Are Teenagers Today More Stressed?

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***Abstract*— Stress has become an increasingly prominent issue in adolescents' lives over the past decades. According to Lazarus, stress arises as a relational phenomenon during interactions between individuals and environmental demands. This study aims to assess the perceived stress levels of high school students in Bulgaria, utilizing the Bulgarian adaptation of the Perceived Stress Scale (PSS). A total of 244 students participated, aged between 14 and 17 (M = 15.56, SD = 0.66). The results indicate slightly higher-than-average stress levels compared to the Bulgarian normative sample. A significant gender disparity was observed in stress levels between female (M = 29.864, SD = 7.168) and male students (M = 25.109, SD = 8.714) (t = -4.59, p < 0.001). Participation in sports activities was associated with significantly lower levels of perceived stress (sports active - M = 26.991, SD = 8.503; non-active - M = 31.385, SD = 4.605), t = -2.587, p = 0.01), highlighting the importance of physical activity for students. Results are discussed in terms of possible practical applications and future research.**

***Keywords*—teenagers, perceived stress, education, gender differences, mental health**

I. Introduction

Living in a dynamic and fast-paced world, stress has become an inescapable part of daily life, affecting individuals across all age groups, including adolescents. The American Psychological Association defines stress as a physiological or psychological response to internal or external stressors, which can disrupt a person's equilibrium and overall well-being. According to Lazarus [1-3], stress is a relational phenomenon that emerges from the interaction between an individual and their environment. Here, the abilities of the individual to cope with the challenges of the outside world have a particularly strong influence. Lazarus [1-3], defines stress as any situation in which external and internal demands "exceed" the individual's ability to adapt and cope, thus disrupting their mental, emotional, and physical health and well-being.

Stress involves changes that affect nearly every system in our body. It can manifest at a physiological level through symptoms such as rapid heartbeat, sweating, dry mouth, shortness of breath, headaches, dizziness, sleep problems, nausea, digestive issues, pain, frequent illness, prolonged fatigue, and more. It can also affect mental and emotional states, such as nervousness, heightened negative emotions, irritability, anger, neglect of responsibilities, lower task performance, difficulty concentrating, and so on. Small amounts of stress can be beneficial and motivate us to achieve specific goals. Stress is not inherently negative; moderate levels of stress can be motivating and lead to personal growth. However, excessive and chronic stress can result in adverse outcomes, including psychological disorders, physiological illnesses, and maladaptive behaviors, reducing the quality of life [4-7]. Research has shown that stress also influences individuals' health-related behaviors such as smoking, alcohol consumption, and physical activity, thereby affecting long-term health outcomes [8-10].

Similar to adults, children and adolescents are also exposed to significant stress. School obligations – lessons, homework, tests, and high academic demands, along with extracurricular activities and courses - often lead to considerable pressure. Social situations such as conflicts with peers, family problems, or negative experiences at school can also be sources of stress. Even positive changes, such as moving to a new home or changing schools, can be potentially stressful [11].

Adolescence is one of the critical periods in a person's life. It is accompanied by dynamic changes in biological, psychological, and social aspects. This is a period of intense self-definition, identity formation, and increased responsibilities, which often leads to high levels of stress. At the same time, social relationships - with parents, peers, and teachers - change and become even more significant, sometimes becoming a source of stress in themselves. According to L. Berk [12], adolescent faces numerous demands (from family, school, peer group), and "incorrect responses" to these demands (e.g., absenteeism, substance abuse, isolation) can exacerbate the stressful transition to adulthood. All of these changes present a unique challenge, and stress during these years can have long-term effects on the mental and physical health of these young people.

Although most adolescents do not have serious health problems, studies show a positive relationship between the accumulation of recent negative life events and reported psychological and physical health issues [13]. Similar results were found in the international study "Health Behaviour in School-aged Children - 2013/2014" (HBSC) [14]. The study provides data on the health and health behaviors of children from 43 countries in Europe, the USA, and Canada. The data for Bulgaria, collected in the 2013-2014 wave, includes 4,796 students from 5th, 7th, and 9th grades (ages 11, 13, and 15), from a total of 311 classes in 163 schools. One of the conclusions is that adolescents who dislike school, experience stress from lessons and homework, and receive poor evaluations from teachers, report low self-rated health, dissatisfaction, and multiple complaints. The most frequent complaints from the surveyed children are nervousness (36.8%), irritability or bad mood (30.9%). The feeling of excessive stress and

