



Factors contributing to a stronger experience of environmental stress by high school students

Factores que aumentan el ambiente de estrés por estudiantes de secundaria

E.A. VASILENKO [1](#); V.I. DOLGOVA [2](#); O.A. KONDRATIEVA [3](#); N.I. ARKAEVA [4](#); G.YU. GOLIEVA [5](#)

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ABSTRACT:

The focal point of the article is an attempt to identify the factors that contribute to a stronger experience of environmental stress by high school students. There is much evidence that this stress stems from the life in ecologically polluted areas. We carried out our study in two stages on the territory of the Chelyabinsk region. During the first stage in 2006-2007, we interviewed 553 senior high school students from 12 localities in ecologically polluted areas. We also included in the interview 526 senior high school students from 12 localities in areas with a relatively satisfactory environmental situation. During the second stage in 2015-2016, we interviewed 112 senior high school students living in 9 localities in zones of ecological disadvantage, and 104 senior high school students living in 9 localities in areas with a relatively satisfactory ecological situation. The greatest finding of the study is a fairly large proportion of high school students living in environmentally unfriendly conditions (53.51% in 2006-2007 and 57.1% in 2015-2016). They suffer from high and above average levels of environmental stress. To increase the reliability of measures we grouped the identified factors according to

RESUMEN:

El punto focal del artículo es un intento de identificar los factores que aumentan el ambiente de estrés por estudiantes de secundaria. Hay mucha evidencia de que este estrés proviene de la vida en áreas ecológicamente contaminadas. Llevamos a cabo nuestro estudio en dos etapas en el territorio de la región de Chelyabinsk. Durante la primera etapa en 2006-2007, entrevistamos a 553 estudiantes de secundaria de 12 localidades en áreas ecológicamente contaminadas. También incluimos en la entrevista a 526 estudiantes de secundaria de 12 localidades en áreas con una situación ambiental relativamente satisfactoria. Durante la segunda etapa en 2015-2016, entrevistamos a 112 estudiantes de secundaria que viven en 9 localidades en zonas de desventaja ecológica, y 104 estudiantes de escuela secundaria superior que viven en 9 localidades en áreas con una situación ecológica relativamente satisfactoria. El mayor hallazgo del estudio es una proporción bastante grande de estudiantes de secundaria que viven en condiciones ambientalmente hostiles (53.51% en 2006-2007 y 57.1% en 2015-2016). Sufren de niveles elevados y superiores al promedio de estrés ambiental. Para aumentar la confiabilidad de las medidas,

four criteria: demographic criterion (sex), individual criterion (temperamental and personal characteristics, the academic success of the participant), group criterion (the family situation of a participant, his/her satisfaction with living conditions), situational criterion (the number of publications in press about the ecological situation in a specific locality). We introduced two approaches to assess these factors. The first approach proceeds from the concept of a stress as a factor that creates an additional burden and affects the psychic and socio-psychological adaptation of the individual. The second approach stems from the concept of personal resistance to the effect of unfavorable factors. These approaches are accompanied by the introduction of personal and socio-demographic variables that affect the resistance of the individual to the action of environmental stress.

Key words: stress, ecological stress, temperamental features, personal characteristics, academic success, family, satisfaction with living conditions, ecological situation.

agrupamos los factores identificados de acuerdo con cuatro criterios: criterio demográfico (sexo), criterio individual (características personales y temperamentales, éxito académico del participante), criterio grupal (la situación familiar de un participante, su / su satisfacción con las condiciones de vida), criterio situacional (el número de publicaciones en prensa sobre la situación ecológica en una localidad específica).

Introducimos dos enfoques para evaluar estos factores. El primer enfoque parte del concepto de estrés como un factor que crea una carga adicional y afecta la adaptación psíquica y sociopsicológica del individuo. El segundo enfoque se deriva del concepto de resistencia personal al efecto de factores desfavorables. Estos enfoques se acompañan de la introducción de variables personales y sociodemográficas que afectan la resistencia del individuo a la acción del estrés ambiental.

Palabras clave: estrés, estrés ecológico, características temperamentales, características personales, éxito académico, familia, satisfacción con las condiciones de vida, situación ecológica.

1. Introduction

There is a growing body of literature which recognizes the fact that the environmental situation in many countries of the world is unfriendly. In areas of intense environmental pollution, the natural and urban environment in which a person lives appears to be not a source of resources, support, connections with the world, but a source of danger.

