

Correction of the psychophysiological state of young men aged 11-12 years by means of hiking tourism

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Abstract

The purpose of the study: to assess the impact of the training programme of tourism and local history of out-of-school education on the psycho-physiological state of young people aged 11-12 years. *Materials and methods:* According to the set goal, we selected generally accepted and approved modern methods of organizing scientific research, the long-term use of which in the practice of pedagogy, psychology, physical education and sports confirmed their informativeness and adequacy. *Results of the study:* A statistically significant difference ($p < 0.05$; $p < 0.01$) is observed in indicators characterizing the functional state of the cardiovascular and respiratory systems, in particular, the heart rate at rest, lung capacity, and Ruffier index. Significant positive dynamics is observed in indicators characterizing cognitive functions, in particular, the short-term memory capacity ($p < 0.01$), the volume of the processed information ($p < 0.01$). The results of visual-motor reactions also had significant changes ($p < 0.01$) in both age groups. *Conclusions:* Taking into account the analysis of the obtained results, we can conclude that the training programme of the tourism and local history of out-of-school education has a positive effect on the morpho-functional state, cognitive functions, and individual motor qualities.

Key words: psycho-physiological state, hiking tourism, young men.

Introduction

At the contemporary stage of development of education, a rethinking of conceptual approaches to the teaching and upbringing of children and adolescents, the improvement of their psychophysiological state and the enhancement of physical and mental abilities (Galan, 2018; Kravchenko, 2018; Paliichuk, 2018; Pasichnyk, 2018). Today, in conditions of increased information loads, Ukrainian students are experiencing significant psycho-emotional stress and the chronic adaptive fatigue caused by the educational process. The overload of the educational process causes stress of functional systems of the body. In the educational process today, we can talk about the psychological and informational shock of the modern student. The consequence of this is chronic fatigue, morbidity, passivity, which suggests the manifestations of chronic adaptive overpressure, and sometimes even the failure of adaptation. So that in the process of urgent adaptation, the body can cope with changes in the conditions of modern life (stress, poor ecology, informational loads), it must increase by several times the mass of mitochondria (cell energy structures). Prevention of chronic adaptive fatigue syndrome is possible through increased motor activity. It has been found that the psycho-physiological development of young students has recently worsened; therefore, the search for comprehensive means of an effective solution of the problem under study is in the sphere of scientific interests of scientists in various fields: pedagogy, medicine, and rehabilitation.

Nowadays, the issue of introducing programs for circles of tourism and local history of out-of-school education, which will contribute to improving health, raising a healthy lifestyle, developing physical abilities, and normalizing the psychophysiological state of schoolchildren, is relevant. The investigated problem covers a wide range of issues. However, the analysis of scientific literature and practical activities of general educational institutions show that the improvement of the psycho-physiological state of adolescents in the process of out-of-class work is out of sight of researchers (Buning, 2018; Gibson, 1998; Gibson, 2018; Grimaldi-Puyana, 2017; Kokun, 2018).

The significant advantages and specific opportunities that are laid out in extracurricular work on physical education, contributing to the improvement of mental performance, physical fitness, physical activity

and personal development in general, have not received adequate coverage, assessment and theoretical justification, which adversely affects the practice of physical education of students (Samoluk, 2012; Van Rheenen, 2016; Sobolev, 2017). The possibility of solving these pressing issues for modern Ukrainian education in the process of activities of the sports tourism circles determines the relevance of the research topic.

Materials and Methods

The scientific and pedagogical experiment was carried out on the basis of the Chernivtsi regional centre of tourism, local history and excursions of students, altogether 23 young people aged 11-12 years took part in it. The young men studied according to the training programme for the circles of the tourism and local history of extracurricular education (sports and tourism profile). The program has been reviewed and approved by the Methodological Council of the Ukrainian State Centre for Tourism and Local History of Students and the Methodological Council for Out-of-School Education of the Scientific and Methodological Council for Education of the Ministry of Education and Science of Ukraine. The training programme is aimed at children aged 11 to 15 years.

