

Internal markers of stress-coping strategies in junior athletes

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Abstract:

The aim is to statistically identify and theoretically justify the internal markers of junior athletes' stress coping strategies. **Methods:** The research used a random sample representative of the general population, consisting of $n = 100$ junior athletes enrolled in sports schools of the Olympic reserve for children and youth in Ukraine. The respondents were members of U-15, U-17, and U-19 junior teams from leading national clubs and participants in national and international sports competitions. The respondents were 15 to 19 years old ($M = 17.93$; $SD = \pm 3.22$). Valid and reliable psychodiagnostic tools were used to measure relevant parameters reflecting the research subject. **Results.** Internal correlations of the parameters of strategies for coping with stress were recorded in three domains: the domain of relationships – two correlations with “assertive behavior” ($p < .001$) and “cautious actions” ($p \leq .050$); the domain of sports activities – two correlations with “assertive behavior” ($p \leq .050$) and “avoidance” ($p \leq .050$); the domain of health and trauma – with “impulsive actions” ($p \leq .050$). The assertive strategy was found to be the most loaded in the correlation matrix. It was substantiated that assertiveness in juniors' relationships is a productive strategy for coping with stress that involves the competency to constructively defend one's needs and rights without humiliating others and becoming a victim of manipulations. A comparison between the levels of internality as the grouping variable showed significant superiorities in the identical domains: the domain of relationships, the domain of sports activities, and the domain of health and trauma. It was found that the productive coping strategy “assertive behavior” and two unproductive coping strategies, “impulsive actions” and “avoidance”, are the most effective in the aforementioned domains. The principal component method with Varimax rotation and Kaiser normalization was used to identify six factors: assertive coping with stress (F 1), asocial coping with stress (F 2), non-productive coping with stress (F 3), cautious coping with stress (F 4), manipulative coping with stress (F 5), and aggressive coping with stress (F 6). **Discussion and Conclusions.** It was substantiated that strategies for coping with stress operationalized by the grouping variables regarding the areas of activity are the projections of junior athletes' intentions in relevant domains. The identified internal markers in the context of coping strategies added novelty to the theoretical clarification of coping strategies and defense mechanisms at the stage of the junior athlete's personal development.

Keywords: mental health, mental state, defense mechanisms, assertiveness, impulsivity, avoidance, distress, resilience.

Introduction

Sports activities are accompanied by chronic stress accepted by the individual, adapting to it and developing productive or non-productive strategies for coping with stress. Each subject in sports, regardless of their role and status – the athlete, coach, mentor, or administrator – has experienced stress and coped with it. Outcomes and constant comparisons in the form of tournament tables, standards, and record achievements instantly differentiate between successful and unsuccessful sports activities or successful and unsuccessful performances. Junior athletes who adapt to new tournament and competition schedules and participate in competitions with experienced athletes have to deal with overexertion and cope with stress without any preparation. Adolescents' overexertion often plays a role in rigorous selection. In this selection, it is not always the weakest who is eliminated. Juniors sometimes lack willpower, but, as practice shows, talented junior athletes often drop out of the “sports race”. Talented young people in sports need psychological support at the stage of personal growth and development. This stage often coincides with the age periods of early and late adolescence. Juniors can receive psychological support from coaches, mentors, and psychologists. These functions are mainly combined in one person who cannot perform them properly. On the other hand, junior sports have always been burdened by excessive demands in the form of competition achievements, because high results demonstrated by junior athletes in U-15, U-17, U-19, U-21, and U-23 allow them to enter the Olympic reserve automatically. They are

the country's closest reserve and sporting hope. These athletes are always in sight and are regarded as the immediate future. The outlined social field reflects the full complexity, multifaceted nature, and contradiction of the zone of the junior's proximal development in sports activities. The psychophysiological patterns and the specificity of the cardiovascular system examined by researchers (Cretu et al., 2021; Kozin et al., 2023), age patterns and new mental formations only add diversity to the scientific problem under study.

According to the initial assumptions of the concept by H. Selye (1975), stress is considered a non-specific neurohumoral response of the body to requirements that act as stressors. There are numerous stressors at the stage of personal growth and development. All of them have three phases: anxiety, resistance (resilience), and exhaustion. In tense activities, the constant rotation (Plokhikh et al., 2025) of eustress, which mobilizes efforts for productive and non-productive strategies, and distress, which is a destructive state causing exhaustion, also depletes the junior athlete's resources. Adaptation disorders considered in the study by O. Blynova et al. (2019; 2022) are accompanied by destructive processes causing diseases. A retrospective analysis of scientific studies (Hobfoll, 1994; 1989; Hobfoll et al., 2011; Yurchuk, 2024) allowed for differentiating between five types of athletes' strategies for coping with stress: 1) physical activity, 2) relaxation techniques, 3) healthy lifestyle, 4) the psychologist's professional support, and 5) psychological strategies. The first four types combine intra-influences that mainly depend on the level of the individual's well-being and financial situation, whereas the fifth type is an inter-influence that depends on their self-regulatory capacity, self-mastery, and internal intentions. Our research focuses on junior athletes' intentions aimed at achieving a competitive result in sports activities. Our study aims to identify internal markers indicating junior athletes' strategies for coping with stress. The study by F. Lebrun et al. (2019) discovered that elite athletes with clinical depression prefer psychologists' professional support and social support as strategies for coping with stress. Studying subjects' personal resources and resistance under stress and social trauma, researchers O. Kokun and O. Bezverkhyi (2024) and A. Riad et al. (2022) focused on respondents' physical and mental health. The cross-sectional survey conducted by O. Kokun and O. Bezverkhyi (2024) on a representative sample ($n = 498$) found that resistance, self-efficacy, and five personality traits "Big Five" (McCrae & Costa, 1991) (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience) are distinctive markers of personal resources. The theoretical and empirical research into the internal markers of junior athletes' strategies for coping with stress involves a combination of logically interrelated indicators that outline the structure of psychological correlations, significant differences, and psycho-complexes of dimensionality reductions in the form of six factors. Strategies for coping with stress operationalized by the grouping variables regarding the areas of activity are the projections of junior athletes' intentions in relevant domains. Identifying and interpreting internal markers in the context of coping strategies can add scientific novelty to understanding and defining coping strategies and defense mechanisms at the stage of the junior athlete's professional growth and development.

