

ORIGINAL ARTICLE

Psychometric Properties of the Method "Evaluation of Negative Mental Reactions and States of Combatants" and Experience of its Application in Short-term Psychological Recovery

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Abstract: *The article shows the development of the method of psychological evaluation called "Evaluation of Negative Mental Reactions and States of Combatants". In the study participated 1300 male servicemen (29.84% from junior lieutenant to colonel and servicemen under contract and demobilized, and 70.16% from private to senior warrant officer). The age of participants varied from 20 to 55 years. The system of evaluation developed consisted of 16 instruments that could help to determine the presence of negative psychological symptoms of servicemen related to their participation in hostilities. The results indicated that the evaluation method developed is a tool that allows determining the presence of negative psychological symptoms related to participation in combat. Likewise, it is a useful and fast method to assess the effectiveness of short-term psychological recovery programs. Unlike existing methods of diagnosing negative mental reactions and states of an individual, which arose after their participation in hostilities, the developed psychodiagnostic toolkit could consider the physical and mental fatigue of the respondents, their deterioration, and other cognitive dysfunctions.*

Keywords: *combat activity, psychological rehabilitation, psychological recovery, post-traumatic stress disorder, evaluation system*

INTRODUCTION

Long participation in hostilities depleted the psychological adaptation resources of servicemen, sharply posing the question concerning the need for psychological recovery [1,2]. This issue was complicated and comprehensive; it related both to the definition of rotation of servicemen and to the determination of the duration and development of effective programs of psychological recovery for all participants of hostilities [3] as well as to the determination of indications for medical and psychological rehabilitation of the servicemen, whose mental health and ability to readaptation was lost [4]. The aim of psychological recovery was to restore the physical and mental resources of servicemen to prolong their ability to

perform tasks under the conditions of combat stress factors action [5].

Nowadays, the psychological decompression measures were directed not only to ensuring the adequacy of switching from military service to peaceful life [6], including traditional stress relief and help in civilian life realization, taking into account the acquired military experience, accepting this experience to reduce the probability of post-traumatic stress disorders (PTSD) formation [7,8], but also for the psychological restoration of mental health of servicemen who participated in hostilities to relieve the accumulated stress prolonging the possibility of adequate functioning of servicemen under combat conditions when it was impossible to realize the

massive rotations to keep their resistance – psychological stability, ability to resist negative influence from the side of combat stress factors [2]. To the institutions of psychological recovery were sent the servicemen with expressed signs of maladjustment [9], acute stressful reactions [7], significant exhaustion, devastation, and fatigue [10], and servicemen, who had difficulties in adaptation [11] while getting back in line after injuries and concussion and after their stay in hospitals.

Institutions that implemented psychological recovery programs were located in the third echelon of defense in safe places in order to form in the minds of servicemen the idea of the need to return to the performance of combat missions, and military duty, which was a way of posing the direction of recovery – the restoration of combat capacity.

Realization of activities of psychological rehabilitation and implementation of existing psychological programs of decompression on the basis of their personal professional experience and world experience of rehabilitation of servicemen was imposed on the military psychologists of the Armed Forces and the National Guard of Ukraine, as well as on the volunteer psychologists from NGOs who had appropriate training and experience. Usually, the implementation of psychological recovery programs was a combination of procedures of medical treatment orientation with the use of appropriate material and technical bases and the involvement of appropriate specialists.

Even though the system of implementation of the psychological restoration of combat servicemen was well-established and proved its effectiveness in practice, there arose a question on the development of effective psychodiagnostic tools of the mental state control of servicemen before and after a complex of actions by the program of psychological rehabilitation for individual servicemen and correction of the recovery program if required. There were distinguished the following requirements for the psychodiagnostic method:

- 1) convenient while conducting both individual and group psycho-diagnosis of servicemen, typical for a survey with a large number of people (100-200 people), capable of taking into account the physical and mental fatigue of the respondents, deterioration of their attention, and other cognitive dysfunctions related to stressful experience;
- 2) suitable for the diagnosis of negative mental reactions and conditions that occur after participation in hostilities;
- 3) reliable for re-diagnosis due to a minor period of time, excluding the ability to remember accurately their past answers;

4) able to clearly demonstrate changes in psychological state that occurred during their participation in the psychological recovery program;

5) convenient for summarizing data and receiving the psychologist's feedback on the effectiveness of the introduction of new actions into the programs of psychological recovery;

6) useful for obtaining information related to the effectiveness of individual consulting, providing a psychologist with a reflection on his/her professional activity. With existing pressure on psychologists, there occurred a need for supervision and their rotation in institutions that dealt with psychological recovery.

The objective of the study was the development of a psychological evaluation system of the consequences of participation in combat activities for military personnel participating in hostilities. Unlike the existing systems to diagnose the psychological consequences of combat participation, it is intended to develop a set of psychodiagnostic tools that assess the physical and mental fatigue of combatants, their deterioration, and other cognitive dysfunctions. And also, that it is capable of clearly showing the psychological changes achieved by participation in psychological recovery programs.

MATERIALS AND METHODS

Participants and Procedure

The study was conducted in 2022. The study included 1300 servicemen who underwent a psychological recovery program after taking part in a long combat mission. The tested group consisted of officers – 29.84% (from junior lieutenant to the colonel) and servicemen under the contract and mobilized – 70.16% (from private to senior warrant officer). The age of the study participants varied from 20 to 55 years.

