

Features of experiencing chronic stress during martial law

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Abstract

The aim of this study was to investigate the characteristics of Ukrainian adolescents' reactions to martial law and related stressful situations. To achieve this goal, a comparative analysis of the results of a survey conducted in 2025 was conducted, in which 127 adolescents aged 15-16 years from Kyiv, Ukraine, and 105 of their peers from Mississauga, Canada, participated. The questionnaire covered four scales: emotional, cognitive, behavioural, and physiological. The study also included interviews with three class teachers and four subject teachers from a school in Kyiv to identify stress factors in Ukrainian adolescents. According to the results of the comparative analysis, high stress levels were three times more common among Ukrainian adolescents (40%) than among their Canadian peers (12%). In terms of the emotional sphere, the percentage of Ukrainian respondents who were in a state of constant emotional calm and confidence was lower than that of Canadian respondents – 30% and 45.7%, respectively. In terms of cognitive functioning, there was also a discrepancy between the percentage of Ukrainian (36%) and Canadian (28.6%) students who had difficulty concentrating and memorising. Behavioural

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responses to stress manifested themselves, in particular, in the form of conflicts, the regularity of which was reported by 22% of Kyiv students; Canadian students (50%), on the other hand, were predominantly in a state of emotional calm and productive social interaction. On a physiological level, headaches, frequent illnesses and other symptoms were more common among Kyiv students than among Canadian students. During interviews with class teachers and subject teachers, age-related, political and socio-cultural stressors were identified, on the basis of which the following recommendations were made: reducing academic workload, conducting regular psychological training, and working with parents to create a favourable atmosphere for development. The results of the study can be used to improve the psychological resilience of adolescents and promote their harmonious development in conditions of uncertainty caused by the state of war.

Keywords: chronic stress in adolescents; psycho-emotional response; academic performance; coping strategies; cross-cultural comparison; effects of martial law; emotional regulation; physiological stress symptoms.

Introduction

The relevance of the study is determined by the transformations in the psycho-emotional state of Ukraine's population due to the full-scale war. Military actions have led to shifts in the usual way of life, causing chronic stress, defined as a prolonged exposure to stressors that leads to persistent emotional tension, heightened arousal, and challenges in adaptation, an increased level of anxiety, a feeling of insecurity, and existential instability. The combination of psycho-traumatic factors in the war environment causes deep and often irreversible changes in the human psyche, manifesting in impaired adaptive behaviour, transformations of worldview orientations, and lifestyle (Efremov, 2026).

M. Mousikou et al. (2023) in their study emphasised that childhood and adolescence are key periods of growth and development. At the same time, during these age periods, the body is most vulnerable to various stressors the effect of which is difficult to predict. E. Ryan et al. (2023) found that the unpredictable nature of stress leads to emotional burnout, which, in turn, influences human physiological and psychological development. From a psychological point of view, emotional burnout is associated with an increased risk of substance abuse and suicidal thoughts. The physical manifestations of chronic stress were investigated by M. Chen et al. (2023), who analysed a sample of 738 patients with signs of chronic pain. According to the researchers, patients' chronic stress is associated with a state of arousal, which leads to their exhaustion and dysregulation of an adequate response to

stimuli. E. Knezevic et al. (2023) also emphasised that chronic stress in its pathophysiology leads to persistently high levels of adrenal hormones (cortisol, noradrenaline), resulting in the development of so-called “stress diseases”: hypertension, stroke, stomach ulcers, diabetes mellitus, and so on. E. Knezevic et al. also concluded that chronic stress can be a trigger for the progression of neurodegenerative diseases, including Parkinson's or Alzheimer's disease. Studies by N. Pornboonmarung and S. Teachapinyawat (2024) indicated a statistically significant correlation between stress levels, physiological health, and the frequency of visits to medical institutions by Thai adolescents. F. Diez-Canseco et al. (2024) emphasised the link between experiencing stressful events, depression, and the quality of life of Latin American adolescents. Thus, international studies underscore the negative impact of chronic stress on physiological, cognitive, psycho-emotional, and other aspects of human growth and development. In conditions of martial law, the number of stressors increases, as the experiences specific to adolescence are supplemented by the experience of sharp changes in life circumstances, loss of relatives and loved ones, rupture of social ties, etc (Yamchuk, 2025; Uygur, 2025).

T. Palko and K. Travina (2024) in their work emphasised that in Ukraine, adolescents are a vulnerable category of the population, as they grow and develop in special conditions. Typical adolescent challenges are compounded by feelings of fear and uncertainty caused by prolonged martial law. According to a study by N. Sokhor et al. (2024), 75% of the population under 18 years of age have experienced trauma due to military actions, manifesting in sleep disturbances, unwillingness for social interaction, and decreased academic performance. Researchers predict that about 4 million children and adolescents will require mental health assistance at the primary healthcare level. Thus, adolescents will constitute the second largest group of the population requiring assistance with psycho-emotional disorders caused by martial law.

In work by K. Maltseva (2024) it was drawn attention to the fact that despite its prevalence among various population groups, stress is a phenomenon specific to each person. The specificity of the phenomenon, according to the cited author, means that people have different stress resistance thresholds and manifest their attitudes differently, which can lead to difficulties in timely diagnosis and taking measures to reduce stress levels. According to L.A. Strashok et al. (2023), the increased sensitivity of adolescents to stressful situations is due to the maturation of stress-sensitive brain regions and associated changes in hormonal activity. From a physiological point of view, the stress response is a coordinated interaction of stress-triggering and stress-limiting systems. In Ukrainian adolescents,

such interaction may be disrupted, as the number of stress-causing events, in particular, frequent air raids, learning in unusual conditions, forced relocation, and rupture of important social ties, exceeds the number of stress-limiting factors, such as a safe environment for development and psycho-emotional support.