Hypothesis. Internal markers will be significant indicators of junior athletes' strategies for coping with stress in learning and training, competitive, and rehabilitative activities.

Aim. To statistically identify and theoretically substantiate the internal markers of junior athletes' strategies for coping with stress.

Methods

The methodology for identifying the internal markers of junior athletes' strategies for coping with stress reflects a number of indicators ensuring the logic, structure, and achievement of the research aim through establishing psychological correlations and identifying significant differences and key factors resulting from dimensionality reduction. The proposed factors are the markers of internalized characteristics underlying respondents' mental states in overcoming difficulties. Junior athletes' most important domains were given through an internal locus of control (Rotter, 1966). Junior athletes' strategies for coping with stress are considered complex, conflictual, and stressful situations in learning and training, competitive, and rehabilitative activities.

Participants. The random sample consisted of $n = 100$ people. Junior athletes were educated and trained at sports schools of the Olympic reserve for children and youth in Ukraine. The research participants engaged in individual and team sports, including football, volleyball, handball, gymnastics, freestyle wrestling, boxing, karate, weightlifting, track and field, and table tennis. A considerable portion of respondents were members of junior teams U-15, U-17, and U-19 of the leading national clubs and participated in national and international sports competitions. The research involved respondents who had turned at least 15 at the time of the survey and were under the age of 19 years. The descriptive frequency characteristics of the sample are as follows: $M = 17.93$; $SD = \pm 3.22$. Gender parity was maintained: junior male athletes ($n = 50$; 50.00%) and junior female athletes ($n = 50$; 50.00%).

Procedures and instruments. To measure junior athletes' internality in relevant areas of activity, the version of the questionnaire "Level of Subjective Control" (LSC) created by J. Rotter (1966), adapted by E. Bazhin et al. (1984). This psychodiagnostic tool allowed for identifying respondents' locus of control in five domains: the domain of athletes' achievements (DAA), the domain of athletes' failures (DAF), the domain of relationships (DR), the domain of sports activities (DSA), and the domain of health and trauma (DHT). The general

internality scale was not used in statistical operations. Respondents answered forty-four statements, using a seven-point bipolar Likert scale. This tool relevantly reflected the research subject, as it allowed for moving away from the traditional dual dimension “internality–externality”. The identified dimensions are junior athletes’ internalized behavioral manifestations in the most relevant areas of activity. Statistical reliability for the methodology measured by Cronbach’s alpha was recorded at $\alpha = .937$, corresponding to a high level. Another method used in the research was “The Connor-Davidson Resilience Scale-10” (CD-RISC-10) (Connor & Davidson, 2003). A number of Ukrainian adaptations, namely by N. Shkolina et al. (2020) and Z. Kireeva et al. (2020), were analyzed. The Ukrainian adaptation by Z. Kireeva, O. Odnostalko, and B. Biron (2020) who proposed a reduced scale was employed. Respondents assessed fourteen statements on a direct five-point Stapel scale. The answer options encompassed: “0” – never, “1” – seldom, “2” – sometimes, “3” – often, and “4” – always. The measurements of the methodology’s single scale, stress resistance (RISC), ranged from 0 to 56 points. Statistical reliability for the methodology’s reduced scale measured by Cronbach’s alpha was recorded at $\alpha = .969$, corresponding to a high level. The questionnaire “Strategic Approach to Coping Scale” (SACS) developed by S. Hobfoll (2002) allowed for identifying strategies for coping with stress. The author’s statement that respondents’ behaviors are regarded as strategies but not as a set of separate interaction patterns is valuable in the context of our research. The conceptual idea involved the proposed model with two main dual dimensions: “active – passive” and “prosocial – asocial”. An additional dimension was used to differentiate between direct and indirect behaviors. Respondents answered fifty-four statements used to detect nine strategies for coping with stress: assertive behavior (AsB), impulsive actions (IA), making social contacts (MSC), cautious actions (CA), avoidance (A), manipulative actions (MA), seeking social support (SSS), asocial behavior (AcB), and aggressive actions (AA). The questionnaire had a direct five-point Stapel scale. The answer options ranged from 5 – “yes, absolutely correct” to 1 – “no, absolutely wrong”. Statistical reliability for “SACS” (Hobfoll, 2002) measured by Cronbach’s alpha was recorded at $\alpha = .843$, corresponding to a medium level.

Organization of Research. The research was conducted based on a confirmatory strategy using statistical parameters to compare independent subsamples. Respondents were observed in September of the 2025–2026 academic year. Observation was organized at the beginning of the academic year, as this period is relatively stressful, accompanied by worries and anxiety that added ecological validity to the social situation under study. Google Forms were employed to collect empirical data. After giving informed consent to participate in the research, respondents answered the questionnaire statements. Researchers ensured data confidentiality and respondents’ awareness. Consent to conduct research was obtained at all administrative levels.