While developing the method "Evaluation of negative mental reactions and states of combatants", there were combined the simplest procedures of conditions evaluation which were typical for the method such as "Profile of mood states" (POMS) [12,13], "Self-esteem of psychophysiological state" (Kokun) [14], "Measurement of states" used to express evaluation of emotional states of sportsmen [15]. Also, there was conducted analysis of negative mental reactions and states that often occurred in servicemen while their participation in hostilities, including those who described the ability to perform tasks and the ability to interact with others in the performance of command work [1,16]. Thus, the list of negative mental reactions and states (experience) was quite wide and contained 16 points: irritability; anxiety; aggressiveness;

anger; inattention; self-doubt; devastation; apathy; concern; sense of guilt; sense of powerlessness; lack of concentration; unwillingness to communicate; lack of trust in comrades in the service; lack of trust in commanders; inability to perform the assigned tasks. It was assumed that the use of factor analysis would give the possibility to group these points into the scale.

It was necessary to point out that the simplicity of the instructions and of the testing procedure itself was an important circumstance for effective diagnostic work with servicemen who had been experiencing the influence of combat stress factors for a long time and who had difficulty in the redistribution of attention.

However, a number of points (16) of the evaluation of negative mental states but the evaluation scale itself (from 0 to 10 points) was quite large (exceeding the amount of short-term memory 7 ± 2 elements), which complicated their memorization and accuracy reproduction during re-testing.

The determination of psychometric indicators of the method "Evaluation of negative mental reactions and states of combatants" and its testing was carried out during the participation in a psychological recovery program by servicemen. 1300 servicemen participated at this stage.

The servicemen filled out the form of the method at the beginning of the psychological recovery program and after it. The results obtained in accordance with the method "Evaluation of negative mental reactions and states of combatants" were compared with the results of methods that were conducted with servicemen to control their condition before and after their participation in the psychological recovery program. Before participating in a psychological recovery program, servicemen were surveyed with the following methods: "Maladjustment" (Prykhodko, Matsegora, Kolesnichenko, and Baida) [17], "Mississippi Scale for Combat-Related PTSD" (Keane, Caddell, and Taylor) [18], "Diagnostics of psychological safety of an individual" (Prykhodko, 2012) [19], "Evaluation of traumatism of combat experience of servicemen" (Kolesnichenko) [20]. After participating in the psychological recovery program, servicemen were surveyed in accordance with the following psychodiagnostic methods – "Resistance to psychological traumatism of combat experience" (Kolesnichenko) [21].

All procedures in the study conformed to the ethical standards of the 1964 Helsinki Declaration and its later amendments. All participants consent for their data to be used in this research.

Instruments and Measures

To determine the constructive validity of the method "Evaluation of negative mental reactions and states of combatants" there were used methods which were

standardized on the Ukrainian selection.

Method "Maladjustment" (Prykhodko, Matsegora, Kolesnichenko, and Baida) [17] was an express version of the method "Adaptability" (Maklakov) [22] which had a long tradition of use in the Armed Forces of Ukraine. The "Adaptability" method was concluded by military psychologist A.H. Maklakov [22] to determine the adaptation potential of servicemen based on the individual scales of the method "Minnesota Multiphasic Personality Inventory" (McKinley, Hathaway) [23]. The developer reported satisfaction with the psychometric characteristics of the formed methodology [22]. Since the beginning of hostilities in eastern Ukraine among military psychologists of Ukraine, there was spread a modification of the methodology proposed by Maklakov "Adaptability 200", carried out by Chermianin and Kondratiev [24]. Unlike the previous method, it was supplemented with a number of issues that allowed us to distinguish "military and professional orientation", "tendency to deviant behaviors", and "suicidal risk" and to calculate "the level of resistance to combat stress". This method included 200 questions; thus, there was a need to form a simpler and more reliable toolkit, which was the basis for the development of an express version of the method. The developed method "Maladjustment" (Prykhodko, Matsegora, Kolesnichenko, and Baida) [17] was aimed at the identification of specific violations of adaptation potential which could have a big influence on the ability to adequately perform the tasks. Thus, the method had 4 scales, each with 10 questions – "Violation of behavioral regulation", "Probability of committing suicidal attempts", "Violation of moral normativity" and "Loss of communicative potential". There was highlighted the calculation of the general indicator of "Maladjustment". This calculation was simple and convenient and could be carried out under field conditions without any additional tools. Although working with the method involved the presence of trust in psychologists, the method had a scale of sincerity. The developers provided data about the satisfactory psychometric indicators of the method.

The study used the "Mississippi Scale for Combat-Related PTSD" (Keane, Caddell, and Taylor), which was restored for the Ukrainian selection [18]. Nowadays, it was one of the most common methods used to measure the signs of PTSD. The scale included 35 statements, each of which can be estimated on a five-point scale. The total indicator which was made up in accordance with this method gave the possibility to estimate the degree of influence of the traumatic experience transferred by an individual.