Medical and psychological researches conducted in different countries of the world show that social tension increases in zones of ecological disadvantage (Landrigan et al, 2002; Mandler, 1984; Needleman, 1995; Rodier, 1995; Rotton, J. and S. White, 1996; Shaffer, 1982; Steven, G. and G.V. Kimberly, 1995; Vreugdenhil et al, 2002; Winneke, G., 1996; Wong, 1993).

This is especially true in case of the radiation contamination that has occurred because of man-made disasters. Y.A. Aleksandrovskii et al. showed in their research that in their sample of 300 examined residents from the areas exposed to radiation contamination because of the Chernobyl nuclear power plant breakdown, only 5% of residents had no psychological problems, and 48% of residents had neurotic disorders (Aleksandrovskii et al., 1991). In the study of G.M. Rumiantseva et al. the presence of borderline mental disorders, psychosomatic diseases appeared in 60.3% of the examined population, and 90% of the examined population pointed at persistent anxious tension, the main feature of which was the fear for one's health and the health of the relatives (Rumiantseva et al., 1994). The study showed that in areas exposed to radiation pollution, there was an increased social and socio-psychological tension, which was expressed in increased anxiety and fears, apathy, abdication of responsibility for themselves and the families, loss of interest in the environment, lower self-esteem, changes in value orientations. On top of that, the population of the effected locality developed victim complex.

Previously published studies showed that the ratio of subjective assessment of health and the results of objective studies of the population health conditions in contaminated territories were contradictory. Most researchers who conducted epidemiological surveys in the territories contaminated by the Chernobyl accident 2-3 years after the accident noted the absence of an increase in the number of oncological and hematological diseases with increasing nonspecific diseases, as well as the presence of various shifts in the work of various organs and systems, metabolism of blood cells. Medical research conducted 5-10 years after the accident revealed tendencies to improved hemodynamics, normalization of immunity, work of various organs and systems, however, many indicators remained changed. In his study A.S. Tkachenko provided the results of medical examination of children and adolescents in contaminated areas in which

he revealed the stress of the body's immune forces, which appeared in more frequent incidence of immune diseases, hypertrophy of tonsils and lymph nodes; simultaneously teachers also noted a decrease in academic performance among students (Tkachenko, 1997).

Of much importance are the studies of the Stavropol State Medical Academy where the researchers described a sample of accentuated adolescents (Boev et al., 2003). It was found that in the contaminated areas the adolescents of hysterical, schizoid, epileptoid type exhibited significant differences in comparison with the adolescents of the corresponding types in clean areas. The comparison described many parameters: the severity of obsessive-phobic disorders, the level of anxiety, neuroticism, psychopathy, propensity to alcoholism, delinquency, the severity of emancipation reaction. According to the authors of the studies in question, negative environmental conditions exerted their destructive influence primarily on the biological basis of the individual, which led to violation of the social adaptation of adolescents.

Much uncertainty still exists about the explanation of the revealed changes in the state of children's health. Therefore, researchers highlight the leading role of the stress factor associated with the anxious state of adults, the violation of microsocial interaction in the development of these changes (Gaiduk et al, 1994; Golushko, 2010.). However, the majority of researchers note that many changes in the metabolism of blood, the modification of metabolic processes do not allow to exclude the effects of radiation.

Some studies revealed gender differences in the severity of the signs of mental maladaptation. Research on the subject showed that, in the contaminated areas, women, especially at the age of 35-50 years, developed low assessment of their health, high level of anxiety and a feeling of "a catastrophe victim", as well as low level of self-confidence. Alternatively, men from contaminated areas, especially at the age of 31-40 years, developed claims for the admission of their "ego", their physical abilities, their social recognition. With the passage of age, the men proclaimed manifestations of pessimistic assessment of their future, the increase of their feeling of a victim.

The existing accounts show that a considerable part of the population of the affected territories developed the maladaptive conditions, which most researchers associate with the impact of chronic stress that has arisen because of the emergency and the media coverage of its possible consequences. At the same time, most researchers emphasize that it is extremely difficult to assess the level of this stress and its impact on the process of mental adaptation.

This paper claims to show that it is important to identify factors that contribute to a greater experience of environmental stress among high school students who live in ecologically polluted areas.