Statistical Analysis. The software “IBM SPSS Statistics” version 29.0.02.01 was used to process the empirical dataset and transform the results into automatically generated tables in APA style. Data at significance levels of $p \leq .050$; $p \leq .010$; $p \leq .001$ were analyzed.

Results

To interpret the key parameter values in this research, the following descriptive frequency characteristics were given: the mean (M), the median (Me), and the squared deviation (SD). It is important to present descriptive frequency characteristics as they allow for outlining the sample’s contours and ensuring reproducibility. Tabl. 1 presents data for three psychodiagnostic methodologies: “Level of Subjective Control” (J. Rotter, 1966; by adaptation E. Bazhin et al., 1984); “The Connor-Davidson Resilience Scale-10” (Connor & Davidson, 2003) and “Strategic Approach to Coping Scale” (Hobfoll, 2002).

Table 1. Main frequency descriptive characteristics of the research variables (n = 100)

Variables	M	Me	SD
“Level of Subjective Control” (J. Rotter, 1966; by adaptation E. Bazhin et al., 1984)			
The domain of athletes’ achievements (DAA)	10.76	11.00	±5.64
The domain of athletes’ failures (DAF)	10.88	10.00	±5.44
The domain of relationships (DR)	9.38	8.50	±5.41
The domain of sports activities (DSA)	10.86	11.00	±5.25
The domain of health and trauma (DHT)	4.54	4.00	±2.75
“The Connor-Davidson Resilience Scale-10” (Connor & Davidson, 2003)			
Stress resistance (RISC)	24.86	24.50	±7.23
“Strategic Approach to Coping Scale” (Hobfoll, 2002)			
Assertive behavior (AsB)	19.86	20.00	±3.56
Impulsive actions (IA)	18.92	18.50	±3.86
Making social contacts (MSC)	21.76	21.50	±3.68
Cautious actions (CA)	21.42	21.00	±4.03
Avoidance (A)	18.22	18.00	±4.10
Manipulative actions (MA)	16.72	17.00	±4.17
Seeking social support (SSS)	22.78	24.00	±4.56
Asocial behavior (AcB)	14.38	14.00	±4.98
Aggressive actions (AA)	18.58	19.00	±4.94

Note: M – the mean; Me – the median (given *in italics*); SD – the squared deviation.

Notably, statistical reliability for all methodologies measured by Cronbach (α) was recorded at high and medium levels. The proposed measurements were compared to the norms and results recommended by the authors of the methodologies (Bazhin et al., 1984). The results of the comparison using Student's t -test did not show significant differences. This result met the requirements for the sample's empirical data. We had no reason to doubt the credibility of the collected empirical data. Therefore, we can state that the sample totaling $n = 100$ people significantly represents junior athletes' general population. The research design entailed establishing internal correlations. The Kolmogorov-Smirnov test (Z) did not detect a normal distribution on all scales; hence, using Spearman's correlation coefficient was deemed legitimate (r_s). Tabl. 2 shows the internal correlations of the strategies for coping with stress.

Table 2. Internal correlations of the strategies for coping with stress

Scale	SP	Parameters of the strategies for coping with stress									
		RISC	AsB	IA	MSC	CA	A	MA	SSS	AcB	AA
DAA	r_s	-.003	.073	-.144	.218	-.208	-.125	-.157	.129	-.086	.109
	p	.982	.615	.320	.129	.148	.387	.275	.371	.555	.452
DAF	r_s	-.025	.180	-.009	.003	.067	.163	-.081	-.062	.022	.208
	p	.865	.210	.950	.984	.642	.257	.577	.668	.881	.147
DR	r_s	.179	.456***	.143	.158	.324*	.261	.143	-.016	.256	-.038
	p	.214	< .001	.323	.275	.022	.068	.321	.911	.073	.793
DSA	r_s	.186	.302*	.184	.016	.142	-.307*	-.124	-.087	-.121	-.147
	p	.197	.033	.201	.910	.325	.030	.390	.547	.401	.310
DHT	r_s	.183	.261	.300*	.062	.091	.004	-.045	-.011	.089	-.032
	p	.203	.067	.035	.671	.529	.976	.756	.940	.540	.828

Note: SP – statistical parameter; * – $p \leq .050$; ** – $p \leq .010$; *** – $p \leq .001$; DAA – the domain of athletes' achievements; DAF – the domain of athletes' failures; DR – the domain of relationships; DSA – the domain of sports activities; DHT – the domain of health and trauma; RISC – stress resistance; AsB – assertive behavior; IA – impulsive actions; MSC – making social contacts; CA – cautious actions; A – avoidance; MA – manipulative actions; SSS – seeking social support; AcB – asocial behavior; AA – aggressive actions.

Five significant correlations were established in three domains: the domain of relationships (DR) – two correlations with “assertive behavior” ($r_s = .456$; $p < .001$) and “cautious actions” ($r_s = .324$; $p = .022$); the domain of sports activities (DSA) – two correlations with “assertive behavior” ($r_s = .302$; $p = .033$) and “avoidance” ($r_s = -.307$; $p = .030$); the domain of health and trauma (DHT) – one correlation with “impulsive actions” ($r_s = .300$; $p = .035$). Notably, the domain of relationships has the strongest significant correlation with assertive behavior. Thus, the assertive strategy for coping with stress is the most loaded in our research. The most loaded domains are the domain of relationships, which combines family and interpersonal relationships, and the domain of sports activities. The established significant correlations required verification by comparing them by the grouping variable. We decided to verify all internal domains of junior athletes. Therefore, the studied groups were compared for five internality parameters. Tabl. 3 presents the results of the comparison by the grouping variable “The domain of athletes' achievements” between Group 1 ($n = 58$; 58.00%) with a low level of internality in the domain of achievements ($\leq Me$) and Group 2 ($n = 42$; 42.00%) with a high level of internality in the domain of achievements ($> Me$). Student's t -test was used to compare two independent samples (Group 1 and Group 2). Statistical parameters, namely Cohen's d and Levene's test (F) were employed to measure the effect size.