"Diagnosis of Psychological Safety of an Individual" (Prykhodko), which was developed on the basis of the concept of psychological safety of an individual of specialists of extreme activities [19]. According to this concept,

psychological safety was not only a lack of danger but also an opportunity for development and self-realization. Psychological safety had a level structure. Each level in the method met a scale with a similar name. The first level was moral and communicative, it meant that knowledge and use of the rules of communication and norms of morality made interaction with the social environment controlled and predictable, formed the ability to escape potentially conflict situations, and involved external resources to overcome problematic situations. The motivational and volitional levels suggested that the developed goal setting, intensity in goal setting, and flexibility in their corrections could ensure the self-realization of an individual in difficult conditions of life. It was assumed that the ability to flexible restructuring of relations with the environment gave the possibility to be leading in these relationships, to control them. The valuable and semantic level was considered as an ability to conscious attitude to one's own life, awareness of one's own influence on the world, and responsibility for its changes. The developer believed that this conscious attitude gave the possibility for an individual to tolerate life difficulties and sufferings that arose in the process of self-realization. Moreover, due to the developer, the hierarchy of the semantic sphere gave the possibility to depreciate the experience in frustration as unimportant and to consolidate efforts to achieve important aims. The level of internal comfort was the factor that provided a change in the direction of activity. Thus, the evaluation of life as safe, and the condition as comfortable contributed to the decision to continue normal regulation. The decisions related to the changes were made in case of non-compliance of the environment with the needs and capabilities of an individual. There was highlighted the calculation of the general indicator of psychological safety of an individual, its height indicated the ability to set new goals of self-realization. When the indicators were reduced the thing was in a supportive reproduction of usual goals of life or in the arrest of development, and further impossibility of self-realization. The developed method had satisfactory psychometric indicators. The National Guard of Ukraine had been using this method for more than 10 years.

The method of "Evaluation of traumatism of combat experience of servicemen" [20] was based on the American method "Combat Exposure Scale" [25]. In the process of its development, there were considered the traumatic events and their intensity which were typical for military actions in Ukraine with the beginning of the Russian invasion in 2014. Unlike the "Combat Exposure Scale" method, the method of "Evaluating of traumatic experience of servicemen" (Kolesnichenko) had been developed; it included a list of phenomena that gave the possibility to reduce the trauma of combat stress factors influence. The method had 5 scales that

met 3 groups of combat stress factors and 2 factors that described internal and external resources used to counteract stress factors. In the process of standardizing the method, there was used the procedure of regressive analysis which gave the possibility to determine the contribution of each scale to acute stress disorder which occurred due to the action of combat stress factors. It was reported that the method had satisfactory psychometric characteristics.

The method "Resistance to psychological traumatism of combat experience" (Kolesnichenko) [21] was developed on the basis of the author's concept of combat psychological traumatism of servicemen [1]. The method reflected the given in this concept three levels (stages) of realization of resistance to the action of combat stress factors, which 1) were related to the preparation for activity under the conditions of combat stress factors and under the existing expectations concerning the stress factors' activity and their ability to overcome them, 2) had the direct ability to overcome stressful influence and used adequate situational copings, and 3) had the ability to accept and realize the acquired experience under the stressful conditions. There was provided the calculations of general resistance to combat psychological traumatism. It was reported that this indicator had a reverse correlation with the "Mississippi Scale for Combat-Related PTSD" (Keane, Caddell, and Taylor) [18], $r = -0.60$, $p \leq 0.01$. Moreover, the method of the scale of the second order – "helplessness", "conscious attitude to professional training", "ability to acquire experience", "cognitive dysfunction", and "attitude to military duties". The method had satisfactory psychometric indicators.

Data Analysis

To represent the data, there was used the main descriptive statistics (arithmetic mean M and standard deviation SD). To distinguish the correlational rate between the variables there was used the correlation analysis. To determine the internal coherence of the method "Evaluation of negative mental reactions and states of combatants" there were used calculations based on Cronbach's alpha. To determine the specific negative mental reactions and states which were experienced by servicemen due to their participation in hostilities there was used regression analysis. To determine the structure of the method "Evaluation of negative mental reactions and states of combatants" there was used factor analysis with the help of the method "Principal components". Mathematical data was processed with the help of SPSS 17.0.

RESULTS

We have developed the following form of psychodiagnostic method "Assessment of negative mental reactions and states in combatants" (Table 1). The instructions are as follows:

"Please assess your psychological state at the moment on a scale from 0 - slightly expressed, 10 - strongly expressed". The internal consistency of the method was evaluated using the α -

Cronbach indicator, which was 0.944 having the selection of 1300 people for 16 indicators.

Table 1: Form of the methodology "Evaluation of negative mental reactions and states of combatants"

Mental reactions and states	Evaluation of reactions and states										
Irritability	0	1	2	3	4	5	6	7	8	9	10
Anxiety	0	1	2	3	4	5	6	7	8	9	10
Aggressiveness	0	1	2	3	4	5	6	7	8	9	10
Anger	0	1	2	3	4	5	6	7	8	9	10
Inattention	0	1	2	3	4	5	6	7	8	9	10
Self -doubt	0	1	2	3	4	5	6	7	8	9	10
Devastation	0	1	2	3	4	5	6	7	8	9	10
Apathy	0	1	2	3	4	5	6	7	8	9	10
Concern	0	1	2	3	4	5	6	7	8	9	10
Sense of guilt	0	1	2	3	4	5	6	7	8	9	10
Sense of powerlessness	0	1	2	3	4	5	6	7	8	9	10
Lack of concentration	0	1	2	3	4	5	6	7	8	9	10
Unwillingness to communicate	0	1	2	3	4	5	6	7	8	9	10
Lack of trust in comrades in the service	0	1	2	3	4	5	6	7	8	9	10
Lack of trust in commanders	0	1	2	3	4	5	6	7	8	9	10
Inability to perform the assigned tasks	0	1	2	3	4	5	6	7	8	9	10