In order to study the effectiveness of the impact of the proposed program for the psycho-physiological state of young men of 11-12 years old, the following research methods were used: theoretical analysis and synthesis of data from scientific and methodological literature and documentary materials; pedagogical research methods; anthropometric research methods; physiological research methods; psychophysiological research methods; mathematical statistics methods. Theoretical analysis and synthesis of data of scientific and methodical literature and documentary materials was carried out with the aim of studying in detail the problem of physical education of schoolchildren of secondary school age, analysing the characteristics of the organization of extracurricular activities of adolescents in physical education, the characteristics of means of correction of the psychophysiological state of schoolchildren. Considerable attention was devoted to the analysis of the conceptual basis for the correction of the psycho-physiological state of schoolchildren in the process of hiking. Particular attention was paid to the analysis of publications in professional journals and in journals that are part of the international scientometric databases in the field of physical education and sport.

The method of pedagogical observation was applied to specify the purpose, methods and ways of the data recording. Observations were carried out in the process of hiking activities of 11-12-year young men, followed by a synthesis and analysis of investigations. The pedagogical testing of physical fitness was carried out by determining the level of basic physical characteristics according to the results of a set of physical activity tests. To assess physical fitness, we used tests of the school program "Physical Education. Grades 5-9" for the students of grades 6-7 of secondary schools. To assess the level of physical fitness, a series of tests was applied, which characterized the level of development of the following physical characteristics: running 30 m (s) - to determine the level of speed development; shuttle running 4x9 (s) - to determine the level of development of dexterity; bending forward from the sitting position, (cm) - to determine the level of development of flexibility; standing long jump (cm) - to determine the level of development of speed-strength qualities; sit-up from the back-lying position, times /30 sec - to determine the level of development of speed-strength qualities; flexion and extension of arms in the front lying position (time) and running in a steady pace without reference to time, (m) and running 1000 m race, (min) - to determine the level of development of endurance. The conditions for performing the tests were under generally accepted procedures. Assessment of the level of development of physical qualities was carried out according to the program for general educational institutions "Physical Education. Grades 6-7". The main somatometric signs of the morphological status of a young man of 11-12 years of age were studied by anthropometric measurements using standard techniques. The following measurements were taken to assess the state of the cardiovascular system: heart rate at rest (HR_{rest}, beats /min-1) - by palpation; systolic and diastolic blood pressure (SBP, mm Hg and DBP, mm Hg) using an Omron - M-1 electronic tonometer (Japan). The measurements of vital capacity of the lungs (VC) were carried out to assess the state of the respiratory system. Psychophysiological research methods were used to determine the reaction rate, the speed of information processing, the level of attention and memory, mental performance and static coordination. The study of the data we carried out using the method "Diagnost 1" Makarenko. The technique included the measurement of four types of reactions: the simple visual-motor reactions to light and sound, the complex choice reaction to various light signals and the combined reaction to sound and light. The first program includes the measurement of the latent period of the visual-motor reaction. A light signal appears on the screen (white), to which it is necessary to respond by pressing the stop button located in the subject's hand. A total of 6 signals are applied at intervals of 2 s. Each result (in ms) is recorded in the protocol. Verbal instruction preliminarily is given and a training attempt is made with 6 signals that are recorded. When the subject has mastered the tasks, the experimenter warns him about the validation test. The second programme is the measurement of the latent period of a simple sensor motor reaction to sounds of different strengths. Sound signals of varying intensity are sent through headphones - 45; 70 and 95 dB from the sound threshold of 0.0002 bar, with three dimensions for each stimulus Sounds are given in the following order: weak, average and strong. Testing is carried out without training, immediately after the verbal instruction. The third program is a complex choice reaction. The following preliminary instruction is given to the subject: "The signals will appear on the

