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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.

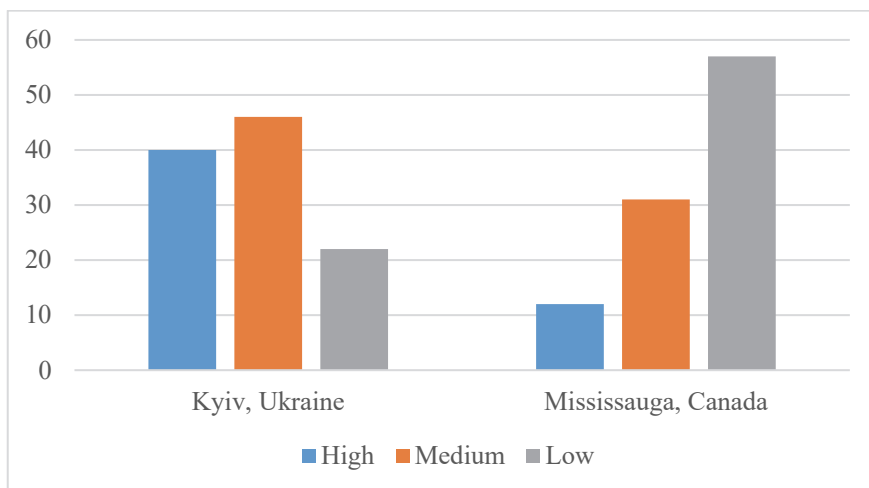


Figure 1 - Comparative analysis of how adolescents experience their life situation
 Source: compiled by the authors.

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/extracurricular 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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References

- Abdygalym, B., Sambetbayeva, M., Yerimbetova, A., Nekessova, A., Tasbolatuly, N., Smailov, N., & Nazymkhan, A. (2025). NLP Models for Military Terminology Analysis and Detection of Information Operations on Social Media. *Computers*, 14(11), 485. Doi: 10.3390/computers14110485.
- Abubakirova, A., Shimtemir, M., Duissenbayeva, A., Kamalova, F., & Tungatova, U. (2025). A Discourse Analysis of State Approaches to Religious Diversity in Multi-Ethnic Societies. *Pharos Journal of Theology*, 106(3), 1-13. Doi: 10.46222/pharosjot.106.3034.
- Ahmed, S.K., Mohammed, R.A., Nashwan, A.J., Ibrahim, R.H., Abdalla, A.Q., Ameen, B.M.M., & Khahir, R.M. (2025). Using thematic analysis in qualitative

- research. *Journal of Medicine, Surgery, and Public Health*, 6, 1000198. Doi: 10.1016/j.glmedi.2025.100198.
- American Sociological Association (2023). *Ethics*. <https://www.asanet.org/wp-content/uploads/savvy/images/asa/docs/pdf/CodeofEthics.pdf>.
- Askovic, M., Soh, N., Elhindi, J., & Harris, A.W.F. (2023). Neurofeedback for post-traumatic stress disorder: systematic review and meta-analysis of clinical and neurophysiological outcomes. *European Journal of Psychotraumatology*, 14(2), 2257435. Doi: 10.1080/20008066.2023.2257435.
- Awoyemi, A.O., Akinduyo, T.E., Ajokpaniovo, M., & Mabaso, N.P.M. (2024). Influence of stress on academic performance of in-school adolescents in Ilorin Metropolis. *Journal for Educators, Teachers and Trainers*, 15(3), 43-55. <https://jett.labosfor.com/index.php/jett/article/view/2313/1336>.
- Bektenova, M., Seitakhmetova, N., Zhandossova, S., & Toktarbekova, L. (2025). Formation of islamic identity in Kazakhstan and the Central Asian region in conditions of religious revival. *European Journal of Science and Theology*, 21(4), 145-174.
- Bevelacqua, A., & Muss, C. (2024). Stress relief measurements in young adults and adolescents – a comparative pilot study with different relaxation programs. *Open Journal of Preventive Medicine*, 14(6), 131-142. Doi: 10.4236/ojpm.2024.146010.
- Bhatia, R., & Kaur, J. (2024). Studying the psychological effects of stress, anxiety, and depression on secondary school students. *International Journal for Multidisciplinary Research*, 6(1). https://www.ijfmr.com/papers/2024/1/14_193.pdf.
- Binder, F., Koenig, J., Resch, F., & Kaess, M. (2024). Indicated stress prevention addressing adolescents with high stress levels based on principles of acceptance and commitment therapy: A randomized controlled trial. *Psychotherapy and Psychosomatics*, 93(3), 191-202. Doi: 10.1159/000537934.
- Biyekenova, N.Z., Abdiraïymova, G.S., Kenzhakimova, G.A., Shaukenova, Z.K., & Senuk, Z.V. (2016). Value system of students of the republic of Kazakhstan as a special social and cultural group. *International Journal of Environmental and Science Education*, 11(9), 2481-2494. Doi: 10.12973/ijese.2016.701a.
- Chen, M.H., Sun, C.K., Lin, I.M., Suen, M.W., Sue, Y.R., Chen, I.L., Lin, C.L., & Yeh, P.Y. (2023). Size reduction of the right amygdala in chronic pain patients with emotional stress: A systematic review and meta-analysis. *Pain Medicine (Malden, Mass.)*, 24(5), 556-565. Doi: 10.1093/pm/pnac162.
- Dahan, E., & Keller, Y. (2025). Kinship Verification Using Hierarchical Structures and Extended Contrastive Learning. *IEEE Open Journal of the Computer Society*, 6, 1549-1560. Doi: 10.1109/OJCS.2025.3610270.
- Diez-Canseco, F., Carbonel, A., Bernabe-Ortiz, A., Olivar, N., Gomez-Restrepo, C., Toyama, M., Uribe-Restrepo, J.M., Brusco, L.I., Hidalgo-Padilla, L., Ramirez-Meneses, D., Carbonetti, F.L., Ariza-Salazar, K., Sureshkumar, D.S., Fung, C., & Priebe, S. (2024). Association between stressful life events and depression, anxiety, and quality of life among urban adolescents and young adults in Latin

- America. *Frontiers in Psychology*, 15, 1466378. Doi: 10.3389/fpsyg.2024.1466378.
- Dopelt, K., & Houminer-Klepar, N. (2024). War-related stress among Israeli college students following 7 October 2023 terror attack in Israel. *European Journal of Investigation in Health, Psychology and Education*, 14(8), 2175-2186. Doi: 10.3390/ejihpe14080145.
- Dudar, O. (2024). Development of empathy in students (psychology students) using art therapy. *Humanities Studios: Pedagogy, Psychology, Philosophy*, 12(3), 9-24. Doi: 10.31548/hspedagog/3.2024.9.
- Dukhlyi, P.M., & Trofimova, D.O. (2024). The impact of the war on the psychological state of citizens of Ukraine: Empirical data analysis. *Habitus*, 68, 141-150. Doi: 10.32782/2663-5208.2024.68.24.
- Efremov, A. (2026). Age-Specific Mental Health Profiles of Combat Veterans: Post-Traumatic Stress Disorder and Related Disorders. *Journal of Rational - Emotive and Cognitive - Behavior Therapy*, 44(1), 4. Doi: 10.1007/s10942-025-00637-7.
- James, K.A., Stromin, J.I., Steenkamp, N., & Combrinck, M.I. (2023). Understanding the relationships between physiological and psychological stress, cortisol and cognition. *Frontiers in Endocrinology*, 14, 1085950. Doi: 10.3389/fendo.2023.1085950.
- Kabidenova, Z.D., Rysbekova, S.S., Rysbekova, G.E., & Duisenbayeva, A. (2016). Contours of attitude of adolescents towards religion and religious identification in Kazakhstan. *Global Media Journal*, 1-6.
- Kaliyeva, Y., Duissenbayeva, A., Kariyev, A., & Azhimov, B. (2025). Role and evolution of islamic education in Kazakhstan. *Occasional Papers on Religion in Eastern Europe*, 45(9), 46-68. Doi: 10.55221/2693-2229.2676.
- Knezevic, E., Nenic, K., Milanovic, V., & Knezevic, N.N. (2023). The role of cortisol in chronic stress, neurodegenerative diseases, and psychological disorders. *Cells*, 12(23), 2726. Doi: 10.3390/cells12232726.
- Lawrence, K.C., Mambetalina, A.S., & Baigabylov, B.N. (2023). Psychosocial-Spiritual Factors Associated With Well-being of Older Population in Africa. *Journal of Education and Community Health*, 10(2), 62-70. Doi: 10.34172/jech.2023.2289.
- Luzan, P., Titova, O., Kurok, R., & Mosia, I. (2021). The Methodology for Assessment of Engineering Students Outcomes. In: *Proceedings of the 20th IEEE International Conference on Modern Electrical and Energy Systems, MEES 2021*. Kremenchuk: Institute of Electrical and Electronics Engineers. Doi: 10.1109/MEES52427.2021.9598666.
- Maksymova, N., & Maksymov, M. (2024). The impact of adolescents' experience of chronic stress on their perceptions of their future. *Kyiv Journal of Modern Psychology and Psychotherapy*, 8, 61-72. Doi: 10.48020/mppj.2024.02.05.
- Maltseva, K. (2024). Stress exposure, perceived stress severity, and their effects on health. *Sociology: Theory, Methods, Marketing*, 2024(1), 187-197. Doi: 10.15407/sociology2024.01.187.

- Messina, A. (2025). Dissociative symptoms in schizophrenia: a connection to inflammatory processes. *Middle East Current Psychiatry*, 32(1), 96. Doi: 10.1186/s43045-025-00593-z.
- Mousikou, M., Kyriakou, A., & Skordis, N. (2023). Stress and growth in children and adolescents. *Hormone Research in Paediatrics*, 96(1), 25-33. Doi: 10.1159/000521074.
- Murnizu, M., Mubarak, A.S., & Patemah. (2024). The role of social support in reducing stress in pre-adolescent children. *Journal of Psychology and Studies*, 2(2), 1-10. Doi: 10.61397/jkpp.v2i2.237.
- Nazarbetova, A., Shaukenova, Z., & Eschment, B. (2016). The media in Kazakhstan: Development, condition, perspectives. *Osteuropa*, 66(11-12), 181-195.
- Nunez-Regueiro, F., Archambault, I., Bressoux, P., & Nurra, C. (2021). Measuring stressors among adolescents: validation of the positive and negative adolescent life experiences scale. *Journal of Psychoeducational Assessment*, 39(8), 969-982. Doi: 10.1177/07342829211027751.
- Okhrimenko, I.M., Ponomarenko, Y.S., Shvets, D.V., Ostapovich, V.P., Kutsenko, D.V., Torlo, O.I., & Hnatyuk, S.S. (2023). The effect of physical training on health and psycho-emotional state of managers of law enforcement agencies. *Wiadomosci lekarskie (Warsaw, Poland: 1960)*, 76(2), 285-291. Doi: 10.36740/WLek202302106.
- Palko, T., & Travina, K. (2024). The effect of war on the psycho-emotional state of adolescents. *Prospects and Innovations of Science*, 42(8), 832-844. Doi: 10.52058/2786-4952-2024-8(42)-832-844.
- Peconga, E.K., & Thøgersen, M.H. (2020). Post-traumatic stress disorder, depression, and anxiety in adult Syrian refugees: What do we know?. *Scandinavian Journal of Public Health*, 48(7), 677-687. Doi: 10.1177/1403494819882137.
- Peltonen, K. (2024). Children and war – vulnerability and resilience. *European Journal of Developmental Psychology*, 22(3), 340-352. Doi: 10.1080/17405629.2024.2382410.
- Pornboonmarung, N., & Teachapinyawat, S. (2024). The effect of stress on the physical health of high school students between grades 10-12 in Thailand. *International Journal of Current Science Research and Review*, 7(8), 5920-5924. Doi: 10.47191/ijcsrr/V7-i8-07.
- Protsyk, N., & Savelyuk, N. (2025). Personal predictors of psycho-emotional adaptation in children of combatants. *Scientific Bulletin of Mukachevo State University. Series "Pedagogy and Psychology"*, 11(4), 78-89. Doi: 10.52534/msu-pp4.2025.78.
- Qian, M., Jin, R., Lu, C., & Zhao, M. (2024). Parental emotional support, self-efficacy, and mental health problems among adolescents in Hong Kong: A moderated mediation approach. *Frontiers in Psychiatry*, 15, 1458275. Doi: 10.3389/fpsy.2024.1458275.
- Rogerson, O., Wilding, S., Prudenzi, A., & O'Connor, D.B. (2024). Effectiveness of stress management interventions to change cortisol levels: A systematic review