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tension that children experience while preparing homework and lessons negatively affects their self-rated health and sometimes even their objective health status [15]. This is confirmed by the research of Vasileva et al. [15]. The results show that nearly half of the teenagers who do not experience stress in school rate their health as excellent, while only about one-third of those who experience stress in school give the same rating. Age-wise, particularly among the older students, a clear connection is observed between the increase in the feeling of excessive school workload and lower self-rated health. Stress and the feeling of being overburdened in school often manifest in behaviors that are risky to the health of children, such as alcohol use, smoking, increased aggression, etc. [15]. Bulgarian adolescents are among the top in terms of weekly alcohol and cigarette consumption. Thirty percent of 15-year-old girls smoke at least once a week, and the percentage for boys is 21%. This places Bulgaria in second place, after Greenland. According to another report (World Health Organization, HBSC, 2020) [16], comparing data from 2014 to 2018 for 227,441 students aged 11, 13, and 15 from 45 countries (for Bulgaria, the sample includes 5,242 students from 367 classes in 120 schools), the number of adolescents with good mental health and well-being has drastically decreased in many countries during this period. In about one-third of the countries, the report shows an increase in adolescents who feel pressured by school activities, and a decline is noted in the number of young people who have a positive attitude towards school compared to 2014. In most countries, school life worsens with age. Satisfaction with school and the sense of support from teachers and peers among adolescents decreases with the increasing pressure from school duties. The report "Focus on Adolescent Mental Health and Well-being in Europe and Central Asia" [17], based on HBSC data from 2021/2022, involving nearly 280,000 boys and girls aged 11, 13, and 15 from 44 countries in Europe and Central Asia, shows lower mental health and well-being indicators for girls compared to boys overall. These indicators worsen with age, with the lowest levels observed among 15-year-old girls. Although these data were collected during the COVID-19 pandemic and the restrictions imposed at that time likely had an impact, this is not the only explanation. Previous reports indicate that life satisfaction and self-rated health among adolescents, particularly girls, have been declining since 2018, even before the pandemic, while an increase in multiple health complaints - such as sleep difficulties, back pain, headaches, or feelings of low mood - has been observed since 2014. "The challenges young people face today are diverse and demanding, ranging from the climate crisis to academic pressure and social expectations to the widespread influence of social media," said Dr. Hans Kluge, WHO Regional Director for Europe (Mental health in Europe and Central Asia, 2023) [18]. Gender differences are also evident, with girls reporting higher stress levels than boys, a trend that is consistent across various studies [19].

Kaplan, Liu, & Kaplan [20] tested the hypothesis that educational expectations for students in the middle school stage, in interaction with stress related to school during early adolescence, would have a negative impact on their grades during high school. They conducted multiple regression analyses on data from 1,034 students and found that stress related to school in early adolescence, both independently and in interaction with high academic expectations, negatively affected academic performance three years later. These results suggest that for students in a high-stress school environment, increasing academic expectations may serve to increase school-related stress and hinder their academic performance [20]. Similar results were found by Vasileva et al. [15] - the higher the academic achievement in school, the less stress adolescents experience from school duties. Seventy-two percent of children who feel that they are not overwhelmed in school and do not experience stress have excellent grades, while among stressed students, honour students are fewer (60.5%).

School workload is definitely a factor that should not be underestimated. However, to what extent students feel burdened and stressed is still an open question. According to data from Bulgaria from the 2005/2006 wave of the HBSC study on behavior and health among 11-, 13-, and 15-year-olds, only 32.1% of students report feeling stressed [15]. In general, girls report a higher percentage of stress due to the many tasks assigned during the learning process compared to boys, respectively 36.2% and 28% [15]. In this wave of the study, Bulgarian students are actually below the average levels of experienced stress (37%). Much higher values are found in Greece (50.2%) and Romania (44.5%). Aafreen, Priya & Gayathri [21] compared students enrolled in different programs. Those in programs with a focus on the exact sciences had higher levels of stress compared to those in other programs. Their workload affects them mentally, physically, and emotionally. Some students are likely to experience anxiety and depression, which later leads to a decrease in their academic performance. Understanding the sources and impacts of adolescent stress is crucial for developing effective interventions. Stress is not necessarily harmful - in moderate amounts, it can serve as a motivator and stimulus for growth. However, chronic stress and the inability to cope with it can lead to significant mental and health issues, including anxiety, depression, and even sleep and eating disorders. According to Lazarus's [1-3] interactionist approach mentioned earlier, an individual's well-being and health are at risk when they subjectively assess the relationship between themselves and their environment as a source of strain and an inability to cope. The subjective appraisal of stress is influenced by individual differences and environmental factors. The so-called perceived stress is how the individual perceives and responds to reality and its challenges.