The difficult living conditions of Ukrainian adolescents should not, however, become an obstacle to the implementation of initiatives aimed at reducing the medium- and long-term impact of stress in this age group. According to the work of O.F. Yatsyna (2022), the experience of war by Ukrainian adolescents leads to the emergence of negative psycho-emotional reactions in them. Using the “Child Impact of Event Scale” instrument, the researcher, in particular, found a high level of avoidance in Ukrainian adolescents, which indicates the traumatisation of their psyche. Similar conclusions were reached by P.M. Dukhlyi and D.O. Trofimova (2024), who found signs of neurotic depression and asthenia in civilians abroad. The data obtained indicate that the negative impact of stress persists even when moving to a relatively safe environment.

Despite a sufficient number of previous studies in the field, some questions regarding the mechanisms and impact of stress remain not fully revealed. Most previous studies do not take into account the age characteristics of adolescence and do not analyse the influence of these characteristics on the functioning of adaptive mechanisms. The question of the reaction of Ukrainian adolescents to chronic stress caused by prolonged martial law remains unanswered. In addition to the mentioned gaps, previous studies pay insufficient attention to the interaction of participants in the educational process as an element of the stress-limiting system in adolescents.

Based on the identified gaps, the aim of this work was to investigate the peculiarities of Ukrainian adolescents’ experience of martial law. The objectives of the work were to identify key emotional, cognitive, behavioural, and physiological reactions of Ukrainian adolescents to chronic stress in conditions of martial law, to conduct a comparative analysis of stress levels between Ukrainian and Canadian adolescents, to identify stress-causing and stress-limiting factors based on interviews with educators, and to formulate practical recommendations for increasing the psychological resilience of adolescents through the adaptation of the educational environment.

Materials and Methods

This empirical study was conducted in two stages: from 1 to 20 May, a survey of adolescents was conducted, and from 21 to 30 May 2025,

interviews with class teachers and subject teachers were conducted. The study included 127 ninth-grade students from Gymnasium No. 318 in Kyiv. The data collection and processing procedure was agreed upon with the parents/guardians and the school administration. The results of the survey of Ukrainian teenagers were then compared with the results of a survey of 105 students at John Fraser Secondary School in Mississauga, Canada. Canada was selected as a comparison country due to its similar age group and accessible school setting, as well as the absence of war-related stress, allowing for a meaningful cross-cultural comparison. The survey of Kyiv adolescents was conducted directly at the gymnasium, while their peers in Mississauga were surveyed online using Google Forms. Participants who met the following selection criteria were added to the sample of Ukrainian and Canadian respondents: age 15-16; awareness of the goals, objectives and procedure of the study; voluntary consent to participate in the study. Candidates who did not provide voluntary written consent to participate in the study were removed from the sample. The study was conducted in accordance with the key standards declared by the American Sociological Association (2023). The principles of voluntary consent, autonomy and confidentiality were observed during the study.

Study participants were asked to answer questions from the author's questionnaire. Teenagers were informed that questionnaires completed after 20 May 2025 would not be accepted for further analysis.

The questionnaire included four scales: emotional, behavioural, cognitive, and physiological. The questions were structured in such a way that these scales were mixed to obtain reliable results. Participants were asked to rate each statement on a progressive scale from 0 (“never”) to 4 (“always”). The questionnaire contained 16 statements covering emotional, behavioural, cognitive, and physiological scales. It was administered in Ukrainian to the Ukrainian respondents and translated into English for the Canadian respondents.

The results were processed by calculating points on scales and overall. For example:

- emotional: **1**, 9, 10, 12;
- behavioural: 4, 6, **11**, **13**;
- cognitive: 2, **3**, **5**, 7;
- physiological: 8, 14, 15, 16.

Questions that should be interpreted in reverse (i.e., scored inversely to reflect the intended direction of the scale) are highlighted in bold. The scores obtained by each respondent were calculated using Microsoft Excel. For each scale and for the overall stress score, participants' stress levels were categorized as low (0-1.33), medium (1.34-2.66), or high (2.67-4.0) based on

the progressive rating scale. This allowed for a standardized classification of stress levels across all respondents.

In the second stage of the study, respondents were interviewed by experts, who were teachers at Kyiv Gymnasium No. 318 who taught the respondents and knew them well: three class teachers (N = 3) and four teachers of core subjects (N = 4). Teachers were selected as the exclusive qualitative informants due to their professional expertise in assessing teenagers' academic achievement, behaviour, and emotional states within an organised school environment, hence offering consistent and comparable data among students. Incorporating parents was impractical for this study due to the inconsistency in parental observations and the emphasis on school-related stressors. The inclusion criteria were the affiliation of the interview participants with the selected Kyiv gymnasium and their informed consent to participate in the study; the absence of written consent was considered an exclusion criterion. The experts were asked to answer 15 semi-structured interview questions, which included the following scales: "Determination of academic performance and level of knowledge"; "Presence of motivation to learn"; "Emotional state of students prevailing throughout the day"; "Features of children's behaviour in class and during breaks"; "Teachers' assessment of the current situation in the learning process". Examples of interview questions were as follows: "How would you assess the overall emotional state of students?", "Have you noticed any differences between the psycho-emotional state of students in class and during breaks? If so, how did they manifest themselves?"; "How would you assess the students' motivation to learn? Have you noticed any changes in the students' motivation due to the transition to new forms of learning – distance, blended or shelter learning?" The responses were analysed using the conceptual model of thematic analysis by V. Braun and V. Clarke, adapted to the educational context in accordance with the approach proposed by S.K. Ahmed et al. (2025).