2. Materials and methods

The article presents the results of two empirical studies which we carried out in 2006-2007 and 2015-2016 in the Chelyabinsk region. During the first stage in 2006-2007, we interviewed 553 senior high school students from 12 localities in ecologically polluted areas, we also included in the interview 526 senior high school students from 12 localities in areas with a relatively satisfactory environmental situation. During the second stage in 2015-2016, we interviewed 112 senior high school students living in 9 localities in zones of ecological disadvantage, and 104 senior high school students living in 9 localities in areas with a relatively satisfactory ecological situation. We used the same indicators to compare the level of socio-economic development, the national-religious structure of the population from contaminated zones and relatively clean territories. To study the ecological stress, we employed a variant of the methodology for the study of environmental involvement developed by Dutch researchers B. Andresen, F.-M. Stark and J. Gross. It is critical to note that we utilized this method according to the adapted version developed by E.A. Vasilenko. The original version of the methodology intended to study the intensity and structure of people's experiences after the Chernobyl accident (Gross et al., 2004).

3. Results and discussion

The results of the study both in 2006-2007 and in 2015-2016 showed that the share of high school students with high and above average level of environmental stress is much higher in contaminated areas than in relatively clean areas (see Table 1).

Table 1
The percentage ratio of environmental stress levels in the study groups

The levels of ecological stress	The research results in 2006-2007		The research results in 2015-2016	
	The group "contaminated territories"	The group "relatively clean territories"	The group "contaminated territories"	The group "relatively clean territories"
High	8,7 %	0 %	9,8 %	0 %
Above the average	44,8 %	25,5 %	47,3 %	19,2 %
Middle	35,9 %	47,2 %	30,4 %	49,0 %
Below the average	10,8 %	20,2 %	12,5 %	23,2 %
Low	0 %	7,2 %	0 %	8,6 %

With the help of the results of both studies (2006-2007 and 2015-2016), we employed a variant of the regression model in which the dependent variable was the indicator of environmental stress. We identified the factors that contributed to a greater experience of environmental stress: the number of publications on environmental problems in the local press, good academic performance of the student, introversion and rigidity, as well as O +, L +, I +, M +, C-, F + and Q2 + factors according to the R. Cattell questionnaire characterizing sensitivity, imagination richness, a certain dissatisfaction with yourself, flexibility and plasticity of emotional experiences and focus on your inner world, nonconformity, expressiveness, emotional brightness of communication.

Among the protective factors that reduce the intensity of environmental stress and reduce its impact on adaptation indicators, of much importance are the points which are as follows: "the attitude towards the family" and "the satisfaction with living conditions". The last variable has the highest beta coefficient. The least environmental stress was characteristic of those participants who were more satisfied with their living conditions. If we analyze the correlation of individual assessments of specific living conditions and the indicator of environmental stress, then the most related to the latter were the satisfaction ratings with such living conditions as "Money" (-0.454), "Leisure, Entertainment" (-0.421). This suggests that high standard of living, the ability to fully restore health, spend leisure, receive paid education plays the role of a buffer that reduces the level of experiencing environmental stress for high school students in areas of ecological disadvantage.

Concerning the influence of the gender factor, we noted that 66% of the high school students with high and above average levels of environmental stress were girls. On the contrary, those with less than average environmental stress, 68% namely, were young men. Girls more than

boys were noted with specific fears associated with the effects of adverse environmental factors, i.e. the fear of life-threatening diseases, the birth of sick children in the future, fear associated with visual representations of a radiation-contaminated planet. The prevalence of these fears among girls living in areas contaminated with radiation reached 15.3%, and in the city of Karabash with the copper smelter works it amounted to 19.14%.

We grouped the identified factors, according to four criteria: demographic criterion (sex), individual criterion (temperamental and personal characteristics, the academic success of the participant), group criterion (the family situation of a participant, his/her satisfaction with living conditions), situational criterion (the number of publications in press about the ecological situation in a specific locality).

In the control group, the same variables determined the indicator of environmental stress, as in the experimental group.

Now we proceed to possible approaches to discussing the features of the socio-psychological adaptation of senior pupils with increased levels of environmental stress in the zones of ecological unhappiness. The first approach stems from the concept of stress as a factor that creates an additional burden and affects the psychic and socio-psychological adaptation of the individual. With this approach, we consider any stress as acting independently on the personality or as an additional stress, joining existing ones, which increases the risk of maladaptation. D. Brown and E. Fromm proposed the similar approach. The psychiatrists created the "model of accumulated risk". Later researchers used it to explain the etiology of military trauma (McIntyre, Venture, 2003).