Despite the fact that the developed method included negative mental reactions and states for evaluation of PTSD, and maladjustment, and testified both negative experiences and inability to manage their behavior, its purposefulness and inability to maintain interaction and consistency in teamwork, factor analysis which was conducted in accordance with "Principal Components" presented the presence of only one factor that included all 16 variables with different factors of factor evaluation: "irritability" (0.743), "anxiety" (0.796), "aggressiveness" (0.692), "anger" (0.722), "inattention" (0.744), "self-doubt" (0.744), "devastation" (0.808), "apathy" (0.733), "concern" (0.808), "sense of guilt" (0.793), "lack of concentration" (0.801), "unwillingness to communicate" (0.714), "lack of trust in comrades in the service" (0.640), "lack of trust in commanders" (0.675), "inability to perform the assigned tasks" (0.746).

Taking into account the received data, the method included the calculations of general indicators. Experience using the method had shown that the most convenient indicator was the calculation of the average arithmetic value for all 16 indicators. Thus, the general indicator had a range from 0 to 10 points, which was convenient to perceive general results by the method and did not require memorization of additional information for manual data processing.

It was necessary to point out that the selection of a single-

factor structure of the method was a certain confirmation of less regularity of negative mental reactions and states, a reflection of greater integration of mental processes while operating under stressful conditions.

The determination of the validity of the method was conducted in two stages. In the first stage, to determine the constructive validity, the data of the method "Evaluation of negative mental reactions and states of combatants" was compared with the data of methods which gave the possibility to diagnose the peculiarities of negative mental reactions and states of servicemen, proving that they were related to their participation in hostilities. First of all, the talk was about the method "Maladjustment" which gave the possibility to evaluate the violation of "behavioral regulation", "the probability of committing suicidal attempts", "violation of moral normativity" and "loss of communicative potential" by servicemen [17], and "Mississippi Scale for Combat-Related PPSD" (Keane, Caddell, and Taylor) [18], which gave the possibility to diagnose PTSD symptoms of those who had participated in hostilities and left the battlefield [24]. Moreover, there was used the method of "Evaluation of traumatic experience of servicemen" (Kolesnichenko) [20] and "Resistance to psychological traumatism" (Kolesnichenko) [21], which in this study gave the possibility to connect the experience of negative mental reactions and states with the

experience of participation in hostilities, as well as with their peculiarities and preparation for them.

Correlational relations with the method of "Diagnosis of psychological safety" (Prykhodko) [19] indicated the depth of violation of personality structures, which ensured its safety and ability to develop, which was an important factor for making a prognosis for the restoration of an individual in the process of psychological decompression and rehabilitation. The results of correlational analysis, which were obtained at this stage of validity determination were given in Table 2. Considering that the selection of the study at this stage included 1300 people, then all the correlational indicators given reached the level of statistical significance and did not require additional indicators.

Dense correlation relations of the method "Evaluation of negative mental reactions and states of combatants" and methods such as "Maladjustment" (Prykhodko et al.) [17] and "Mississippi Scale for Combat-Related PTSD" (Keane, Caddell, and Taylor) [18] pointed out that according to the data provided by the developed method, it was really possible to consider negative experience, which was connected with adaptation disorders and PTSD symptoms. The data provided by the method "Evaluation of traumatic experience of servicemen" [20] proved that negative experience was mostly related to the force of negative effects than to the existing external support.

However, the formed personality structure (according to the method "Diagnosis of Psychological Safety" [19] including the process of professional and professional-psychological training, due to the method "Evaluation of traumatism of combat experience of servicemen" [20] was able to restrain the development of negative states, providing adequate functioning of an individual under combat conditions. But at this stage, it was impossible to monitor the accumulated influence of traumatic events on the development of negative mental states while exceeding the recommended time for rotation (more than 6 months).

The second stage of determination of the method's validity was developed to determine its ability to be a tool for tracking the dynamics of changes during psychological recovery. The methods which were used at the first stage had satisfactory indicators of reliability, and, therefore, could be insensitive to the changes which occurred during the week (this was a usual term of the program of psychological recovery of servicemen). The method of "evaluation of negative mental reactions and states of combatants" was developed specifically for evaluating the control of negative states' changes before and after participation in the psychological recovery program, including the possibility to evaluate its effectiveness.

Considering such purpose, the data obtained by the method "evaluation of negative mental reactions and states of combatants" before and after the participation in the recovery program was compared to the data obtained by Lüscher's color test including the indicator of anxiety. This indicator pointed out the availability of frustrated needs and inadequacy of compensation and, unlike other indicators by this projective method, could be confused with indicators by other methods. The indicator of anxiety in accordance with Lüscher's color test was used as an integrated state evaluation since the main determinants of mental states were the ratio: firstly, conscious and unconscious needs, desires, and aspirations of an individual; secondly, the capabilities of an individual (obvious abilities and hidden potentials); thirdly, environmental conditions (objective influence and subjective perception of the current situation) [25].