- and meta-analysis. *Psychoneuroendocrinology*, 159, 106415. Doi: 10.1016/j.psyneuen.2023.106415.
- Rosu, A.M., Sitou, A., & Panisoara, G. (2024). Parental support and its role on youth and adult self-efficacy. *Anthropological Researches and Studies*, 14, 190-204. Doi: 10.26758/14.1.14.
- Ryan, E., Hore, K., Power, J., & Jackson, T. (2023). The relationship between physician burnout and depression, anxiety, suicidality and substance abuse: A mixed methods systematic review. *Frontiers in Public Health*, 11, 1133484. Doi: 10.3389/fpubh.2023.1133484.
- Sokhor, N., Yasnyi, O., Smashna, O., & Gashimova, N. (2024). The impact of war and forced relocation on the mental health of children and adolescents. *NeuroNews*, 153(8), 16-19. [https://neuronews.com.ua/uploads/issues/2024/8\(153\)/nn24_8_16-19.pdf](https://neuronews.com.ua/uploads/issues/2024/8(153)/nn24_8_16-19.pdf).
- Strashok, L.A., Rak, L.I., Danylenko, H.M., Yeshchenko, A.V., Kashina-Yarmak, V.L., Zavelya, E.M., & Isakova, M.Yu. (2023). Impact of stress on adolescents during puberty (part 1). *Childs Health*, 18(5), 376-383. Doi: 10.22141/2224-0551.18.5.2023.1616.
- Stromájer, G.P., Csima, M., Iváncsik, R., Varga, B., Takács, K., & Stromájer-Rácz, T. (2023). Stress and anxiety among high school adolescents: Correlations between physiological and psychological indicators in a longitudinal follow-up study. *Children*, 10(9), 1548. Doi: 10.3390/children10091548.
- Toktarbekova, L., Zhandossova, S., & Bektenova, M. (2025). Kazakh Women's Visual Religious Identity and Islamic Agency on Instagram. *Pharos Journal of Theology*, 106(3). Doi: 10.46222/pharosjot.106.3041.
- Tullius, J.M., Geboers, B., Stewart, R.E., Wei, Y., Reijneveld, S.A., & de Winter, A.F. (2024). Psychometric properties of the knowledge and attitudes to mental health scales in a Dutch sample (KAMHS-NL): A comprehensive mental health literacy measure in adolescents. *BMC Public Health*, 24, 1995. Doi: 10.1186/s12889-024-19371-3.
- Tyutyunnyk, L. (2025). Self-regulation as a psychological phenomenon. *The Bulletin of National Defence University of Ukraine*, 20(5), 207-215. Doi: 10.33099/2617-6858-2025-87-5-207-215.
- Uygur, S.S. (2025). Combating Mental Illness Microaggressions in Colleges and Improving Mental Health. *Journal of Nervous and Mental Disease*. Doi: 10.1097/NMD.0000000000001834.
- Vakulyk, I. (2025). Minimal effort: The key to effective learning and goal attainment. *Humanities Studios: Pedagogy, Psychology, Philosophy*, 13(1), 70-82. Doi: 10.31548/hspedagog/1.2025.70.
- Vazova, T., Vazov, R., & Radev, V. (2025). Active aging among the elderly and its economic and social consequences in Bulgaria. *Jurnal Ilmiah Ilmu Terapan Universitas Jambi*, 9(3), 1037-1054. Doi: 10.22437/jiituj.v9i3.42957.
- What should homework be like in schools? (2021). <https://eo.gov.ua/yakymy-maiut-buty-domashni-zavdannia-u-shkoli/2021/12/03/>.
- Winding, T.N., Nielsen, M.L., & Grytnes, R. (2024). Impact of stress during adolescence on general and work-related stress in early adulthood: A prospective

- cohort study. *International Journal of Population Studies*. Doi: 10.36922/ijps.0864.
- Wu, J., & Wu, Q. (2024). Effects of early-life environmental stress on risk-taking tendency of adolescents in rural areas of southwestern China. *Frontiers in Psychiatry*, 15, 1520790. Doi: 10.3389/fpsy.2024.1520790.
- Yamchuk, T. (2025). The resilience of the student community in wartime. *Scientific Bulletin of Mukachevo State University. Series "Pedagogy and Psychology"*, 11(1), 19-31. Doi: 10.52534/msu-pp1.2025.19.
- Yatsyna, O.F. (2022). The impact of war on mental health: signs of trauma in children and adolescents. *Scientific Perspectives*, 25(7), 554-567. Doi: 10.52058/2708-7530-2022-7(25)-554-567.
- Yurtseven, N., Doğan, S., Sayı, A.K., & Çelik, I. (2025). Evaluating the Effectiveness of a Professional Development Program: Changes in Teachers to Improve Teaching Quality. *International Journal of Educational Reform*. Doi: 10.1177/10567879251331215.
- Zhandossova, S., Seitakhmetova, N., Shaukenova, Z., & Nurov, M. (2025). Exploring Internet Space on the Formation of Religious Identity. *Journal of Social Studies Education Research*, 16(2), 316-342.

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Working Memory and Executive Functions in monolingual and bilingual preschoolers: The role of the socio-economic status

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Abstract

Research on bilingualism showed mixed results about performance on cognitive tasks in preschoolers, and only few studies also considered children's socioeconomic status. This study aims at (i) investigating the difference between monolingual and bilingual preschoolers concerning socioeconomic status in the Italian context; (ii) investigating the difference between monolinguals and bilinguals concerning performance on working memory and executive functions tasks, and (iii) verifying the difference between monolinguals and bilinguals on working memory and executive functions tasks, also controlling for socioeconomic status. A large battery of working memory and executive functions tasks was administered to 91 typically developing children ($M_{age}=64$ months; 44 monolinguals and 47 bilinguals). Findings reported higher socioeconomic status in monolinguals; furthermore, results showed that the monolingual group outperformed the bilingual group on some cognitive tasks administered. However, when performance of monolinguals and bilinguals was controlled for socioeconomic status, no significant difference emerged, and most effect sizes were indeed negligible.

Keywords: bilingualism; socioeconomic status; working memory; executive function; preschool

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Introduction

Executive function (EF) refers to a family of adaptive, goal-directed, top-down mental control processes that may rely on working memory (e.g., Miyake et al., 2000). Working memory is a system that can hold a limited amount of information in a heightened state of availability for use in ongoing information processing (e.g., Cowan, 2017).

A large body of literature showed that some contextual factors, such as bilingualism (e.g., Foy & Mann, 2014; Martin-Rhee & Bialystok 2008; Morales, Calvo, & Bialystok, 2013) and socioeconomic status (SES; for a review Lawson, Hook, & Farah, 2018) can influence the development of EF and WM.

There is a controversy on the role of WM and EF in children with bilingualism, which in the present study is conceived within a functional perspective referring to the use and need of two or more languages in everyday life (Grosjean, 1992). On the one hand, past literature showed that bilinguals outperform monolinguals in EF and WM tasks (for a review, see Bialystok, Craik, & Luk, 2012). Conversely, a series of recent studies did not find evidence for a bilingual advantage (e.g., Duñabeitia, 2014; Jaekel, Jaekel, Willard, & Leyendecker, 2019; von Bastian, Souza, & Gade, 2016). Notably, some recent systematic reviews and meta-analyses, on both younger and older children and adults, found no evidence of any difference between monolinguals and bilinguals on measures of EF after correcting for publication bias (de Bruin, Treccani, & Della Sala, 2015; Gunnerud, Ten Braak, Reikerås, Donolato, & Melby-Lervåg, 2020; Lowe, Cho, Goldsmith, & Morton, 2021).

A crucial aspect that might influence the results on this topic is SES.

There is abundant evidence indicating that children living in poverty are at increased risk of deficits in WM and EF domains (e.g., Lawson et al., 2018).

In the Italian context, this issue is particularly relevant because bilingualism in childhood is frequently associated with migration and minority language backgrounds. Most children from migrant families are first exposed to their home language (L1) within the family context and subsequently encounter the majority language (L2) primarily at school. Moreover, migrant families often experience socioeconomic disadvantage, resulting in a frequent overlap between bilingualism and lower SES.

Recent Italian studies on language minority bilingual children (LMBC) have consistently highlighted the need to disentangle the role of bilingualism from that of SES. For instance, studies comparing LMBC and monolingual children with different SES levels have shown that, once SES is controlled

for, several differences traditionally attributed to bilingualism are reduced or disappear, whereas socioeconomic disadvantage remains a robust predictor of performance, particularly in complex language-related skills (Bonifacci et al., 2019; Bonifacci et al., 2022; Cangelosi et al., 2024).

Although these studies focused primarily on literacy outcomes, their findings are highly relevant to research on EF and WM. EF and WM are known to support language and academic development, including reading comprehension and vocabulary acquisition. Therefore, the documented impact of SES on literacy skills suggests that socioeconomic disadvantage may also play a fundamental role in shaping the cognitive mechanisms that underpin those skills, especially during the early phases of development.

Most of the studies investigating the role of SES in the performance of cognitive tasks in monolinguals and bilinguals are focused on older children or adults (e.g., Donnelly et al., 2019; Giovannoli et al., 2020; Vivas et al., 2020). In fact, only few studies are focused on children in the early years of life (e.g., Carlson & Meltzoff, 2008; Morales et al., 2013),

However, evidence on preschool-aged children in the Italian context is still limited, despite the fact that the impact of SES may be particularly pronounced in the earliest stages of cognitive and language development. Indeed, considering different stages of language development could be relevant.

Based on these premises, we decided to examine the performance of monolingual and bilingual preschool children on a series of WM and EF tasks. We also decided to take SES into account, since past literature showed that this might be crucially important (e.g., Lawson et al., 2008).

Given the sociolinguistic characteristics of the Italian context, where many bilingual preschoolers come from lower-SES backgrounds, disentangling the respective contributions of bilingualism and SES to early EF and WM development appears essential.

The current study

The current study was performed in Italy, in an area in which bilingual children are typically from a lower SES background.

The main goal is to examine differences between monolinguals and bilinguals, controlling for SES, in WM and EF tasks, during the pre-school years.

Starting from this main goal, our research questions are as follows:

Research Question (RQ1): *Is there a difference between monolinguals and bilinguals concerning SES?*

Research Question 2 (RQ2): *Are there some differences in monolinguals and bilinguals concerning performance in WM and EF tasks?*

Research Question 3 (RQ3): *Does SES play an important role in performance in WM and EF tasks in monolinguals and bilinguals?*

Concerning *RQ1*, we expect to find a difference between monolinguals and bilinguals concerning SES. This is because in the Italian context a large number of bilinguals come from a low-income background (INVALSI, 2018). Therefore, we expect that, on average, monolingual children will probably have a higher SES than bilinguals. It is, in fact, very hard to match monolingual children for SES in Italy, since many bilingual families typically have lower resources as compared to average families.

Concerning *RQ2*, as for differences between monolingual and bilingual children in cognitive performance, we did not have strong predictions, since the literature is mixed (e.g., Byalistok et al., 2012; Jaekel et al., 2019)

Finally, concerning *RQ3*, we expect to find (i) a relation between SES and performance in WM and EF tasks in preschoolers and (ii) SES influences performance in WM and EF tasks, in line with the literature (e.g., Lawson et al., 2008) and that its influence is more relevant than bilingualism in the specific Italian context.

Methods

Participants and procedure

91 typically developing children, $M_{\text{age}} = 64.20$ months (5.08), range = 53-74, 52% female, participated in the study. 44 children were monolingual, ($M_{\text{age}} = 63.77$, $SD = 5.95$), and 47 were bilingual ($M_{\text{age}} = 64.60$, $SD = 4.12$). Two groups did not statistically differ for age, $F(1, 89) = 0.201$, $p = .655$, $\eta^2 = .002$.

The children were recruited in two public preschools in the main town of a northwestern region of Italy. Concerning monolinguals, we included typically developing children (without ascertained diagnosis) that speak only Italian with both Italian parents. Regarding bilinguals, we considered typically developing children that speak Italian at school and in the community and a different language at home. Specifically, the bilingual group included children whose parents, in 85.1% of cases, both had the same non-Italian nationality. The languages spoken at home were: Spanish ($n = 19$; 40%); Albanian ($n = 14$; 29.8%); Arabic ($n = 5$; 10.6%); French ($n = 2$; 4.3%); English ($n = 2$; 4.3%); Chinese ($n = 1$; 2.1%); Sinhala ($n = 1$; 2.1%); Polish ($n = 1$; 2.1%); Tagalog ($n = 1$; 2.1%); Urdu ($n = 1$; 2.1%). The school

did not inform the research team of the need for a mediator to inform the parents of bilingual children about the research. The Peabody Picture Vocabulary Test was administered to the bilingual children group to assess Italian comprehension; the mean raw score was 48.38. Each child was tested by a trained graduate student in a quiet room during school day. The tasks were administered during two sessions lasting approximately 20-30 minutes each.

Materials

Parents' questionnaire

Parents provided both bilingualism and SES information filling in a questionnaire. Parents were asked about their nationality, as well as the language spoken at home. Concerning SES, each parent's educational level was classified on a 7-point scale: 0 = no educational title; 1 = primary education, 2 = secondary school; 3 = professional education; 4 = high school; 5 = degree; and 6 = post graduate education. Each parent's occupation was classified on an 8-point scale. The levels of this scale were: 1 = housewife, unemployed, student; 2 = unskilled professions; 3 = craftsmen and skilled workers, drivers of vehicles or machinery; 4 = qualified commercial and service jobs; 5 = clerical work; 6 = technical professions; 7 = highly specialized intellectual and scientific professions; and 8 = entrepreneurs and high executives.

Working memory tasks

Mr. Cucumber Test (Case, 1985). The outline of an extra-terrestrial figure, to which colored stickers were attached, was displayed for 5s per item. The child was then required to show the positions of the stickers. There were three items at each level (from one to eight stickers). The test was discontinued after failing three items at a level. One point was awarded for each consecutive level on which at least two items were correctly solved, and one-third of a point for each item above that level

Backward Word Span (BWS; Morra, 1994). The child had to repeat lists of words in backward order. Each level (from two to seven words) had three lists. The test was discontinued when the child failed all three lists at one level. One point was awarded for each consecutive level on which a subject had at least two lists correct and one-third of a point for each list above that level.

Executive function tasks

Day/Night Stroop Task (Gerstadt, Hong, & Diamond, 1994). This is an inhibition task. The task consists of two phases. In the first phase (control phase), the child is shown cards depicting either a “moon” or a “sun.” The child is required to say “night” when seeing the moon and “day” when seeing the sun. In the second phase (Stroop phase), the child must say “day” when seeing the moon and “night” when seeing the sun. Each phase includes 16 items. The final score is calculated as the difference between the Stroop phase and the control phase (Stroop-control).

Simon Says Task (Strommen, 1973). This task was used to assess response inhibition. The child was required to do certain actions (e.g., touch his head) only if the experiment said “Simon says”. If not, the child must not move. The task includes twenty items (10 go/Simon says items in which the child has to perform the action required and ten no-go items in which the child should not move). The score is the sum of the correct responses to the no-go items

Dimensional Change Card Sort (DCCS; Zelazo, 2006). This is a shifting task: the child is shown a deck of cards, each of which displays a figure with three variables: shape (rabbit, boat), color (red, blue), and the presence or absence of a black border. During the pre-switch phase the child was required to sort the cards according to color, during the post-switch phase the child was required to sort the cards according to shape, and in the third phase, the child had to sort cards with a black border according to shape, and those without border according to color. There were six trials in the pre-switch phase, six in the post-switch phase, and 12 in the border phase. During the pre-switch phase, the DCCS creates a predominant response that must later be inhibited in the post-switch phase. Subsequently, the third phase introduces an additional, second level variable. The score was the sum of the child's correct responses.

Magic House (Panesi & Morra, 2017). This task assesses monitoring, addition and deletion of working memory contents. On each item, three to five toy animals were placed sequentially in a cardboard house. The child was instructed to recall which animal entered the house last, and which one entered just before it. There were nine items, each of which was scored zero, one, or two points (i.e., the number of correct responses).