With this approach, we consider environmental stress as a factor that makes an additional load on adaptation mechanisms that depletes the adaptive capabilities of the individual. If a person perceives the life environment as dangerous to health and life, to the health of future children, then the "image of the victim" becomes the basis for consolidation of self-consciousness. This helps to reduce self-acceptance and self-esteem, optimism of life prospects. Difficulties in making their own experiences lead to a decrease in the ability to accept other people.

It should be noted that negative changes in self-awareness, life prospects and attitudes toward the environment are recorded in people who have experienced other types of stress, they are the most important symptoms of post-traumatic stress disorder (Dolgova, et. al. 2017a, 2017 b, 2017c; Zhakupova et al., 2017).

The second approach to discussing the differences that we have identified in the socio-psychological adaptation between groups that differ in the level of environmental stress is based on the concept of the resistance of a person to the effect of adverse factors. Modern experts of psychology understand resistance as an ability to develop normally despite destabilizing events, difficult living conditions, and as a result, the absence of mental disorders in situations causing frustration. We describe it as a process of interaction between the subject and the environment, including protection factors. Some people can develop normally in the environment in which others have adaptation difficulties. Returning to environmental stress, we can assume that people who have certain characteristics (temperamental, personal, social) do not have sufficient resistance and are inclined to give negative assessments and expressed reactions to any external influences. This is the reason for their observation of unfavorable environmental factors and suffering from them, feeling environmental stress. This study suggests that the experiment results stem from this approach and are fruitful for further discussion.

4. Conclusion

The research has several theoretical and practical implications. The study showed that the most powerful effect of adverse environmental factors is typical of young men and women who are characterized by introversion and rigidity, high sensitivity, introverted behavior, and independence in behavior. It is possible that these features make them susceptible to any

negative environmental factor. The negative relationship between the indicator of environmental stress and satisfaction with living conditions can also be interpreted as the aptitude of certain individuals to complain, to be dissatisfied with both the social and environmental conditions of life. However, we identified high and above average levels of environmental stress in a large proportion of high school students living in environmentally unfriendly conditions (53.51% in 2006-2007 and 57.1% in 2015-2016). So, increased sensitivity and insufficient resistance are not the only reasons for these findings.

We promoted the study of the revealed factors contributing to a stronger experience of environmental stress by high school students from the standpoint of two approaches. The first approach proceeds from the concept of stress as a factor that creates an additional burden and affects the psychic and socio-psychological adaptation of the individual. The second approach is based on the concept of the resistance of a person to the effect of unfavorable factors. Most likely, both approaches are not so much contradictory to each other, in fact, they complement each other. We consider environmental stress as a factor that influences the socio-psychological adaptation of high school students in zones of ecological disadvantage, i.e. we adhere to the "accumulated risk model". The key strength of the research is our idea to use this model with some adjustment, i.e. it is critical to introduce personal and socio-demographic variables that affect the resistance of the individual to the action of environmental stress.

References

- Aleksandrovskii, I.U., O.S. Lobastov, L.I. Spivak and B.P. Shukin, 1991. *Psikhogeniia v ekstremal'nykh usloviakh* [Psychogeniuses in extreme conditions]. Moscow: Meditsina.
- Boev, I.V., K.S. Giulushanian, O.A. Akhverdova, I.V. Kobrianova and I.A. Lukovka, 2003. *Anomalnaia konstitutsionalno-psikhotipologicheskaia izmenchivost lichnosti v usloviakh neblagopriiatnoi ekologo-khimicheskoi sredy obitaniia* [Anomalous constitutional-psychotypic personality variability in conditions of unfavorable ecological and chemical habitat]. Stavropol: Stavropolskii gosudarstvennyi meditsinskii universitet, 3.
- Dolgova, V.I., E.A. Vasilenko, E.G. Kapitanets, O.A. Kondratieva and Y.T. Zhakupova, 2017a. Features of social and psychological adaptation of teenagers from foster families in school. *Man In India*, 97 (07), 61-69
- Dolgova, V.I., J.A. Rokitskaya, O.A. Kondrateva, N.I. Arkaeva and N.V. Kryzhanovskaya, 2017b. The interactions of individual religiosity and axiological orientations of students. *European Journal of Science and Theology*, 13 (4), 47-53
- Dolgova, V.I., N.G. Kutepova, E.G. Kapitanets, N.V. Kryzhanovskaya and E.V. Melnik, 2017c. The study of motivational readiness of teachers to implement inclusive education of children with disabilities. *Espacios*, 38 (40), 9
- Gaiduk, F.M., S.A. Igumnov and V.B. Shalkevich, 1994. *Kompleksnaia otsenka psikhicheskogo zdorovia detei podvergshikhsia vozdeistviu radionukleidov v prenatalnom periode vsledstvie Chernobyl'skoi katastrofy* [Comprehensive assessment of mental health of children exposed to radionuclides in the prenatal period because of the Chernobyl disaster]. *Otsialnaia i klinicheskhaia psikhiatriia*, 1.
- Golushko, T.V., 2010. *Osobennosti strakhov u detei sviazannykh s prozhivaniem v regionakh postradavshikh v rezultate avarii na Chernobyl'skoi AES na materiale issledovaniia detei 5-6 letnego vozrasta* [Features of fears among the children living in regions affected by the Chernobyl accident: on the basis of a study of children aged 5-6 years], PhD thesis, TSMU, Tyumen.
- Gross, S.D., T.D. Matte and J. Schwartz, 2002. Economic gains resulting from reduction in children exposure to lead in the United States. *Environmental health perspectives. Journal of the National Institute of Environmental health sciences*, 110 (6), 8
- Landrigan, P.J., C.B. Schechter, J.M. Lipton, M.C. Fahs and J. Schwartz, 2002. Environmental