40 servicemen participated at this stage of the study. Thus, the general indicator by the method "evaluation of negative mental reactions and states of combatants" correlated with anxiety before the beginning of the decompression program at a moderate level – $r = 0.41$, $p \leq 0.01$; after the decompression program the data was – $r = 0.47$, $p \leq 0.01$. These data proved that the developed method was sensitive to the changes in states and could be used to evaluate the dynamics of states during the programs of psychological recovery which were developed for short-term (up to a week).

It was figured out that the general indicator (see Table 2) had a slightly higher density than individual indicators by the method "evaluation of negative mental reactions and states of combatants" with general indicators of maladjustment, PTSD, psychological safety of an individual, traumatism of combat experience, and resistance to psychological traumatism. It was another piece of evidence that the method would be more reliable if it was used as a single scale.

Then there was used the procedure of regression analysis to determine specific negative mental reactions and states experienced in these psychological categories; thus, there were formed relevant regression equations:

$$\begin{aligned} \text{Maladjustment} &= 3.804 + 0.216 * \text{Irritability} + 0.307 * \\ &\text{Aggressiveness} + 0.259 * \text{Self-doubt} + 0.249 * \text{Devastation} + \\ &0,245 * \text{Concern} + 0.386 * \text{Reluctance to communicate} + 0.229 * \\ &\text{Lack of trust in comrades in the service} + 0.350 * \text{Lack of trust} \\ &\text{in commanders} + 0.264 * \text{Inability to perform the assigned} \\ &\text{tasks} + 0,529. \\ \text{Post-traumatic stress disorder} &= 54.66 + 1,070 * \text{Irritability} + \\ &0.719 * \text{Aggressiveness} + 0.572 * \text{Inattention} + 0.557 * \\ &\text{Devastation} + 1.230 * \text{Apativity} + 0.794 * \text{Concern} + 0.613 * \\ &\text{Unwillingness to communicate} + 0.602 * \text{Lack of trust in} \\ &\text{commanders} + 0.941 * \text{Inability to perform the assigned tasks} \\ &+ 0.506. \end{aligned}$$

Table 2: The indicators of correlative relations between the scales of method "Evaluation of negative mental reactions and states of combatants" and the scales of other psychodiagnosics methods which were used to estimate its validity (in points).