This study aims to examine and analyze the levels of stress in adolescents in Bulgaria, as well as the influence of various stress factors on their mental and physical well-being. This research seeks to address the following questions: Are adolescents today more stressed than previous generations? What factors contribute to their stress? How do gender, age, and lifestyle behaviors, such as sports participation, influence their stress experiences? Understanding these factors is key to developing effective interventions and support strategies that can reduce the negative consequences of stress and promote the sustainable

development of young people and their mental health and well-being.

II. METHODOLOGY

Hypotheses

1. Adolescents report higher perceived stress levels compared to normative data.
2. Female students exhibit higher stress levels than male students.
3. Students participating in sports demonstrate lower stress levels than their non-active peers.

Measures

Perceived Stress Scale (PSS)

This study used the Bulgarian adaptation of Naydenova & Ilieva Sheldon Cohen's Perceived Stress Scale (PSS) [10]. This scale was developed by Cohen, Kamarck & Mermelstein [22] based on Lazarus's theory and is designed to measure the extent to which life situations are perceived as stressful. The PSS scale consists of 14 items that assess the thoughts and feelings of students over the past four weeks. It has been widely used in research in various countries and is proven to be reliable.

Procedure

The study was conducted with prior permission from the principal of a mainstream school in Sofia, the capital of Bulgaria, and signed informed consent from the students' parents. The participants filled out the Perceived Stress Scale and a questionnaire with demographic data during class. The study adhered to ethical guidelines, ensuring anonymity and voluntary participation. The study was approved by the Ethics Committee of the Department of Cognitive Science and Psychology, New Bulgarian University.

Participants

The present study included 244 students. Of these, 125 (51.2%) were girls and 110 (45.1%) were boys (9 (3.7%) participants did not indicate their gender). The students were between 14 and 17 years old, mean age 15.56 years (SD = 0.66). Most students reported having siblings (75%), engaging in sports (89.3%), and attending extracurricular activities (64.8%) (Table 1).

The sample is relatively balanced by gender, and is also relatively balanced by age of the children.

TABLE I
DEMOGRAPHIC CHARACTERISTICS DISTRIBUTION OF CHILDREN PARTICIPATING IN THE STUDY

		Number	Percentage
Gender	Boys	110	45.1
	Girls	125	51.2
	Missing data	9	3.7
	Total	244	100.0
Age (in years)	14 years	6	2.5
	15 years	113	46.3
	16 years	108	44.3
	17 years	17	7
Siblings	Yes	183	75
	No	60	24.6
	Missing data	1	0.4
Pet	Yes	122	50
	No	122	50
Sports	Yes	218	89.3
	No	26	10.7
Extracurricular activities	Yes	158	64.8
	No	87	34.4
	Missing data	2	0.8

The parents of the students are aged 33-61 for mothers and 38-69 for fathers, respectively. Most of the parents have higher education (mothers - 89.4%; fathers - 78.4%), are married (mothers - 69.4%; fathers - 69%), and are employed full-time (mothers - 75.5%; fathers - 78%) (Table 2).

TABLE 2
DEMOGRAPHIC CHARACTERISTICS DISTRIBUTION OF CHILDREN'S PARENTS PARTICIPATING IN THE STUDY

		Mothers		Fathers	
		Number	Percentage	Number	Percentage
Education	Basic Level	-	-	2	0.8
	High School	5	2.0	22	9.0
	University degree	219	89.4	192	78.4
	Doctoral degree	2	0.8	4	1.6
	Missing data	17	7.8	24	10.2
Marital status	Married, lives with spouse	170	69.4	169	69.0
	Married, but not living with spouse (separated)	4	1.6	5	2.0
	Cohabitating	28	11.4	33	13.5
	Single	9	3.7	5	2.0
	Divorced	15	6.1	13	5.3
	Widower	5	2.0	1	.4
	Missing data	13	5.7	18	7.8
Employment	Unemployed, not looking for a job (incl. pensioner)	9	3.7	3	1.2
	Unemployed, looking for a job	5	2.0	1	0.4
	Part-time employed	25	10.2	8	3.3

	Full-time employed	185	75.5	191	78.1
	Other	9	3.7	21	8.6
	Missing data	11	4.9	20	8.4

III. Results

Overall Stress Levels of Perceived Stress

To test the first hypothesis, that students from the current sample will have higher levels of perceived stress, we compare their results with the average for the Bulgarian sample, based on the data from the study on the adaptation of the Perceived Stress Scale for Bulgaria. The average range on the Perceived Stress Scale for the Bulgarian population, according to the results of Naydenova and Ilieva (2006), is 25.17. The analysis revealed that the average stress score for the sample was 27.45 (SD = 8.28). It slightly exceeds the Bulgarian normative average of 25.17 (SD = 7.89). However, this is within the range of the average norm and does not mean the presence of higher levels of perceived stress (Table 3).