Table 3. Results of the comparison of the strategies for coping with stress by the grouping variable “The domain of athletes' achievements” between Group 1 and Group 2

Scale	Levene's test		Student's t-test for the equality of variances				d Cohen's
	F	p	t	p	95 CI		
					Lower	Upper	
AsB	.000	.988	-1.805	.077	-3.808	.205	-.517
IA	.278	.601	.317	.752	-1.892	2.601	.091
MSC	1.014	.319	-1.585	.120	-3.732	.442	-.454
CA	.010	.922	1.129	.264	-1.014	3.611	.324
A	.578	.451	.810	.422	-1.414	3.322	.232
MA	2.890	.096	.486	.629	-1.833	3.003	.139
SSS	.326	.570	-.600	.551	-3.436	1.856	-.172
AcB	.315	.577	.113	.911	-2.734	3.059	.032
AA	1.197	.279	-.450	.655	-3.511	2.227	-.129

Note: Group 1 – a low level of internality in the domain of achievements; Group 2 – a high level of internality in the domain of achievements; F – Levene's test for the equality of variances; p – significance level; t – Student's t -test (significant differences are given in bold); 95 CI – confidence interval; d Cohen's – effect size; AsB – assertive behavior; IA – impulsive actions; MSC – making social contacts; CA – cautious actions; A – avoidance; MA – manipulative actions; SSS – seeking social support; AcB – asocial behavior; AA – aggressive actions.

Unexpectedly, the comparison by the grouping variable “The domain of athletes’ achievements” showed no significant differences in the strategies for coping with stress. Thus, junior athletes with low and high levels of internality in the domain of sports achievements are equally susceptible to stressors and do not differ significantly in the studied parameter. Some athletes probably experience stress when they have not achieved the desired result, while others are stressed even having achieved the aim, because they set themselves another task and feel stressed again. Tabl. 4 shows the results of the comparison by the grouping variable “The domain of athletes’ failures” between Group 1 ($n = 54$; 54.00%) with a low level of internality in the domain of failures ($\leq Me$) and Group 2 ($n = 46$; 46.00%) with a high level of internality in the domain of failures ($> Me$). Significant differences were identified in the same way as in the previous statistical comparison.

Table 4. Results of the comparison of the strategies for coping with stress by the grouping variable “The domain of athletes’ failures” between Group 1 and Group 2

Scale	Levene's test		Student's t-test for the equality of variances				Cohen's d
	F	p	t	p	95 CI		
					Lower	Upper	
AsB	2.146	.149	-1.468	.149	-3.476	.542	-.517
IA	3.641	.062	-.498	.620	-2.772	1.671	.091
MSC	2.086	.155	.189	.851	-1.920	2.319	-.454
CA	.011	.916	-1.302	.199	-3.757	.804	.324
A	.466	.498	-.824	.414	-3.306	1.383	.232
MA*	11.078	.002	-.352	.727	-2.965	2.089	.139
SSS	.565	.456	.366	.716	-2.148	3.105	-.172
AcB	1.722	.196	-.695	.490	-3.841	1.867	.032
AA	1.043	.312	-.379	.706	-3.380	2.307	-.129

Note: * – data are given using Welch’s t-test; Group 1 – a low level of internality in the domain of failures; Group 2 – a high level of internality in the domain of failures; F – Levene’s test for the equality of variances; p – significance level; t – Student’s t-test (significant differences are given in **bold**); 95 CI – confidence interval; Cohen’s – effect size; AsB – assertive behavior; IA – impulsive actions; MSC – making social contacts; CA – cautious actions; A – avoidance; MA – manipulative actions; SSS – seeking social support; AcB – asocial behavior; AA – aggressive actions.

The result obtained is identical to that of the previous comparison, i.e., no significant difference was identified by the grouping variable “The domain of athletes’ failures” in the strategies for coping with stress. Obviously, the personal internalization of a sports failure and the emotions evoked by it do not correlate; hence, there are no differences. Tabl. 5 presents the results of the comparison by the grouping variable “The domain of relationships” between Group 1 ($n = 52$; 52.00%) with a low level of internality in the domain of relationships ($\leq Me$) and Group 2 ($n = 48$; 48.00%) with a high level of internality in the domain of relationships ($> Me$) using Student’s t-test. Statistical parameters, namely Cohen’s d, Levene’s test (F), and Welch’s t-test, were employed to measure the effect size.

Table 5. Results of the comparison of the strategies for coping with stress by the grouping variable “The domain of relationships” between Group 1 and Group 2

Scale	Levene's test		Student's t-test for the equality of variances				d Coen's
	F	p	t	p	95 CI		
					Lower	Upper	
AsB	.096	.759	-3.139	.003	-4.779	-1.047	-.889
IA	3.087	.085	-.212	.833	-2.455	1.987	-.060
MSC	.214	.646	-1.219	.229	-3.346	.820	-.345
CA	.158	.693	-1.489	.143	-3.939	.587	-.422
A	.362	.550	-.529	.599	-2.967	1.730	-.150
MA	1.522	.223	-.931	.356	-3.473	1.274	-.264
SSS*	4.409	.041	-1.472	.148	-4.414	.683	-.413
AcB	.225	.638	-1.134	.262	-4.417	1.231	-.321
AA*	7.364	.009	.957	.344	-1.504	4.216	.274

Note: * – data are given using Welch’s t-test; Group 1 – a low level of internality in the domain of relationships; Group 2 – a high level of internality in the domain of relationships; F – Levene’s test for the equality of variances; p – significance level; t – Student’s t-test (significant differences are given in **bold**); 95 CI – confidence interval; d Cohen’s – effect size; AsB – assertive behavior; IA – impulsive actions; MSC – making social contacts; CA – cautious actions; A – avoidance; MA – manipulative actions; SSS – seeking social support; AcB – asocial behavior; AA – aggressive actions.