Results

Martial law as a form of social instability causes changes in the emotional, behavioural and cognitive experiences of adolescents. At this age, active psychophysiological processes take place, which increase sensitivity to external stress factors. The study recorded indicators that allow analysing the characteristics of respondents' experiences of martial law. The summary results are presented in Table 1.

Table 1 - Self-assessment of the psycho-emotional state of adolescents in Kyiv under stressful conditions

No.	Statement	Never (0)		Sometimes (1)		Often (2)		Very often (3)		Always (4)	
			%		%		%		%		%
1.	I am calm and in a good mood.	91	71.7	10	7.9	10	7.9	15	11.8	1	0.8
2.	It is difficult to concentrate and maintain attention.	45	35.4	25	19.7	24	18.9	14	11.0	19	15.0
3.	It is easy to remember everything I need to learn.	23	18.1	79	62.2	10	7.9	14	11.0	1	0.8
4.	I make unfounded decisions.	64	50.4	12	9.4	11	8.7	12	9.4	28	22.0
5.	I complete my tasks successfully.	37	29.1	24	18.9	42	33.1	19	15.0	5	3.9
6.	Conflicts at school or at home.	13	10.2	81	63.8	13	10.2	20	15.7	0	0.0
7.	I manage to do everything I planned.	79	62.2	23	18.1	11	8.7	13	10.2	1	0.8
8.	My hands or voice are shaking.	85	66.9	14	11.0	10	7.9	12	9.4	6	4.7
9.	Sad, gloomy mood	64	50.4	31	24.4	14	11.0	12	9.4	6	4.7
10.	I feel anxious, afraid	37	29.1	58	45.7	15	11.8	11	8.7	6	4.7
11.	I am satisfied with myself, confident	21	16.5	58	45.7	13	10.2	21	16.5	14	11.0
12.	Very irritable, angry	54	42.5	48	37.8	12	9.4	10	7.9	3	2.4
13.	Energetic and cheerful	68	53.5	27	21.3	11	8.7	16	12.6	5	3.9
14.	I have been ill	20	15.7	80	63.0	14	11.0	12	9.4	1	0.8
15.	I have a headache	83	65.4	13	10.2	21	16.5	10	7.9	0	0.0
16.	It is difficult to breathe	15	11.8	39	30.6	59	46.6	12	9.4	2	1.6

Source: compiled by the authors.

The survey results indicate pronounced emotional and physiological reactions to stress among Kyiv adolescents. In particular, 71.7% of respondents reported that they are never calm and in a good mood, which may indicate an unstable emotional background. At the same time, more than half (64.6%) of respondents had difficulty concentrating, confirming the impact of stress on the cognitive sphere. In terms of behavioural reactions, impulsiveness stands out: 22% of respondents reported that they always make unreasonable decisions. Also, 63.8% reported conflicts at home or at school, which may be related to the tension in the social environment. In terms of physiology, 33.9% of respondents said they were often ill, and 32.3% said they often suffered from headaches. In addition, almost 37% reported periodic breathing difficulties. The data also shows that only 3.9% of students are always satisfied with their performance, while 29.1% do not feel satisfied at all. For comparison, a similar survey was conducted among adolescents in the Canadian city of Mississauga. Its results are presented in Table 2.

Table 2 - Emotional well-being of adolescents in Mississauga (Canada) based on self-assessment results

No.	Statement	Never (0)		Sometimes (1)		Often (2)		Very often (3)		Always (4)	
			%		%		%		%		%
1.	I am calm and in a good mood.	48	45.7	23	21.9	19	18.1	10	9.5	5	4.8
2.	It is difficult to concentrate and maintain attention.	30	28.6	28	26.7	22	21.0	15	14.3	10	9.5
3.	It is easy to remember everything I need to learn.	17	16.2	44	41.9	23	21.9	15	14.3	6	5.7
4.	I make unfounded decisions.	42	40.0	18	17.1	19	18.1	12	11.4	14	13.3
5.	I complete my tasks successfully.	22	21.0	26	24.8	32	30.5	17	16.2	8	7.6
6.	Conflicts at school or at home.	10	9.5	55	52.4	20	19.0	15	14.3	5	4.8
7.	I manage to do everything I planned.	36	34.3	27	25.7	19	18.1	14	13.3	9	8.6

8.	My hands or voice are shaking.	60	57.1	15	14.3	12	11.4	11	10.5	7	6.7
9.	Sad, gloomy mood	41	39.0	27	25.7	18	17.1	14	13.3	5	4.8
10.	I feel anxious, afraid	28	26.7	36	34.3	22	21.0	13	12.4	6	5.7
11.	I am satisfied with myself, confident	19	18.1	38	36.2	24	22.9	15	14.3	9	8.6
12.	Very irritable, angry	35	33.3	29	27.6	19	18.1	14	13.3	8	7.6
13.	Energetic and cheerful	30	28.6	33	31.4	21	20.0	13	12.4	8	7.6
14.	I have been ill	12	11.4	56	53.3	20	19.0	13	12.4	4	3.8
15.	I have a headache	47	44.8	22	21.0	21	20.0	11	10.5	4	3.8
16.	It is difficult to breathe	15	14.3	31	29.5	39	37.1	12	11.4	8	7.6

Source: compiled by the authors.

The results indicate a relatively balanced psycho-emotional state among adolescents in Mississauga. In particular, almost half of the respondents (45.7%) said that they are usually calm and in a good mood, although only 4.8% feel calm and confident all the time. At the same time, more than half of the participants (55.3%) sometimes or often experience anxiety or fear, which may indicate a moderate level of emotional stress. In terms of cognition, the distribution of responses is as follows: 71.5% of respondents experience some degree of difficulty concentrating, but 41.9% said that they sometimes find it easy to memorise educational material. At the same time, only 5.7% indicated this ability as constant. In terms of behaviour, 40% of adolescents never make unfounded decisions, but 24.7% (answers “very often” and “always”) demonstrate impulsive reactions. The social environment is characterised by relative stability: 61.9% of adolescents rarely or never have conflicts at school or at home. In terms of physiological manifestations, 57.1% of participants did not experience hand or voice tremors, but symptoms such as headaches (20%) or difficulty breathing (37.1% chose “often”) remain quite common.