TABLE 3
COMPARISON OF THE RESULTS FOR THE LEVEL OF PERCEIVED STRESS FOR THE CURRENT SAMPLE AND THE AVERAGE FOR THE BULGARIAN POPULATION, NAYDENOVA & ILIEVA, 2006 [10]

	Results of the current study		Results Bulgarian adaptation	
	X	SD	X	SD
Total Stress Score	27.459	8.281	25.17	7.89

Overall, the mean value in the present sample is within the average norm. The distribution is quite close to the normal one (Figure 1).

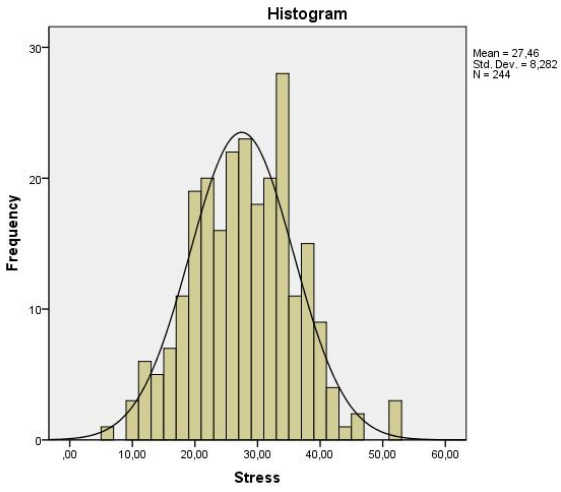

Fig. 1. Distribution of Stress Levels of the sample

While the majority of students fell within the average stress category (68.4%), a notable 22.5% reported high stress levels, and 9% exhibited low stress levels. These findings suggest that stress is a common experience among adolescents, though not universally extreme. The distribution of stress levels is illustrated in Figure 2 and summarized in Table 4.

TABLE 4
DISTRIBUTION OF STRESS LEVELS OF THE SAMPLE

Stress Level	Frequency	Percentage
Low	22	9.0%
Moderate	167	68.4%
High	55	22.5%

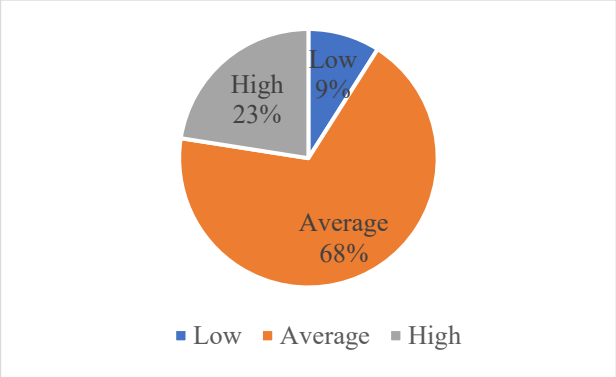

Fig. 2. Distribution of Stress Levels of the sample

Gender Differences and Perceived Stress

A significant gender disparity was observed in stress levels. Female students reported a mean score of 29.864 (SD = 7.168), which was significantly higher than the mean score of male students, 25.109 (SD = 8.714), $t = -4.59$, $p < 0.001$. These findings are presented in Table 5.

TABLE 5
COMPARISON OF THE STRESS LEVELS BY GENDER

	Gender	Number	Mean Score	Standard Deviation	t-value	p-value
Stress	Girls	*125*	*29.864*	*7.168*	*-4.587*	*<0.001*
	Boys	*110*	*25.109*	*8.714*		

Age Differences and Perceived Stress

In previous studies (Vasileva et al., 2008), in addition to gender differences, age differences were also found. Our sample included students aged 14-17 years. The age range is quite narrow. The first group included 14 and 15-year-old students (119, 48.6%), and the second (126, 51.4%) included 16 and 17-year-olds. The groups are almost equal. The comparison of stress levels between younger (14-15 years) and older (16-17 years) adolescents yielded no significant differences, $t = -0.426$, $p = 0.67$. This finding may reflect the homogeneity of the sample, as the majority of participants were aged 15 and 16 (90.6% of the entire sample). Additionally, shared environmental and academic pressures across these age groups might contribute to similar stress levels.

