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Predictors of Psychological Recovery after Traumatic Events

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ABSTRACT: The aim of the study was to identify psychological factors associated with the success of individuals' recovery from traumatic events, as well as to evaluate the effectiveness of a structured psychological rehabilitation and psychocorrection program. A prospective longitudinal controlled quasi-experimental study was conducted in Kyiv, Ukraine, from January to June 2026. The matched sample included 160 adults aged 18–60 years, divided equally between the experimental group and the comparison group. The experimental group received 16 group sessions over eight weeks, while the comparison group received four supportive consultations. 145 participants completed all three measurements, and the main analysis included the full original sample with correction for missing values. After three months, the mean score on the severity of posttraumatic stress disorder symptoms decreased by 13.21 points in the experimental group and by 5.55 points in the comparison group. The adjusted intergroup difference was 8.23 points. At the same time, a more pronounced decrease in depressive, anxiety, and stress manifestations as components of psychopathological symptoms was found, as well as an increase in resilience and perceived social support. The author's comprehensive criterion of psychological recovery was achieved by 55.0% of the participants in the experimental group and 16.3% of the participants in the comparison group. A higher initial level of posttraumatic symptoms and re-traumatization were associated with a less favorable outcome, while social support and other psychological resources predicted lower final symptoms and a higher probability of comprehensive improvement. The results confirmed the feasibility of early screening, assessment of re-traumatization, and inclusion of resource-oriented psychocorrectional components in psychological rehabilitation programs aimed at preserving and restoring mental health. The limitations of the study concerned the quasi-experimental distribution, short observation period, and use of the author's comprehensive criterion.

1. INTRODUCTION

Psychological recovery from traumatic events is not limited to the reduction of PTSD symptoms. It can include stabilization of emotional state, reduction of concomitant psychological distress, restoration of coping skills, and utilization of available social resources. Bonfils et al. (2022) found that psychotherapeutic interventions improved functional outcomes in individuals with PTSD, but these changes did not always correspond to the rate of reduction in clinical symptoms. Therefore, assessing only the severity of PTSD symptoms does not fully reflect the dynamics of psychological state after trauma.

In this study, psychological recovery was viewed as a symptomatic-resource process. Its symptomatic component included a reduction in posttraumatic, depressive, anxiety, and stress symptoms, while the resource component included increased resilience and perceived social support. This operational definition was not equated with complete clinical recovery or

restoration of all areas of social and professional functioning. It reflected those components of positive dynamics that could be directly assessed using the psychodiagnostic tools used.

The course of posttraumatic reactions depended on the initial severity of symptoms and the characteristics of the experienced event. Dokkedahl & Lahav (2024) showed that perceived threat modified the relationship between peritraumatic dissociation and subsequent symptoms of posttraumatic stress disorder. Ford et al. (2025) also confirmed the prognostic value of initial psychological and clinical characteristics for the subsequent dynamics of depressive and posttraumatic symptoms. These results indicate that a traumatic event with the same formal features can be accompanied by different recovery trajectories.

At the same time, the outcome of post-traumatic recovery was determined not only by the severity of symptoms. An important role was played by the psychological resources of the individual and the availability of social support. Fares-Otero et al. (2024) found a relationship between the level of social support and the severity of symptoms of post-traumatic and complex post-traumatic stress disorder. Grant et al. (2025) found that psychological interventions contributed to the reduction of post-traumatic stress, anxiety and depression. However, the significant heterogeneity in the content, duration and organization of such programs made it difficult to determine which resources and baseline characteristics of participants were associated with more favorable dynamics.

A scientific gap has been the insufficient explanation of how initial posttraumatic and concomitant psychopathological symptoms, retraumatization, resilience, and perceived social support are collectively associated with symptomatic-resource recovery. In existing studies, these factors have often been analyzed separately, while their combined prognostic contribution and relationship to the outcomes of structured psychological rehabilitation have remained poorly defined.

The aim of the study was to identify psychological predictors of symptomatic and resource recovery after traumatic events and to assess its dynamics in participants of a structured psychological rehabilitation program compared to supportive care. To achieve the aim, it was planned to: assess changes in post-traumatic, depressive, anxiety and stress manifestations; determine the dynamics of resilience and perceived social support; establish initial factors associated with the level of post-traumatic symptoms after three months; assess the likelihood of achieving a comprehensive symptomatic and resource outcome; formulate practical recommendations for differentiated psychological support for individuals who have experienced traumatic events.

2. LITERATURE REVIEW

Modern research on psychological recovery after traumatic events has gradually moved away from the idea of it as a linear reduction in the symptoms of posttraumatic stress disorder (PTSD). Recovery was considered a heterogeneous process in which symptomatic remission could be combined with the preservation of depressive manifestations, social difficulties or a decrease in functionality. Halkiadakis et al. (2023), assessing the resilience of patients with physical injuries, did not find a significant overall change in its level during a short observation period. This result indicated the relative stability of the psychological resource, but did not allow determining its long-term prognostic value due to the loss of some participants during re-assessment and the short time interval. At the same time, Pereira and da Silva (2025) showed that recovery could occur without formal psychotherapy due to social support, the desire to return to a familiar life, awareness of the traumatic experience and time free from new stressors. However, the qualitative design and small sample size limited the generalizability of these findings to clinical groups.

The trajectory approach more convincingly explained why the same traumatic events did not cause the same psychological consequences. Kang et al. (2024) distinguished predictors of early and delayed PTSD after physical trauma. For the early onset of the disorder, the severity of the injury, subthreshold symptoms and stressful events were important, but delayed reactions were formed under a different configuration of factors. This called into question the practice of one-time screening immediately after the injury, since a low initial level of symptoms did not exclude further deterioration. Similar heterogeneity was found by Lommen et al. (2025): in firefighters, the trajectories of PTSD and depression did not completely coincide, although experiential avoidance was associated with the adverse development of both groups of symptoms. A strength of this work was the use of latent trajectory analysis, but the occupationally homogeneous sample limited the applicability of the results to individuals who experienced single-time domestic or medical trauma (Kang et al., 2024; Lommen et al., 2025).

Resilience could not be reduced to the absence of psychological distress. Lin et al. (2022) showed that predictors of distress and resilience only partially overlapped, and therefore these states were not opposite poles of a single continuum. Methodologically,

it was important to take into account social and psychological factors, but the post-pandemic context was not identical to the impact of a discrete traumatic event. Therefore, transferring the results to individuals with clinically pronounced PTSD required caution. Collectively, these works confirmed that the prediction of recovery should include not only the severity of symptoms, but also avoidance, self-assessment of the ability to cope with the consequences of the trauma, the availability of resources and the dynamics of their use (Halkiadakis et al., 2023; Lin et al., 2022; Lommen et al., 2025).

Social support has been one of the most consistently studied resources, although its role has been shown to be more complex than a simple protective effect. Li et al. (2022) found a direct relationship between social support and self-efficacy and posttraumatic growth in burn patients, with self-efficacy partially mediating the effects of support. This suggested that support was beneficial when it enhanced a sense of personal empowerment rather than creating passive dependence. However, the cross-sectional design did not allow for causality to be established: more psychologically resilient patients were more likely to actively engage in support themselves. A similar limitation was the study by Melander et al. (2024), in which support use among emergency medical personnel was associated with posttraumatic symptoms, but it was unclear whether support reduced symptoms or whether individuals with more severe symptoms sought help more often (Li et al., 2022; Melander et al., 2024).