Italian comprehension

Peabody picture vocabulary task. The Italian version of the PPVT (Stella, Pizzoli & Tressoldi, 2000) was administered only to bilingual children group

to assess receptive vocabulary (Hoffman, Templin & Rice, 2012). In this task, the experimenter reads a word aloud and the child selects the corresponding picture from four options. The starting item is determined by the child's PPVT age. A basal is established after eight consecutive correct responses; otherwise, testing proceeds backward until this criterion is met. The task continues until the child makes six errors within eight items. The score corresponds to the total number of correct responses, with items preceding the basal counted as correct (range: 0-175).

Data analytic approach

A composite SES score was used. To create the SES composite score, all four SES variables (each parent's education level and occupation) were transformed in z-scores considering the whole sample and then the mean was computed (if there were not at least 2 out of 4 indices of SES, the SES composite score was not computed, and it was considered as a missing value; this caused the exclusion of 8 participants from some analyses).

Descriptive analyses considering SES and cognitive task scores were calculated for the monolingual and bilingual groups. Concerning SES and cognitive measures, the differences between the two groups were investigated performing independent sample t-tests and examining the effect size. Subsequently, Pearson's correlations among variables of interest were calculated. Then, we used ANCOVAs to examine the difference in cognitive performance between bilingual and monolingual groups adjusting for SES. Effect sizes were calculated using eta squares (η^2), for the ANCOVA. The results were interpreted using Cohen's (1988) traditional criteria. Analyses were performed using SPSS (IBM Corp. Released 2019).

Results

Descriptive statistics of WM, EF task scores and SES variables, and differences between monolingual and bilingual groups performing independent sample t-tests (also examining the effect size) are reported in Table 1.

The results suggest a significant difference in SES between groups, with a high effect size of the difference in favor of monolingual children.

Concerning performance in cognitive tasks, monolingual children outperformed bilingual children in the Simon Says and Magic House tasks, with a medium effect size of the difference, while the group difference on the other tasks was nonsignificant.

Tab. 1 - Descriptive statistics on cognitive task scores and SES variables (for the monolingual and bilingual groups), results of the independent sample t-tests performed to compare performance on cognitive tasks and SES of monolingual and bilingual groups and standardized differences and 95% CIs expressed in terms of Cohen's *d* between the two groups

Tasks	Monolingual				Bilingual				t	df.	p	Cohen's <i>d</i>	LL	UL
	Min	Max	Mean	SD	Min	Max	Mean	SD						
BWS	0.33	5.00	2.40	0.87	1.00	3.33	2.20	0.75	1.15	89	.25	0.25	-0.17	0.66
Mr. Cuc.	0.00	3.66	1.73	0.85	0.00	3.33	1.61	0.74	0.67	88	.50	0.15	-0.26	0.56
Day/Night Stroop	-6.00	1.00	-1.24	1.78	-11.00	3.00	-1.78	2.80	1.08	86	.28	0.23	-0.19	0.65
Simon Says	0.0	19.0	7.59	6.68	0.0	20.0	4.57	6.32	2.21	89	.03	0.46	0.04	0.88
DCCS	17.0	24.0	19.12	1.69	12.0	24.0	18.41	2.34	1.61	87	.11	0.35	-0.08	0.76
Magic House	2.0	18.0	11.82	3.66	2.0	17.0	9.83	3.95	2.49	89	.02	0.52	0.10	0.94
SES	-1.08	1.60	0.52	0.74	-1.40	1.60	-0.40	0.69	5.51	71	<.001	1.295	0.78	1.80

Note. LL = Lower Level, UL = Upper Level. Differences are statistically significant when zero is not included in the interval (95% confidence interval).

Table 2 reports zero-order (Pearson) correlations in the whole sample. The two WM measures showed a reasonable correlation. Among EF tasks, the two inhibition tasks showed a reasonable correlation. Moreover, the Simon Says and the DCCS tasks correlated significantly with the Magic House task. Furthermore, WM tasks correlated significantly with EF tasks except for two correlations. Finally, cognitive tasks were significantly correlated with the SES composite score, except for Mr. Cucumber and DCCS.

Finally, we ran a series of analyses ANCOVAs using SES as covariate, and linguistic status (monolingual vs. bilingual) as the independent variable. The ANCOVA results are reported in Table 3.

Tab. 2 - *Correlations among cognitive task scores and SES*

	1	2	3	4	5	6	8
1 BWS	—						
2 Mr. Cucumber	.358**	—					
3 Day/Night Stroop	.262*	.088	—				
4 Simon Says	.375**	.344**	.265*	—			
5 DCCS	.299**	.206	.088	.162	—		
6 Magic House	.421**	.298**	.162	.450**	.263*	—	
8 SES	.376**	.103	.265*	.494**	.121	.459**	—

Note.

* $p < .05$

** $p < .01$

As we can observe, results showed the absence of a statistically significant effect of bilingualism in all the tasks. Moreover, the effect of SES was statistically significant in BWS, Simon Says and Magic House.

In particular, in the BWS task the effect of bilingualism was not statistically significant; instead, the effect of the covariate SES was statistically significant and the effect size was large. As for the Simon Says, the effect of bilingualism was not statistically significant; concerning the effect of the covariate SES, it was statistically significant and the effect size was large. Finally, the results of the Magic House showed that the effect of

bilingualism was not statistically significant; instead, the effects of the covariate SES was statistically significant and the effect of size was large (for details, see table 3).

Tab. 3 - Results of the ANCOVAs using SES as covariate, and linguistic status (monolingual vs. bilingual) as the independent variable

	Source of variance	Sum of Squares	df	Mean Square	F	p	η^2
<i>BWS</i>	SES	7.549	1	7.549	14.001	< .001	0.166
	Linguistic status	1.313	1	1.313	2.435	0.123	0.029
	Residuals	37.744	70	0.539			
<i>Mr.Cuc.</i>	SES	0.317	1	0.317	0.496	0.483	0.007
	Linguistic status	8.190×10^{-4}	1	8.190×10^{-4}	0.001	0.972	0.00002
	Residuals	44.060	69	0.639			
<i>Day/Night</i>	SES	21.184	1	21.184	3.525	0.065	0.048
	Linguistic status	0.008	1	0.008	0.001	0.970	1.903×10^{-5}
	Residuals	408.624	68	6.009			
<i>Simon Says</i>	SES	633.290	1	633.290	17.914	< .001	0.193
	Linguistic status	7.072	1	7.072	0.200	0.656	0.002
	Residuals	2.474.667	70	35.352			
<i>DCCS</i>	SES	0.623	1	0.623	0.125	0.724	0.002
	Linguistic status	4.251	1	4.251	0.856	0.358	0.012
	Residuals	342.636	69	4.966			
<i>Magic House</i>	SES	199.850	1	199.850	15.622	< .001	0.175
	Linguistic status	4.571	1	4.571	0.357	0.552	0.004
	Residuals	895.494	70	12.793			

Discussion

The relationships between SES, WM and EF (e.g., Lawson et al., 2018), and between bilingualism and WM and EF (e.g., Foy & Mann, 2014; Martin-Rhee & Bialystok, 2008; Morales et al., 2013) have been repeatedly investigated in the current literature. However, studies that considered the joint effects of bilingualism and SES on WM and EF found mixed results (e.g., Gunnerud, 2020; Vivas et al., 2017), and only a few studies jointly investigated these variables in preschoolers (e.g., Carlson & Meltzoff, 2008). It is also worth mentioning that the Italian context is quite different from other international environments. In fact, bilingual children in Italy typically come from a lower SES background and this makes it very interesting to evaluate the current issue in this context.

Concerning RQ1, the findings highlighted a difference between monolinguals and bilinguals concerning SES, in favor of monolinguals. This is in line with our hypothesis that monolingual children have a higher SES than bilinguals, as in the Italian context a large number of bilinguals come from a low-income background (INVALSI, 2018).

Concerning RQ2, our findings suggest that in the preschool years there are some differences in monolinguals and bilinguals, in favor of monolinguals. Specifically, we found that monolinguals outperformed in two tasks: an inhibitory control task (Simon Says) and an updating task (Magic House). Our results are in line with a series of recent studies that did not find evidence for a bilingual advantage in preschoolers and even in older children (e.g., Lowe et al., 2021; Duñabeitia et al., 2014; Jaekel, Jaekel, Willard, & Leyendecker, 2019).

Finally, concerning RQ3, the results confirmed our hypothesis that SES plays an important role in performance in WM and EF tasks in monolinguals and bilinguals, in line with the literature (e.g., Lawson et al., 2008). Specifically, we did not find differences between monolinguals and bilinguals in cognitive tasks performance, except for Simon Says and Magic House, but those differences became not statistically significant when SES was controlled for.

Also concerning RQ3, our results showed that SES was positively associated with WM and EF. This is not particularly surprising, being in line with our hypothesis and with Lawson and colleagues (2018), who found a correlation between SES and EF.

A possible explanation for this association may be found in the proximal mechanisms through which SES operates on children's cognitive development. According to the family stress model, children growing up in socioeconomically disadvantaged contexts are more likely to be exposed to

higher levels of parental psychological distress and environmental stressors, which in turn may negatively affect the quality of parent–child interactions and the development of self-regulatory skills. In addition, the family investment model suggests that families with higher SES may have greater access to cognitively stimulating materials and experiences (e.g., books, structured games, rule-based activities) that resemble the cognitive demands of EF tasks. Therefore, children from lower SES backgrounds may have fewer opportunities to engage in activities that train WM and EF. Differences in parenting styles, scaffolding practices, and exposure to structured rule-based play may also contribute to disparities in EF development. These mechanisms are consistent with previous research showing that parental education and psychological well-being can influence children’s executive functioning through variations in environmental stimulation and family functioning (e.g., Vrantsidis et al., 2020).

However, not all cognitive tasks were equally influenced by SES. In particular, the Mr. Cucumber and the DCCS were not statically correlated with SES. Regarding the Mr. Cucumber test (Case, 1985), it is essentially a refinement of the older Mr. Cucui, designed by De Avila, Havassy and Pascual-Leone (1976) as a culture-fair test for a study of Mexican-American schoolchildren, most of whom had a low-income family background and only had a lower proficiency in English.

Regarding the DCCS, our results did not replicate findings in the literature that found a relation between DCCS and SES (Hartanto and colleagues, 2019). We can explain the lack of replication analyzing the difference in the definition of SES. In fact, differently from our study, Hartanto and colleagues (2019) considered also household income in the SES component. A limitation of our study is that we only considered four indices for SES and did not include household income.

To conclude, this study brings some elements of novelty in the field of bilingualism. First, the results of our study provide support in favor of the null hypothesis, against the prediction of a bilingual advantage in cognitive tasks (i.e., in EF measures and in a sample of preschoolers). Furthermore, our results showed a significant effect of SES (although not on all tasks), whereas the effect of bilingualism was not statistically significant (or in some cases, without SES as covariate, in favor of monolinguals), and was negligible in terms of magnitude.

It is worth noting that our results might be related to the Italian context that has specific socioeconomic and sociolinguistic features. These results are very important also because there is a paucity of studies carried out in Italy on the cognitive effects of bilingualism. Finally, in this study we used six different cognitive tasks to investigate WM and EF thus adding

significantly to the literature on bilingual preschoolers, which remains an under-investigated area of research. Moreover, to the best of our knowledge, this is the first research using an updating task for preschoolers (the Magic House task) in a study on bilingualism, thus adding new information to the literature.

Despite these positive aspects, this paper presents some limitations. First, bilinguals were speaking several different mother languages. Therefore, we cannot exclude the possibility that a bilingual advantage may occur for some specific L1 languages (e.g., Prior & Gollan, 2011). Additionally, the description of participants' bilingual status could be more detailed. Future studies should incorporate a more comprehensive assessment of specific bilingual profiles and linguistic experiences in a larger sample, including aspects such as children's language exposure history (e.g., attendance in Italian nurseries) and parental language use patterns. Finally, future research should also take a longitudinal approach, analyzing the relationships between WM and EF and their changes over time.

References

- Bialystok, E., Craik, F. I., & Luk, G. (2012). Bilingualism: consequences for mind and brain. *Trends in cognitive sciences*, 16(4), 240-250. Doi: 10.1016/j.tics.2012.03.001.
- Bonifacci, P., Ferrara, I. C., Pedrinazzi, J., Terracina, F., & Palladino, P. (2022). Literacy acquisition trajectories in bilingual language minority children and monolingual peers with similar or different SES: A three-year longitudinal study. *Brain Sciences*, 12(5), 563. Doi: 10.3390/brainsci12050563.
- Bonifacci, P., Lombardo, G., Pedrinazzi, J., Terracina, F., & Palladino, P. (2020). Literacy skills in bilinguals and monolinguals with different SES. *Reading & Writing Quarterly*, 36(3), 243-259. Doi: 10.1080/10573569.2019.1635057.
- Carlson, S. M., & Meltzoff, A. N. (2008). Bilingual experience and executive functioning in young children. *Developmental science*, 11(2), 282-298. Doi: 10.1111/j.1467-7687.2008.00675.x.
- Case, R. (1985). *Intellectual Development: Birth to Adulthood*. New York: Academic Press.
- Cohen, J. (1988). Set correlation and contingency tables. *Applied psychological measurement*, 12(4), 425-434. Doi: 10.1177/014662168801200410.
- Cangelosi, M., Barichello, C., Dijkstra, T., & Palladino, P. (2024). How SES may affect reading comprehension and vocabulary in language minority bilingual and monolingual children. *Reading & Writing Quarterly*, 40(2), 170-190. Doi: 10.1080/10573569.2023.2181246.
- Cowan, N. (2017). The many faces of working memory and short-term storage. *Psychonomic Bulletin and Review* 24, 1158-70.