screen: red, yellow and green; red and yellow need to respond as quickly as possible, that is, press the stop button, and the green - will not be pressed". Thus, the instruction creates a particular psychological setting for the complexity of the task. If the subject makes two mistakes, then testing should be repeated after repeated instructions for option II. The fourth programme - a combined reaction, to assess the impact of the sound stimulus. When studying the aftereffect from one reaction, it reveals in the strength or speed of the other reaction, which results from the first one, and it becomes mostly the "involuntary reaction technique" because it is impossible to manage these aftereffects by means of the word, at least under particular experimental conditions. The essence of the technique: a 70 dB sound signal comes in through the headphones to the subject for 10 seconds; by the instruction, it is negative. After that, 15 positive light signals are sent, it is necessary to react by pressing the stop button. The interval between signals is 2 s. Each result recorded in the protocol.

The memory function we investigated using a test to determine the short-term memory capacity. We studied the number of correctly reproduced two-digit figures out of the 12 given to a subject for 30 s. The short-term memory capacity was determined in per cent. The psychodiagnostic testing was chosen between the research methods of this group and, in particular, the test which allows assessing the cognitive functions of young men - "ESAP" (The European Survey on the Aging Protocol). The applied test was recommended by the European Psychological Association after testing in the pilot project "EXCELSA-Pilot" in the EU and Ukraine during 1998-2001, the basis of which is the Wechsler-Shannon modified technique. The technique of the test used is as follows: during the 90-second-period, the young men put down in each cell of the protocol a symbol corresponding to the particular digit (from "1" to "9" inclusive); it is contained in the protocol, so the young men could always restore it in the memory. The task was in the specified time to fill with correct symbols as many protocol cells as possible. After that, the experimenter counted the correct answers (the number of true characters), and using the formulas provided by the method, taking into account these answers, we evaluated the cognitive functions that characterize the volume of processed information. Static coordination was investigated using a complicated Romberg test. The reliability of the results obtained is provided by a reliable theoretical and methodological basis of the study, the use of scientific methods, adequate to the goal, a sufficient amount of empirical data and correct statistical processing of experimental materials. The statistical processing of the data was carried out using the package "Statistica 6.0" (StatSoft, USA) and the electronic spreadsheets "Excel 2010" (Microsoft, USA), which allowed us to perform the studies of the measurements and calculation of the basic values.

Results

The basis for the implementation of the program of tourism and local history in the outside educational activities of schoolchildren was the hypothesis of the positive impact of hiking tourism on the psychophysiological state of young people aged 11-12 years. The training programme provides for 216 hours a year, 6 hours a week in the first year of study. The young men who took part in the pedagogical experiment were assigned to the main medical group for health reasons; they underwent sports healthcare and were enrolled in the first year of study. During the first year of study, the theoretical and practical classes focused on mastering general tourist skills and methods of orientation, while at the same time beginning to master the basics of hiking. Mostly practical exercises were carried out in the fresh air, using various forms of relief. They also used active and interactive forms of education, technical means, information and communication technologies of education, visibility and the like. The obligatory part of the educational process was the participation of the young men of 11-12 years old in one-three-day tourist trips, and in a multi-day ranking, sports country walks. The program also included the participation of the young men in competitions, rallies, and other public events.