pollutants and disease in American children: Estimates of morbidity, mortality, and costs for lead asthma, cancer, and developmental disabilities. Environmental health perspectives. Journal of the National Institute of Environmental health sciences, 110 (7), 9

Mandler, G., 1984. Mind and body: Psychology of emotions and stress. London: Norton and co.

Needleman, H.L., 1995. Behavior toxicology. Environmental health perspectives. Journal of the National Institute of Environmental health sciences, 103, 77-79

Rodier, P. M., 1995. Developing brain as a target of toxicity. Environmental health perspectives. Journal of the National Institute of Environmental health sciences, 103, 73-76

Rotton, J. and S. White, 1996. Air pollution, the sick building syndrome, and social behavior. Environment International: A Journal of science, technology, health, monitoring and policy, 22 (1), 8

Rumiantseva, G.M., E.S. Matveeva and L.V. Romasenko, 1994. Rasprostranennost psikhicheskikh rasstroistv sredi naseleniia vovlechenogo v ekologicheskuiu katastrofu [The prevalence of mental disorders among the population involved in an environmental disaster]. Sotsialnaia i klinicheskaia psikhiatriia Sotsialnaia i klinicheskaia psikhiatriia, 4.

Shaffer, M., 1982. Life after stress. New York: Plenum Press.

Steven, G. and G.V. Kimberly, 1995. Neurobehavioral effects of developmental methylmercury exposure. Environmental health perspectives. Journal of the National Institute of Environmental health sciences, 3 (8).

Tkachenko, A.S., 1997. Teoriia i praktika psikhologo-pedagogicheskoi pomoshchi detiam i podrostkam v postkatastroficheskikh usloviakh [Theory and practice of psychological and pedagogical assistance to children and adolescents in post-catastrophic conditions], Dr. hab. thesis, BSMU, Bryansk.

Vreugdenhil, H.G., F.M. Slijper, P.G. Mulder and N. Weisglas-Kuperus, 2002. Effects of perinatal exposure to PCBs and Dioxins on play behavior in Dutch children of school age. Environmental health perspectives. Journal of the National Institute of Environmental health sciences, 110 (10).

Winneke, G., 1996. Separating the impact of exposure and personality in annoyance response to environmental stressors, particularly odors Environment International: A Journal of science, technology, health, monitoring and policy.

Wong, P.T., 1993. Effective management of life stress. The resource-congruence model. Stress Medicine, 9 (1).

Zhakupova, Ya.T., V.I. Dolgova, N.V. Kryzhanovskaya, O.A. Kondratieva, E.G. Kapitanets, 2017. Gifted adolescents: special qualities of the cognitive activities' motivational component. Espacios, 38 (40), 45

1. South Ural State Humanitarian Pedagogical University, Russia, 454080, Chelyabinsk, Lenin Avenue, 69

2. South Ural State Humanitarian Pedagogical University, Russia, 454080, Chelyabinsk, Lenin Avenue, 69

3. South Ural State Humanitarian Pedagogical University, Russia, 454080, Chelyabinsk, Lenin Avenue, 69

4. South Ural State Humanitarian Pedagogical University, Russia, 454080, Chelyabinsk, Lenin Avenue, 69

5. South Ural State Humanitarian Pedagogical University, Russia, 454080, Chelyabinsk, Lenin Avenue, 69

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