The collected data was also analysed in terms of the overall stress levels of Kyiv adolescents and their peers from the Canadian city of Mississauga. The results of the comparison are presented in Figure 1.

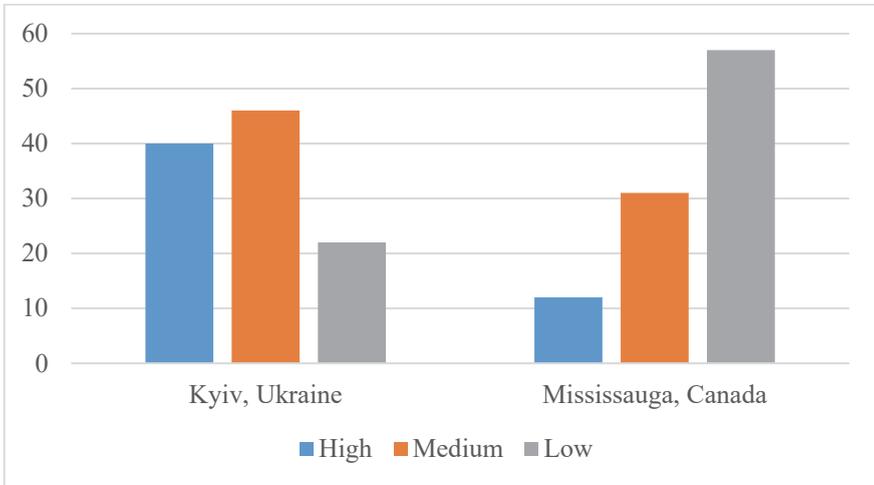


Figure 1 - Comparative analysis of how adolescents experience their life situation
 Source: compiled by the authors.

Figure 1 illustrates the distribution of stress levels among adolescents from Kyiv and Mississauga in three categories: high, medium and low. The most noticeable difference is in the proportion of respondents with high stress levels: in the Ukrainian sample, it is 40%, which is almost three times higher than the corresponding figure among Canadian adolescents (12%). This gap may reflect the influence of external stressors, in particular the state of war and the associated psycho-emotional challenges. A medium stress level was recorded in 46% of Ukrainian respondents and 31% of Canadian respondents. Although this proportion indicates that most participants are relatively well adapted to their learning and living conditions, it also indicates a stable level of stress among a significant proportion of adolescents in both samples. Low stress levels are characteristic of most Canadian adolescents (57%), while among Ukrainian participants, this figure is only 22%. This may indicate greater emotional stability or better implementation of self-regulation strategies in the Canadian context. In summary, the data reveal a noticeable difference in stress levels between the two samples. Adolescents from Kyiv are more likely to experience medium or high levels of stress, while most of their Canadian peers demonstrate lower levels of emotional tension.

Thus, a comparative analysis of the survey results revealed that Kyiv adolescents are forced to develop in a less favourable psycho-emotional environment than their Canadian peers. The unfavourable psycho-emotional environment was partly due to the protracted state of war and the associated

losses and restrictions. At the same time, the results of the comparative analysis prompted a study of the impact of individual socialisation institutions, in particular parents and schools, on preventing stress or reducing its negative impact on Kyiv adolescents.

In order to clarify these aspects, a series of semi-structured interviews were conducted with class teachers and subject teachers. The responses obtained made it possible to outline a practical view of the problems faced by adolescents in the educational process during the war. In particular, class teachers almost unanimously (80%) noted that the average level of academic performance in classes ranges from satisfactory to average. The main problem, according to 60% of class teachers, is the heterogeneity of students' knowledge levels: in each class, there are groups of students with high achievements and those with gaps in their basic knowledge. More than half (60%) of subject teachers confirmed this opinion: basic knowledge is mostly formed, but when performing high-level tasks, the same mistakes are often made, which indicates a superficial understanding of the material. Teachers also pointed out the negative impact of long-term distance learning and frequent interruptions due to force majeure circumstances, such as schedule changes, air raid alerts, etc. Teachers noted that organising the educational process in shelters is extremely difficult, as there are no adequate conditions for conducting lessons. Even when attempts are made to hold classes, the results are significantly worse due to students working in confined spaces, artificial lighting, increased noise levels and a lack of fresh air. Periodic knowledge assessments conducted in senior classes of general education schools show lower results for work written in shelters compared to work written in classrooms or at home. In general, it can be said that student success requires intensive individual work with those who demonstrate low results, as well as regular knowledge checks to avoid the accumulation of gaps.