- De Avila, E. A., Havassy, B., & Pascual-Leone, J. (1976). *Mexican American schoolchildren: A neo-Piagetian analysis*. Washington: Georgetown University Press.
- de Bruin, A., Treccani, B., & Della Sala, S. (2015). Cognitive advantage in bilingualism: an example of publication bias?. *Psychological science*, 26(1), 99-107. Doi: 10.1177/0956797614557866.
- Duñabeitia, J. A., Hernández, J. A., Antón, E., Macizo, P., Estévez, A., Fuentes, L. J., & Carreiras, M. (2014). The inhibitory advantage in bilingual children revisited: myth or reality?. *Experimental psychology*, 61(3), 234-251. Doi: 10.1027/1618-3169/a000243.
- Donnelly, S., Brooks, P. J., & Homer, B. D. (2019). Is there a bilingual advantage on interference-control tasks? A multiverse meta-analysis of global reaction time and interference cost. *Psychonomic bulletin & review*, 26(4), 1122-1147. Doi: 10.3758/s13423-019-01567-z.
- Foy, J. G., & Mann, V. A. (2014). Bilingual children show advantages in nonverbal auditory executive function task. *International Journal of Bilingualism*, 18(6), 717-729. Doi: 10.1177/1367006912472263.
- Gallistel, C. R. (2009). The importance of proving the null. *Psychological review*, 116(2), 439. Doi: 10.1037/a0015251.
- Gerstadt, C. L., Hong, Y. J., & Diamond, A. (1994). The relationship between cognition and action: performance of children 312-7 years old on a stroop-like day-night test. *Cognition*, 53(2), 129-153. Doi: 10.1016/0010-0277(94)90068-x.
- Giovannoli, J., Martella, D., Federico, F., Pirchio, S., & Casagrande, M. (2020). The impact of bilingualism on executive functions in children and adolescents: A systematic review based on the PRISMA method. *Frontiers in Psychology*, 11, 574789. Doi: 10.3389/fpsyg.2020.574789.
- Grosjean, F. (1992). Another view of bilingualism. *Advances in Psychology*, 83, 51-62. Doi: 10.1016/S0166-4115(08)61596-9.
- Gunnerud, H. L., ten Braak, D., Reikerås, E. K. L., Donolato, E., & Melby Lervåg, M. (2020). Is bilingualism related to a cognitive advantage in children? A systematic review and meta-analysis. *Psychological Bulletin*, 146(12), 1059-1083. Doi: 10.1037/bul0000301.
- Hartanto, A., Toh, W. X., & Yang, H. (2019). Bilingualism Narrows Socioeconomic Disparities in Executive Functions and Self-Regulatory Behaviors During Early Childhood: Evidence From the Early Childhood Longitudinal Study. *Child development*, 90(4), 1215-1235. Doi: 10.1111/cdev.13032.
- IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.
- INVALSI (2018). Rapporto prove INVALSI 2018 [National Italian Institute for Education Report]. INVALSI, Rome.
- Jaekel, N., Jaekel, J., Willard, J., & Leyendecker, B. (2019). No evidence for effects of Turkish immigrant children's bilingualism on executive functions. *PLoS one*, 14(1), e0209981. Doi: 10.1371/journal.pone.0209981.
- Lawson, G. M., Hook, C. J., & Farah, M. J. (2018). A meta-analysis of the relationship between socioeconomic status and executive function performance

- among children. *Developmental science*, 21(2), e12529. Doi: 10.1111/desc.12529.
- Lowe, C. J., Cho, I., Goldsmith, S. F., & Morton, J. B. (2021). The Bilingual Advantage in Children's Executive Functioning Is Not Related to Language Status: A Meta-Analytic Review. *Psychological science*, 32(7), 1115-1146. Doi: 10.1177/0956797621993108.
- Martin-Rhee, M. M., & Bialystok, E. (2008). The development of two types of inhibitory control in monolingual and bilingual children. *Bilingualism: language and cognition*, 11(1), 81-93. Doi: 10.1017/S1366728907003227.
- Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The unity and diversity of executive functions and their contributions to complex "frontal lobe" tasks: A latent variable analysis. *Cognitive psychology*, 41(1), 49-100. Doi: 10.1006/cogp.1999.0734.
- Morales, J., Calvo, A., & Bialystok, E. (2013). Working memory development in monolingual and bilingual children. *Journal of experimental child psychology*, 114(2), 187-202. Doi: 10.1016/j.jecp.2012.09.002.
- Morra, S. (1994). Issue in working memory measurement: Testing for M capacity. *International Journal of Behavioral Development*, 17(1), 143-159. Doi: 10.1177/016502549401700109.
- Panesi, S., Morra, S. (2017). La Casetta Magica. Un nuovo strumento per indagare l'aggiornamento (updating) della memoria di lavoro in età prescolare. *Psicologia clinica dello sviluppo*, 21(3), 443-462. Doi: 10.1449/88502.
- Prior, A., & Gollan, T. H. (2011). Good language-switchers are good task switchers: Evidence from Spanish-English and Mandarin-English bilinguals. *Journal of the International Neuropsychological Society*, 17(4), 682-691. Doi: 10.1017/S1355617711000580.
- Strommen, E. A. (1973). Verbal self-regulation in a children's game: impulsive errors on "Simon Says". *Child Development*, 849-853. Doi: 10.2307/1127737.
- Vivas, A. B., Chrysochoou, E., Ladas, A. I., & Salvari, V. (2020). The moderating effect of bilingualism on lifespan cognitive development. *Cognitive Development*, 55, 100890. Doi: 10.1016/j.cogdev.2020.100890.
- von Bastian, C. C., Souza, A. S., & Gade, M. (2016). No evidence for bilingual cognitive advantages: A test of four hypotheses. *Journal of Experimental Psychology: General*, 145(2), 246. Doi: 10.1037/xge0000120.
- Vrantsidis, D. M., Clark, C. A. C., Chevalier, N., Espy, K. A., & Wiebe, S. A. (2020). Socioeconomic status and executive function in early childhood: Exploring proximal mechanisms. *Developmental Science*, 23(3), e12917. Doi: 10.1111/desc.12917.
- Zelazo, P. D. (2006). The Dimensional Change Card Sort (DCCS): A method of assessing executive function in children. *Nature protocols*, 1(1), 297-301. Doi: 10.1038/nprot.2006.46.

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Sibling relationships and pediatric cancer: A systematic review

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Abstract

In the literature, the experience of siblings of children and adolescents with cancer has been extensively explored, mainly along two lines of research: the psychological impact of the illness on the typically developing siblings, and the support interventions designed for them. Instead, the effect of cancer on the sibling relationship itself has received comparatively little attention.

This systematic integrative review aims to identify studies specifically focused on sibling relationships, to understand whether and how these relationships change during the illness, and what impact these changes may have on broader family dynamics. The review follows the PRISMA guidelines and includes seven studies identified through a comprehensive literature search.

The findings were analyzed according to the research methods used and the themes investigated. Most studies employed quantitative methods, such as questionnaires, while only two used qualitative approaches, including interviews and focus groups, primarily with typically developing siblings.

The studies reveal that siblings perceive changes in their relationship in ambivalent ways reporting both a general deterioration and an increased sense of closeness. These changes are also linked to their perceptions of the parental relationship.

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The results highlight a clear need for further research into the specific effects of cancer on sibling relationships and suggest indications for the psychological support to the whole family. More qualitative studies are recommended to explore the nuanced nature of these changes, with attention to the perspectives of both typically developing and siblings with cancer.

Key Words: Cancer, sibling relationships, children, young people, systematic review.

Introduction

The birth of a sibling marks the beginning of a very important and lasting relationship with unique characteristics. It can be characterized by strong closeness and cohesion, but it can also be changeable, dynamic, and highly complex (Dunifon et al., 2017). Especially in childhood and adolescence, siblings share spaces, play and daily life, which contributes to creating a complex emotional bond (Dunn & Kendrick, 1982). This context becomes even more complex when a serious illness such as cancer occurs.

In general, childhood cancer encompasses a heterogeneous group of malignancies that arise between 0 and 19 years of age and accounts for about 1% of all cancers; yet it remains one of the leading causes of disease-related death in childhood and adolescence (Bhakta et al., 2019; WHO, 2025). Over recent decades, therapeutic advances have led to 5-year survival rates exceeding 80% in high-income countries, particularly for acute leukemias, lymphomas, and some solid tumors, although marked global inequalities in access to care persist (Bhakta et al., 2019; Santero et al., 2025; WHO, 2025). The typical course involves an often-abrupt diagnosis, followed by intensive multimodal treatments (chemotherapy, surgery, radiotherapy, and, in some cases, stem cell transplantation), with frequent hospitalizations, invasive procedures, and prolonged outpatient follow-up. Even after the end of treatment, children and adolescents require long-term surveillance to monitor the risk of relapse and late physical and neurocognitive effects, with a lasting impact on developmental trajectories and quality of life (Patenaude & Kupst, 2005).

Therefore, when a child in a family develops a very serious illness like cancer, the entire system is affected by the new condition, which results in lifestyle changes, not only of the parents but also of the siblings (Deavin et al., 2018; Long et al., 2015; Rolland, 2018; Rostila et al., 2017). In fact, from parents' perspective, they report high levels of anxiety, depression, post-traumatic stress, and caregiving burden, especially in the initial phases of the illness and during the most intensive treatments; these difficulties may

interfere with couple functioning, day-to-day family organization, job stability, and financial security (Kazak, 2002; Pai & Kazak, 2006; Wiener et al., 2015).

In the literature, the experience of the siblings of children with cancer has been extensively considered and investigated (Cheung et al., 2020; Weiner & Woodley, 2018; Yang et al., 2016) with respect to two main lines of study: the psychological impact of the cancer on the healthy siblings and supportive interventions for them.

In the first line, research has investigated the psycho-social adjustment of typically developing siblings, their emotional, social and psychological needs, which are scarcely satisfied within the family of the child with cancer, and the impact of the sibling's illness on their mental health (Alderfer et al., 2015; Weiner & Woodley, 2018; Yang et al., 2016). In this regard, studies agree in presenting the siblings' experience as characterized by a sense of loss both towards the parents and the sibling and towards themselves, which leads them to take a marginal position within their own family (Alderfer et al., 2015; Weiner & Woodley, 2018; Yang et al., 2016). Typically developing siblings feel that parents focus their attention and energy solely towards the child with cancer and perceive a loss of self-esteem and identity as a child or sibling. This experience impacts on emotional, social and academic functioning, as they often report feeling anger, frustration, jealousy, guilt and isolation, emotions that can sometimes lead to anxiety and depression (Björk et al., 2009; Rosenberg et al., 2015). However, the literature also reports the positive impact that the disease has on the life of siblings as concerns psychological and social growth; some studies have reported an increase in the sense of responsibility, greater maturity and personal independence, social skills, empathy and care for others (Alderfer et al., 2015; Van Schoors et al., 2019).

The second line of studies concerns the interventions to support the siblings of children with cancer. A systematic review (Guan et al., 2021) reports that most interventions are psycho-social and addressed to the following topics: how to inform about cancer, working on peer group support and communication within the family, improving their quality of life and supporting their self-esteem (Barrera et al., 2018; Neville et al., 2016; Nolbris et al., 2014a, 2014b).

Despite the multiplicity of studies on these issues, there are few contributions regarding the impact that the disease has specifically on sibling relationships. The study by Cheung and colleagues (2020) is the only review in the literature that aims to provide an overview of research on sibling relationships in the context of illness. It highlights greater attention to the social context and family's relational functionality. However, the review

focuses on the psychosocial and family factors affected by illness, touching only marginally on the quality of sibling relationships.

Aims

This systematic integrative review aims to bridge this gap by identifying the research focused specifically on the siblings' relationship, reporting the topics they deal with, and which are worthwhile exploring.

For the detailed formulation of a precise research question and to clearly focus the study, we structured its components using the PICO framework (Polit & Beck, 2018). Specifically, we identified as the Population children and adolescents with a cancer diagnosis and their typically developing siblings; as the Intervention exposure to pediatric cancer; and as the Outcome changes in the sibling relationship and their impact on other family relationships.

In summary, this review aims to examine, based on the available literature, the changes (O) that cancer (I) in a child or adolescent produces in the sibling relationship (P), and how these changes are in turn influenced by other family relationships, particularly those with parents (O).

Specifically, the research questions posed for the review concerned:

- RQ (1) which methods are employed for investigating the impact of the disease on the sibling relationship;
- RQ (2) whether and how the sibling relationship changes during the illness;
- RQ (3) whether and how changes in the sibling relationship impact other family relationships.

It is crucial to assess the impact that the child's illness may have not only on individual siblings but also on the quality of their relationship and on their perception of each other. Finally, being aware of these relational dynamics in a context of illness can suggest more specific psychological supportive interventions for the whole family.

Methods

This study was based on the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Page et al., 2021). The protocol of this review was not prepared and registered on the International Prospective Register of Systematic Reviews.

Information sources and search strategy

The systematic literature search was performed by the two authors from January 2024 to December 2024. The review was updated through a second literature search in March 2025. We consulted the databases of PsycINFO, SCOPUS, Web of Science and PubMed. First, we employed specific keywords including “sibling* AND child cancer”, “children cancer AND sibling* OR sister* OR brother*”, “sibling* AND child cancer OR childhood cancer OR oncology OR cancer”. To find specific studies on the research topic, then we used keywords including “sibling* relationship AND child cancer”.

We retrieved 467 articles. After eliminating duplicates with *Zotero*, 378 contributions were reached.