A significant difference was identified in the parameter “assertive behavior” ($t = -3.139$; $p = .003$; $d = -.889$). A large effect size was measured. In summary, one superiority by the grouping variable “The domain of relationships” was recorded in the group with a high level of internality in the domain of family and interpersonal relationships (Group 2). Obviously, in constructive relationships, much depends on participants’ initiative and internality, as confirmed by this superiority. Tabl. 6 presents the results of the comparison by the grouping variable “The domain of sports activities” between Group 1 ($n = 56$; 56.00%) with a low level of internality in the domain of sports activities ($> Me$) and Group 2 ($n = 44$; 44.00%) with a high level of internality

in the domain of sports activities ($\leq Me$), using Student's t-test. Statistical parameters, namely Cohen's d, Levene's test (F), and Welch's t-test, were employed to measure the effect size.

Table 6. Results of the comparison of the strategies for coping with stress by the grouping variable "The domain of sports" between Group 1 and Group 2

Scale	Levene's test		Student's t-test for the equality of variances				d Cohen's
	F	p	t	p	95 CI		
					Lower	Upper	
AsB	.219	.642	-2.631	.011	-4.450	-.594	-.750
IA	2.007	.163	-2.287	.027	-4.539	-.291	-.652
MSC	.670	.417	-.715	.478	-2.871	1.364	-.204
CA	.001	.980	-1.487	.144	-3.963	.593	-.424
A	.704	.405	2.391	.021	.423	4.907	.681
MA*	1.511	.225	-.079	.938	-2.504	2.316	-.022
SSS	.389	.536	-.486	.629	-3.271	1.998	-.138
AcB	.087	.770	.761	.450	-1.778	3.947	.217
AA*	4.887	.032	.790	.433	-1.724	3.958	.225

Note: * – data are given using Welch's t-test; Group 1 – a low level of internality in the domain of sports activities; Group 2 – a high level of internality in the domain of sports activities; F – Levene's test for the equality of variances; p – significance level; t – Student's t-test (significant differences are given **in bold**); 95 CI – confidence interval; d Cohen's – effect size; AsB – assertive behavior; IA – impulsive actions; MSC – making social contacts; CA – cautious actions; A – avoidance; MA – manipulative actions; SSS – seeking social support; AcB – asocial behavior; AA – aggressive actions.

Three significant differences were identified in the parameters "assertive behavior" ($t = -2.631$; $p = .011$; $d = -.750$), "impulsive actions" ($t = -2.287$; $p = .027$; $d = -.652$), and "avoidance" ($t = 2.391$; $p = .021$; $d = .681$). Large and medium effect sizes were measured using Cohen's d for these differences. In summary, three superiorities were recorded by the grouping variable "The domain of sports activities": two superiorities were recorded in the parameters "assertive behavior" and "impulsive actions" for the group with a high level of internality in the domain of sports activities (Group 2); one superiority was recorded in the parameter "avoidance" for the group with a low level of internality in the domain of sports activities (Group 1). Tabl. 7 presents the results of the comparison by the grouping variable "The domain of health and trauma" between Group 1 ($n = 52$; 52.00%) with a low level of internality in the domain of health and trauma ($\leq Me$) and Group 2 ($n = 48$; 48.00%) with a high level of internality in the domain of health and trauma ($> Me$). The same statistical parameters were employed.

Table 7. Results of the comparison of the strategies for coping with stress by the grouping variable "The domain of health and trauma" between Group 1 and Group 2

Scale	Levene's test		Student's t-test for the equality of variances				d Cohen's
	F	p	t	p	95 CI		
					Lower	Upper	
AsB	.960	.332	-1.144	.258	-1.150	.870	-.324
IA	.981	.327	-2.117	.040	-2.237	-.112	-.599
MSC	.966	.331	.171	.865	.179	2.294	.048
CA	.373	.544	-.273	.786	-.314	1.999	-.077
A	.339	.563	.430	.669	.503	2.854	.122
MA	.029	.866	.970	.337	1.144	3.516	.275
SSS*	.085	.772	.849	.400	1.099	3.704	.240
AcB	.521	.474	-.844	.403	-1.192	1.648	-.239
AA*	.452	.505	-.118	.907	-.166	2.674	-.033

Note: * – data are given using Welch's t-test; Group 1 – a low level of internality in the domain of health and trauma; Group 2 – a high level of internality in the domain of health and trauma; F – Levene's test for the equality of variances; p – significance level; t – Student's t-test (significant differences are given **in bold**); 95 CI – confidence interval; d Cohen's – effect size; AsB – assertive behavior; IA – impulsive actions; MSC – making social contacts; CA – cautious actions; A – avoidance; MA – manipulative actions; SSS – seeking social support; AcB – asocial behavior; AA – aggressive actions.