Table 1 presents the results of the morpho-functional state of young men before and after the pedagogical experiment. Analysis of the results of anthropometric data indicates the natural biological changes that occurred in the young men during the school year. The average group result of body length in boys 11 years at the end of the pedagogical experiment increased by 3.6 cm ($p > 0.05$), body weight by 2.3 kg ($p < 0.05$), in boys 12 years old, these figures increased by 2.9 cm and 2.3 kg ($p < 0.05$). High variability is observed in body mass indexes of both age groups, the coefficients of variation exceed 14.6%. The analysis of individual results of the dynamometry of the right and left hand in the boys of both age groups indicates significant variability, the variation coefficients exceed 14.6%, that indicates the heterogeneity of the sample. It should also indicate the asymmetry of the strength of the right and left hand in the boys of 11-12 years. The results of the heart rate at the beginning of the pedagogical experiment in both age groups indicated that the young men had individual results that exceeded the age norms. We also found out that 40.0% of 11-year-old boys and 53.8% of the 12-year-old young men at the beginning of the pedagogical experiment have a low level of physical performance. The results obtained indicate a sedentary lifestyle, emotional stress, etc. The results of the pedagogical experiment indicate positive changes that have occurred in the young men aged 11-12 years under the influence of hiking tourism. A statistically significant difference ($p < 0.05$; $p < 0.01$) at the end of the pedagogical experiment was observed in both age groups in terms of the dynamometry of the right hand, heart rate at rest, lung capacity, and Ruffier index. In our opinion, the positive effect on the cardiovascular and respiratory systems is due to an increase in the volume of physical activity in the fresh air.

Table 1. Dynamics of indicators of the psychophysiological state of the young men aged 11-12 years under the influence of hiking activities (n = 23)

Indicators under study	Age, years	Nn	Before the pedagogical experiment		After the pedagogical experiment		±Δ, %
			\bar{X}	S	\bar{X}	S	
Body length, cm	11	10	148.2	4.98	151.8	8.16	2.4
	12	13	153.0	5.50	155.9	9.26	1.9
Body length, cm	11	10	40.2	8.32	42.5	10.47	5.4
	12	13	44.1	11.08	46.4	10.79	5.0
Chest girth, cm	11	10	68.8	6.18	69.9	7.16	1.6
	12	13	70.9	6.22	72.8	5.43	2.6
Chest girth during inspiration, cm	11	10	76.3	6.01	78.6	8.26	2.9
	12	13	79.1	7.01	80.2	7.12	1.4
Chest girth during expiration, cm	11	10	67.6	6.04	68.3	8.02	1.0
	12	13	69.9	6.86	71.2	6.21	1.8
Chest expansion, cm	11	10	8.6	1.82	8.8	2.11	2.3
	12	13	8.7	1.61	8.9	1.54	2.2
Right hand grip dynamometry, kg	11	10	12.3	3.17	13.8*	2.37	10.9
	12	13	15.0	3.91	16.3*	2.21	8.0
Right hand grip dynamometry, kg	11	10	10.3	3.60	10.9	5.03	5.5
	12	13	13.0	3.91	13.5	3.89	3.7
HR _{rest} , beats /min ⁻¹	11	10	92.8	6.25	88.2*	7.23	5.2
	12	13	89.4	7.86	85.1*	7.42	5.1
SBP, mm Hg	11	10	109.3	5.12	110.2	6.38	0.8
	12	13	110.5	5.86	110.7	6.84	0.2
DBP, mm Hg	11	10	65.1	6.84	65.4	5.49	0.5
	12	13	68.2	4.36	68.5	5.18	0.4
Ruffier index, nominal units	11	10	9.7	2.84	7.3**	1.38	32.9
	12	13	9.6	2.65	7.1**	1.24	35.2
VC, l	11	10	1650	136.4	1,995**	128.8	17.5
	12	13	1820	142.5	2,150*	132.6	15.3

Note: ± Δ, % - the difference at the end of the pedagogical experiment;

Note: * the difference is statistically significant at the level of p <0.05; ** the difference is statistically significant at the level of p <0.01

One of the criteria for the effectiveness of the hiking program was to evaluate the cognitive functions of the young men at the end of the pedagogical experiment and to conduct the comparative analysis of the results, which are presented in Table 2. An analysis of the results indicates that the cognitive function indices improved in the boys aged 11 and 12 years (p <0.01), in particular, the short-term memory capacity in the boys of 11 years old improved by 39.5% (p <0.01) and in boys of 12 years old by 43.3%. The indicators of the volume of the processed information in the 11- year-old boys, improved by 82.9 bits, which was 22.9% (p <0.01); in the 12-year-old boys - by 89.2 bits, which was 24.9% (p <0, 01).