Data obtained through interviews with teachers also indicate a link between stress and motivation to learn. According to class teachers' observations, about 30% of students are internally motivated – they strive for knowledge and self-development, participate in competitions and Olympiads. At the same time, about 60% of students study mainly under coercion or parental control, which indicates external, situational motivation, while the rest do not want to study at all and have an extremely low level of knowledge. According to subject teachers, 60% of online class attendees choose to behave passively, turning off audio and video, refusing to participate in discussions of the material, or delaying the submission of assignments. The interviewees also noted a tendency among students to violate academic integrity rules by abusing artificial intelligence tools, using

ready-made assignments, and cheating. Teachers have recorded numerous cases of discrepancies between the grades received and the actual level of knowledge. About 50% of the interview participants expressed the opinion that the availability of various tools for violating the principles of academic integrity reduces teenagers' motivation to study. Subject teachers, in turn, emphasised that the level of motivation depends on the subject and the form of presentation of the material. In lessons directly related to preparation for the National Multidisciplinary Test (NMT) or the State Final Assessment (SFA), motivation is higher: students work actively, ask questions, and do their homework. In lessons on subjects that do not directly affect the assessment of academic performance when applying to higher education institutions, students often show passivity, get distracted by extraneous matters, or use their phones (Vakulyk, 2025; Dahan & Keller, 2025). Student activity also increases significantly when interactive exercises, digital platforms, and project-based work are used. According to subject teachers' observations, the use of such approaches helps to engage up to 80-90% of students in active work. Digital platforms and interactive technologies enhance engagement, facilitate self-paced learning, offer immediate feedback, and alleviate stress by fostering a friendly and adaptable educational environment (Bektenova et al., 2025; Toktarbekova et al., 2025). It follows that the key task for teachers remains to create an attractive learning atmosphere and select methods that stimulate internal interest in the subject.

The emotional state of students can change throughout the working day and depending on the events that took place that day (Protsyk & Savelyuk, 2025; Okhrimenko et al., 2023). The responses of class teachers show a consistent emphasis on the fact that the emotional state of more than half (60-70%) of students is characterised by high levels of anxiety and fatigue. The interviewees explained this fatigue by the general tense social situation, excessive information overload, and insufficient time for rest and recovery. In the responses of 90% of class teachers, there was an observation that students engage in disputes and conflicts, which are often related to different interpretations of events taking place in the country and abroad. There is a certain alienation between students who have remained in the country and those who have left abroad but continue to study in educational institutions in the country. In their responses, class teachers (60%) noted that teenagers have become more sensitive to external stimuli and are starting conflicts in situations that were previously resolved through discussion and other constructive methods. Subject teachers pointed out in their interviews that students attending classes show apathy, low levels of engagement, complaints of fatigue, headaches or decreased attention. However, during

breaks, children become more active, seek communication with their peers, and sometimes react emotionally to minor conflicts or arguments. Therefore, it can be argued that students are predominantly emotionally unstable with a tendency towards conflict, but friendly communication during breaks partially compensates for this condition. Class teachers (90%) and subject teachers (80%) noted that in cases of emotional overload, psychological relief corners are effective, where students can be alone and reflect.

The interviews also show that stress affects how students act in class and during breaks. Class teachers say that students are generally well-behaved during lessons, but in 60-70% of cases, they use gadgets for other things, like checking social media and messaging. Students tend to be inattentive or try to avoid active participation in class. Subject teachers add that when lessons are conducted in a more traditional format, discipline can deteriorate: noise levels increase, students may distract each other or fail to respond to comments. For 70% of the teachers surveyed, situations are familiar where students discuss topics unrelated to the lesson and engage in other behavioural violations to test the limits of teachers' stress tolerance. According to class teachers, such students have usually experienced or are experiencing negative life situations and need additional attention and support. During breaks, students' behaviour is more relaxed – children actively discuss the news, play active games or, conversely, focus on their phones. Based on these responses, it was concluded that student behaviour is controllable but requires a clear system of rules and consistent monitoring by all teachers.

At the end of the interview, participants were asked to give an overall assessment of the current situation in the educational process. Both groups of teachers – class teachers and subject teachers – note that the educational process is generally stable and controlled, but with a number of issues affecting its quality. Among the main challenges, they mention the lack of time for individual work with each student, the overload of the school curriculum, difficulties in organising distance or blended learning formats, and the negative impact of excessive use of gadgets. Teachers emphasise that improving the situation requires the introduction of innovative teaching methods, systematic psychological support for students, and the development of more flexible individual development programmes for different groups of schoolchildren.

Based on interviews with class teachers and subject teachers, factors that increase the stress levels of Kyiv adolescents and stress-limiting factors that can be used to increase the psychological resilience of this age group were identified. The key factors are presented in Table 3.

Table 3 - Stress-inducing and stress-limiting factors in Ukrainian adolescents

No.	Stress/support factor	Description of the situation	Consequences for adolescents	Compensatory mechanisms/support
1.	Military action, security threats	Constant alarms, explosions, evacuations, loss of loved ones	PTSD, anxiety, emotional exhaustion	Psychological support, emotional stability in the family
2.	Information pressure	Excessive news coverage of military operations, mobilisation, losses	Chronic anxiety, emotional instability	Restrictions on news content, information literacy
3.	Personal traumatic experiences	Loss of home, death of a relative, relocation	Depression, apathy, social maladjustment	Individual consultations with a psychologist
4.	Overload from studying	Missed classes due to alarms, large amount of independent work	Overwork, decreased concentration, fear of learning	Flexible planning, reduction of homework load
5.	Studying at several schools	Difficulty combining online/offline/extra-curricular learning	Lack of rest, irritability, burnout	Individualised schedules, mentoring support
6.	Stress from assessment	Tests/exams in conditions of unstable internet, alarms, blackouts	Anxiety, panic, decreased self-esteem	Postponement of deadlines, adaptive testing formats
7.	Technical limitations	Lack of internet, gadgets, educational materials	Falling behind, stress due to inability to complete tasks	Provision of equipment, offline materials
8.	Studying in shelters	Cramped conditions, noise, lack of light	Exhaustion, irritation, difficulty concentrating	Organisation of a comfortable environment in shelters
9.	Lack of personal space	Constant presence of family members or classmates	Fatigue, irritability, withdrawal	Definition of "personal zones", distribution of space
10.	Decreased motivation to study	Lack of meaning, faith in the future	Indifference, absences, deterioration of results	Career counselling, interactive presentation of material
11.	Monotony of studying	Dry theoretical material without practical application	Loss of interest, inattention, passivity	Use of projects, integration of real-life experience

Note: PTSD – post-traumatic stress disorder.