Inclusion criteria

Studies were included in this review based on the following criteria:

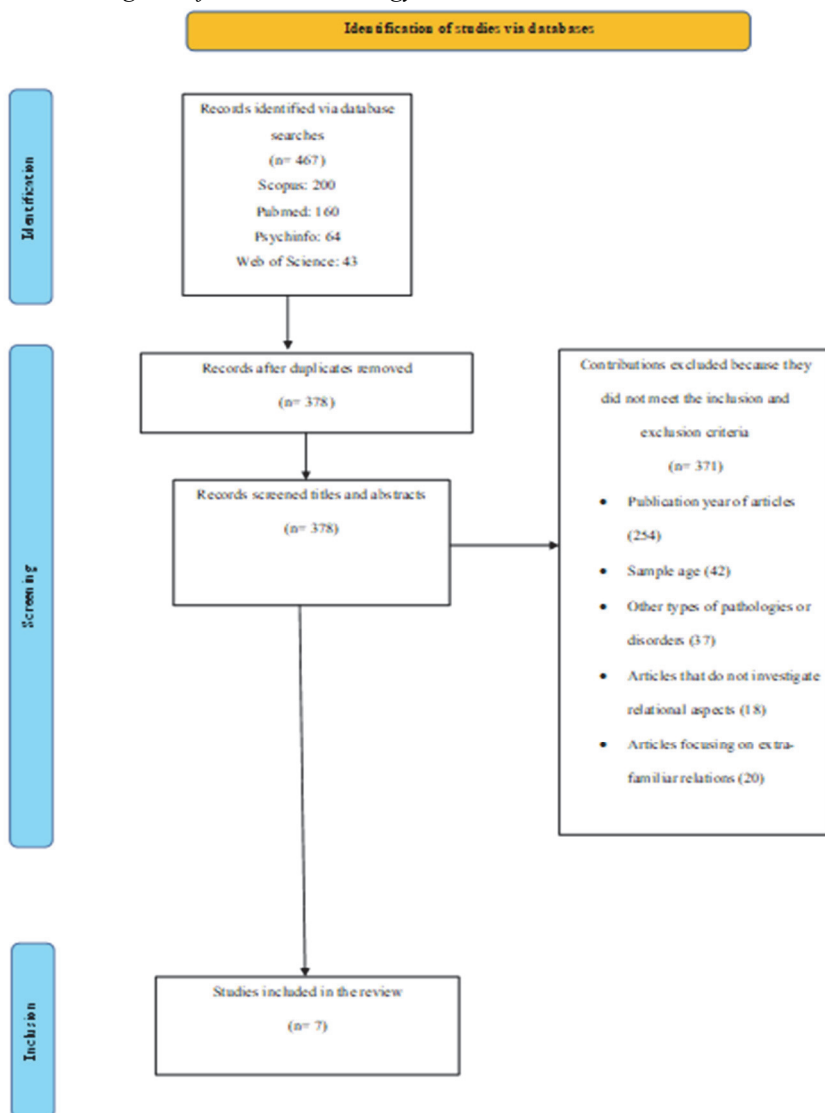
- (1) they were published between 2000 and March 2025 (254 articles excluded) to provide the most up-to-date overview possible of the research topic;
- (2) only articles written in English were considered;
- (3) they were focused on siblings in childhood and youth (age ranging from 3 to 25 years), phases of life in which siblings spend more time together (Dunifon et al., 2017) (42 articles excluded);
- (4) they were focused on cancer and not on other pathologies (e.g., chronic and/or genetic diseases) or disorders (for example, autism spectrum disorder) (37 articles excluded);
- (5) they were focused specifically on the relationship between siblings (38 articles excluded).

Furthermore, based on inclusion criteria (1), (2), and (3), specific filters were applied to each database to facilitate the search.

Identification and selection of studies

The authors independently assessed titles and abstracts to identify relevant studies. After this initial screening, assessment was carried out based on the full texts. The authors compared their results, and, in case of disagreements, they resolved them by mutual consensus. The overall inter-rater agreement was 95%. Seven studies that satisfied the inclusion criteria were selected for the review (Figure 1).

Fig. 1 - Flow diagram of the search strategy



Analysis of the studies

The studies included in the review were analysed by the first author based on the following general characteristics: authors and year, country, sample characteristics, methods, topics and main results. These categories are summarized in Table 1. Subsequently, some emerging themes were identified from the topics and main results.

Tab. 1 – Studies included in the review

Author	Country	Sample	Methodology	Topics	Results
Erker et al. (2018)	USA	n = 73 age M = 13	PROMIS	Subjective experiences of family relationships	Siblings of therapy patients score worse on family relationship than their siblings
Faith et al. (2022)	USA	n = 104 (Typically development siblings) age M (SD) = 12.4 (3.8) 44.2% females	Sibling Relationship Quality Questionnaire	Perception of sibling relational quality in relation to parental coping ability	Adaptive coping skills associated with a positive perception of the quality of the sibling relationship
Fladeboe et al. (2018)	USA	n = 128 (Typically development siblings) age M (SD) = 8.38 (5.61)	Sibling Relationship Questionnaire	Stress resulting from illness and degree of conflict in the sibling relationship	High levels of stress are associated with a perception of a high degree of conflict
Hovén et al. (2021)	Sweden	n = 30 (Typically development siblings) age M = 18	Focus group	Personal experience of being the sibling of a pediatric cancer patient	Perception of an important change in the relationship that follows the disease evolution
Katz et al. (2019)	USA	n = 119 (siblings with cancer) age M(SD) = 6.3 (3.5); 49% male	Sibling Relationship Questionnaire	Stress resulting from illness and degree of conflict in the sibling relationship	Higher level of perceived stress associated with an increased degree of conflict
Labay and Walco (2004)	USA	n = 29 (Typically development siblings) age M(SD) = 11.23 (2.97) 20 males, 9 females	Sibling Relationship Questionnaire	Relational quality	The birth order, the number of family members and the degree of closeness influence the perception of the relationship

Nolbris et al. (2007)	Sweden	n = 10 (Typically development siblings) age M = 14.5 6 females, 4 males	Interview open questions	Personal experience of being the sibling of a pediatric cancer patient	Ambivalent feelings affect the sibling relationship
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Results

General characteristics of the studies

First, the general characteristics of the studies included are presented below.

Five studies were conducted in the USA and two in Sweden, between 2004 and 2022.

Five studies had a sample size ranging from 12 to 105 siblings (Erker et al., 2018; Faith et al., 2022; Hoven et al., 2021; Labay & Walco, 2004; Nolbris et al., 2007), while the remaining two did not explain the number of siblings involved but the number of families who participated, in particular 103 families in Fladeboe and colleagues' study (2018) and 159 families in the Katz and colleagues' study (2018). In four studies the most frequent diseases of the child were leukemia, Central Nervous System tumor, sarcoma and lymphoma. The other three studies (Erker et al., 2018; Hoven et al., 2021; Katz et al., 2018) did not report this information. Only two studies (Katz et al., 2018; Faith et al., 2022) involved siblings with cancer.

Methods

The first research question (RQ1) aimed to investigate which methodologies were employed by the included studies to examine the impact of pediatric oncological illness on the sibling relationship.

The most common study design was longitudinal (n = 2); other types of study designs employed were cross-sectional, focus group and qualitative studies. Two of the reviewed studies (Faith et al., 2022; Labay & Walco, 2004) did not disclose the research design.

Two papers used a qualitative survey method for data collection. Hoven et al. (2021) explored the personal experience of 14- to 23-year-olds having a brother or sister diagnosed with cancer using a focus group approach (Peterson-Sweeney, 2005). Nolbris et al. (2007), pursuing roughly the same

goal, used a narrative interview with open-ended questions with children of an average age of 14 to allow participants to talk more deeply about their experience of being the siblings of a cancer patient.

Other articles used a quantitative methodology for data collection. Faith et al. (2022), with children with an average age of 12, proposed the “Sibling Relationship Quality Questionnaire” (SRQ-C; Furman & Buhrmester, 1985), which provides the indices of warmth/proximity, dominance and conflict to evaluate the quality of sibling relationship. Another study (Labay & Walco, 2004) also investigated the quality of siblings relationship considering warmth, status, conflict and rivalry, with children aged between 7 and 16, using the Sibling Relationship Questionnaire (SRQ; Furman & Buhrmester, 1985). In Erker and colleagues’ paper (2018), PROMIS (Patient-Reported Outcomes Measurement Information System; Bevens et al., 2017) is used with children aged between 8 and 17 to evaluate the subjective experiences of family relationships from the point of view of the patient and of his/her sibling, differentiating the experiences based on the conclusion or not on the treatments.

Finally, in two articles (Fladeboe et al., 2018; Katz et al., 2018) the Sibling Relationship Questionnaire (Furman & Buhrmester, 1985) was proposed to the primary caregiver of the siblings in order to evaluate the relationship between sibling conflict and family stress, during the first year of treatment.

Changes in the sibling relationship

The second research question (RQ2) focused on capturing any changes that the sibling relationship underwent during the illness. In response to this question, we identified some topics in the studies examined.

The first is the perception of changes. Two studies analysed the point of view of the siblings regarding the changes experienced in their relationship (Hovén et al., 2021; Nolbris et al., 2007). Through focus groups conducted with siblings aged between 14 and 23, Hoven’s study highlighted how the perception of change in the relationship depends on the disease phase. During the treatment the changes were perceived as temporary and reversible, while at the end of the treatment the siblings felt that “everything has changed”, a “before” and an “after” having been created, the relationship had worsened and there was no going back.

Thanks to the use of narrative interviews, Nolbris and colleagues (2007) found that the siblings consider the sibling relationship as something that requires a special closeness. In most cases the disease increases their awareness of this belief and, consequently, leads the relationship itself to change, even positively. Typically developing siblings feel the need to stay

close and to protect their sibling and that the disease has contributed to making their relationship clearer, tighter, stronger, and more harmonious than in the pre-sickness period.

Another theme that emerged in two studies is the presence of ambivalent feelings as characterizing the sibling relationship during the sickness. Nolbris and colleagues (2007) found that typically developing siblings develop ambivalent feelings toward their sibling which could have an impact on their bond. They would like to continue to cultivate their own interests such as school, work and friends; on the other hand, they feel the need to be close to their sibling in a delicate moment of their life. This induces an ambivalent mood and behaviour towards the sibling with cancer and fosters a strong sense of interdependence. This specific feeling also emerged in the study of Hovén et al. (2021), which identified it as a moral dilemma. The authors report that the typically developing siblings frequently say they feel a conflict between the awareness that the sibling's disease requires them to sacrifice some aspects of their daily life, and the occurrence of negative emotions of loneliness, shame and guilt affecting the relationship itself.

Finally, another important theme emerged from the studies analysed is the effect of the child's disease on the quality of the siblings' relationship.

Labay and Walco (2004) focused on quality relationship characteristics such as warmth, status, conflict and rivalry, finding a correlation between birth order and the quality of the sibling relationship. When the younger sibling falls ill, the typically developing sibling tends to have a worse perception of the quality of their relationship, especially concerning rivalry. Another aspect that influences the quality of the sibling relationship is family size. The larger the number of family members, the greater the complexity of the relationships. Consequently, an increase in the extent of conflict and rivalry may be observed, as emotional resources are threatened by the onset of the disease. Finally, what emerges from this study is that, during the disease, a particularly close siblings' relationship can lead siblings to experience particularly demanding and stressful challenges.

Parents and sibling relationship

Finally, the third research question (RQ3) aimed to investigate whether and how changes in the sibling relationship may also impact other family relationships.

The close intertwining between the sibling's relationship and relationships with other family members emerges from the study by Erker and collaborators (2018). The authors investigated the subjective experience of children with cancer and their 8-17-year-old siblings, highlighting how

siblings' bonds, during the illness, can influence the relationships experienced with their parents. The more patients and their siblings perceive each other's suffering (depressive and anxious symptoms, difficulties in peer relationships), the more family relationships are also perceived as worse.

Another study focused on the quality of the sibling relationship (Faith et al., 2022) investigating the impact of parental coping skills on it. Parents who are better able to cope with stress see the sibling's relationship as characterized by more warmth and less conflict and dominance. However, the correlation between parental coping skills and positive perception of the quality of sibling relationship is mediated by an emotional socialization based on coaching and not on dismissing (Eisenberg et al., 1998).

Other studies considered in this review focused on a particular index of the quality of siblings' relationship, that is conflict, often intertwined with parental relationship. The study by Fladeboe and colleagues (2018) examined how family stress resulting from pediatric cancer could influence sibling conflict at a specific time, i.e., during the first year of therapy, a period when very high distress is experienced by the family. In this period the psychological resources of family members can be depleted and can have repercussions on relationships within the family. The authors reported that parents who are particularly challenged by their child's illness may be less able to support and mediate sibling relationships and, as a result, more sibling conflict may be generated. In support of this, several studies have been cited (Nixon & Cummings, 1999; Wilkins & Woodgate, 2005), which have pointed out that children and adolescents perceive different treatment by their parents when their sibling has cancer, and this could easily contribute to exacerbating conflicts.

Furthermore, the intensity and the duration of the child's therapeutic treatments impacts on the level of conflict. If the child must face a series of demanding therapeutic procedures for a longer period, the resulting continuous stress can have consequences on the sibling relationship in terms of conflict, making it more difficult for both siblings to adjust to the disease (Fladeboe et al., 2018).

Katz and colleagues' article (2018) seems to move in the same direction as the study above. The authors highlighted that in most cases typically developing siblings may initially be reluctant to enter into conflict with their sibling because they feel concerned for their well-being and life. However, over time, the feeling of receiving differential treatment or the frustration stemming from the changes occurring within the family, can lead to increased conflict. Despite this evidence, the two articles reported that, in general, the average level of conflict perceived by siblings appears to be comparable to what is recorded in typical sibling relationships (Fladeboe et al., 2018; Katz et al., 2018).

Discussion

The main aim of this review consists in identifying and systematizing the studies focusing on the impact that the child's cancer has specifically on sibling relationships, trying to describe the main themes and the neglected aspects. Despite the extensive literature on the influence of this pathology on the typically developing siblings, only a small number of studies (7) focusing on the siblings' relationship have been found. Based on the questions research posed for the review, interesting results have emerged.

First of all, from a methodological point of view, quantitative methods (questionnaires) have been mainly used to investigate the sibling relationship; this makes it possible to provide a specific picture of the relationship at a given time, neglecting, however, subjective experiences about the changes. On the contrary, the qualitative methodology (i.e. focus group, narrative interviews), used in only two studies, has also made it possible to grasp the changes and the quality sibling relationship perceived by participants during the illness.

Another methodological aspect that emerged from the analysis concerns the research participants, who are mainly the typically developing siblings. However, it would be interesting to consider the point of view of the sibling with cancer as well. In fact, the literature underlines the importance of directly involving young patients and taking into account the perception of their illness impact (Corsano et al., 2013). Furthermore, unlike their siblings, they may be less influenced by the tendency to provide socially desirable responses.

From a content point of view, the themes emerging from the analysis allowed us to make several considerations in view of the research questions. The first theme that we have detected is the perception of change in the sibling's relationship because of the disease. Although the study of Hovén and colleagues (2021) highlighted that siblings are aware that the disease must modify the relationship and marks a "before" and an "after", the authors did not report the content of these changes, the typically developing sibling's perception of this relationship, the image this constructs of the sibling with cancer, or how the relationship evolved. Only from the interviews in the study by Nolbris and colleagues (2007) it emerges that illness increases awareness of the need to be close to siblings and makes the relationship closer and stronger.

With regard to the second theme identified, i.e. the presence of ambivalent feelings characterizing the sibling relationship, this datum confirms the literature, which more generally studies the relationship between siblings with typical and atypical development (Cebula et al., 2019; Corsano et al.,

2017). In fact, it has been possible to observe in typically developing siblings how there is both the desire to continue leading a normal life and feelings of guilt and protectiveness arising from the condition of their sibling.