Indicators	"Estimation of negative mental reactions and states of combatants"																
	Irritability	Anxiety	Aggressiveness	Anger	Inattention	Self-doubt	Devastation	Apathy	Concern	Sense of guilt	Sense of powerlessness	Lack of concentration	Unwillingness to communicate	Lack of trust in comrades in the service	Lack of trust in commanders	Inability to perform the assigned tasks	General indicators due to the method
"Maladjustment" (Prykhodko, Matsegora, Kolesnichenko, and Baida) [17]																	
Violation of behavioral regulation	0.50	0.56	0.46	0.44	0.49	0.51	0.52	0.51	0.54	0.41	0.54	0.52	0.49	0.42	0.49	0.55	0.68
Probability of committing suicidal attempts	0.41	0.52	0.36	0.39	0.47	0.48	0.54	0.48	0.49	0.41	0.53	0.49	0.48	0.38	0.42	0.51	0.62
Violation of moral normativity	0.34	0.24	0.37	0.33	0.20	0.16	0.25	0.18	0.23	0.14	0.22	0.23	0.29	0.28	0.36	0.19	0.34
Loss of communicative potential	0.36	0.37	0.39	0.38	0.35	0.35	0.38	0.34	0.37	0.27	0.35	0.35	0.43	0.41	0.40	0.36	0.50
General indicators of maladjustment	0.50	0.52	0.49	0.47	0.47	0.47	0.52	0.47	0.50	0.38	0.51	0.49	0.52	0.46	0.52	0.50	0.66
"Mississippi Scale for Combat-Related PTSD" (Keane, Caddell, and Taylor) [18]																	
PTSD	0.54	0.56	0.51	0.48	0.50	0.50	0.57	0.53	0.54	0.44	0.54	0.53	0.50	0.44	0.48	0.55	0.69
"Diagnostics of psychological safety of an individual" (Prykhodko) [19]																	
Trust	-0.29	-0.34	-0.25	-0.29	-0.29	-0.32	-0.38	-0.30	-0.39	-0.35	-0.39	-0.35	-0.35	-0.33	-0.30	-0.35	-0.44
Respect	-0.25	-0.25	-0.26	-0.29	-0.22	-0.18	-0.28	-0.20	-0.30	-0.24	-0.26	-0.26	-0.32	-0.29	-0.24	-0.21	-0.34
Moral and communicative	-0.30	-0.33	-0.28	-0.32	-0.29	-0.28	-0.37	-0.28	-0.38	-0.33	-0.36	-0.35	-0.37	-0.34	-0.31	-0.32	-0.44
Motivational and volitional	-0.31	-0.38	-0.27	-0.31	-0.34	-0.36	-0.38	-0.33	-0.39	-0.36	-0.40	-0.41	-0.36	-0.28	-0.25	-0.34	-0.46
Valuable and semantic	-0.28	-0.30	-0.27	-0.28	-0.28	-0.28	-0.35	-0.29	-0.32	-0.32	-0.36	-0.33	-0.36	-0.30	-0.25	-0.29	-0.41
Internal comfort	-0.24	-0.30	-0.22	-0.25	-0.30	-0.31	-0.39	-0.33	-0.31	-0.32	-0.37	-0.34	-0.33	-0.27	-0.25	-0.29	-0.40
General indicators of psychological safety of an individual	-0.30	-0.35	-0.28	-0.31	-0.32	-0.32	-0.39	-0.33	-0.37	-0.35	-0.39	-0.38	-0.38	-0.32	-0.28	-0.33	-0.45
"Evaluation of traumatism of combat experience of servicemen" (Kolesnichenko) [20]																	
Unfavorable social conditions of performing service combat tasks	0.47	0.49	0.41	0.37	0.37	0.39	0.42	0.41	0.44	0.33	0.42	0.42	0.34	0.41	0.50	0.45	0.58
Specific traumatic combat conditions	0.27	0.29	0.23	0.22	0.13	0.17	0.14	0.21	0.23	0.21	0.14	0.18	0.13	0.22	0.29	0.15	0.28
Unfavorable social situation of participation under combat conditions	0.21	0.23	0.25	0.26	0.08	0.09	0.09	0.13	0.18	0.06	0.11	0.13	0.15	0.14	0.23	0.09	0.21
Internal resources of resistance	-0.12	-0.14	-0.03	0.00	-0.23	-0.20	-0.24	-0.27	-0.12	-0.10	-0.24	-0.22	-0.10	-0.15	-0.07	-0.27	-0.21
External resources of resistance	-0.11	-0.14	-0.08	-0.10	-0.16	-0.17	-0.20	-0.13	-0.17	-0.12	-0.16	-0.08	-0.07	-0.09	-0.01	-0.14	-0.16
General indicators of traumatism of combat experience	0.32	0.37	0.25	0.24	0.32	0.32	0.38	0.37	0.34	0.23	0.36	0.31	0.17	0.28	0.24	0.36	0.42
"Resistance to psychological traumatism of combat experience" (Kolesnichenko) [21]																	
Expectations of participation in hostilities	-0.32	-0.37	-0.25	-0.15	-0.40	-0.37	-0.39	-0.38	-0.34	-0.31	-0.43	-0.39	-0.26	-0.27	-0.34	-0.46	-0.48
Overcoming a stressful situation	-0.38	-0.38	-0.29	-0.16	-0.40	-0.41	-0.38	-0.31	-0.30	-0.27	-0.40	-0.41	-0.28	-0.27	-0.26	-0.46	-0.46
Implementation of the received experience	-0.36	-0.34	-0.31	-0.19	-0.39	-0.30	-0.44	-0.38	-0.30	-0.25	-0.41	-0.40	-0.30	-0.29	-0.30	-0.42	-0.47
General indicators of resistance to traumatism	-0.40	-0.41	-0.32	-0.18	-0.45	-0.41	-0.45	-0.40	-0.36	-0.31	-0.46	-0.45	-0.32	-0.31	-0.34	-0.50	-0.53
Helplessness	0.28	0.32	0.23	0.16	0.34	0.38	0.30	0.28	0.29	0.26	0.35	0.33	0.27	0.25	0.39	0.39	0.41
Conscious attitude towards professional training	-0.12	-0.07	-0.10	0.01	-0.16	-0.08	-0.17	-0.16	-0.09	-0.07	-0.18	-0.18	-0.07	-0.09	-0.10	-0.17	-0.15
The ability to get experience	-0.35	-0.36	-0.25	-0.17	-0.34	-0.28	-0.33	-0.25	-0.22	-0.23	-0.30	-0.39	-0.19	-0.27	-0.24	-0.34	-0.38
Cognitive dysfunction	0.40	0.38	0.29	0.13	0.37	0.36	0.38	0.32	0.28	0.26	0.39	0.39	0.27	0.23	0.27	0.42	0.45
Conscious attitude towards military duties	-0.21	-0.27	-0.20	-0.09	-0.28	-0.22	-0.34	-0.32	-0.22	-0.18	-0.35	-0.28	-0.18	-0.21	-0.25	-0.38	-0.35

Psychological safety of an individual = $5.325 - 0.072 \cdot \text{Irritability} - 0.064 \cdot \text{Devastation} - 0.077 \cdot \text{Sense of guilt} - 0.095 \cdot \text{Sense of powerlessness} - 0.071 \cdot \text{Reluctance to communicate} + 0.775$.

Traumatism of combat experience = $-17.672 + 0.426 \cdot \text{Anxiety} + 0.393 \cdot \text{Apathy} + 0.502 \cdot \text{Inability to perform the assigned tasks} + 0.789$.

Resistance to combat psychological traumatization = $167.165 - 2.514 \cdot \text{Anxiety} + 2.869 \cdot \text{Anger} - 1.621 \cdot \text{Apathy} - 1.510 \cdot \text{Lack of trust in comrades in the service} - 4.812 \cdot \text{Inability to perform the assigned tasks} + 0.599$.

The procedure of regression analysis had to give the possibility to reduce the dimension of measurements for each state, but as it could be seen, the error of evaluation in the concluded regression equations was quite high, especially in the process of predicting traumatism of combat experience ($e = 0.789$) and psychological safety of an individual ($e = 0.775$) that made it inappropriate to use them for calculations. However, the information obtained through regression analysis gave the possibility to better understand the experience of servicemen who had different negative symptoms due to their participation in hostilities.

Moreover, a long-last period of testing and a large selection of the study had shown that the calculations made with the help of regression analysis by individual scales were less accurate than the normalized general indicator by the method (that indicated one more time the importance of using the method as a single scale). It was the regulation for different negative symptoms that prevailed in determining the ways of processing data by the method.