A meta-analysis by Ning et al. (2023) confirmed the positive association of social support with posttraumatic growth across groups, but considerable heterogeneity across studies suggested that the effect depended on the type of trauma, culture, source of support, and how it was measured. Perry et al. (2023) elaborated on this issue by delineating the functions of support. Support related to a sense of belonging predicted a reduction in PTSD symptoms, while symptoms themselves predicted a further reduction in material support. Thus, the relationship was bidirectional: social resources influenced recovery, but PTSD, through avoidance, emotional alienation, and communication difficulties, could erode these resources. The lack of significant within-person effects in Perry et al. (2023) also suggested that group patterns did not always accurately describe individual changes (Ning et al., 2023; Perry et al., 2023).

A separate strand of literature has focused on the characteristics of psychotherapy. Hoppen, Kip, and Morina (2023) examined the frequency of psychological interventions and found that a more intensive format was as effective as a standard format and may have reduced the risk of treatment discontinuation. However, frequency of sessions alone did not explain therapeutic response, as the outcome depended on the content of the intervention, the qualifications of the specialist, the patient's adherence, and the severity of co-morbidities. Another meta-analysis by Hoppen et al. (2024) did not support the assumption that multiple trauma necessarily reduced the effectiveness of psychotherapy. This finding had important clinical implications, but grouping participants only by the number of traumatic events may have obscured differences in the duration of trauma, age of first exposure, and interpersonal nature of the trauma (Hoppen et al., 2023; Hoppen et al., 2024).

Keyan et al. (2024), summarizing data from 114 studies, showed that baseline patient characteristics had limited and heterogeneous ability to predict response to trauma-focused psychotherapy. This meant that a statistically significant predictor at the group level was not necessarily suitable for individual clinical decision-making. Furthermore, the aggregated meta-analytic data did not allow for full consideration of the interaction of symptoms, motivation, therapeutic alliance, and changes that occurred already during treatment. Therefore, predicting effectiveness should rely not only on the initial patient profile, but also on re-assessment of early symptom dynamics and engagement in therapy (Keyan et al., 2024).

Comorbid psychiatric disorders further complicated recovery. Kline et al. (2023) argued for trauma-focused interventions for PTSD and substance use disorders and argued against the need to postpone work with traumatic memories until the comorbid disorder had fully stabilized. However, the increased risk of treatment discontinuation necessitated integrated treatment, safety monitoring, and motivational support. Molendijk et al. (2024) confirmed the reduction of PTSD, depression, and anxiety symptoms after psychological interventions in forced migrants. However, no type of therapy demonstrated a convincing advantage, and differences between countries of origin, legal status, living conditions, and current stressors limited the comparability of studies. The therapeutic effect in such groups could not be separated from environmental safety and access to social resources (Kline et al., 2023; Molendijk et al., 2024).

Thus, the literature confirmed the multifactorial nature of psychological recovery, but left several unresolved questions. Studies often analyzed symptoms, resilience, support, or treatment parameters separately, while their interaction within a single prognostic model remained poorly understood. Cross-sectional designs limited causal inferences, short follow-up periods did not capture delayed responses, and professional and clinical samples reduced generalizability. A scientific gap was the lack of

an integrated explanation of how baseline psychopathological symptomatology, psychological resources, functional social support, comorbidity, and characteristics of rehabilitation interventions jointly determined the trajectory of recovery.

3. MATERIALS AND METHODS

3.1 Design and participants

The study was conducted from January to June 2026 at two anonymous psychological and medical-psychological care facilities in Kyiv, Ukraine. The design was a prospective, longitudinal, controlled, quasi-experimental study. Participant recruitment occurred in January 2026, an eight-week rehabilitation program lasted from January to March, and a three-month reassessment was completed in June 2026. The sample size was determined a priori to detect a small-to-moderate interaction effect of group by time with a statistical power of 0.80, a significance level of 0.05, and an expected dropout rate of 10%.

A total of 198 individuals underwent initial screening. The matched sample included 160 participants aged 18–60 years, 80 in the experimental and comparison groups. The mean age was 36.8 ± 9.7 years; there were 104 women and 56 men. Group assignment was not randomized and was based on availability of a structured program. To reduce baseline heterogeneity, groups were matched 1:1 by gender, type of traumatic event, age with a range of up to three years, and baseline PTSD Checklist for DSM-5 (PCL-5) score with a range of up to five points. The main analysis was conducted according to initial group assignment and included all 160 participants.

Inclusion criteria were age 18 years or older, the presence of an event that met DSM-5 Criterion A, a PCL-5 score of at least 33 points, and written informed consent. The traumatic experience met Criterion A by a clinical psychologist during a structured interview supplemented with the Life Events Checklist for DSM-5. Exclusion criteria were psychotic state, severe cognitive impairment, current intoxication, withdrawal syndrome, and the need for urgent specialized psychiatric or medical-psychological care.

3.2 Intervention

The experimental group participants were divided into eight small groups of ten. Each group received 16 sessions of 90 minutes duration, which were held twice a week for eight weeks. The program structure included psychoeducation about posttraumatic reactions, mastery of stabilization and self-regulation techniques, processing of dysfunctional traumatic beliefs, development of skills for seeking social support, and gradual restoration of participation in available daily activities. The latter component was considered the content of rehabilitation work, but functional activity was not assessed on a separate standardized scale.

The sessions were conducted by four psychologists with master's degrees and at least three years of experience working with the consequences of traumatic events. Compliance with the program structure was recorded in standardized cards, which marked the completion of the mandatory components of each session. The completeness of the program implementation was additionally checked during weekly supervisions.

Participants in the comparison group received four individual supportive consultations lasting 50 minutes. The consultations included general psychological support, discussion of the current state, and recommendations for seeking specialized help, but did not contain the full structure of the experimental program. Concomitant psychological, psychiatric, and pharmacological care was recorded throughout the study.

3.3 Assessment tools

Measurements were conducted at three time points: before the program began, immediately after its completion, and three months later. The Ukrainian version of the PCL-5 was used to assess posttraumatic symptoms. Depressive, anxious, and stressful manifestations were determined by three subscales of the Depression Anxiety Stress Scales-21 (DASS-21). Resilience was assessed by the Connor–Davidson Resilience Scale-10 (CD-RISC-10), and the perceived availability of support from family, friends, and significant others was assessed by the Multidimensional Scale of Perceived Social Support (MSPSS). Internal consistency of the indicators in the study sample was determined by the McDonald omega coefficient.

3.4 Operationalization of psychological recovery

In the study, psychological recovery was defined as symptomatic-resource positive dynamics after a traumatic event. The symptomatic component included a decrease in posttraumatic manifestations according to the PCL-5 and a decrease in

depressive, anxiety, and stress symptoms according to the DASS-21. The resource component reflected an increase in resilience according to the CD-RISC-10 and a positive dynamics of perceived social support according to the MSPSS.

This operational definition did not equate to full clinical recovery or restoration of professional, family, and social-role functioning. It referred only to those components of recovery that were directly measured by the psychodiagnostic scales used.

The primary outcome was PCL-5 score at three months after completion of the program with control for baseline levels. Secondary continuous outcomes were depression, anxiety, and stress scores on the DASS-21, CD-RISC-10, and MSPSS.

For the integrated assessment, the author's operational criterion of symptomatic and resource recovery was developed. It was considered achieved if three conditions were simultaneously met: a decrease in PCL-5 by at least 10 points, a decrease in at least two DASS-21 subscales by at least 20%, and an increase in CD-RISC-10 by at least five points between the initial and three-month measurements.