Table 2. Dynamics of indicators of the psychophysiological state of young men aged 11-12 years under the influence of hiking training (n = 23)

Indicators under study	Age, years	Nn	Results before the pedagogical experiment		Results after the pedagogical experiment		±Δ, %
			\bar{X}	S	\bar{X}	S	
Short-term memory capacity (STMC), %	11	10	25.9	10.23	42.8**	5.41	39.5
	12	13	24.7	10.16	43.6**	4.19	43.3
Volume of the processed information (VPI), bit	11	10	279.8	64.31	362.7**	45.91	22.9
	12	13	268.4	59.62	357.6**	49.81	24.9
Simple visual-motor reaction to light, millisecond	11	10	379.5	55.81	335.8**	30.11	13.0
	12	13	375.7	60.93	332.4**	32.48	13.0
Simple visual-motor to sound, millisecond	11	10	386.4	48.33	340.2**	38.09	13.6
	12	13	395.7	65.69	341.5**	38.84	15.9
Complex choice reaction, millisecond	11	10	495.1	58.32	427.9**	28.54	15.7
	12	13	485.3	66.81	421.7**	41.12	15.1
Romberg test, second	11	10	6.1	3.27	15.3**	1.15	60.1
	12	13	5.8	2.12	14.9**	0.32	61.1

Note: ± Δ, % - the difference at the end of the experiment;

Note: ** the difference is statistically significant at p <0.01

The indicators characterizing neurodynamic functions also underwent significant positive changes. The results of simple visual-motor response in the boys of 11-12 years improved by 13.0% ($p < 0.01$). The time indicators of a simple visual-motor response to the sound of the 11-year-old boys decreased by 13.6% ($p < 0.01$), of the 12-year-old boys - by 15.9% ($p < 0.01$). Indicators of a difficult reaction of choice in young men improved by 15.7% and 15.3% ($p < 0.01$). The indicator characterizing the coordination skills of the young men was significantly changed. The average result in the boys aged 11 years improved by 9.3 s, which amounted to 60.1% ($p < 0.01$), in the boys aged 12 years, it increased by 9.1 s, which amounted to 61.1% ($p < 0.01$). Significant positive changes in the cognitive functions of the young men aged 11-12 years are due to the fact that practical training in hiking tourism paid great attention to mastering the skills of working with various sources of information, such as reading a map, skills to navigate the terrain, measure distances, determine the angle of inclination, etc.

To study the effect of hiking lessons on young men's physical fitness, we conducted a comparative analysis of changes in motor tests; the results are presented in Table 3. By the end of the pedagogical experiment, there was a statistically significant difference ($p < 0.05$; $p < 0.01$) in most of the studied indicators.

Table 3. Dynamics of indicators of physical fitness of the young men aged 11-12 years under the influence of hiking training (n = 23)

Indicators under study	Age, years	Nn	Results before the pedagogical experiment		Results after the pedagogical experiment		±Δ, %
			\bar{x}	S	\bar{x}	S	
Running 30m, sec	11	10	6.7	0.45	6.5	0.28	3.1
	12	13	6.5	0.57	6.3	0.31	3.2
Shuttle running 4 × 9 m, sec	11	10	12.5	1.15	11.6*	1.02	7.8
	12	13	12.3	1.86	11.4*	0.97	7.9
Bending forward from the sitting position, cm	11	10	1.9	1.11	2.1	1.23	9.5
	12	13	1.8	1.32	2.0	1.41	10.0
Standing long jump, cm	11	10	123.4	26.18	135.8*	18.32	9.1
	12	13	131.7	23.11	148.4*	19.48	11.3
Running in a steady pace without reference to time, m	11	10	530.6	87.32	821.7**	45.31	35.4
Running 2000 m race, min sec	12	13	5.32	0.32	5.07*	0.21	4.9
Sit-up from the back-lying position, times /30 sec	11	10	9.6	1.98	12.1*	0.64	20.7
	12	13	11.3	1.75	14.2*	0.55	20.4
Flexion and extension of arms in front lying support, times	11	10	6.1	1.64	9.3**	0.78	34.4
	12	13	8.4	1.97	10.6**	0.93	20.8