A significant difference was found in the parameter "impulsive actions" ($t = -2.117$; $p = .040$; $d = -.599$). A medium effect size was measured using Cohen's d. In summary, by the grouping variable "The domain of health and trauma", one superiority was recorded in the group with a high level of internality (Group 1). At the same time, the strategy for coping with stress "impulsive actions" is considered non-productive.

The statistical operation of dimensionality reduction was utilized for the set of research variables consisting of fifteen relevant dimensions. The principal component method with Varimax rotation and Kaiser normalization was used. The number of respondents ($n = 100$) met the requirements for performing this statistical operation. Tabl. 8 presents the matrix of factor loadings of the internal markers of strategies for coping with stress.

Table 8. Matrix of factor loadings of the internal markers of strategies for coping with stress (n = 100)

Parameter	Principal component method ^a					
	F1	F2	F3	F4	F5	F6
The domain of athletes' achievements (DAA)			.530			
The domain of athletes' failures (DAF)			.649			
The domain of relationships (DR)	.756					
The domain of sports activities (DSA)	.603			-.553		
The domain of health and trauma (DHT)	.658					
Stress resistance (RISC)	.551		-.531			
Assertive behavior (AsB)	.720					
Impulsive actions (IA)	.531					.580
Making social contacts (MSC)		-.644				
Cautious actions (CA)				.589		
Avoidance (A)					-.553	
Manipulative actions (MA)		.668			.559	
Seeking social support (SSS)		-.642		.550		
Asocial behavior (AcB)		.848				
Aggressive actions (AA)			.548			.598

Note: ^a – the principal component method was used, and six factors were identified; F 1 – assertive coping with stress; F 2 – asocial coping with stress; F 3 – non-productive coping with stress; F 4 – cautious coping with stress; F 5 – manipulative coping with stress; F 6 – aggressive coping with stress.

To complement the principal component method, Tabl. 9 presents the matrix of total variance of the internal markers of junior athletes' strategies for coping with stress.

Table 9. Matrix of total variance of the internal markers of junior athletes' strategies for coping with stress (n = 100)

Initial eigenvalues			Sum of squared loadings		
V, in total	D (%)	Σ (%)	V, in total	d (%)	Σ (%)
3.073	20.484	20.484	3.073	20.484	20.484
2.610	17.402	37.886	2.610	17.402	37.886
1.954	13.024	50.910	1.954	13.024	50.910
1.716	11.443	62.353	1.716	11.443	62.353
1.298	8.656	71.009	1.298	8.656	71.009
1.062	7.079	78.088	1.062	7.079	78.088
.696	4.642	82.730			
.620	4.135	86.865			
.487	3.249	90.114			
.425	2.832	92.946			
.369	2.461	95.407			
.284	1.894	97.301			
.210	1.399	98.701			
.101	.676	99.377			
.093	.623	100.000			

Note: D – dispersion; Σ – sum of variances.

The matrix shows initial eigenvalues and the sum of squared loadings. We recorded six factors with loadings greater than one with a total variance of $\Sigma = 78.088$ and an eigenvalue of $V = 7.079$. F 1 combined the largest number of parameters loading it – six: “the domain of relationships” (.756), “the domain of sports activities” (.603), “the domain of health and trauma” (.658), “stress resistance” (.551), “assertive behavior” (.720), and “impulsive actions” (.531). All parameters have direct loadings. This state was interpreted as “assertive coping with stress”. F 2 combined four parameters, two of which were directly loaded, “asocial behavior” (.848) and “manipulative actions” (.668), and two parameters were inversely loaded, “making social contacts” (-.644) and “seeking social support” (-.642). This state was defined as “asocial coping with stress”. F 3 combined four parameters, three of which were directly loaded, “the domain of athletes' achievements” (.530), “the domain of athletes' failures” (.649), and “aggressive actions” (.548), and one inversely loaded parameter, “stress resistance” (-.531). This state was interpreted as “non-productive coping with stress”. F 4 combined three parameters, two of which were directly loaded, “cautious actions” (.589) and “seeking social support” (.550), and one inversely loaded parameter, “the domain of sports activities” (-.553). This state was defined as “cautious coping with stress”. F 5 combined two parameters, one of which was directly loaded, “manipulative actions” (.559), and one parameter was inversely loaded, “avoidance” (-.553). This state was interpreted as “manipulative coping with stress”. The final factor, F 6, combined two directly loaded parameters, “aggressive actions” (.598) and “impulsive actions” (.580). This state was defined as “aggressive coping with stress”.

Discussion

The internal markers of junior athletes' strategies for coping with stress are considered statistically significant correlations, significant differences, and factors obtained using the dimensionality reduction for the research variables. The value of identifying any psychological markers lies in the fact that such dimensions are of applied interest, easily identified and operationalized in practice.

Though the empirical data (see Tabl. 1) showed medium and high levels of statistical reliability, attention should be paid to the highest values. The dimensions of internality, such as the domain of athletes' achievements, the domain of athletes' failures, and the domain of sports activities, have the highest values. Notably, in our sample, the highest mean values are recorded for the domain of athletes' failures ($M = 10.88$; $SD = \pm 5.44$). This additionally confirms that failures and achievements go hand in hand, rotating. The attitude towards achievements, failures, and sports activities in general is particularly important. To some extent, the mechanism of social comparison and attributional style, depresses the individual and causes their failures, a lack of self-confidence, and unwillingness to change traditional algorithms and leave their comfort zone, when they compare their results with their peers' higher achievements. This corroborates that psychologically competent support for beginning athletes allows them to avoid a number of difficulties.