MSPSS was not included in the mandatory components of the comprehensive criterion, since perceived social support was considered both as a psychological resource and a potential predictor of recovery. In addition, its level depended not only on the participant's internal changes, but also on the availability of help in his social environment. Therefore, the dynamics of MSPSS were analyzed as a separate secondary outcome and as a predictor of the final state.

3.5 Statistical analysis

Baseline comparability of groups was assessed using standardized differences. Values close to zero were interpreted as indicating minimal differences after matching. Potential factors for non-completion of reassessment were tested using regression models.

Mixed models were used to analyze changes in continuous measures across the three time points. They included fixed effects of group, time, the interaction of group by time, and institution, a random intercept for participant, and a random effect of specific rehabilitation group within the experimental condition. The main efficacy parameter was the interaction of group by time, which indicated whether the dynamics of outcomes differed between the two conditions.

Multiple linear regression was used to determine predictors of PCL-5 at three months. The model included baseline PCL-5, group membership, institution, age, gender, traumatic experience characteristics, baseline DASS-21, CD-RISC-10, and MSPSS scores. Logistic regression predicted achievement of the author's criterion of symptomatic-resource recovery. The fit of the logistic model to the data was assessed by the Hosmer–Lemeshaw test, and the discriminatory power was assessed by the area under the ROC curve.

For five continuous secondary outcomes, namely the three subscales of the DASS-21, CD-RISC-10, and MSPSS, sequential Holm correction was applied. Missing values were handled by multiple imputation based on a fully conditional specification in 20 data sets. The final coefficients and standard errors were pooled according to Rubin's rules.

The robustness of the main results was tested using an analysis of complete cases, a separate analysis of attendance, and an analysis of experimental group participants who attended at least 12 of the 16 sessions. Statistical calculations were performed in IBM SPSS Statistics 29.0. A two-sided p value < 0.05 was considered statistically significant, except when correcting for multiple comparisons.

3.6 Ethical provisions

The study protocol was approved by the Joint Local Ethics Commission of Partner Institutions, decision No. 04/2026 dated January 12, 2026. Before participation, all respondents received information about the purpose, procedures, possible psychological discomfort, voluntariness of participation, and the right to terminate it without explanation. All participants provided written informed consent. Personal data were replaced with digital codes, and analytical arrays did not contain information that would allow direct identification of the person.

4. RESULTS

4.1 Sample characteristics and study completion

198 individuals underwent the initial screening. Of these, 22 individuals did not meet the inclusion criteria: in 11 cases the PCL-5 score was lower than 33 points, in five cases the event did not meet DSM-5 criterion A, three individuals required urgent

specialized care, two had cognitive impairments that prevented them from completing the methods, and one individual was in a state of intoxication. Eight potential participants refused to participate after being familiarized with the procedure. For eight individuals, no suitable pair was found according to the established matching criteria. Thus, the main sample included 160 participants, 80 individuals in each group.

A total of 145 participants completed all three measurements: 73 in the experimental group and 72 in the comparison group. The overall dropout rate was 9.4%. Six participants moved, four were lost to follow-up, three withdrew due to worsening psychological status and were referred to specialist care, and two withdrew consent without giving a reason. Dropout rates did not differ between groups, $\chi^2(1) = 0.00, p = 1.000$. Age, gender, baseline *PCL-5*, *DASS-21*, *CD-RISC-10*, and *MSPSS* scores were not statistically associated with the likelihood of not completing the reassessment, all $p > 0.10$.

All 160 participants were included in the main analysis according to their initial group assignment. Missing repeated measures were imputed using a fully conditional specification method in 20 imputation sets. The distributions of the imputed values did not fall outside the acceptable ranges of the psychodiagnostic scales, and the pooled scores did not show instability between sets.

Before analyzing the dynamics, the initial comparability of the groups was checked. No statistically significant differences were found in socio-demographic characteristics, type of traumatic event, recurrence of trauma, initial psychopathological symptoms, and psychological resources. The absolute values of standardized differences for continuous indicators did not exceed 0.08, which confirmed the proper quality of the comparison.

Table 1. Baseline characteristics of study participants

Indicator	Experimental group, n = 80	Comparison group, n = 80	<i>p</i>	Standardized difference
Age, years, M $\pm$ SD	36.85 $\pm$ 9.63	36.75 $\pm$ 9.63	0.946	0.01
Women, n (%)	52 (65.0)	52 (65.0)	1,000	0.00
Men, n (%)	28 (35.0)	28 (35.0)	1,000	0.00
First partner institution, n (%)	48 (60.0)	48 (60.0)	1,000	0.00
Re-traumatization, n (%)	36 (45.0)	36 (45.0)	1,000	0.00
Combat events, n (%)	24 (30.0)	24 (30.0)	1,000	0.00
Forced displacement with imminent threat, n (%)	16 (20.0)	16 (20.0)	—	—
Violence, n (%)	14 (17.5)	14 (17.5)	—	—
Road traffic accident, n (%)	11 (13.8)	11 (13.8)	—	—
Physical trauma, n (%)	9 (11.3)	9 (11.3)	—	—
Other immediate threat to life, n (%)	6 (7.5)	6 (7.5)	—	—
<i>PCL-5</i> , M $\pm$ SD	47.98 $\pm$ 7.34	48.54 $\pm$ 7.60	0.632	−0.08
<i>DASS-21</i> : depression, M $\pm$ SD	20.17 $\pm$ 6.55	20.50 $\pm$ 6.15	0.744	−0.05

DASS-21: anxiety, M ± SD	17.69 ± 6.55	18.00 ± 6.19	0.757	−0.05
DASS-21: stress, M ± SD	23.80 ± 6.00	23.76 ± 5.97	0.969	0.01
CD-RISC-10, M ± SD	19.26 ± 5.59	19.60 ± 6.54	0.723	−0.06
MSPSS, M ± SD	3.94 ± 0.95	4.00 ± 0.97	0.727	−0.06
Pharmacological treatment, n (%)	17 (21.3)	19 (23.8)	0.850	−0.06
Additional consultation with a psychiatrist, n (%)	8 (10.0)	10 (12.5)	0.802	−0.08

Note: M – arithmetic mean; SD – standard deviation; PCL-5 – PTSD Checklist for DSM-5; DASS-21 – Depression Anxiety Stress Scales-21; CD-RISC-10 – Connor–Davidson Resilience Scale-10; MSPSS – Multidimensional Scale of Perceived Social Support. The p- value for types of traumatic events was related to the overall distribution of categories.

Source: calculated by the authors based on the results of an empirical study.

Thus, the differences between groups found after comparison were minimal, reducing the possibility that subsequent differences in outcomes were due to baseline heterogeneity in age, gender, type of traumatic experience, or initial symptom severity.

4.2 Reliability of methods and implementation of the rehabilitation program

The internal consistency of the scales used was adequate or high. For *the PCL-5 total score*, the McDonald omega coefficient was 0.93 at the first measurement and 0.94 after three months. For the depression, anxiety, and stress subscales *of the DASS-21*, the initial values were 0.89, 0.87, and 0.90, respectively. For *the CD-RISC-10*, the coefficient was 0.86, and for *the MSPSS*, 0.92. The obtained values confirmed acceptable item consistency and the possibility of using the total scores in subsequent models.

Within the experimental condition, all 128 planned group sessions were conducted. According to standardized cards, the average adherence to the program content was 95.1%. Eight weekly supervision meetings were held. No systematic deviations were found in the implementation of the program by the four psychologists.