Note: ± Δ, % - the difference at the end of the pedagogical experiment;

Note: * the difference is statistically significant at the level of $p < 0.05$; ** the difference is statistically significant at the level of $p < 0.01$

The obtained average results of flexibility in both age groups indicate a low development of this quality and the inability of the young men to fulfil the standard for a positive score. The indices characterizing the speed qualities received insignificant positive changes, in the boys of 11 years the time to overcome the distance of 30 m decreased by 0.1 s, which is 3.1% ($p > 0.05$); in the boys of 12 years by 0.2 s which is 3.2% ($p > 0.05$).

The highest positive changes occurred in the indicators of motor tests characterizing agility, strength, endurance, and speed-strength. The statistically significant difference in both age groups is observed when performing tests: shuttle running 4x9 m ($p < 0.05$); standing long jump ($p < 0.05$); running 1,000 m race; in the 12 years old boys ($p < 0.05$) -sit-up from the back-lying position, times /30 sec ($p < 0.05$); in the boys aged 11 years - running in a steady pace without reference to time ($p < 0.01$); flexion and extension of the arms in the front lying support ($p < 0.01$). The improvement of motor skills in the young men aged 11-12 years can be explained by the application in practical classes of motor tasks to overcome the natural obstacles characteristic of pedestrian routes (forest obstructions, windbreaks, wind throw, scree, marshes, sand, water obstacles).

Discussion

An integral part of the education system in Ukraine is out-of-school education, which provides an opportunity for self-realization, the acquisition of various skills and knowledge of students and students.

In the system of out-of-school education, a significant role is performed by the institutions of the tourism and local history direction, and in them, the sports and tourism circles have a considerable place. Classes in sports and tourism clubs, participation in competitions contribute to the self-assertion of students, the

development of their leadership qualities, the formation of a sustainable desire for a healthy lifestyle. During tourist trips and excursions, children and young people learn the history of their native land, get acquainted with the monuments of history, nature and culture (Mikkonen, 2010; Mhanna, 2018).

One of the most popular areas of extracurricular work is now tourism and local history. Among the tourism and local history circles, a distinguished place is held by the groups of tourism and sports profile.

This activity contributes to the formation of a healthy lifestyle, physical hardening of pupils, strengthening their health, self-affirmation, education of leadership skills. At the same time, during hiking trips and competitions, pupils learn the history of their native land, the origins of national culture, their ancestry, and get acquainted with nature (Kazimierczak, 2013).

Given the above, we can state that as a result of the study, two groups of data obtained. Given the above, we can state that as a result of the study, two groups of data were obtained:

1. The data confirming the results of research of the national scientists that the average indicators of physical development, in particular, body length and body weight in the young men aged 11-12 years old are within the physiological standards; the indicators of dynamometry of the right and left hand in the 11-12-year-old-boys indicate the asymmetrical development and the average statistical result the right hand is significantly higher ($p < 0.05$) in both age groups (Andrieieva, 2017); the low level of physical activity has negative influence on the personal mental activity, in particular, on the short-term memory capacity (Erickson, 2011), on the information processing speed, on the volume of the processed information (Korobeynikov, 2001) and on the emotional state (Blagii, 2018). 2. The data complementing the scientists that in the process of tourism and local history work, the young people aged 11-12 years old develop the system knowledge and practical skills of preservation and development of self-regulation of active life activity (Kobenok, 2010; Galenko, 2011; Samoluk, 2012; Galenko, 2013; Ratkowski, 2018); optimization of health-improving and recreational activities of schoolchildren during extracurricular time is one of the ways to increase their functional state of the cardio-respiratory system (Tomenko, 2013; Vaskan, 2018); the introduction of hiking tourism in the health-improving and recreational activities of schoolchildren contributed to the positive dynamics of physical fitness indicators (Voitovich, 2010; Golubeva, 2018).