Sports Participation and Perceived Stress

The third hypothesis is related to perceived stress levels and sports participation. Participation in sports emerged as a critical factor influencing stress levels. Students who actively engaged in sports reported lower mean stress levels ($M = 26.991$, $SD = 8.503$) compared to their non-sporting peers ($M = 31.385$, $SD = 4.605$), $t = -2.587$, $p = 0.01$. These results are summarized in Table 6.

TABLE 5
COMPARISON OF STRESS LEVELS BY SPORTS PARTICIPATION

	Sports Participation	Number	Mean Score	Standard Deviation	t-value	p-value
Stress	Sports Active	*218*	*26.991*	*8.503*	*-2.587*	*0.010*
	Non-active	*26*	*31.385*	*4.605*		

Extracurricular Activities and Perceived Stress

In addition to the formulated hypotheses, the role of participation in extracurricular activities was also examined. This type of education may include activities related to the arts (dancing, drawing, music), activities that may be a hobby, provide pleasure, represent additional interest, etc. Such activities, as well as sports, may have a relaxing and stress-reducing effect. In the current sample, more than half of the students noted participation in such forms – 64.8%. The results show that there is no significant difference in the levels of perceived stress between students who participate and those who do not participate in extracurricular forms of learning ($t = -0.462$, $p = 0.644$).

IV. DISCUSSION

The present study provides significant results related to levels of perceived stress among students in Bulgaria, examining the influence of different factors – gender, participation in sports activities and extracurricular activities. These results contribute to the existing literature and highlight the need for interventions aimed at supporting the psychosocial well-being of adolescents.

Levels of perceived stress

The mean levels of perceived stress observed in the present study are comparable to those reported by Naydenova and Ilieva [10], suggesting a relative stability of stress experiences among students over the years. However, the slight increase observed in our sample may be related to the increasing academic and social demands on students, which are increasing in the context of contemporary societal and technological changes.

The distribution of the data shows that the majority of students fall within typical levels of perceived stress, but the presence of subgroups with high levels is concerning. Previous research highlights that chronic stress can have serious consequences for students' mental health and academic performance [23], which necessitates the need for early identification and support for these groups.

Gender differences in perceived stress

The results of the study confirm the consistent trend reported in previous studies that girls are more vulnerable to perceived stress compared to boys [24-25]. High levels of stress among girls can be explained by factors such as greater emotional sensitivity, a tendency towards ruminative thinking, and increased attention to social relationships [26].

These results highlight the need for a differentiated approach when developing interventions. For example, programs that focus on developing emotional regulation skills may be particularly effective in reducing stress among girls. In addition, social support from peers and family plays a key role in coping with stress and should be integrated into intervention strategies [27].

Age differences in perceived stress

Another intriguing aspect is the lack of significant age differences in stress levels. While previous research has documented an increase in stress as students transition to higher grades, this study's narrow age range may explain the absence of such findings. The homogeneity of the sample - primarily consisting of students aged 15 and 16 years - could obscure age-related trends. Furthermore, this result invites a closer examination of contextual factors that may buffer or exacerbate stress during adolescence. For example, supportive relationships with teachers and peers might mitigate age-related stress, while academic pressures and societal expectations could heighten it.

Role of sports in reducing stress

The results highlight the importance of regular sports activities as an effective stress management strategy. Participation in sports activities was associated with significantly lower levels of perceived stress, highlighting the importance of physical activity for students. These findings are consistent with numerous studies that highlight the protective effect of physical activity on mental health [28-29].

Physical activity stimulates the production of endorphins, which reduce stress, and provides opportunities for social interaction and building teamwork skills. In the context of the current results, sport can be seen not only as a means of physical development, but also as an important tool for promoting the psychosocial well-being of students. Sports, as a physical activity, can contribute to releasing tension, improving mood, and developing social skills through interaction with peers. The protective effect of sports participation highlights an actionable pathway for reducing stress. Physical activity has been shown to improve mood, reduce anxiety, and enhance resilience [21].