At least 12 of the 16 sessions were attended by 68 participants in the experimental group, which was 85.0%. The median attendance was 13 sessions, the interquartile range was 12–15. Twelve participants attended between five and 11 sessions, but were not excluded in accordance with the main analytical strategy. In the comparison group, the average number of individual consultations was 3.63 ± 0.68 : 59 people attended all four consultations, 12 – three consultations, nine – two.

Within the experimental group, participants who attended at least 12 sessions had slightly lower *PCL-5 scores* at three months than participants with lower attendance: 34.35 ± 7.67 versus 37.14 ± 8.04 points. After controlling for baseline *PCL-5*, recidivism, resilience, social support, and institution, the number of sessions attended was not an independent predictor of the final score, $B = -0.05$, 95% CI $[-0.38; 0.28]$, $p = 0.768$. Thus, the difference between groups could not be explained solely by a formal dose effect of the number of sessions.

4.3 Dynamics of post-traumatic symptoms

The primary outcome was *the PCL-5 score* at three months from baseline. In the experimental group, the mean score decreased from 47.98 ± 7.34 points to 37.12 ± 8.37 at the end of the program and to 34.77 ± 7.74 at three months. The overall decrease was 13.21 points, or 27.5% from baseline.

In the comparison group, the score decreased from 48.54 ± 7.60 to 45.09 ± 8.19 points after the follow-up period and to 43.00 ± 8.77 after three months. The decrease was 5.55 points, or 11.4%. Thus, some positive dynamics were observed in both conditions, but its magnitude was significantly greater after the structured rehabilitation program.

The mixed model confirmed a statistically significant interaction of group by time, Wald $\chi^2(2) = 110.17, p < 0.001$. The adjusted between-group difference at three months was -8.23 points, 95% CI $[-10.67; -5.78]$. The standardized between-group difference was $d = -0.99$, corresponding to a large effect. The fixed effect of facility did not reach the established level of significance, $p = 0.059$. Variability associated with a specific rehabilitation group was small and accounted for less than 2% of the residual variance, so differences between individual treatment groups did not determine the overall outcome.

To present the primary and secondary symptomatic outcomes, Table 2 shows the scores of the three measurements and mixed model estimates.

Table 2. Dynamics of post-traumatic, depressive, anxiety and stress symptoms

Indicator	Group	Initial measurement, M $\pm$ SD	After the program, M $\pm$ SD	After three months, M $\pm$ SD	Wald χ^2 for group $\times$ time	Adjusted difference at three months, B [95% CI]	p with Holm correction
PCL-5	Experimental	47.98 $\pm$ 7.34	37.12 $\pm$ 8.37	34.77 $\pm$ 7.74	110.17	-8.23 [-10.67; -5.78]	<0.001
	Comparison	48.54 $\pm$ 7.60	45.09 $\pm$ 8.19	43.00 $\pm$ 8.77			
DASS-21: depression	Experimental	20.17 $\pm$ 6.55	13.65 $\pm$ 7.39	11.70 $\pm$ 7.19	116.51	-6.22 [-8.33; -4.11]	<0.001
	Comparison	20.50 $\pm$ 6.15	19.15 $\pm$ 6.54	17.92 $\pm$ 7.21			
DASS-21: alarm	Experimental	17.69 $\pm$ 6.55	12.89 $\pm$ 6.81	10.75 $\pm$ 6.95	77.16	-4.86 [-6.88; -2.83]	<0.001
	Comparison	18.00 $\pm$ 6.19	16.55 $\pm$ 6.37	15.61 $\pm$ 6.67			
DASS-21: stress	Experimental	23.80 $\pm$ 6.00	16.84 $\pm$ 6.28	14.57 $\pm$ 6.57	177.45	-6.16 [-8.11; -4.22]	<0.001
	Comparison	23.76 $\pm$ 5.97	22.57 $\pm$ 6.40	20.74 $\pm$ 6.79			

Note: Mixed models included fixed effects of group, time, their interaction, and institution, a random intercept for participant, and a random effect of rehabilitation group in the experimental condition. A negative B value indicated a lower score in the experimental group. For secondary outcomes, Holm-adjusted p values are reported.

Source: calculated by the authors based on the results of an empirical study.

DASS-21 subscales corresponded to the change in posttraumatic symptoms. In the experimental group, the depression score decreased by 8.47 points, anxiety by 6.94 points, and stress by 9.22 points. In the comparison group, the corresponding changes were 2.57, 2.40, and 3.02 points. The group-by-time interaction remained statistically significant after correction for multiple comparisons for all subscales.

These results showed that the rehabilitation program was not associated with an isolated decrease in one indicator, but with a coordinated dynamics of post-traumatic, depressive, anxiety and stress manifestations. At the same time, the preservation of some symptoms after three months indicated that the effect obtained did not mean the complete elimination of psychological distress in all participants.

4.4 Changes in psychological resources

Along with the reduction in psychopathological symptoms, an increase in resilience and perceived social support was found. The average *CD-RISC-10* score in the experimental group increased from 19.26 ± 5.59 to 24.36 ± 5.73 points after the program and to 26.22 ± 6.19 after three months. The cumulative increase was 6.96 points. In the comparison group, the score increased by 2.45 points - from 19.60 ± 6.54 to 22.05 ± 7.52 .

For the *CD-RISC-10*, the group-by-time interaction was statistically significant, Wald $\chi^2(2) = 170.36, p < 0.001$. The adjusted between-group difference at three months was 4.16 points, 95% CI [2.18, 6.15].

MSPSS score in the experimental group increased from 3.94 ± 0.95 to 4.63 ± 0.99 after the program and to 4.85 ± 1.08 after three months. In the comparison group, the change was smaller: from 4.00 ± 0.97 to 4.29 ± 1.01 . The interaction of group and time was also significant, Wald $\chi^2(2) = 147.61, p < 0.001$.

Summary indicators of resource dynamics are presented in Table 3.

Table 3. Dynamics of resilience and perceived social support

Indicator	Group	Initial measurement, M $\pm$ SD	After the program, M $\pm$ SD	After three months, M $\pm$ SD	Wald χ^2 for group $\times$ time	Adjusted difference at three months, B [95% CI]	p with Holm correction
<i>CD-RISC-10</i>	Experimental	19.26 $\pm$ 5.59	24.36 $\pm$ 5.73	26.22 $\pm$ 6.19	170.36	4.16 [2.18; 6.15]	<0.001
	Comparison	19.60 $\pm$ 6.54	21.23 $\pm$ 6.93	22.05 $\pm$ 7.52			
<i>MSPSS</i>	Experimental	3.94 $\pm$ 0.95	4.63 $\pm$ 0.99	4.85 $\pm$ 1.08	147.61	0.55 [0.25; 0.86]	<0.001
	Comparison	4.00 $\pm$ 0.97	4.12 $\pm$ 0.97	4.29 $\pm$ 1.01			

Note: A positive B value indicated a higher outcome in the experimental group. The p value was adjusted by Holm's method along with other secondary outcomes.

Source: calculated by the authors based on the results of an empirical study.

The obtained dynamics showed that the effect of the program was not limited to the reduction of undesirable symptoms. In the experimental group, resources related to the ability to withstand psychological stress and perceive the social environment as an available source of help simultaneously increased. It is especially important that the increase in *CD-RISC-10* and *MSPSS* did not disappear after the end of the eight-week intervention, but was maintained or strengthened over the three-month period.

