STSI. It indicates positive associations between STS and negative strategies of coping with trauma, such as regret and denial, rumination about traumatic events experienced by the clients, as well as empathy and secondary post-traumatic growth. It also highlights negative relationships with optimism and self-efficacy in coping with trauma experienced by others.

Among the eight groups of professionals exposed to indirect trauma participating in the study, the highest STS severity was observed among medical staff, i.e., paramedics and nursing staff, and the lowest among therapists and police officers. The STSI score was not found to be differentiated by sex, but participants with greater age and seniority at work tend to demonstrate higher levels of STSI.

For the purpose of psychometric diagnosis, a cut-off points of 33 was adopted. A score of 33 or less in STSI are classified as indicative of low STS severity, while scores higher than 33 points are indicative of high STS severity and a probable diagnosis of STSD.

Psychometric diagnosis of STSD can be based on a designated cut-off point or on an assessment of symptom value. Both procedures turned out to be similar, but the diagnosis based on the cut-off point is simpler to calculate, and also allows the severity of the negative consequences of indirect exposure to trauma to be assessed. Overall, 25% of the surveyed professionals exposed to indirect trauma could be diagnosed with secondary traumatic stress disorder.

It should be remembered that the test result does not determine the clinical diagnosis made by a doctor or psychologist, but provides grounds for making one. It is important to emphasize the complete convergence of the assessed symptoms of STS in the clinical and testing examinations in relation to the B-E criteria. Two other criteria, i.e. A (confirmation of indirect exposure to a stressor) and F (duration of symptoms from criteria B-E – longer than a month), are a prerequisite for performing the test. The fundamental difference comes down to the assessment of the last two criteria, i.e., G – the occurrence of disturbances causing clinically significant suffering or impairment of functioning in the social, occupational, and other important areas, and H – confirmation that the disturbances are not caused by the physiological effects of the substance (e.g., abuse drugs or alcohol) or any other general medical condition.

These two criteria require assessment by an independent specialist and fall within the scope of clinical diagnosis.

Limitations

The research has certain limitations. Although it was conducted among eight selected groups of professionals exposed to indirect trauma, caution should still be observed when generalizing the results to other groups of people after traumatic experiences. In addition, the groups differed in terms of size and sex distribution, which could have influenced the results. Furthermore, while the study examined the influence of seniority, it did not include other professional factors, such as workload, commitment to work or the possibility of obtaining support in the work environment. Finally, it did not examine the personal traumatic experiences of the surveyed professionals.

Conclusions

1. The *Secondary Traumatic Stress Inventory* is an accurate and reliable tool for assessing the severity of secondary traumatic stress symptoms among professionals exposed to indirect trauma. The tool can be used for screening and can enable the initial diagnosis of secondary post-traumatic stress disorder.
2. The inventory can be used in both scientific research and clinical practice. After a slight modification of the instructions, the tool can also be used for research by non-professionals, i.e., people caring for individuals who have experienced traumatic experiences, e.g., with disabilities, after violence, accidents or struggling with a serious somatic disease.
3. It is extremely important to be able to self-test to detect secondary traumatic stress early and implement practices to reduce its impact, thereby improving the quality and effectiveness of services for trauma survivors.

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