Source: compiled by the authors.

The results obtained indicate the existence of clear internal links between individual aspects of adolescent development and stress levels: there is a tendency towards a weakening of adaptive potential in the areas of emotional regulation, cognitive stability, behavioural control and physiological endurance under conditions of increased stress. This picture confirms the complex nature of the impact of stress, which simultaneously affects both psycho-emotional manifestations and physical reactions, emphasising the

importance of a holistic approach to psychosocial support for adolescents in crisis situations (Messina, 2025; Luzan et al., 2021).

Based on the results of a survey and interviews conducted among Ukrainian adolescents, teachers, and class teachers, a set of recommendations was formulated to reduce stress levels in conditions of martial law. The recommendations are grouped according to four key scales that reflect the characteristics of stress manifestation: emotional, cognitive, behavioural and physiological.

On the emotional scale, 40% of respondents experience high levels of stress, manifested in anxiety, emotional exhaustion, mood swings, tearfulness and a feeling of constant danger. To reduce emotional stress, it is recommended to introduce regular “emotional relief hours” in the school environment with elements of art therapy: drawing, creating collages, listening to music or written reflection. Schools can organise thematic sessions on anxiety management, during which students are taught breathing techniques, visualisation methods, and exercises to relieve muscle tension (Abdygalym et al., 2025; Yurtseven et al., 2025). Rituals of stability within the educational process are also effective – morning addresses, thematic tea parties, or short positive messages at the beginning of the week. An important component is the regular work of the school psychologist – at least one group or individual meeting per month for students who demonstrate a high level of emotional vulnerability (Abubakirova et al., 2025; Dudar, 2024).

The cognitive scale revealed signs of overload, difficulty concentrating, impaired memory, and difficulties with self-organisation. Among the surveyed Kyiv adolescents, 62% mostly cope with their tasks, and only 1% always achieve their academic goals. The higher performance indicators of Canadian adolescents, including the fact that 41.9% of respondents do not find concentration and memorisation difficult, indicates the need to reduce stress levels in the Ukrainian educational environment in order to achieve better academic results. One of the key recommendations is to optimise the workload, in particular by reviewing the amount of homework. For example, according to the standards recommended by the Education Ombudsman of Ukraine, 9th grade students should spend no more than 1.5 hours per day on homework (What should homework..., 2021). Teachers should take these limits into account when adapting assignments to the age and learning conditions of their students. It is advisable to introduce weeks without tests so that students can focus on learning the material without constant assessment. It is also important to diversify teaching approaches: instead of a large number of similar tasks, focus on a deeper understanding of a limited number of tasks. For example, instead of ten similar maths problems, the

teacher can offer three different ones, encouraging students to discuss solution strategies.

The behavioural scale revealed that 30% of students lack internal motivation to learn, as evidenced by passivity, avoidance of activities, aggressive reactions, and devaluation of the importance of the educational process. To reduce these manifestations, it is advisable to increase students' interest by introducing a project-based approach. Students should be given more autonomy in choosing the topic, format, and tools for implementing research or creative projects (Biyekenova et al., 2016; Tyutyunnyk, 2025). For example, monthly mini-lectures, during which students act as speakers in front of their peers, demonstrate high potential in forming interest, confidence, and responsibility. The practice of “flipped lessons”, where older students teach younger ones, is also effective (Lawrence et al., 2023; Vazova et al., 2025). This not only stimulates cognitive activity, but also helps to develop skills of cooperation, empathy and flexible thinking. To promote responsible behaviour, it is recommended to introduce “digital ethics” – rules for the reasonable use of gadgets, formulated jointly with students (Nazarbetova et al., 2016; Zhandossova et al., 2025). Such rules may include, for example, using a phone as a timer or calculator in class, but keeping it in a special box at other times. It is also advisable to introduce a system of micro-rewards – praise, badges, points for attentiveness, activity or helping others.

According to the physiological scale, frequent complaints of illness (11%), headaches (16.5%) and difficulty breathing (46.5%) were recorded. The appearance of these and other somatic symptoms is due, in particular, to the high level of stress among Kyiv adolescents and the need to develop and learn in conditions that are often unsuitable for this, with limited space, lack of light and stale air. In order to reduce somatic symptoms of stress, it is recommended to regularly include physical activity breaks in the schedule (even in a remote format) and to conduct short exercises before tests (for example, “square breathing”) to relieve tension. Schools need to provide more comfortable conditions in shelters – as far as possible, attention should be paid to lighting, ventilation and noise levels. It is also worth involving medical professionals in monitoring the physiological condition of students, especially those who show chronic fatigue or persistent physical complaints. The importance of working with physiological manifestations of stress is confirmed by a study by F. Binder et al. (2024), which proved that acceptance and commitment therapy effectively reduces psycho-emotional stress in adolescents and prevents somatic symptoms. In this study, the higher frequency of such manifestations among Ukrainian schoolchildren compared

to their Canadian peers highlights the need to teach adolescents to adapt to changing conditions and self-regulation techniques.

Thus, the higher level of stress in Ukrainian adolescents compared to their Canadian peers was considered in terms of martial law and the associated losses and restrictions. The state of chronic stress, which affects about 60% of Kyiv adolescents, affects their emotional, cognitive and physiological development, as well as determining their behavioural responses.