4.5 Predictors of post-traumatic symptoms three months later

A hierarchical multiple regression model was constructed to identify independent predictors of the final *PCL-5* score. In the first stage, the initial *PCL-5*, group, and institution explained 67.7% of the variance in the final score. Adding age and gender increased the proportion of explained variance by only 0.9%, $\Delta F = 2.21, p = 0.113$.

Traumatic experience parameters increased R^2 by 2.4%, $\Delta F = 6.38, p = .002$. Adding baseline general distress increased R^2 by another 0.9%, $\Delta F = 4.98, p = .027$. Psychological resources provided the largest additional contribution after controlling for

group and baseline symptoms. Including *CD-RISC-10* and *MSPSS* increased the proportion of explained variance by 8.3%, $\Delta F = 31.24$, $p < 0.001$.

The final model was statistically significant, $F(10, 149) = 60.43$, $p < 0.001$, $R^2 = 0.802$, adjusted $R^2 = 0.789$. The variance inflation coefficients ranged from 1.00 to 4.34, so no critical multicollinearity was found. The detailed coefficients are given in Table 4.

Table 4. Multiple regression model of PCL-5 score after three months

Predictor	B	SE	95% CI for B	β	p
Initial <i>PCL-5</i>	0.63	0.09	[0.45; 0.82]	0.51	<0.001
Experimental group	-8.00	0.67	[-9.33; -6.67]	-0.44	<0.001
Institution	0.02	0.71	[-1.37; 1.42]	0.00	0.973
Age	0.04	0.04	[-0.03; 0.11]	0.04	0.270
Female gender	0.14	0.72	[-1.28; 1.56]	0.01	0.845
Re-traumatization	2.29	0.70	[0.90; 3.68]	0.12	0.001
Months after the event	0.13	0.09	[-0.06; 0.32]	0.05	0.180
Initial Total <i>DASS-21</i>	0.06	0.04	[-0.02; 0.14]	0.11	0.153
Initial <i>CD-RISC-10</i>	-0.18	0.10	[-0.39; 0.03]	-0.12	0.087
Initial <i>MSPSS</i>	-1.94	0.67	[-3.26; -0.62]	-0.20	0.004

Note: The dependent variable was the PCL-5 score at three months. The experimental group was coded as 1, the comparison group as 0. A positive value for re-traumatization indicated a higher residual level of posttraumatic symptoms. Negative coefficients for psychological resources indicated their protective association with outcome.

Source: calculated by the authors based on the results of an empirical study.

The strongest predictor of risk remained high baseline levels of posttraumatic symptoms. A one-point increase in baseline *PCL-5* was associated with a 0.63-point increase in final score, holding other variables constant. In contrast, being in the experimental group was associated with a decrease in final score of approximately eight points.

Re-traumatization predicted a 2.29 point higher level of symptoms at three months. Age, gender, institution, and time since the event had no independent prognostic significance.

Initial social support remained a statistically significant protective predictor after controlling for other characteristics. A one-point increase in *MSPSS* corresponded to a 1.94-point decrease in final *PCL-5*. For resilience, the direction of the relationship was also protective, but the individual coefficient did not reach the $p < 0.05$ level. At the same time, the joint inclusion of the two resource variables significantly increased the explanatory power of the model. This indicated that their significance should be assessed not only by individual coefficients, but also by the aggregate contribution of the resource block.

4.6 Comprehensive criterion for psychological recovery

The author's comprehensive operational criterion of psychological recovery was achieved by 44 participants in the experimental group, or 55.0%, and 13 participants in the comparison group, or 16.3%. The absolute difference was 38.8 percentage points, 95% CI [24.2; 51.0]. The relative probability of achieving the criterion in the experimental group was 3.38 times higher, 95% CI [1.95; 5.57], $p < 0.001$.

Five predictors were used for the multivariate logistic model, corresponding to the number of events reported. The model was statistically significant, $\chi^2(5) = 74.63$, $p < 0.001$. The Nagelkirk index was 0.432. The Hosmer–Lemeshaw test did not reveal poor agreement, $\chi^2(8) = 4.90$, $p = 0.769$. The area under the curve was 0.841, 95% CI [0.778; 0.899], indicating good discriminatory power.

Before reporting the model coefficients, we checked whether the model performance was determined solely by group membership. Including baseline symptoms, retraumatization, resilience, and social support did not eliminate the association between the rehabilitation program and the composite outcome.

Table 5. Logistic regression of achievement of the complex criterion of psychological recovery

Predictor	Adjusted OR	95% CI	<i>p</i>
Experimental group	11.26	[4.49; 28.27]	<0.001
Initial <i>PCL-5</i>	0.99	[0.94; 1.05]	0.777
Re-traumatization	0.55	[0.24; 1.24]	0.152
Initial <i>CD-RISC-10</i>	1.02	[0.90; 1.16]	0.723
Initial <i>MSPSS</i>	2.95	[1.35; 6.46]	0.007

Note: OR is odds ratio. A composite endpoint was defined as a simultaneous decrease in *PCL-5* of at least 10 points, a decrease in two DASS-21 subscales of at least 20%, and an increase in *CD-RISC-10* of at least five points between baseline and three-month measurements.

Source: calculated by the authors based on the results of an empirical study.

After adjusting for psychological characteristics, experimental group membership remained the main predictor of the composite outcome. Higher baseline social support also increased the odds of simultaneous symptomatic and resource improvement. Baseline *PCL-5*, retraumatization, and *CD-RISC-10* did not reach statistical significance in the logistic model. This did not negate their importance for individual outcomes, as the composite criterion required simultaneous change in several indicators and was more stringent than assessing only posttraumatic symptoms.

4.7 Sensitivity analysis

The results of the complete case analysis were generally consistent with the estimates obtained after multiple imputation. In the sample of 145 participants, the adjusted difference in final *PCL-5* between groups was -8.10 points, 95% CI $[-9.54; -6.66]$, $p < .001$. The composite criterion was met by 41 of 73 participants in the experimental group, or 56.2%, and 12 of 72 participants in the comparison group, or 16.7%. The adjusted odds ratio was 11.12, 95% CI $[4.23; 29.21]$, $p < .001$.

A separate analysis of participants who attended at least 12 group sessions also did not change the general trend of the results. However, the lack of an independent linear relationship between the number of sessions and the final *PCL-5* indicated that the effectiveness could not be reduced to the mechanical accumulation of visits. Rather, it was the completion of the interrelated components of the program, combined with initial resources and characteristics of the traumatic experience, that was important.

Concomitant pharmacological and psychiatric care was distributed comparably between groups. Its additional inclusion in the models did not change the magnitude or statistical significance of the group-time interaction. Therefore, the established dynamics were not explained by uneven receipt of external specialized care.

The results showed that psychological recovery was determined by a combination of three groups of factors. Higher initial levels of posttraumatic symptoms and re-traumatization were associated with a less favorable outcome. Perceived social support performed a protective function and explained an additional part of the variability in recovery. The greatest positive dynamics were observed under the condition of completing a structured program that combined a decrease in psychopathological symptoms with an increase in resilience and social resources.

5. DISCUSSION

The results showed that a structured eight-week psychological rehabilitation program was associated with more pronounced positive dynamics of psychological state than standard supportive care. After three months, participants in the experimental group had lower rates of post-traumatic symptoms, depression, anxiety and stress, as well as higher levels of resilience and perceived social support. The comprehensive criterion of recovery was achieved by 55.0% of participants in the experimental group and 16.3% of individuals in the comparison group. Therefore, the established dynamics were not limited to the reduction

of psychopathological symptoms. It simultaneously included the strengthening of resources that support adaptation after a traumatic experience.