However, it is important to note a worrying trend in the "Spotlight on adolescent health and well-being. Findings from the 2017/2018 Health Behaviour in School-aged Children (HBSC) survey in Europe and Canada. International report. Volume 1. Key findings" of the World Health Organization [16]. This report provides key information on the physical activity of adolescents in Europe and Canada, highlighting a decline in adolescent activity, particularly among girls and older adolescents. Fewer than 1 in 5 adolescents meet WHO recommendations for physical activity. Levels have declined in about a third of countries since 2014.

However, it is important to note that the quality and context of sporting activities also matter. Excessive emphasis on competition or pressure to achieve can have the opposite effect, increasing stress levels [30]. Sports programs must therefore be carefully designed to provide a supportive and fun environment.

Role of extracurricular activities

The role of extracurricular activities in stress

management also warrants discussion. While a majority of students reported participating in extracurricular activities, these were not significantly linked to stress reduction in this study. Contrary to expectations, the results did not show significant differences in stress levels between students who participated in and did not participate in extracurricular activities. This contradicts some previous research that emphasizes the benefits of such activities for the development of personal and social skills [31].

This unexpected result is likely due to the nature of the extracurricular activities described by participants. A more in-depth analysis revealed that some of the responses as a type of attendance at extracurricular activities were actually students entering attendance at additional courses and lessons in school subjects (Bulgarian language, mathematics, English, etc.), rather than activities related to pleasant activities and relaxation. These activities, rather than alleviating stress, might contribute to it by adding to students' workload and academic pressures. This finding highlights the need to differentiate between extracurricular activities that serve as stressors and those that act as stress relievers, such as creative arts or recreational clubs.

In this context, future research should examine the qualitative characteristics of extracurricular activities to assess their real contribution to students' well-being.

The results of this study provide important information about perceived stress among students in Bulgaria, as well as have significant practical applications. First, they highlight the need for early identification of students with high levels of stress and the provision of targeted support. Special attention should be paid to girls, who are more vulnerable to the effects of stress.

Secondly, schools should encourage regular physical activity and provide access to a variety of sports activities. Developing programs that combine sports, creativity and social activities can be key to reducing stress and increasing students' well-being.

Finally, extracurricular activities should be reviewed to provide a balance between academic demands and off-duty activities. Future research should examine the qualitative characteristics of extracurricular activities to determine which types of activities have the greatest potential for reducing stress. Conduct longitudinal studies to track how perceived stress changes over time and how different interventions (such as sports programs) may affect stress levels. Examine additional factors, such as social support and family environment, that may play a role in students' stress levels. The present study provides provide a basis for future research and interventions aimed at improving the psychosocial well-being of adolescents.

The broader implications of these findings align with global concerns about adolescent mental health. According to the World Health Organization [32], there has been a notable decline in adolescent well-being across multiple regions, with stress identified as a key factor. This study adds to the growing body of evidence suggesting that targeted interventions are necessary to address adolescent stress.

Schools, in particular, are uniquely positioned to implement these interventions. Initiatives such as mindfulness programs, peer support groups, and stress management workshops could provide students with the tools they need to cope with challenges effectively. One of the main conclusions of the study by Cosma and colleagues [17] is the importance of early intervention and the role of schools as the first line of support for adolescents suffering from mental health problems. According to the authors, schools provide a unique opportunity to provide psychosocial support and referral to specialized services when necessary. In the context of our study, such an approach could be useful to identify students with higher levels of anxiety and stress and to provide the necessary support through psychosocial support programs in the school environment. Programs that promote activity and socialization can be key to reducing social isolation and improving students' mental health. In addition, existing research points to the importance of school programs that focus on mental health, such as those that provide support for developing skills to cope with stress and anxiety.

Additionally, the findings underscore the importance of family and community involvement in stress mitigation. Parental support and open communication can play a pivotal role in helping adolescents navigate stressful situations. Community-based programs that focus on building resilience and promoting mental health awareness could further strengthen these efforts. Policymakers should also consider incorporating mental health education into school curricula to equip students with the knowledge and skills needed to manage stress.

V. Conclusion

In conclusion, while this study sheds light on the stress profiles of Bulgarian adolescents, it also raises important questions for future research. How do cultural and societal factors shape stress experiences in adolescents? What specific interventions are most effective in reducing stress among different demographic groups? Addressing these questions will require a multidisciplinary approach, integrating insights from psychology, education, and public health.

While the overall stress levels are within normative bounds, certain subgroups exhibit heightened vulnerability. Interventions tailored to address gender-specific stressors and encourage physical activity could significantly enhance adolescent well-being. By prioritizing adolescent mental health, we can pave the way for a healthier, more resilient generation.

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