As concerns the theme of the quality of sibling relationships, the work of Labay and Walco (2004) has offered numerous ideas regarding the relational elements that can influence it. We can hypothesize that typically developing siblings have a worse perception of the relationship when the younger sibling gets sick because they perceive in their parents an expectation regarding their own development of greater self-sufficiency, since parental attention is mainly focused on caring for the sibling with cancer. Moreover, it was emphasized how during the illness a particularly close relationship can lead to an increase in stress. In the specific case of the typically developing siblings, a perception of a particularly close relationship could lead them to experience a certain fragility during the separation from their sibling (Labay & Walco, 2004).

Furthermore, the results emerging from the studies confirm the models on family complexity and are thus in line with what was stated at the beginning of this review. The illness of a family member is an event that interferes in current relationships. Therefore, it is not possible to study the sibling relationship without placing it in a broader context and without considering the family variables that can play a mediating role in this type of relationship. This is an aspect highlighted mainly in the study by Faith and colleagues (2022) in which it is possible to see how a good parental coping ability based on coaching rather than dismissal is related to a qualitatively positive perception of the relationship between siblings. It is important for parents to use their children's negative emotional experiences as an opportunity to help them develop good coping skills, rather than tending to minimize or avoid the children's negative emotions that may occur more frequently during the disease.

Some aspects investigated both from the point of view of parents and children have shown conflicting data. This is the case of the studies by Fladeboe and colleagues (2021) and Katz and colleagues (2018) in which the increase in conflict between siblings emerged from the parents and not from the children. This datum can be interpreted in two ways. On the one hand, the parents, in view of the awareness of the stressful condition in the family and their preponderant focus on the child with cancer, would expect greater conflict between siblings, overestimating it. On the other hand, the answers provided by the siblings could be influenced by a certain degree of social desirability which would make it more difficult to express oneself with complete sincerity. Future studies could use other qualitative tools with typically developing siblings, such as drawing, which allow for greater

spontaneity of expression. Finally, in both articles the topic of the conflict that could eventually characterize the relationship between siblings is reported mainly from the parents' point of view, not paying much attention, however, to the opinion of siblings and what happens within the siblings' relational dynamics.

If, on the one hand, this review has confirmed the scarcity of studies focused specifically on the sibling's relationship, on the other it has made it possible to detect that it is undergoing changes. Although the studies do not describe them in depth, it is noted that they appear to be irreversible. They are partly positive because they increase the perception of closeness, and partly negative because they increase conflicts, interdependence and ambivalent feelings.

Conclusions, future developments and implications

The relationship between siblings represents one of the most enduring, strong and long-term bonds that can exist and is, therefore, an important source of support for children as they grow up. It acquires even greater significance when one of the siblings is affected by a serious illness such as cancer.

By virtue of this strong bond, the illness significantly affects not only siblings from an individual point of view, but also their relationships. The studies considered in this review have highlighted how cancer in a child or youngster contributes to significantly modifying the quality of the sibling relationship, connoting it with ambivalent feelings, conflictual aspects, but also by increasing a sense of cohesion. Furthermore, another aspect that seems to change because of the illness concerns family relationships, which are perceived as worse by the typically developing sibling.

From the analysis of the articles, it also emerged in which direction the research should continue.

First, although studies report the changes perceived by the siblings, these are not well explained or investigated in depth. In this regard, it would be useful to study the perception of the bond between siblings before the disease and how it changed after the diagnosis.

Second, in some studies it has emerged that in order to have a complete understanding of the fraternal relationship under the condition of illness, it would be appropriate to investigate it also with respect to parental variables. It would be interesting to analyse, for example, the impact that the ability of parents to cope with the stress of illness might have not only on their perception of the quality of the fraternal relationship, but also on the siblings'

own perception of it, or on the attitude of the typically developing sibling towards their sister or brother with cancer.

A further theme that could be explored is conflict as an element that characterizes the post-diagnosis fraternal relationship. It was noticed how this aspect of relational quality was mainly investigated from the parents' point of view, i.e., as a perception that they have of it. In this regard, it would be useful to also collect and analyse the point of view of the typically developing sibling, possibly comparing their perception of the conflict before and after the sibling's sickness.

From an applied and clinical standpoint, the findings of this review point to several implications for the psychological support offered to families. In particular, the centrality of the sibling relationship in the context of pediatric cancer underscores the importance of systematically including siblings in psychosocial assessment and care pathways, through interventions that foster the expression of ambivalent emotions, support the management of conflict, and strengthen the sense of family cohesion.

Within this perspective, professionals (psychologists, psycho-oncologists, and multidisciplinary teams) can draw on the evidence outlined in this review to inform clinical practice by designing targeted support interventions for siblings, psychoeducational groups involving the entire family, and counselling pathways that explicitly take into account the impact of changes in the sibling relationship on other family subsystems. Highlighting and integrating these aspects into routine practice may facilitate the earlier identification of support needs and the implementation of more tailored interventions that are sensitive to the complexity of siblings' experiences in pediatric oncology.

Finally, from the analysis of the literature it was observed that the studies mainly considered the point of view of the typically developing sibling. In this regard, it is thought that it may be useful to direct future studies also to the experience of the sibling with cancer regarding the sibling relationship changes. In conclusion, we believe that a more in-depth understanding of the disease's potential impact on the sibling relationship is important not only to enhance the literature on this topic, showing its complexity, but also to enable professionals to identify suitable support for young people and their families who are going through such a delicate phase of their lives.

Strengths and limitations

Our review has some important limitations.

First, no assessment of the methodological quality of the included studies was carried out.

Second, despite the large amount of literature on cancer and sibling relationships, we found only seven studies that met our inclusion criteria. In fact, we focused exclusively on studies that specifically investigated the sibling relationship and how illness can change siblings' perception of it. This narrow focus clearly represents a limitation in terms of the breadth of available evidence and the generalizability of the findings. At the same time, however, it can be regarded as a strength of the present review. By applying stringent, conceptually driven inclusion criteria, we were able to document the paucity of empirical studies that address the sibling relationship as a relational construct, rather than as a background variable. In this sense, the limited number of included studies provides a clear indication of a gap in literature and, considering the themes that emerged, offers a focused starting point for delineating novel directions for future research. Moreover, the review has additional strengths, including a systematic and transparent search strategy across multiple databases, the use of predefined inclusion criteria, a high level of inter-rater agreement in study selection, and the integration of quantitative and qualitative evidence to derive clinically relevant implications for psychosocial support to families.

References

- Alderfer M.A., Stanley C., Conroy R., Long K.A., Fairclough D.L., Kazak A.E. et al. (2015). The social functioning of siblings of children with cancer: A multi-informant investigation. *Journal of Pediatric Psychology*, 40(3): 309-319. Doi: 10.1093/jpepsy/jsu079.
- Barrera M., Neville A., Purdon L. & Hancock K. (2018). "It's just for us!" perceived benefits of participation in a group intervention for siblings of children with cancer. *Journal of Pediatric Psychology*, 43(9): 995-1003. Doi: 10.1093/jpepsy/jsy026.
- Bevans K.B., Riley A.W., Landgraf J.M., Carle A.C., Teneralli R.E., Fiese B.H. et al. (2017). Children's family experiences: Development of the PROMIS® pediatric family relationships measures. *Quality of Life Research*, 26(11): 3011-3023. Doi: 10.1007/s11136-017-1629-y.
- Bhakta N., Force L. M., Allemani C., Atun R., Bray F., Coleman M. P., ... Frazier A. L. (2019). Childhood cancer burden: A review of global estimates. *The Lancet Oncology*, 20(1): e42-e53.
- Björk M., Wiebe T. & Hallström I. (2009). An Everyday Struggle-Swedish Families' Lived Experiences During a Child's Cancer Treatment. *Journal of Pediatric Nursing*, 24(5): 423-432. Doi: 10.1016/j.pedn.2008.01.082.

- Cebula K., Gillooly A., Coulthard L.K., Riby D.M. & Hastings R.P. (2019). Siblings of children with Williams syndrome: Correlates of psychosocial adjustment and sibling relationship quality. *Research in Developmental Disabilities, 94*: 103-496. Doi: 10.1016/j.ridd.2019.103496.
- Cheung C.K., Acquati C., Smith E., Katerere-Virima T., Helbling L. & Betz G. (2020). The impact of a cancer diagnosis on sibling relationships from childhood through young adulthood: a systematic review. *Journal of family social work, 23*(4): 357-377. Doi: 10.1080/10522158.2020.1799897.
- Corsano P., Majorano M., Vignola V., Cardinale E., Izzi G. & Nuzzo M.J. (2013). Hospitalized children's representations of their relationship with nurses and doctors. *Journal of Child Health Care, 17*(3): 294-304. Doi: 10.1177/1367493512456116.
- Corsano P., Musetti A., Guidotti L. & Capelli F. (2017). Typically developing adolescents' experience of growing up with a brother with an autism spectrum disorder. *Journal of Intellectual & Developmental Disability, 42*(2): 151-161. Doi: 10.3109/13668250.2016.1226277.
- Deavin A., Greasley P. & Dixon C. (2018). Children's Perspectives on Living with a Sibling with a Chronic Illness. *Pediatrics, 142*(2): 2017-4151. Doi: 10.1542/peds.2017-4151.
- Dunifon R., Fomby P. & Musick K. (2017). Siblings and children's time use in the United States. *Demographic Research 37*: 1611-1624. Doi: 10.4054/DemRes.2017.37.49.
- Eisenberg N., Cumberland A., & Spinrad T. L. (1998). Parental socialization of emotion. *Psychological Inquiry, 9*(4): 241-273. doi: 10.1207/s15327965pli0904_1.
- Erker C., Yan K., Zhang L., Bingen K., Flynn K.E. & Panepinto J. (2018). Impact of pediatric cancer on family relationships. *Cancer Medicine, 7*(5): 1680-1688. Doi: 10.1002/cam4.1393.
- Faith M.A., Boone D.M., Healy A. & Davila E. (2022). Parent coping, emotion socialization beliefs, and sibling relationship quality in pediatric cancer. *Children's Health Care, 1*-23. Doi: 10.1080/02739615.2022.2076682.
- Fladeboe K., King K., Kawamura J., Gurtovenko K., Stettler N., Compas B. et al. (2018). Featured article: Caregiver perceptions of stress and sibling conflict during pediatric cancer treatment. *Journal of Pediatric Psychology, 43*(6): 588-598. Doi: 10.1093/jpepsy/jsy008.
- Furman W. & Buhrmester D. (1985). Children's Perceptions of the Qualities of Sibling Relationships. *Child Development, 56*(2): 448. Doi: 10.2307/1129733.
- Guan T., Chapman M.V., Qan'ir Y. & Song L. (2021). Psychosocial interventions for siblings of children with cancer: A mixed methods systematic review. *Psycho-Oncology, 30*(6): 818-831. Doi: 10.1002/pon.5684.
- Hovén E., Lindahl Norberg A., Toft T. & Forinder U. (2021). Siblings of children diagnosed with cancer: Being faced with a moral dilemma. *Journal of Family Studies*. Doi: 10.1080/13229400.2021.2021273.
- Katz L.F., Fladeboe K., Lavi I., King K., Kawamura J., Friedman D., Compas B., Breiger D., Lengua L., Gurtovenko K. & Stettler N. (2018). Trajectories of

- marital, parent-child, and sibling conflict during pediatric cancer treatment. *Health Psychology*, 37(8): 736-745. Doi: 10.1037/hea0000620.
- Kazak A. E. (2002). Family systems practice in pediatric psychology. *Journal of Pediatric Psychology*, 27(2): 133-143. DOI: 10.1093/jpepsy/27.2.133.
- Kendrick C., & Dunn J. (1982). Protest or pleasure? The response of first-born children to interactions between their mothers and infant siblings. *Child Psychology & Psychiatry & Allied Disciplines*, 23(2): 117-129. Doi: 10.1111/j.1469-7610.1982.tb00057.x.
- Labay L.E. & Walco G. A. (2004). Brief report: Empathy and psychological adjustment in siblings of children with cancer. *Journal of Pediatric Psychology*, 29(4): 309-314. Doi: 10.1093/jpepsy/jsh032.
- Long K.A., Marsland A.L., Wright A. & Hinds P. (2015). Creating a Tenuous Balance: Siblings' Experience of a Brother's or Sister's Childhood Cancer Diagnosis. *Journal of Pediatric Oncology Nursing*, 32(1): 21-31. Doi: 10.1177/1043454214555194.
- Neville A., Simard M., Hancock K., Rokeach A., Saleh A. & Barrera M. (2016). The Emotional Experience and Perceived Changes in Siblings of Children with Cancer Reported during a Group Intervention. *Oncology Nursing Forum*, 43(5): E188-E194. Doi: 10.1188/16.ONF.E188-E194.
- Nixon C.L. & Cummings E.M. (1999). Sibling disability and children's reactivity to conflicts involving family members. *Journal of Family Psychology*, 13(2): 274-285. Doi: 10.1037/0893-3200.13.2.274.
- Nolbris M., Enskär K. & Hellström A.L. (2007). Experience of siblings of children treated for cancer. *European Journal of Oncology Nursing*, 11(2): 106-112. Doi: 10.1016/j.ejon.2006.10.002.
- Nolbris M.J., Enskär K. & Hellström A.L. (2014). Grief related to the experience of being the sibling of a child with cancer. *Cancer Nursing*, 37(5): E1-E7.
- Page M.J., Moher D., Bossuyt P.M., Boutron I., Hoffmann T.C., Mulrow C.D. et al. (2021). PRISMA 2020 explanation and elaboration: Updated guidance and exemplars for reporting systematic reviews. *BMJ*, n160. Doi: 10.1136/bmj.n160.
- Pai A. L. H., & Kazak A. E. (2006). Pediatric medical traumatic stress in pediatric oncology: Family systems interventions. *Current Opinion in Pediatrics*, 18(5): 558-562. DOI: 10.1097/01.mop.0000245358.06326.e9.
- Patenaude A. F., & Kupst M. J. (2005). Psychosocial functioning in pediatric cancer. *Journal of Pediatric Psychology*, 30(1): 9-27.
- Peterson-Sweeney K. (2005). The use of focus groups in pediatric and adolescent research. *Journal of Pediatric Health Care*, 19(2): 104-110. Doi: 10.1016/j.pedhc.2004.08.006.
- Polit D., & Tatano Beck C. (2018). *Fondamenti di Ricerca infermieristica* (2a ed.). McGrawHill Education.
- Rolland J.S. (2018). *Helping couples and families navigate illness and disability: An integrated approach*.
- Rosenberg A.R., Postier A., Osenga K., Kreicbergs U., Neville B., Dussel V. et al. (2015). Long-term psychosocial outcomes among bereaved siblings of children