Within the framework of this study, psychological recovery is best understood as a symptomatic-resource process. Its symptomatic component was manifested in the reduction of post-traumatic, depressive, anxiety and stress symptoms. The resource component included increased resilience and a more positive perception of the availability of social support. This distinction is important, since the reduction of distress does not automatically mean the restoration of the ability to cope with new difficulties, seek help and use available psychological resources.

The decrease in the PCL-5 score by 13.21 points in the experimental group indicated a practically significant positive dynamics of the symptomatic component of recovery. At the same time, the final indicators remained elevated in some participants. Therefore, the eight-week intervention did not ensure complete psychological recovery for all individuals, especially with high initial symptoms and repeated traumatization. The obtained result confirmed the need for differentiated support, in which the duration, intensity and combination of group and individual forms of assistance are determined by the psychological profile of the affected person.

Initial levels of posttraumatic symptoms remained the strongest predictor of outcome at three months. This finding was consistent with Shih et al. (2025), who showed that early posttraumatic assessments can be used to predict the subsequent development of posttraumatic symptoms. The practical significance of this relationship is that initial screening should serve not only a descriptive but also a prognostic function. Individuals with high initial scores require more intensive monitoring, early inclusion in structured rehabilitation, and reassessment after the completion of the main course of care.

At the same time, a high initial PCL-5 did not mean that positive dynamics were impossible. Rather, it indicated a more difficult recovery trajectory and a greater amount of residual symptoms after three months. Thus, the initial severity of the condition should be taken into account when planning care, but should not be interpreted as an unchanging characteristic or a reason to underestimate the expected effectiveness of rehabilitation.

Retraumatization also predicted higher levels of symptoms at three months. Presumably, new or repeated traumatic exposures made it more difficult to form a sense of safety, maintained psychological alertness, and reduced opportunities for stabilization. At the same time, retraumatization did not become an independent predictor of the comprehensive criterion of recovery. This may be due to the fact that the comprehensive indicator included not only symptom reduction, but also increased resilience. The negative impact of retraumatization could therefore be partially compensated by social and psychological resources.

A particularly important finding was the predictive value of social support. Higher baseline MSPSS scores were associated with lower levels of posttraumatic symptoms and higher odds of meeting the comprehensive recovery criterion. This was consistent with the findings of Santos et al. (2025), who confirmed the long-term buffering effect of emotional support on posttraumatic stress. In this context, social support was not a background sociodemographic characteristic, but an active resource for psychological regulation.

The practical mechanism of this connection could involve several interrelated processes. The availability of support reduced feelings of isolation, made it easier to seek professional help, promoted adherence to recommendations, and created a safer context for processing traumatic experiences. At the same time, the MSPSS reflected the subjective perception of support, not its objective amount. Therefore, an increase in the indicator could indicate both a real increase in support from the environment and a change in the participant's ability to notice, accept, and use the support already available.

The relationship between social support and posttraumatic symptoms, however, was not unidirectional. Sippel et al. (2024) found that support contributed to the reduction of posttraumatic symptoms, but high symptoms could gradually worsen social ties. A similar mechanism could be at work in the studied sample. Reduction of avoidance, emotional alienation and constant psychological tension could facilitate interaction with loved ones, while available support contributed to further stabilization of the condition. Therefore, the restoration of social contacts should not be considered only as a consequence of treatment. It can be one of its effective resources.

The increase in MSPSS after rehabilitation was partially consistent with the meta-analysis by Swerdlow et al. (2023), which showed a positive effect of trauma-focused psychotherapy on interpersonal functioning. However, these constructs are not identical. The study assessed subjective perceptions of support, and not the full range of interpersonal functions, social roles,

or actual frequency of contacts. Therefore, the changes found should not be interpreted as evidence of complete recovery of social functioning. They characterized primarily the resource side of psychological recovery.

The increase in resilience in the experimental group also confirmed that psychological recovery was not limited to the elimination of undesirable symptoms. The increase in CD-RISC-10 reflected a positive change in the ability to withstand psychological stress, adapt to difficulties and continue activities under adverse circumstances. This result gives grounds to speak of resource recovery, and not just symptomatic relief.

However, the initial CD-RISC-10 was not an independent predictor of final outcome after taking into account symptoms and social support. This could mean that the dynamics of resilience during rehabilitation rather than the initial resilience as a relatively static characteristic were more important. A similar conclusion followed from the study by Yeager & Benight (2022), in which the outcome of a digital intervention depended on the increase in self-efficacy and the ability to apply the acquired skills. Therefore, it is advisable to assess resources not only before the start of the program, but also at intermediate stages and after its completion.

This result has important practical significance. Low initial resilience should not be considered as a fixed unfavorable prognosis. With the purposeful development of self-regulation, reassessment of traumatic beliefs and a gradual return to everyday activities, the resource potential can change. Therefore, psychological rehabilitation should be aimed not only at controlling symptoms, but also at developing the ability to independently maintain the achieved changes.

The number of sessions attended was not an independent predictor of the final PCL-5. This did not mean that engagement was not important. Formal attendance did not reflect motivation, task completion, group interaction, and use of learned skills in daily life. Yeager & Benight (2022) also showed that engagement should be assessed as a multidimensional process, not just as the number of contacts with the program.

The lack of an independent linear relationship between the number of sessions and final symptomatology may also indicate that the positive dynamics were not determined by the mechanical accumulation of visits. Presumably, the assimilation of the interconnected components of the program, which included stabilization, self-regulation, processing of beliefs, and the use of social support, was of greater importance. However, the available design did not allow us to establish the separate contribution of each component.

The author's comprehensive criterion was of particular importance for the interpretation of recovery. In contrast to assessing only the PCL-5, it assumed a simultaneous decrease in posttraumatic symptoms, a decrease in at least two components of psychological distress, and an increase in resilience. Therefore, achieving the criterion meant a combination of symptomatic and resource improvement. It is this simultaneity that gives more meaningful grounds to speak of psychological recovery than a statistically significant change in one scale.

However, this criterion was not a diagnostic indicator of complete recovery. It did not cover occupational functioning, family role performance, quality of life, social participation, or daily independence. Therefore, it should be interpreted as an operational criterion of symptomatic and resource recovery. This interpretation does not diminish the significance of the established difference between the groups, but rather outlines the limits within which the results can be generalized.

The averages obtained may have masked different individual trajectories. Zhang et al. (2026) found heterogeneity in the combination of posttraumatic symptoms and posttraumatic growth after a natural disaster. Some individuals may demonstrate rapid symptomatic improvement, others a slow but sustained resource dynamics, and still others delayed deterioration after initial stabilization. Therefore, further studies should identify groups with sustained recovery, partial response, delayed deterioration, and a combination of residual symptoms with posttraumatic growth.

The main limitation remained the quasi-experimental design. Group matching reduced baseline differences in baseline characteristics but did not eliminate the possible influence of motivation, treatment readiness, support from loved ones, and other unmeasured factors. Therefore, participation in a structured program should be viewed as a factor associated with better positive dynamics, rather than as a definitively proven causal mechanism for recovery.

The observation period was three months, so the long-term stability of the changes was not determined. This time interval allowed us to assess the preservation of the short-term result, but did not show whether the changes remained stable over a

year, after the appearance of new stressors or after repeated traumatic exposure. In addition, the methods used were based on self-assessment, which could depend on the current emotional state and the individual way of interpreting the questions.