Thus, the obtained data showed that if the general indicator by the method "Evaluation of negative mental reactions and states of combatants" exceeded 3.5 points, then 65.45% of servicemen-participants of the psychological recovery program were likely to be symptoms of maladjustment by the same method. If the average points according to the developed method were 5 or more, then more than 85% of servicemen with this indicator were diagnosed with expressed symptoms of maladjustment.

The comparison of the general indicator by the method "evaluation of negative mental reactions and states of combatants" with the method "Mississippi Scale for Combat-Related PTSD" (Keane, Caddell, and Taylor) [18] showed that while exceeding 3.5 points according to the scale of the developed method more than 90% of servicemen with this

indicator had expressed PTSD symptoms. When the average quantity of points was 5.5% – 100% of servicemen who participated in psychological recovery activities had an indicator that exceeded the norm by the "Mississippi Scale for Combat-Related PTSD" (Caddell and Taylor) [18].

The comparison with the data provided by the method "Resistance to psychological traumatism of combat experience" showed that with general points 3 or more in accordance with the method "Evaluation of negative mental reactions and conditions of combatants" 75.59% of servicemen with such quantity of points were diagnosed with an unsatisfactory indicator of resistance (from 0 to 143 points).

If the general indicator was exceeded in accordance with the method "Evaluation of negative mental reactions and states of combatants" the score of 5 points meant that low resistance to combat psychological traumatism was diagnosed in almost 86% of servicemen who participated in psychological recovery activities.

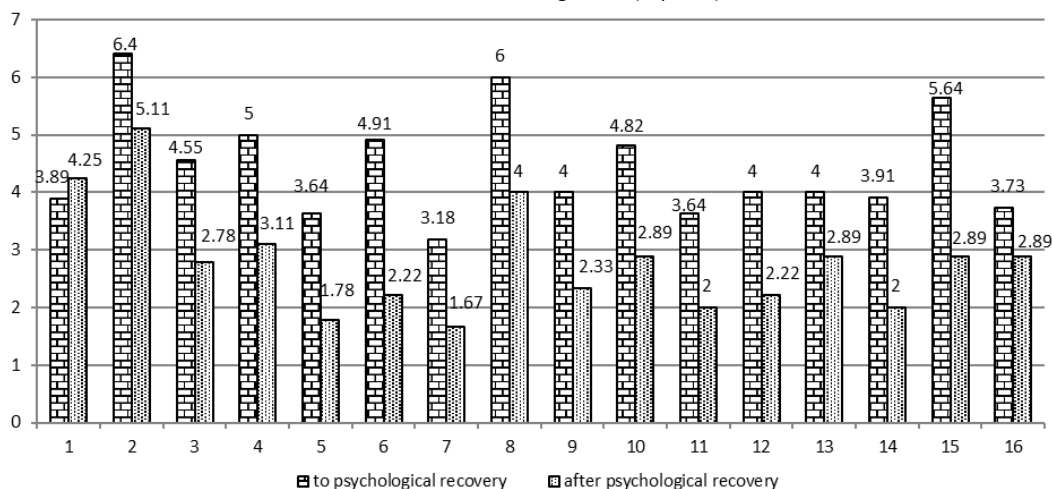
The comparison with the express method "Psychological Safety of an Individual" (Prykhodko) [19] and "Evaluation of traumatism of combat experience of servicemen" (Kolesnichenko) [20] pointed out that if the points were less than 3 by the general scale of the method "Evaluation of negative mental reactions and states of combatants" 89% of servicemen retained satisfactory indicators of psychological safety of an individual, and 85.41% were diagnosed with low trauma of combat experience.

More reliable for these two methods was a forecast concerning psychological well-being than negative symptoms.

Thus, the given data showed that for the general indicator by the method "Evaluation of negative mental reactions and states of combatants" it was normal to have a high probability of negative symptoms' absence (PTSD, maladjustment, instability to combat psychological traumatization, and psychological safety of an individual) and it also showed that high ability to recover was possible when an indicator was less than 3 points.

It was necessary to point out that the results obtained with the help of the method, both individual and group ones, were convenient to present in the form of column histograms. As an example, there was proposed the histogram of the dynamics of negative mental reactions and conditions of servicemen with signs of maladjustment (in particular, violation of behavioral regulation) in the process of one of the decompression courses (Figure 1).

Figure 1: Dynamics of negative mental reactions and conditions while participating in psychological recovery in a group of servicemen with violation of behavioral regulation (in points)



Notes: 1 – inability to perform the assigned tasks; 2 – lack of trust in commanders; 3 – lack of trust in comrades in the service; 4 – unwillingness to communicate; 5 – lack of focus; 6 – sense of impotence; 7 – sense of guilt; 8 – concern; 9 – apathy; 10 – devastation; 11 – self-doubt; 12 – inattention; 13 – anger; 14 – aggressiveness; 15 – anxiety; 16 – irritability