- with cancer. *Journal of Pain and Symptom Management*, 49(1): 55-65. Doi: 10.1016/j.jpainsymman.2014.05.006.
- Rostila M., Berg L., Saarela J., Kawachi I. & Hjern A. (2017). Experience of Sibling Death in Childhood and Risk of Death in Adulthood: A National Cohort Study from Sweden. *American Journal of Epidemiology*, 185(12): 1247-1254. Doi: 10.1093/aje/kww126.
- Santero M., et al. (2025). Childhood cancer survival in low- and middle-income countries and the Global South: Emerging evidence and critical gaps from a scoping review of observational studies. *Authorea*. DOI: 10.22541/au.175034169.99781789/v1.
- Van Schoors M., De Mol J., Laeremans N., Verhofstadt L.L., Goubert L. & Van Parys H. (2019). Siblings' Experiences of everyday Life in a Family where one child is Diagnosed with Blood Cancer: A Qualitative Study. *Journal of Pediatric Oncology Nursing*, 36(2): 131-142. Doi: 10.1177/1043454218818067.
- Wiener L., Kazak A.E., Noll R.B., Patenaude A.F. & Kupst M.J. (2015) Standards for the Psychosocial Care of Children with Cancer and their Families: An Introduction to the Special Issue. *Pediatric Blood Cancer*, S419-24. doi: 10.1002/pbc.25675.
- Wiener J.A. & Woodley L.K. (2018). An integrative review of sibling responses to childhood cancer. *Journal of Child and Adolescent Psychiatric Nursing*, 31(4): 109-119. Doi: 10.1111/jcap.12219.
- Wilkins K.L. & Woodgate R.L. (2005). A Review of Qualitative Research on the Childhood Cancer Experience from the Perspective of Siblings: A Need to give them a Voice. *Journal of Pediatric Oncology Nursing*, 22(6): 305-319. Doi: 10.1177/1043454205278035.
- World Health Organization (2025, February 4). *Cancer in children* (Fact sheet). World Health Organization.
- Yang H.C., Mu P.F., Sheng C.C., Chen Y.W. & Hung G.Y. (2016). A Systematic Review of the experiences of Siblings of Children with Cancer. *Cancer Nursing*, 39(3): E12-E21. Doi: 10.1097/NCC.0000000000000258.

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The relationship between anxiety symptoms and somatic disorders in young people aged 15-21 years

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Abstract

Background: Mental health issues remain a significant concern in our society, ranging from mild to severe conditions. This study aims to document anxiety and somatic symptoms as two disorders that manifest to varying degrees in individuals, with the primary objective of exploring the relationship between these symptoms.

Objective: This study aims to explore the relationship between anxiety symptoms and somatic disorders in young people aged 15-21.

Methods: A cross-sectional quantitative study design was employed. The sample consisted of 150 respondents divided into two educational levels: high school and university students. Stratified random sampling was used to ensure proportional representation of the target population. Participants were recruited via email invitations. Data were collected through standardized instruments measuring anxiety and somatic symptoms. Statistical analysis was performed using SPSS Statistics version 27.0.

Results: The sample included 73 girls (48.7%) and 77 boys (51.3%), with an average age of 17.13 years (SD = 2.18). Educational distribution comprised 42 participants (28.0%) in 10th grade, 43 (28.7%) in 11th grade, 1 (0.7%) in 12th grade, 53 (35.3%) in first-year undergraduate studies, 1 (0.7%) in second year, and 10 (6.7%) in third year. Of the 147 participants reporting residence, 49 (33.1%) lived in urban areas, while 98 (66.2%) resided in rural areas. The average anxiety score was 0.76 (SD = 0.6) and the average somatic symptom score was 0.57 (SD = 0.35). A significant positive correlation was found between anxiety and somatic symptoms ($r = 0.725$, $p = 0.000$).

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Key words: Somatic disorder, anxiety disorder, age, education level, gender, mental health.

1. Introduction

Adolescence is a critical developmental stage marked by significant physical, emotional, and social changes (Smith et al., 2019; Steinberg, 2014). While it is commonly defined as spanning ages 10-19, the present study focuses on individuals aged 15-21 years, a period that partially overlaps with what the literature defines as *emerging adulthood* (18-29 years). This transitional phase is characterized by continued identity formation, increasing independence, and exposure to new social and academic demands. Including individuals from both late adolescence and early emerging adulthood allows for a more comprehensive understanding of mental health vulnerabilities within a population that is still engaged in educational settings (schools and universities), thus representing a unique and relevant sample.

During this developmental period, mental health concerns – particularly anxiety disorders – are highly prevalent and often manifest alongside somatic symptoms such as headaches, abdominal pain, and fatigue (Jones & Brown, 2021; World Health Organization, 2022; Costello et al., 2003). Anxiety disorders are among the most common psychiatric conditions affecting young people, with global prevalence estimates ranging from 10% to 20% (Kessler et al., 2007; Polanczyk et al., 2015; Baxter et al., 2014). These disorders frequently co-occur with somatic complaints, creating complex clinical presentations that may challenge accurate diagnosis and effective treatment (Gerritsen et al., 2018; Hiller et al., 2006). In many cases, somatic symptoms may overshadow underlying psychological distress, potentially delaying appropriate mental health interventions (Beesdo-Baum & Knappe, 2012; Rief & Broadbent, 2007; Campo, 2012).

The relationship between anxiety and somatic symptoms is widely recognized as bidirectional, with each condition potentially exacerbating the other (Van der Feltz-Cornelis et al., 2010; Henningsen et al., 2003).

Neurobiological evidence suggests that dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis may underlie this interaction (Chrousos, 2009; McEwen, 2004; Gunnar & Quevedo, 2007). From a psychological perspective, cognitive-behavioral theories propose that individuals with elevated anxiety may demonstrate increased somatic vigilance, leading to heightened perception and misinterpretation of physical symptoms (Barsky et al., 1995; Hadwin et al., 2006; Rachman, 1998). Additionally, environmental and social stressors – including academic

pressure, peer relationships, and family dynamics – play a significant role in shaping both anxiety and somatic experiences (Compas et al., 2017; Samaan, 2000; Repetti et al., 2002). Cultural factors further influence how symptoms are perceived, expressed, and reported, highlighting the importance of context-specific research (Kirmayer & Young, 1998; Kleinman, 1986; Hinton et al., 2008).

In Kosova, research examining the relationship between anxiety and somatic symptoms remains limited. As a developing context with ongoing challenges in mental health infrastructure, Kosova faces difficulties in recognizing and strengthening the role of psychological services. The field of psychology is still relatively undervalued, and there is a lack of locally grounded empirical studies addressing the interplay between mental and physical health among young people. This gap underscores the importance of conducting research within this specific socio-cultural context, as findings from other countries may not be fully generalizable. Understanding how anxiety and somatic symptoms manifest among youth in Kosova is essential for informing culturally appropriate prevention strategies and interventions.

Untreated anxiety and somatic disorders during adolescence and emerging adulthood may have long-term consequences, including impaired academic performance, reduced occupational functioning, and lower quality of life (Woodward & Fergusson, 2001; Copeland et al., 2014; Fergusson et al., 2007). Early identification and intervention are therefore crucial, emphasizing the need for integrated approaches that address both psychological and physical health (Katon et al., 2007; Bower et al., 2011; O’Connell et al., 2009). Despite the growing body of literature, important gaps remain regarding the mechanisms underlying this relationship and the most effective strategies for intervention (Froehlich et al., 2018; Haller et al., 2021; Craske et al., 2009).

Aim, objectives, and hypotheses of the study

The main aim of this study is to examine the relationship between anxiety symptoms and somatic symptoms among young people aged 15-21 years in Kosova. Specifically, the study seeks to: (1) determine whether a significant relationship exists between anxiety and somatic symptoms; (2) assess the prevalence of anxiety within the sample; and (3) analyze gender differences in both anxiety levels and somatic complaints.

Based on the existing literature, the study proposes the following hypotheses: (H1) there is a positive correlation between anxiety levels and

somatic symptoms, and (H2) there are gender differences in the levels of anxiety and somatic symptoms.

2. Methods

2.1. Study Design and Setting

This study employed a quantitative, cross-sectional design conducted during the 2022-2023 academic year in Pristina and Mitrovica, Kosovo. The primary objective was to examine the prevalence of anxiety and its relationship with somatic symptoms among high school and university students, as well as to analyze gender differences.

A stratified random sampling technique was used to ensure proportional representation across two educational strata: high school (grades 10-12) and undergraduate university students. Participants were randomly selected from compiled lists provided by the participating institutions. Data were collected face-to-face during non-disruptive periods (homeroom or after class).

Permissions were obtained from the Ministry of Education, Science and Technology of Kosovo, as the main authority, and additionally from the heads of the participating high schools and universities. This ensured formal approval and collaboration for data collection.

Potential sources of bias were addressed by using stratified random sampling, clearly defined eligibility criteria, standardized and validated instruments, and ensuring participant anonymity and confidentiality. The study included 150 participants, which was sufficient for this pilot study and provided a basis for future larger-scale research in Kosovo.

Eligibility criteria are summarized in Table 1.

Table 1

Criterion	Description
Age	15-21 years
Education	High school (grades 10-12) or undergraduate university
Location	Kosova (urban and rural)
Consent	Written informed consent from participants; parental consent for participants under 18

2.2. Instruments and Measures

Three standardized and validated instruments were used:

1. **Beck Anxiety Inventory (BAI)** – 21-item self-report measuring anxiety levels.
2. **Level 2 – Somatic Symptom – Adult questionnaire** (PHQ-15 adaptation) – 15-item checklist for somatic symptoms.
3. **Level 2 – Somatic Symptom – Child (Ages 11-17)** – 15-item checklist for adolescents.

The instruments were **culturally adapted and validated** for use in Kosovo through expert review, back-translation, and pilot testing.

2.3. Reliability of the instruments

Anxiety Scale

Reliability Statistics	
Cronbach's Alpha	N of Items
.925	20

The reliability of the scale used in the analysis was assessed using Cronbach's Alpha. The Cronbach's Alpha coefficient obtained was 0.925, indicating a high level of internal consistency reliability. The scale consisted of 20 items in total

Somatic symptoms scale

Reliability Statistics	
Cronbach's Alpha	N of Items
.798	15

The reliability of the scale used in the analysis was assessed using Cronbach's Alpha. The Cronbach's Alpha coefficient obtained was 0.798, indicating a moderate level of internal consistency reliability. The scale consisted of 15 items in total.

2.4. Variables

Outcome variables:

- Anxiety symptoms (BAI)
- Somatic symptoms (checklists)

Exposure variables and effect modifiers:

- Gender (male/female)
- Age (continuous)
- Educational level (high school/university)

Diagnostic criteria:

- Anxiety and somatic symptoms were classified as significant based on established cut-offs for each scale.

2.5. Data Analysis

Quantitative variables (anxiety and somatic symptoms) were treated as continuous. Analyses were conducted using SPSS version 27 and included:

- **Pearson correlation** to examine the relationship between anxiety and somatic symptoms.
- **Independent-samples t-test** to compare scores between males and females.
- **ANOVA** to compare scores across educational levels.
- **Subgroup analyses** by gender and educational level to detect potential differences or interactions.

Missing data were minimal and handled using complete-case analysis. Weighting adjustments were applied to account for stratified sampling, ensuring proportional representation. A significance threshold of $p < 0.05$ was used for all analyses.

3. Results

A total of 150 adolescents participated in the study (73 females, 77 males; mean age = 17.13 ± 2.18 years). Participants included high school students (grades 10-12) and university students (years 1-3). Of 147 participants who provided residence information, 33.1% lived in urban areas and 66.2% in rural areas (Table 2). The mean anxiety score was 0.76 (SD = 0.6) and the mean somatic symptom score was 0.57 (SD = 0.35).

Anxiety and somatic symptoms

Participants reported a range of anxiety and somatic symptoms. The most frequently reported anxiety symptoms were nervousness, inability to relax, and fear of worst happening, whereas symptoms such as faintness and numbness were less frequent. Somatic symptoms most commonly reported included tiredness, sleep problems, headaches, and backache, while

symptoms such as pain during sexual intercourse and chest pain were less frequent. Detailed distributions of all symptoms are presented in Tables 3 and 4.

Hypothesis 1 – Anxiety and somatic symptoms correlation:

Pearson correlation analysis indicated a strong positive relationship between anxiety and somatic symptoms ($r = 0.725$, $p < 0.001$), supporting Hypothesis 1. Linear regression analysis confirmed that anxiety symptoms significantly predicted somatic symptoms ($B = 0.902$, $\beta = 0.574$, $p < 0.001$; $R^2 = 0.329$) (Tables 5-7).

Hypothesis 2 – Gender differences:

Independent-samples t-tests and one-way ANOVA showed that girls reported significantly higher levels of anxiety ($M = 0.986$ vs. 0.555 , $t = 4.774$, $p < 0.001$) and somatic symptoms ($M = 0.739$ vs. 0.416 , $t = 6.189$, $p < 0.001$) than boys. Gender accounted for 10.4% of the variance in anxiety levels ($R^2 = 0.104$) and 22.4% of the variance in somatic symptoms ($R^2 = 0.224$) (Tables 7-9). A post hoc power analysis confirmed the study was adequately powered (power ≈ 0.99) to detect these effects.