A separate limitation concerned the content of the concept of psychological recovery. The study directly measured posttraumatic and concomitant psychopathological symptoms, resilience, and perceived social support. Professional, family, social-role, and everyday functioning were not assessed with separate standardized instruments. Therefore, the results characterized the symptomatic-resource level of recovery, but not the entire process of the person's return to a full-fledged everyday life.

Furthermore, the comprehensive recovery criterion was an operational measure of the authors and needed further validation. Future studies should test its sensitivity, specificity, and predictive value in independent samples. It would also be appropriate to supplement it with standardized measures of functioning, quality of life, social participation, and return to professional and family roles.

Overall, the results confirmed that psychological recovery from traumatic events is a heterogeneous process in which symptomatic reduction is combined with the strengthening of personal and social resources. High initial symptomatology and re-traumatization were associated with less favorable dynamics, while perceived social support and completion of a structured program increased the likelihood of a positive outcome. Recovery, therefore, should not be interpreted as a one-time achievement or a simple absence of symptoms. It appears as a gradual restructuring of psychological functioning, requiring simultaneous work with distress, resilience, the social environment and the person's ability to apply the acquired skills outside the rehabilitation program.

6. CONCLUSIONS

The study identified psychological factors associated with recovery from traumatic events and assessed the effectiveness of a structured eight-week psychological rehabilitation program. The data obtained showed that psychological recovery was not limited to a change in a single indicator. Within the operational model used, it encompassed two interrelated components: a reduction in post-traumatic and concomitant psychopathological symptoms, as well as an increase in psychological resources.

After completing the program and three months of follow-up, the experimental group showed a more pronounced decrease in post-traumatic, depressive, anxiety, and stress symptoms than the comparison group. The average PCL-5 score decreased by 13.21 points in the experimental group and by 5.55 points in the comparison group. The adjusted between-group difference after three months was 8.23 points. At the same time, resilience and perceived social support increased in the experimental group. This indicated that the positive dynamics encompassed not only the reduction of psychological distress, but also the resource component of recovery.

The author's comprehensive operational criterion of psychological recovery was achieved by 55.0% of the participants in the experimental group and 16.3% of the participants in the comparison group. Thus, the structured rehabilitation program was associated with a higher probability of simultaneous reduction in posttraumatic symptoms and psychological distress and increased resilience. At the same time, this criterion should be considered as an indicator of symptomatic and resource recovery, and not as confirmation of full clinical, social or functional recovery.

The most robust factors associated with outcome were initial severity of posttraumatic symptomatology, retraumatization, and level of perceived social support. Higher initial PCL-5 and retraumatization were associated with less favorable symptomatic dynamics. At the same time, social support was associated with lower levels of residual posttraumatic symptoms and higher chances of achieving a comprehensive outcome. Initial resilience did not become an independent predictor after accounting for other variables, but its increase during rehabilitation confirmed the possibility of purposeful development of this psychological resource.

The practical significance of the results is the need for early screening for posttraumatic symptoms, assessment of retraumatization, and inclusion of social support in the individual care plan. Reassessment after completion of the main rehabilitation cycle is advisable, since initial reduction of symptoms does not always mean completion of the recovery process. For individuals with high initial distress, longer support, a combination of group and individual work, and periodic revision of the rehabilitation plan should be envisaged.

The limitations of the study included the quasi-experimental distribution, the three-month observation period, the use of self-assessment scales and the author's complex criterion, which requires separate validation. In addition, the study did not use standardized indicators of professional, family, social-role and everyday functioning. Therefore, the results obtained characterize the symptomatic-resource level of psychological recovery, but not the entire process of returning a person to a full life.

Future studies should include randomized designs, longer follow-up periods, individual trajectory analyses, and the mechanisms through which social support and resilience influence positive outcomes. It would also be useful to supplement symptom and resource scales with standardized measures of quality of life, social participation, daily activities, and return to professional and family roles. This would allow us to move from assessing individual manifestations of improvement to a more comprehensive analysis of psychological recovery after traumatic events.

AUTHOR CONTRIBUTIONS

Tetiana Kovalenko: Conceptualization, Writing—Original Draft, Project Administration.

Irina Spirina: Formal Analysis, Investigation, Writing—Original Draft.

Maryna Varakuta: Methodology, Supervision, Data Curation.

Nataliia Bondarenko: Investigation, Literature Review, Writing—Review & Editing.

Dmytro Zavialov: Validation, Visualization, Writing—Review & Editing.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ETHICS STATEMENT

The study protocol was approved by the Joint Local Ethics Commission of Partner Institutions, decision No. 04/2026 dated January 12, 2026. Before participation, all respondents received information about the purpose, procedures, possible psychological discomfort, voluntariness of participation, and the right to terminate it without explanation. All participants provided written informed consent. Personal data were replaced with digital codes, and analytical arrays did not contain information that would allow direct identification of the person.

DATA AVAILABILITY STATEMENT

Data supporting the findings of this study are available from the corresponding author upon reasonable request.

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APPENDIX A. STRUCTURE OF THE PSYCHOLOGICAL REHABILITATION PROGRAM AFTER PSYCHOTRAUMATIC EVENTS

The program consisted of 16 90-minute group sessions held twice a week for eight weeks. Each session included an initial assessment, a focus area, practical exercises, reflection, and the identification of a task for independent work.

Table A.1. Content of the psychological rehabilitation program

Session	Thematic block	Main content	Practical techniques	Expected result
1	Introduction and creating a safe environment	Familiarization with the program structure, group interaction rules, and confidentiality principles	Group agreement, initial self-assessment of the condition, definition of personal goals	Building a sense of security and willingness to participate
2	Psychoeducation about trauma	Consideration of typical psychological and physiological reactions after a traumatic event	Informational conversation, symptom map, normalization of post-traumatic reactions	Understanding your own condition and reducing self-blame
3	Trigger recognition	Identifying external and internal stimuli associated with increased distress	Trigger diary, analysis of situations, emotions and reactions	Raising awareness about the causes of deterioration
4	Stabilization of psychological state	Developing skills for returning attention to the present moment	Grounding techniques, spatial orientation, sensory self-regulation	Reducing the intensity of acute emotional reactions
5	Regulation of physiological stress	Recognizing and regaining control over bodily manifestations of stress	Controlled breathing, muscle relaxation, body scan	Reduction of somatic tension and anxiety
6	Awareness of emotions	Identification, naming, and differentiation of emotional states	Emotional diary, emotional intensity scaling, working with bodily signals	Improving the ability to recognize and describe emotions

7	Emotional self-regulation skills	Developing adaptive ways of responding to strong emotions	Pause technique, attention switching, individual stabilization plan	Reducing impulsivity and restoring control over behavior
8	Traumatic beliefs	Identifying negative beliefs about yourself, other people, and the world around you	Monitoring automatic thoughts, cognitive model of the situation	Awareness of the connection between thoughts, emotions and behavior
9	Cognitive processing	Examining the validity of traumatic beliefs and seeking alternative explanations	Cognitive restructuring, evidence analysis, forming balanced judgments	Weakening dysfunctional beliefs
10	Feelings of guilt and helplessness	Dealing with excessive responsibility, guilt, and loss of control	Delimitation of responsibility, reassessment of available opportunities, self-compassion	Reducing self-blame and increasing feelings of personal empowerment
11	Restoring interpersonal interaction	Identifying communication difficulties related to avoidance, mistrust, or emotional alienation	Communication exercises, active listening, formulating needs	Improving the ability to establish and maintain social contacts
12	Recourse	Developing the ability to communicate needs and accept support without feeling helpless	Role-playing situations, the “I-message” technique, practicing asking for help	Increasing willingness to use available support
13	Mapping psychological resources	Identifying personal, family, social and professional sources of support	Resource mapping, creating a support network, crisis contact plan	Activation of internal and external assistance resources
14	Resumption of daily activities	Identifying areas of life in which activity has decreased after a traumatic event	Behavioral activation, planning gradual actions, ranking tasks	Gradual return to normal activities
15	Sustaining positive change	Consolidation of established skills and identification of situations with increased risk of deterioration	Individual self-help plan, analysis of early signs of deterioration, response plan	Increasing the ability to independently maintain achieved results
16	Completion and prevention of deterioration	Summarizing results, assessing personal changes, and planning further recovery	Repeated resource mapping, deterioration prevention plan, final reflection	Consolidating results and developing a long-term recovery strategy

Note: The structure of the sessions was standardized. At the same time, the intensity of individual exercises was adapted to the psychological state of the participants without changing the main components of the program. The traumatic experience was

not recreated in detail during group sessions. In case of deterioration of the participant's condition, they were referred for individual counseling or specialized help.