Internal markers in the form of psychological correlations showed (see Tabl. 2) that only the domain of relationships has significant relationships with the productive coping strategies "assertive behavior" and "cautious actions". The domain of sports activities also correlates with the productive coping strategy "assertive behavior" and the non-productive coping strategy "avoidance". Assertiveness in the athlete's relationships is considered a strategy for coping with stress that involves the ability to constructively defend their needs and rights without humiliating others and becoming a victim of manipulations.

Assertiveness combines internal strength and respect for the opponent, allowing a junior athlete to have a clear position on the situation relevant for maintaining psychological comfort, avoiding burnout, and building healthy relationships in sports activities and personal life. Logically, the domain of sports activities has an inverse correlation with the avoidance strategy. The coping strategy "avoidance" allows junior athletes to cope with stress when they strive to avoid a problem or stressful situation. Unlike assertive actions, this coping strategy is a mirror image of opposite efforts. Notably, avoidance can take on more complex, destructive forms when it is accompanied by confrontation or distancing and the defense mechanism of substitution through unhealthy behavior, such as drinking alcohol or taking drugs to escape reality. Another significant correlation was established between the domain of health and trauma and "impulsive actions". This correlation is explained by the variability of volitional and personal characteristics. Therefore, impulsive actions internalizing the domain of health and trauma reflect age-related characteristics that change with experience and time. In summary, the dual pair of strategies for coping with stress, "assertive actions-avoidance", is the most effective for the junior athletes' sample.

A successful attempt to compare the levels of internality as the grouping variable allowed for identifying significant differences only in three domains: the domain of relationships, the domain of sports activities, and the domain of health and trauma (see Tabl. 3-7). It was found that the productive coping strategy "assertive behavior" and two non-productive coping strategies, "impulsive actions" and "avoidance", are the most effective in the aforementioned domains. The non-productive coping strategy "impulsive actions", as opposed to "avoidance", is significantly pronounced and dominant. Therefore, comparing the parameters of internality again suggests focusing on the dual pair of strategies for coping with stress, namely "assertive actions – impulsive actions". Thus, assertive actions, avoidance, and impulsive actions are specific internal markers characteristic of the junior athletes' sample. The analysis of this research shows that assertiveness is pronounced in the most productive self-actualizing mental states.

Factor analysis for dimensionality reduction using the principal component method with Varimax rotation and Kaiser normalization (see Tabl. 8-9) allowed for identifying six factors that are legitimately considered internal markers. All factors can be conditionally divided into productive ones, namely assertive coping with stress (F 1) and cautious coping with stress (F 4), and non-productive ones, namely asocial coping with stress (F 2), non-productive coping with stress (F 3), manipulative coping with stress (F 5), and aggressive coping with stress (F 6). It is noteworthy that in our juniors' sample, F 1 – Assertive coping with stress prevails with the following share in the factor structure – $V = 3.073$; $d = 20.484$. F 5 – Manipulative coping with stress and F 6 – Aggressive coping with stress, which are loaded by manipulative and aggressive actions, reflect respondents' most dangerous mental states. Some results are confirmed while others are refuted in the factor structure of expected mental states in university students' educational and professional activities (Popovych & Blynova, 2019).

The aim was achieved, and the hypothesis was verified. The value of the internal markers of junior athletes' strategies for coping with stress in learning and training, competitive, and rehabilitative activities was presented and clarified in a discursive style. The statistical results obtained possess scientific novelty and deepen the understanding of coping strategies and defense mechanisms at the stage of the junior athlete's personal growth and development.

Conclusions

It was substantiated that the research into the internal markers of junior athletes' strategies for coping with stress outlines a specific structure of psychological correlations, significant differences, and psycho-complexes of dimensionality reduction in the form of six factors. It was noted that strategies for coping with stress operationalized by the grouping variables regarding the area of activity are the projections of junior athletes' intentions in relevant domains. Internal correlations of the strategies for coping with stress were established in three domains: the domain of relationships – two correlations with “assertive behavior” ($p < .001$) and “cautious actions” ($p \leq .050$); the domain of sports activities – two correlations with “assertive behavior” ($p \leq .050$) and “avoidance” ($p \leq .050$); and the domain of health and trauma – with “impulsive actions” ($p \leq .050$). Comparing the levels of internality as the grouping variable showed significant superiorities in the identical domains: the domain of relationships, the domain of sports activities, and the domain of health and trauma. It was found that in the aforementioned domains, the productive coping strategy “assertive behavior” and two unproductive coping strategies, “impulsive actions” and “avoidance”, are the most effective. It was summarized that assertive actions, avoidance, and impulsive actions are specific internal markers characteristic of the junior athletes' sample. Factor analysis for dimensionality reductions using the principal component method with Varimax rotation and Kaiser normalization allowed for identifying six factors: assertive coping with stress (F 1), asocial coping with stress (F 2), non-productive coping with stress (F 3), cautious coping with stress (F 4), manipulative coping with stress (F 5), and aggressive coping with stress (F 6). It was explained that F 5 – Manipulative coping with stress and F 6 – Aggressive coping with stress, which are loaded by manipulative and aggressive actions, are respondents' most dangerous mental states. The research's scientific novelty and complementing the theory of the functioning of coping strategies and defense mechanisms at the stage of the junior athlete's growth and development allow for recommending the results obtained for implementing in the theory and practice of juniors' sports activities.