Discussion

The empirical study data indicate that adolescents are one of the most stress-vulnerable age groups in the population. In the sample of Kyiv adolescents, 40% of respondents had a high level of stress. Among Canadian adolescents, the overall stress level was significantly lower – 60% of respondents had a low level of stress. The analysis conducted confirmed the conclusions of previous studies (James et al., 2023; Maksymova and Maksymov, 2024), which established that an increased level of stress in adolescents is associated with a decrease in emotional stability, cognitive functions, and physiological endurance. In this study, this tendency is also observed, particularly among Kyiv schoolchildren with high stress levels, who experienced frequent emotional breakdowns, difficulties with concentration, and somatic complaints. The results obtained are consistent with the research by K. Dopelt and N. Houminer-Klepar (2024), who analysed the stress levels of 625 respondents – students of Ashkelon Academic College in southern Israel. The study, conducted in January-February 2024, four months after the Hamas terrorist attack on Israel, found that respondents still had medium or high levels of stress, which manifested, among other things, in sleep problems. The results of the conducted study are also consistent with the work of K. Peltonen (2024), who analysed the impact of military actions on the psycho-emotional state of children. According to the researcher, children living in or forced to leave territories affected by war and armed conflicts are in chronic stress, which can have deep and long-term consequences for their development and social adaptation. Despite the noted correspondences, it was also noted that the cited studies have a somewhat different scientific focus, as K. Peltonen in her work focused on children, and K. Dopelt and N. Houminer-Klepar – on older adolescents and adults. The contribution of the conducted research to the existing discourse is that it focuses on Ukrainian adolescents – an age group whose representatives are forced to develop under the influence of both typical and atypical stressors.

The recommendations proposed in this work were based on the

understanding that in the absence of adequate therapeutic and preventive measures for adolescents and children in Ukraine, the further impact of such a level of stress can undoubtedly lead to irreversible changes in psychological development. This idea, in particular, found its confirmation in the predictions that about four million Ukrainian children and adolescents will need professional help with their psycho-emotional state. The cited idea is consistent with the results of previously conducted studies, in particular, E.K. Peconga and M.H. Thøgersen (2020). Analysing data from 8,176 Syrian refugees in 10 countries around the world, E.K. Peconga and M.H. Thøgersen concluded that there is a high risk of post-traumatic stress disorder (43.0%), depression (40.0%), and anxiety (26.6%) in this demographic group. Summarising the results obtained, the researchers concluded that, compared to the general population, Syrian refugees have a ten times higher risk of developing post-traumatic stress disorder and other psycho-emotional problems. The study by E.K. Peconga and M.H. Thøgersen is important for understanding the prospects of psycho-emotional development of Ukrainian adolescents, some of whom were also forced to leave the country, escaping armed aggression. The recommendations provided in the work are also consistent with the results of the research by M. Askovic et al. (2023) and A. Bevelaqua and C. Muss (2024), according to which timely provided psychotherapist services and quality treatment of children in a state of stress can lead to a positive effect on their psycho-emotional state. Based on data from 293 subjects with chronic stress, M. Askovic et al. and A. Bevelaqua and C. Muss noted that although individual interventions, such as electroencephalographic feedback, have high effectiveness in the short term, remission rates remain at 79.3%. The cited data are consistent with the comprehensive approach to chronic stress proposed in this work, which involves interdisciplinary interaction at various levels of intervention. The approach recommended in this work involved the interaction of teachers, psychologists, social workers, and parents as agents of a stress-limiting environment.

In the present work, the necessity of comprehensive intervention was conditioned by the understanding of the medium- and long-term effect of stress on the behavioural reactions of adolescents. According to the comparative analysis results, Ukrainian adolescents demonstrated somewhat sharper behavioural reactions compared to their Canadian peers: about 22% of Kyiv respondents were witnesses or participants in conflicts, while for 61.9% of those surveyed from Mississauga, they never had conflicts with peers or at school. The idea of the influence of stress on the behavioural reactions of adolescents is consistent with the results of previous studies, including A.O. Awoyemi et al. (2024). Having studied a group (N = 400) of students from several Nigerian schools, the scientists recorded a statistically

significant (0.88) correlation between stress and individual behavioural reactions, in particular, irritability, low attention, and concentration. The identified correlation allows for a better understanding of the behaviour of Ukrainian schoolchildren, who, according to class teachers and subject teachers, tend to react sharply to external stimuli, entering into disputes and conflicts. The behavioural reactions of Ukrainian adolescents analysed in the work also to some extent correlate with the results of the study by J. Wu and Q. Wu (2024). Having analysed a group of 610 students from provincial Chinese secondary schools, the scientists concluded that a high level of stress at early stages increases the predisposition to risky behaviour in later life. In the Ukrainian context, such an interrelationship may, in particular, manifest in adolescents being more prone to conflicts with peers and teachers, violations of rules of conduct, and ethical norms. The recommendations proposed in the work are based on the understanding that timely intervention not only neutralises existing manifestations of destructive behaviour but also reduces the risk of such behaviour occurring in the future. This is consistent with previous works, in particular, with the study by T.N. Winding et al. (2024) and R. Bhatia and J. Kaur (2024). The researchers established a positive correlation between the subjective level of stress in adolescence and its manifestations in adulthood, particularly in the professional environment. The cited results confirm the expediency of early intervention, recommendations for which were given in this work.