Table 2 - Descriptive data

	Sample		Mean	SD	%
	<i>Valid</i>	<i>Missing</i>			
Gender	150	0			
Woman/Girl	73	0			48.7
Man/Boy	77	0			51.3
Age	150	0	17.13	2.18	
Level of education	150	0			28.0
Grade 10	42	0			28.7
Grade 11	43	0			.7
Grade 12	1	0			35.3
Bachelor 1-st year	53	0			.7

Bachelor 2-nd year	1	0			6.7
Bachelor 3-rd year	10	0			28.0
Place of residence	147	3			
Urban	49	0			33.1
Rural	98	0			66.2
Anxiety	150	0	.76	.6	
Somatic Symptoms	150	0	.57	.35	

Table 3 - The table presents the anxiety symptoms experienced by participants during the past month

	Not at all	Mildly but it didn't bother me to much	Moderately – it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	54.40%	33.60%	6.70%	5.40%
Feeling hot	44%	33.30%	20%	2.70%
Wobbliness in legs	41.20%	36.50%	14.20%	8.10%
Unable to relax	52.30%	23.50%	16.80%	7.40%
Fear of worst happening	36.90%	22.10%	21.50%	19.50%
Dizzy or lightheaded	44.30%	29.50%	16.80%	9.40%
Heart pounding/racing	36.20%	30.20%	22.10%	11.40%
Unsteady	51.40%	18.90%	16.90%	12.80%
Terrified or afraid	58.70%	16.70%	13.30%	11.30%
Nervous	12%	28.70%	28.70%	30.70%
Feeling of choking	71.30%	15.30%	9.30%	4%
Hands trembling	55.80%	25.90%	8.80%	9.50%
Shaky/ unsteady	57.70%	21.50%	9.40%	11.40%
Fear of losing control	65.30%	16%	12%	6.70%

Difficulty in breathing	63.50%	18.20%	11.50%	6.80%
Fear of dying	76.40%	12.80%	6.10%	4.70%
Scared	58.70%	24%	10.70%	6.70%
Indigestion	75.30%	17.30%	5.30%	2%
Faint/ lightheaded	86.70%	9.30%	2.70%	1.30%
Face flushed	49.30%	32%	13.30%	5.30%

Table 4 - Somatic Symptoms

	Not At All	Somewhat	Often
Stomach ache	47.30%	45.30%	7.30%
Backache	42.70%	42.70%	14.70%
Pain in the arms, legs or joints (knees, hips, thirst)	37.80%	50.70%	11.50%
Menstrual pain or other problems with menstruation (ONLY FOR GIRL)	48.00%	26.00%	26.00%
Headache	31.50%	45.00%	23.50%
Chest pain	71.10%	22.80%	6.00%
Dizziness	60.00%	30.00%	10.00%
The feeling of turning off	81.30%	14.00%	4.70%
Feeling your heart beat or beat	55.80%	31.30%	12.90%
Shortness of breath	76%	17.30%	6.70%
Pain or problems during sexual intercourse	91.20%	4.00%	4.80%
Constipation, loose bowels or diarrhea	79.00%	16.00%	5.00%
Nausea, gas or indigestion (upper middle part of the stomach)	78.50%	16.10%	5.40%
Feeling tired or low on energy	24.00%	42.00%	34.00%
Problems with sleep	24.00%	42.00%	34.00%
Dizziness	60.00%	30.00%	10.00%

Table 5 - Correlation between anxiety level and somatic symptoms

		Somatic Symptoms
Anxiety	Pearson Correlation	.725**
	Sig. (2-tailed)	.000
	N	150

** Correlation is significant at the 0.01 level (2-tailed).

Table 6 - ANOVA results for the linear regression model

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	48.012	1	48.012	72.709	.000 ^b
	Residual	97.728	148	.660		
	Total	145.740	149			

Table 7 - Linear regression coefficients for the model

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.023	.155		6.590	.000
	Anxiety	.902	.106	.574	8.527	.000

Table 8 - Gender differences

	Gender	N	Mean	T	P
Anxiety	Girl	73	.9855	4.774	.000
	Boy	77	.5546		
Somatic Symptoms	Girl	73	.7385	6.189	.000
	Boy	77	.4158		

Table 9 - Tests of between-subjects effects for anxiety levels by gender

Tests of Between-Subjects Effects

Dependent Variable: Anxiety

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6.128 ^a	1	6.128	17.155	.000
Intercept	265.968	1	265.968	744.589	.000

gjinia	6.128	1	6.128	17.155	.000
Error	52.866	148	.357		
Total	323.000	150			

a. R Squared = .104 (Adjusted R Squared = .098)

Table 10 - Tests of between-subjects effects for somatic symptoms by gender

Tests of Between-Subjects Effects					
Dependent Variable: Somatic symptoms					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	32.578 ^a	1	32.578	42.607	.000
Intercept	747.031	1	747.031	977.011	.000
gjinia	32.578	1	32.578	42.607	.000
Error	113.162	148	.765		
Total	885.000	150			
Corrected Total	145.740	149			

a. R Squared = .224 (Adjusted R Squared = .218)

4. Discussion

The relationship between anxiety and somatic symptoms in individuals aged 15-21 is crucial for understanding adolescent mental health. Anxiety frequently co-occurs with physical complaints such as headaches, muscle tension, and gastrointestinal disturbances. In this study, a strong positive correlation ($r = 0.725$, $p < 0.001$) was observed, supporting the hypothesis that higher anxiety levels are associated with more pronounced somatic symptoms. This finding aligns with prior research demonstrating the co-occurrence of emotional and somatic disturbances in adolescents (Kossowska et al., 2018; Lu et al., 2025).

Moreover, the results revealed that girls reported significantly higher levels of anxiety ($M = 0.9855$) and somatic symptoms ($M = 0.7385$) compared to boys ($M = 0.5546$ and 0.4158 , respectively), consistent with previous studies showing gender differences in anxiety expression (Berman & Kossowska, 2017; Sackl-Pammer et al., 2018). Social pressures, cultural norms, and gender expectations may amplify anxiety symptoms in girls (Santarossa & Cummings, 2021). Biological factors, such as hormonal

fluctuations during adolescence, may also contribute to these differences (Berman & Kossowska, 2017).

Contextual factors specific to Kosovo are also important. As a recently established post-conflict society, Kosovo has faced social, economic, and psychological challenges that may exacerbate anxiety and related somatic symptoms. Limited access to mental health resources, stigma surrounding mental health issues, and constrained public awareness can contribute to the underreporting or somatization of anxiety among adolescents (Tao et al., 2019; Gebreegziabher et al., 2024).

Cross-cultural comparisons suggest that these findings are not unique to Kosovo. For example, studies in China and Germany have similarly reported high prevalence of somatic complaints among adolescents with elevated anxiety levels (Lu et al., 2025; Geremek et al., 2024). Systematic reviews highlight that somatic symptomatology in adolescence is often intertwined with psychological distress, emphasizing the importance of culturally sensitive mental health interventions (Ludot et al., 2021).

Comorbidity is another consideration. Anxiety frequently coexists with depressive symptoms, chronic pain, or other psychiatric disorders, which may intensify somatic complaints (Britt et al., 2020). Failure to account for these comorbidities can obscure the true nature of the anxiety–somatic symptom relationship. The present findings underscore the importance of holistic assessment and intervention strategies that address both emotional and physical health needs in adolescents.

Conclusion

This study investigated the relationship between anxiety and somatic symptoms among adolescents and young adults aged 15–21 in Kosovo. The findings indicate a strong positive correlation between anxiety and somatic symptoms ($r = 0.725$, $p < 0.001$), with girls exhibiting higher levels of both anxiety and somatic complaints compared to boys. These results highlight the significance of gender-specific differences and the necessity for targeted interventions.

The study emphasizes the importance of early identification and culturally sensitive psychosomatic care for adolescents, particularly in contexts where stigma and limited resources may impede access to mental health services. Policymakers and clinicians should integrate strategies that address both psychological and somatic components of distress. Future research should explore longitudinal trends, evaluate intervention

effectiveness, and examine the role of sociocultural factors in shaping adolescent mental health outcomes.

Limitations

This study has several limitations. First, reliance on self-reported measures may introduce response bias, including underreporting or overreporting of symptoms due to social desirability or misunderstanding. Second, the study was conducted in a specific cultural and societal context (Kosovo), which limits the generalizability of the findings to other populations. Third, the exclusive use of quantitative methods may overlook nuanced insights, such as lived experiences or qualitative narratives, which could provide a deeper understanding of anxiety and somatic symptom dynamics.

Additionally, the cross-sectional design precludes causal inferences. While the study demonstrates associations between anxiety and somatic symptoms, it cannot establish directionality. Future research should adopt longitudinal and mixed-method approaches, incorporating qualitative data and diverse cultural contexts, to enhance the comprehensiveness and applicability of findings.

Author contribution

It is hereby acknowledged that both authors have accepted responsibility for the content of the manuscript and have given their consent for its submission. They have carefully reviewed all the results and unanimously approved the final version of the manuscript.

Ethics approval and consent to participate

This study was approved by the Ethics Committee of UBT – Higher Education Institution, reference nr. 7111. All data were treated confidentially, with no personal, identifiable, or sensitive information collected or analyzed. The data were generalized and processed in aggregate form, not pertaining to specific individuals. Additionally, parental consent was obtained for adolescents under the age of 18.

Human and animal rights

All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committees and with the 1975 Declaration of Helsinki, as revised in 2013.

Consent for publication

Confidentiality and privacy were assured for all the participants, and

they were informed that all information would be kept strictly confidential. Lastly, each participant signed the informed consent form.

Availability of data and materials

The data and supportive information are available within the article.

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Conflict of interest

The authors declare no conflict of interest, financial or otherwise.

References

- Angold, A., Costello, E. J., & Erkanli, A. (1999). Comorbidity. *Journal of Child Psychology and Psychiatry*, 40(1), 57-87. Doi: 10.1111/1469-7610.00424.
- Barsky, A. J., & Borus, J. F. (1995). Somatization and medicalization in the era of managed care. *Journal of the American Medical Association*, 274(24), 1931-1934.
- Beesdo-Baum, K., & Knappe, S. (2012). Developmental epidemiology of anxiety disorders. *Dialogues in Clinical Neuroscience*, 14(3), 249-266.
- Bower, P., et al. (2011). Multimorbidity and mental health: Can research and practice unlock the potential for positive outcomes?. *Psychological Medicine*, 41(1), 23-37. Doi: 10.1017/S0033291710001253.
- Campo, J. V. (2012). Annual Research Review: Functional somatic symptoms and associated anxiety and depression – developmental psychopathology in pediatric practice. *Journal of Child Psychology and Psychiatry*, 53(5), 575-592. Doi: 10.1111/j.1469-7610.2012.02535.
- Craske, M. G., Rauch, S. L., Ursano, R., et al. (2009). What is an anxiety disorder? *Depression and Anxiety*, 26(12), 1066-1085. Doi: 10.1002/da.20633.
- Froehlich, T. E., et al. (2018). Anxiety and somatic symptoms: A review of the literature. *Journal of Clinical Psychology*, 74(6), 1014-1025. Doi: 10.1002/jclp.22537.
- Gerritsen, L., et al. (2018). Somatization and mental health in adolescents. *Journal of Adolescent Health*, 62(2), 223-229. Doi: 10.1016/j.jadohealth.2017.08.017.
- Ginsburg, G. S., et al. (2012). Cognitive-behavioral therapy for anxiety disorders in children. *Psychiatry*, 75(1), 80-86. Doi: 10.1176/appi.ajp.2011.11060871.
- Gunnar, M. R., & Quevedo, K. (2007). The neurobiology of stress and development. *Annual Review of Psychology*, 58, 145-173. Doi: 10.1146/annurev.psych.58.110405.085605.
- Geremek, A., Lindner, C., Jung, M., Calvano, C., & Munz, M. (2024). Prevalence of somatic symptoms and somatoform disorders among a German adolescent psychiatric inpatient sample. *Children*, 11(3), 280. Doi: 10.3390/children11030280.

- Haller, H., et al. (2021). The relationship between anxiety and somatic symptoms. *Psychiatry Research*, 295, 113591. Doi: 10.1016/j.psychres.2020.113591.
- Gebreegziabher, Z. A., Eristu, R., & Molla, A. (2024). Determinants of adolescents' depression, anxiety, and somatic symptoms in Northwest Ethiopia: A structural equation modeling study. *PLOS ONE*, 19(4), e0281571. Doi: 10.1371/journal.pone.0281571.
- Jones, M. J., & Brown, C. A. (2021). Anxiety in adolescents: Understanding the impact of social factors. *Journal of Youth and Adolescence*, 50(3), 554-563. Doi: 10.1007/s10964-020-01345-0.
- Kirmayer, L.J., & Young, A. (1998). Culture and somatization: Clinical, epidemiological, and ethnographic perspectives. *Psychosomatic Medicine*, 60(4), 420-429. Doi: 10.1097/00006842-199807000-00003.
- Kessler, R. C., et al. (2007). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62(6), 593-602. Doi: 10.1001/archpsyc.62.6.593.
- Lu, J., Han, Y., Liu, X., Li, W., & Zhou, X. (2025). Association between somatic symptoms and depression and anxiety in adolescents: A cross-sectional school-based study. *BMJ Open*, 15(9), e103860. Doi: 10.1136/bmjopen-2025-103860.
- McEwen, B. S. (2004). Protective and damaging effects of stress mediators. *The New England Journal of Medicine*, 338(3), 1711-1719. Doi: 10.1056/NEJM199801153380307.
- Polanczyk, G. V., et al. (2015). Annual research review: The evolution of epidemiology and classification of anxiety disorders in childhood and adolescence. *Journal of Child Psychology and Psychiatry*, 56(3), 244-252. Doi: 10.1111/jcpp.12343.
- Samaan, M. (2000). Environmental influences on adolescent mental health. *Journal of Adolescent Health*, 27(1), 36-40. Doi: 10.1016/S1054-139X(00)00128-2.
- Sackl-Pammer, P., Özlü-Erkilic, Z., Jahn, R., Karwautz, A., Pollak, E., Ohmann, S., & Akkaya-Kalayci, T. (2018). Somatic complaints in children and adolescents with social anxiety disorder. *Neuropsychiatry*, 32(4), 187-195. Doi: 10.1007/s40211-018-0288-8.
- UNDP (2013). *Kosovo Human Development Report 2013: Youth Employment and Economic Participation*. United Nations Development Programme.
- World Health Organization (2022). *Adolescent mental health*. <https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health>.
- Kosova, M., et al. (2018). Anxiety and its relationship with somatic symptoms: A multidimensional approach. *Journal of Anxiety and Stress Disorders*, 32(4), 201-210.
- Berman, L., & Kosova, M. (2017). Gender differences in anxiety and stress in adolescents: A longitudinal study. *Adolescent Health Journal*, 24(2), 108-115.
- Santarossa, S., & Cummings, R. (2021). The social pressures influencing mental health in young girls. *Journal of Adolescent Psychology*, 35(6), 400-410.
- Tao, F., et al. (2019). Somatic symptoms in adolescents with anxiety: A review of the literature. *International Journal of Adolescent Health*, 41(3), 123-133.

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