DISCUSSION

According to Ukrainian [14] and foreign specialists [26,27], early diagnosis of negative mental reactions and states [28], post-stress states, and determination of a group of increased psychological attention among personnel gave the possibility to identify servicemen with low personal adaptive potential and high probability of early and severe manifestations of combat psychological traumas [29] and its consequences [30]; also gave the possibility to create individual tactics and methods of prevention and restoration of each surveyed serviceman. To solve the problem of diagnosis of negative mental reactions and states of servicemen, it was suggested to use the following psychodiagnostic tools: "The Hospital Anxiety and Depression Scale (HADS)", "Brief Scale of Anxiety, Depression, and PTSD", "The Montgomery-Asberd Depression Rating Scale (MADRS)" [31], "Beck Depression Inventory (BDI)" [32], "Primary Screening for Post-Traumatic Stress Disorder (PTSD)", "Mississippi Scale for Combat-Related PTSD" (Keane, Caddell, and Taylor) [18], "Impact of Event Scale-Revised (IES-R)" [33], "Patient Health Questionnaire (PHQ)-9" [34], "Clinical-administered PTSD Scale" [35], "Neurotization and Psychopathization (LNP) questionnaire" [14] and others. As an additional diagnostic tool, at the request of a psychologist, there was used the method "The Suicidal Behaviors Questionnaire-Revised (SBQ-R)" [36] to diagnose the suicidal inclinations of servicemen. However, this psychological study could have been placed under the conditions of medical and psychological rehabilitation which lasted not less than two weeks, but it was quite difficult to realize this tool under the conditions of psychological recovery, which lasted not more than one week.

Traditionally, in clinical practice, there had been used for a long time the projective method such as Lusher's color test, in particular after psychotherapy and training activities for self-regulation and restoration of adaptive capacity, the selection of colors could be compared with the so-called autogenic norm by Wallnöfer [37].

World tendencies in psychological studies showed that the diagnosis of mood, mental reactions, and conditions was relevant not only for the needs of the clinic but also in the workplace. The study of workers' moods and states was an important component of the psychological well-being (health) of workers. These studies were extremely large-scale and attracted thousands of working people as participants [38]. Such interest in the problem of studying the state of a working person, as an indicator of his/her psychological well-being, was quite clear since the psychological state was a holistic, systematic, integral formation of human psychological activity. The psychological state of an individual could be internally and externally observed, it acted as a regulatory function of adaptation to the external situation and environment [16]. According to the definition by Kirilenko, the psychological state was the formation of psychological activity, which reflected the moment of stability and specificity of psychological processes' duration, as a form of response, and reflected the attitude of an individual toward his/her own psychological phenomena at a certain point in time under certain conditions [39]. Varii pointed out that the psychological state was a temporary functional level of the psyche, which reflected the interaction of the influence of the internal environment of the body or external factors and determined the orientation of

psychological processes' duration at a certain moment and manifestation of psychological properties of an individual [40]. The author defined the following areas in the studies of mental states: 1) mental states were an integral characteristic of the psyche at a particular moment; 2) psychological states were the background on the bases of which operated the psychological activity and orientation of the psychological activity of an individual; 3) it was a systemic reaction of the human psyche to changes of the conditions.

Volzhentseva highlighted that the leading functions of mental states were the regulation and integration into functional units, which were formed in the hierarchy of a single, holistic set of psychological processes and properties [25]. According to the author, the adaptive function of the psychological state was to establish the correspondence between the current needs and capabilities of an individual, considering the external conditions, features of activity, and behavior.

It was likely that the integration and integrity of psychological states became the basis for reducing the dimensions of the methods which were intended for their research. Thus, in foreign scientific sources, it was reported that to determine the moods and conditions, which were important indicators of short-term effects of intervention, was also used in clinical practice, "The Profile of Mood States (POMS)" [12,41]. This scale was developed by American experts, it had the form of a self-report and included 65 elements that related to 7 different scales: depression, anxiety, fatigue, energy, irritability, tension, and confusion.

The answer scale was divided into 5 categories from "not at all" to "completely yes". However, German psychologists in the re-standardization of POMS [12,13] created a shortened version of the method that included only 35 points which belonged to the scale "Depression/anxiety", "Fatigue", "Energy" and "Irritability" [38]. Another study was intended to

reduce the dimension of POMS [41]. For this purpose, the POMS scale [12,13] with the help of regression analysis correlated with "The Eight State Questionnaire" (8SQ) [42], which was formed to measure anxiety, stress, depression, regression, fatigue, guilt, extraversion, and excitement. Researchers found that the excessiveness of measurement between these two methods mainly referred to negative emotional states.

CONCLUSIONS

Thus, the developed method "evaluation of negative mental reactions and states of combatants" was a tool that gave the possibility to determine the presence of negative psychological symptoms of servicemen related to their participation in hostilities and was a convenient tool for estimation of the dynamics of the state under the conditions of short-term programs of psychological recovery without the use of complex evaluation procedures and calculation of data.

Conflicts of interest and sources of funding

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Authors' contribution

Conceptualization, O.K. and YaM.; managed the project, I.P.; conducted the research, V.K. and V.P.; contributed to the final draft of the manuscript, A.P., S.S. and N.P.; substantiated the methodology, S.L. All authors have read and agreed to the published version of the manuscript. All authors have read and agreed to the published version of the manuscript.

Patient consent for publication

Informed consent was obtained from all subjects for inclusion in the study while maintaining their confidentiality. Written informed consent has been obtained from all subjects to publish this paper.

Ethics approval and consent to participate

All procedures followed were in accordance with the ethical standards of the Helsinki Declaration of 1975, as revised in 2000.

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