In the recommendations presented in this work, attention was paid to the interaction between school and parents to reduce stress levels and create safe conditions for the physiological, cognitive, and psycho-emotional development of adolescents. Recommendations for increasing parental awareness, conducting thematic meetings, trainings, etc., are based on understanding the role of parents in ensuring the harmonious psycho-emotional development of adolescents (Kabidenova et al., 2016; Kaliyeva et al., 2025). The idea of the importance of parental or guardian involvement in increasing the psychological resilience of adolescents found its confirmation in previous studies, in particular, the work of M. Qian et al. (2024). Having analysed data from 3,613 students from 109 schools in Hong Kong, M. Qian et al. found a statistically significant correlation between parental emotional support and the manifestations of certain psychosomatic symptoms in adolescents aged 15. Similar results were obtained by A.M. Rosu et al. (2024) and G.P. Stomájer et al. (2023), who found that parental support, including recognising and accepting a child's feelings, increased adolescents' self-sufficiency and their ability to overcome stressful situations. The identified correspondences, however, do not negate the fact that the interaction between Ukrainian adolescents and their parents is

burdened by factors atypical for other countries, in particular, prolonged hostilities, misunderstanding of prospects or their absence, and loss of loved ones. The present work emphasises that effective confrontation with these stressors is possible only with interdisciplinary interaction, whose members understand the unique challenges and have a vision for overcoming them. The expediency of interdisciplinary interaction in combating adolescent stress found its partial confirmation in previous studies, for example, in the works of M. Murnizu et al. (2024) and J.M. Tullius et al. (2024). The researchers found that emotional support from parents, peers, and teachers significantly reduces the level of psycho-emotional load in this age group. The relationship between high stress levels and a decrease in motivation to learn deserves special attention. As evidenced by interviews with class teachers and subject teachers, about 60% of Kyiv adolescents study mostly out of compulsion, demonstrate passivity, and violate academic integrity, which indicates external motivation, conditioned more by control than by interest in knowledge. These observations are consistent with previous studies, including the works of F. Nunez-Regueiro et al. (2021) and O. Rogerson et al. (2024), which showed that timely psychotherapeutic interventions can not only reduce psycho-emotional load but also contribute to increasing learning motivation. These studies emphasise that stress significantly reduces students' involvement in the learning process, but this tendency can be overcome through comprehensive support.

Despite some overlap in conclusions, it should be noted that the present work focuses on adolescents aged 15-16, who, due to their age, face unique challenges and require a more individualised approach to their resolution. The consistency of the results obtained with the results of previous studies allowed for the assumption that the strategies and recommendations proposed in the work are appropriate and realistic. Furthermore, it is essential to evaluate not only conventional academic performance as an indicator of success but also pupils' capacity to acclimatise to intensely stressful situations. The sustained moderate performance throughout martial law, along with coping mechanisms like self-regulation, peer support, and participation in school rituals, might be considered a type of success. Emphasising adaptive skills and resilience recognises that pupils can attain significant developmental milestones despite external conditions that restrict conventional performance results.

Conclusions

The results of the study showed that adolescents are one of the most

vulnerable groups to chronic stress, especially in conditions of martial law. According to a survey conducted among 127 ninth-grade Ukrainian adolescents aged 15-16, 40% of respondents had high levels of stress, and another 46% have moderate levels. For comparison, among their Canadian peers who participated in the study in the Canadian city of Mississauga (N = 105), 60% showed low stress levels and only 12% showed high stress levels. This discrepancy in stress levels indicates the direct impact of martial law on the psycho-emotional state of Ukrainian teenagers.

Assessing stress levels on four scales – emotional, behavioural, cognitive and physiological – revealed the most sensitive aspects of psycho-emotional development. A comparative analysis revealed significant differences in the emotional state of respondents: 70% of Kyiv schoolchildren said they rarely or never felt calm and in a good mood, while 45.7% of their Canadian peers reported being in a positive emotional state all the time. In terms of cognitive functioning, 36% of Kyiv respondents had difficulty concentrating and memorising educational material, while similar difficulties were reported by only 28.6% of their Canadian peers. At the behavioural level, conflicts were more common among the sample of Kyiv adolescents (22%), while 50% of Mississauga respondents said they rarely or never had conflicts. On a physiological level, Kyiv adolescents were more prone to symptoms such as headaches, frequent illnesses and shortness of breath than their Canadian peers. The differences identified were associated with high levels of chronic stress, which was recorded in 40% of Ukrainian adolescents and only 12% of Canadian adolescents.

Interviews with teachers confirmed that 60-70% of students show increased anxiety, fatigue and emotional instability. In 60% of classes, there is a disparity in knowledge levels, which complicates the learning process. About 60% of adolescents study mainly out of compulsion, reducing their own involvement. In 60% of cases, gadgets are used for non-educational purposes during lessons. At the same time, the use of interactive forms of work increases student activity by 80-90%, which indicates the potential of pedagogical interventions as a stress-limiting factor.

Based on interviews with class teachers and teachers, key stress-inducing factors were identified: threats to physical safety, excessive academic workload, difficulties with learning in conditions of air raid alerts or shelters, unstable internet connection, loss of loved ones or forced displacement. Among the stress-limiting factors, respondents noted: emotional support from parents, school rituals of stability (e.g., morning meetings), informal communication with peers, and access to psychological assistance.

The recommendations proposed in the study were developed taking into account each of the scales: for emotional stress – the organisation of

relaxation practices and art therapy; for cognitive stress – optimisation of the workload; for behavioural stress – the introduction of project work and the development of digital ethics; for physiological stress – ensuring a comfortable learning environment, regular physical activity breaks and working with school medical staff.

Moreover, it is advisable that forthcoming evaluations of student results in crisis situations regard adaptive coping and resilience as critical indicators of success, rather than concentrating exclusively on conventional academic accomplishments. Recognising students' capacity to sustain emotional stability, cognitive functioning, and social involvement throughout extended stress might yield a more comprehensive knowledge of their growth and well-being.

The limitation of this study is that it covered only one Ukrainian gymnasium and one Canadian school, which makes it difficult to extrapolate the results to the entire population of Ukrainian and Canadian adolescents. In future studies, it would be advisable to expand the geography of the sample and include adolescents from other countries experiencing humanitarian or military crises in the analysis in order to develop a more generalised understanding of stress resilience in a global context.

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