Source: developed by the authors in accordance with the purpose and methodology of the study.

APPENDIX B. RESEARCH VARIABLES MATRIX

The matrix included sociodemographic characteristics, traumatic experience parameters, psychopathological symptomatology indicators, psychological resources, intervention characteristics, and recovery outcomes. Psychodiagnostic indicators were assessed before the program, after the completion of the eight-week intervention, and three months later. Categorical variables were coded with numerical values for mixed modeling, multiple, and logistic regression.

Table B.1. Operationalization and coding of research variables

Variable name	Tool or data source	Value range	Time point	Role in a statistical model	Coding
Research group	Participant registration form	0–1	Initial assessment	Main independent predictor, fixed effect	0 – comparison group; 1 – experimental group
Measurement time	Research protocol	0–2	Before the program, after the program, three months later	Fixed effect in mixed models	0 – initial measurement; 1 – after the program; 2 – three-month follow-up
Institution	Registration form	0–1	Initial assessment	Control variable in mixed and regression models	0 – first partner institution; 1 – second partner institution
Participant ID	Research record code	001–160	All time points	Random intercept in mixed models	Unique three-digit numeric code
Rehabilitation group	Session log	1–8	During the program	Random effect in experimental condition models	Small therapeutic group serial number
Age	Registration form	18–60 years old	Initial assessment	Demographic predictor and comparison variable	Number of completed years
Sex	Participant self-report	0–1	Initial assessment	Demographic predictor and comparison variable	0 – male; 1 – female
Type of traumatic event	Clinical Interview and <i>Life Events Checklist for DSM-5</i>	1–6	Initial assessment	Variable mapping and characterization of traumatic experiences	1 – combat events; 2 – forced displacement with immediate threat; 3 – violence; 4 – road accident; 5 – physical trauma; 6 – other immediate threat to life
<i>with DSM-5 Criterion A</i>	Clinical Interview and <i>Life Events</i>	0–1	Screening	Inclusion criterion	0 – does not correspond; 1 – corresponds

	<i>Checklist for DSM-5</i>				
Re-traumatization	Clinical conversation	0–1	Initial assessment	Predictor in multiple and logistic regression	0 – absent; 1 – present
Time after the traumatic event	Clinical conversation	1–12 months	Initial assessment	Predictor of final symptom level	Number of full moons
Post-traumatic symptoms	<i>PTSD Checklist for DSM-5</i>	0–80 points	Three measurements	Primary dependent variable; mixed model outcome; predictor in regression	Total of 20 items; higher score indicates greater severity of symptoms
Screening level of post-traumatic symptoms	<i>PTSD Checklist for DSM-5</i>	0–1	Initial assessment	Inclusion criterion	0 – less than 33 points; 1 – 33 points or more
Depressive symptoms	<i>Depression Anxiety Stress Scales-21</i> Depression Subscale	0–42 points	Three measurements	Secondary dependent variable; initial distress component	The sum of seven points multiplied by two
Alarming symptoms	Anxiety subscale <i>Depression Anxiety Stress Scales-21</i>	0–42 points	Three measurements	Secondary dependent variable; initial distress component	The sum of seven points multiplied by two
Stress symptoms	<i>Depression Anxiety Stress Scales-21</i> Stress Subscale	0–42 points	Three measurements	Secondary dependent variable; initial distress component	The sum of seven points multiplied by two
General psychological distress	Three subscales of the <i>Depression Anxiety Stress Scales-21</i>	0–126 points	Initial assessment	Block of predictors in multiple regression	Sum of depression, anxiety, and stress scores
Resilience	<i>Connor–Davidson Resilience Scale-10</i>	0–40 points	Three measurements	Secondary dependent variable; resource predictor	Sum of ten points; higher score indicates higher resilience
Perceived social support	<i>Multidimensional Scale of Perceived Social Support</i>	1–7 points	Three measurements	Secondary dependent variable; resource predictor	The average score is 12 points; a higher score indicates higher perceived support
Number of sessions attended	Attendance log	0–16 sessions	During the program	Additional predictor only in the experimental group	Actual number of sessions attended
Completion of the	Attendance log	0–1	After the program	Protocol analysis variable	0 – attended less than 12 sessions; 1 –

rehabilitation program					attended 12–16 sessions
Number of support consultations	Consultation log	0–4 consultations	During the study	Descriptive variable of comparison group	Actual number of consultations received
Concomitant pharmacological care	Medical and psychological chart and self-report	0–1	During the study	Control variable in sensitivity analysis	0 – not received; 1 – received
Additional psychiatric care	Medical and psychological chart and self-report	0–1	During the study	Control variable in sensitivity analysis	0 – not received; 1 – received
Change in post-traumatic symptoms	<i>PCL-5</i> score difference	From –80 to 80 points	Between baseline and three-month measurements	Additional performance indicator	Initial score minus final score; positive value indicates reduction in symptoms
Significant reduction in post-traumatic symptoms	<i>PCL-5</i> score difference	0–1	In three months	Component of the comprehensive criterion	0 – decrease of less than 10 points; 1 – decrease of at least 10 points
Reducing psychological distress	Difference between <i>DASS-21 subscales</i>	0–1	In three months	Component of the comprehensive criterion	0 – less than two subscales decreased by 20%; 1 – at least two subscales decreased by 20%
Increasing resilience	<i>CD-RISC-10</i> scores	0–1	In three months	Component of the comprehensive criterion	0 – increase of less than five points; 1 – increase of at least five points
Comprehensive psychological recovery	Author's operational criterion	0–1	In three months	Dependent variable of logistic regression	0 – criterion not met; 1 – three recovery components performed simultaneously
Completion of all measurements	Research register	0–1	After a three-month evaluation	Variable analysis of dropouts and complete cases	0 – at least one missed repeat measurement is present; 1 – all three measurements are completed
Reason for withdrawal	Research register	0–4	After elimination	Descriptive variable	0 – did not drop out; 1 – change of residence; 2 – loss of contact; 3 – deterioration of condition; 4 – withdrawal of consent

Note: DSM-5 – Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; PCL-5 – PTSD Checklist for DSM-5; DASS-21 – Depression Anxiety Stress Scales-21; CD-RISC-10 – Connor–Davidson Resilience Scale-10; MSPSS – Multidimensional Scale of Perceived Social Support. For psychodiagnostic indicators, continuous total or mean scores were used in statistical analysis. Dichotomization was used only for inclusion criteria and the author’s composite recovery index.

Source: compiled by the authors according to the design, instruments, and statistical plan of the study.