References

- Bazhin, E. F., Golyukin, E. A., & Etkind, A. M. (1984). A method for studying the level of subjective control. *Psychological Journal*, 5(3), 152–162.
- Blynova, O., Derevianko, S., Ivanova, O., Popovych, I., & Estay Sepulveda, J. G. (2022). Professional relevance of potential labor emigrants. *Revista Notas Históricas y Geográficas*, 29, 88–106. <https://www.revistanotashistoricasygeograficas.cl/index.php/nhyg/article/view/435>
- Blynova, O. Ye., Popovych, I. S., Bokshan, H. I., Tsilmak, O. M., & Zavatska, N. Ye. (2019). Social and Psychological Factors of Migration Readiness of Ukrainian Students. *Revista ESPACIOS*, 40(36), 4. <https://www.revistaespacios.com/a19v40n36/19403604.html>
- Connor, K. M., & Davidson, J. R. T. (2003). Development of a New Resilience Scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, 18, 76–82. <http://dx.doi.org/10.1002/da.10113>
- Cretu, M., Borysenko, I., Ushmarova, V., Grynyova, V., & Masych, V. (2021). Features of vascular regulation of students – future specialists in physical education and sports of different sports specializations with different body lengths. *Health, Sport, Rehabilitation*, 7(2), 29–44. <https://doi.org/10.34142/HSR.2020.07.02.03>
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, 44(3), 513–524. <https://doi.org/10.1037/0003-066X.44.3.513>
- Hobfoll, S. E., Dunahoo, C. L., Ben-Porath, Y., & Monnier, J. Gender and coping: The dual-axis model of coping. *American Journal of Community Psychology*. 1994. Vol. 22. P. 49–82. <https://psycnet.apa.org/doi/10.1007/BF02506817>
- Hobfoll, S. E., Mancini, A. D., Hall, B. J., Canetti, D., & Bonanno, G. A. (2011). The limits of resilience: distress following chronic political violence among Palestinians. *Social Science and Medicine*, 72(8), 1400–1408. <https://doi.org/10.1016/j.socscimed.2011.02.022>
- Hobfoll, S. E. (2002). Social and Psychological Resources and Adaptation. *Review of General Psychology*, 6(4), 307–324. <https://doi.org/10.1037/1089-2680.6.4.307>
- Kireeva, Z. O., Odnostalko, O. S., & Biron, B. V. (2020). The Psychometric Analysis of the Adapted Version of Resilience Scale (CD-RISC-10). *Habitus*, 14, 110–116. <https://doi.org/10.32843/2663-5208.2020.14.17>
- Kokun, O., & Bezverkhyi, O. (2024). Ukrainian students' Personal Resources and Resistance to War Stress: A Cross-Sectional Survey. *Journal of Loss and Trauma*, 29(8), 976–993. <https://doi.org/10.1080/15325024.2024.2325084>
- Kozin, O., Kozina, Z., Cretu, M., Boychuk, Y., Pavlović, R., Garmash, I., & Berezhna, Y. (2023). Vegetative regulation of vascular tone and features of the nervous system of pedagogical universities students. Is there a relationship with professional specialization?. *Health, Sport, Rehabilitation*, 9(1), 29–44. <https://doi.org/10.34142/HSR.2023.09.01.03>

- Lebrun, F., MacNamara, Á., Collins, D., & Rodgers, S. (2019). Elite Athletes Coping with Depression: A Qualitative Study. *Journal of Clinical Sport Psychology*, 13(3), 351–373. <https://doi.org/10.1123/jcsp.2018-0072>
- McCrae, R. R., & Costa, P. T. (1991). The NEO Personality Inventory: Using the Five-Factor Model in Counseling. *Journal of Counseling & Development*, 69, 367–372. <https://doi.org/10.1002/j.1556-6676.1991.tb01524.x>
- Plokhikh, V., Popovych, I., Shevchenko, N., Losiyevska, O., Kolly-Shamne, A., & Akimov, R. (2025). Time Perspective of Forced Migrants within the National Boundaries and Abroad. *Journal of Education Culture and Society*, 16(1), 125–142. <https://doi.org/10.15503/jecs2025.2.125.142>
- Popovych, I. S., & Blynova, O. Ye. (2019). The Structure, Variables and Interdependence of the Factors of Mental States of Expectations in Students' Academic and Professional Activities. *The New Educational Review*, 55(1), 293–306. <https://doi.org/10.15804/ner.2019.55.1.24>
- Riad, A., Drobov, A., Krobot, M., Antalová, N., Alkasaby, M. A., Peřina, A., & Koščík, M. (2022). Mental Health Burden of the Russian–Ukrainian War 2022 (RUW-22): Anxiety and Depression Levels among Young Adults in Central Europe. *International Journal of Environmental Research and Public Health*, 19(14), 8418. <https://doi.org/10.3390/ijerph19148418>
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement: Psychological Monographs. *General and Applied*, 80(1), 1–28.
- Selye, H. A. (1975). Confusion and Controversy in the Stress Field. *Journal of Human Stress*, 1, 37–44. <http://dx.doi.org/10.1080/0097840X.1975.9940406>
- Shkolina, N. V., Shapoval, I. I., Orlova, I. V., Kedyk, I. O., Stanislavchuk, M. A. (2020). Adaptation and validation of the Ukrainian version of the Connor-Davidson Stress Resilience Scale-10 (CD-RISC-10): testing in patients with ankylosing spondylitis. *Ukrainian Journal of Rheumatology*, 2(80), 66–72. <https://doi.org/10.32471/rheumatology.2707-6970.80.15236>
- Yurchuk, S. (2024). Study of strategies for coping with stressful situations in adolescents in a situation of uncertainty. *Personality and Environmental Issues*, 3(2), 33–39. [https://doi.org/10.31652/2786-6033-2024-3\(2\)-33-39](https://doi.org/10.31652/2786-6033-2024-3(2)-33-39)