Conclusions

The high growth rate in the indices characterizing the cardiovascular and respiratory systems of young people of 11-12 years old is due to the use of pedestrian tourism facilities, which have a positive effect on the adaptive capabilities of the body, have increased the level of physical performance. One of the impact factors contributing to the positive dynamics of the studied parameters is a three-time class during the week, which overwhelmingly took place in the fresh air with active movement and the use of technical means. The highest impact of the program of tourism and local history is seen in the indicators characterizing the cognitive functions of the young people of 11-12 years old. The indicators of the short-term memory capacity, the information processing speed, reactions to light and sound have significantly improved ($p < 0.01$).

By the end of the pedagogical experiment, the young men of 11-12 years old have significant changes ($p < 0.05$; $p < 0.01$) in motor abilities, in particular dexterity, strength, speed-strength qualities and endurance. It can be explained by the fact that the "Physical Education" section of the hiking tourism program, pays much attention to the development of basic motor skills, necessary for the participation of schoolchildren in one-three-day hiking trips, or in a multi-day ranking sports country walk.

Conflicts of interest

The authors declare that they have no competing interests.

References

- Andrieieva O., Galan Y., Hakman A., & Holovach I. (2017). Application of ecological tourism in physicaleducation of primary school age children. *J of Physical Education and Sport*, 17 (1), 7-15. <https://doi:10.7752/jpes.2017.s1002>
- Blagii O., Berezovskyi V., Balatska L., Kyselytsia O., Palichuk Y., Yarmak O. (2018). Optimization of psychophysiological indicators of adolescents by means of sport orienteering. *J of Physical Education and Sport*, 18 Supplement Issue 1, 526-531. <https://doi:10.7752/Jpes.2018.S175>
- Buning R.J. (2018). Sport tourism development. *J of Sport & Tourism*, 1(2), 6-14. <https://doi:10.1080/14775085.2018.1548814>
- Erickson K.L., Voss M.W., Prakash R.S. (2011). Exercise training increases size of hippocampus and improves memory. *Proc. Natl. Acad. Sci*, 108, 3017-3022. <https://doi.org/10.1073/pnas.1015950108>
- Galan Y., Yarmak O., Kyselytsia O., Paliichuk Y., Moroz O., Tsybanyuk O. (2018). Monitoring the physical condition of 13-year-old schoolchildren during the process of physical education. *Journal of Physical Education and Sport*, 18(2), 663-669. <https://doi:10.7752/jpes.2018.02097>
- Galenko T.P. (2013). Innovative technologies of formation of the value attitude of the older teenagers towards their own health by means of tourism. *Actual Problems of Intellectual Property: Theory and Practice*, 34-36. Ukrainian.

- Galenko T.P. (2011). Valuable attitude of young people to their own health in the process of tourist-local lore work. *Humanitarian Bulletin of the Pereyaslav-Khmelnytsky State Pedagogical University named after Hryhoriy Skovoroda*, 20, 434-436. Ukrainian.
- Gibson H.J. (1998). Sport tourism: A critical analysis of research. *Sport Management Review*, 1(1), 45-76.
- Gibson H.J., Lamont M., Kennelly, M., Buning, R.J. (2018). Introduction to the Special Issue Active Sport Tourism. *J of Sport & Tourism*, 22(2), 83-91. <https://doi:10.1080/14775085.2018.1466350>
- Golubeva G.N., Smarchkov V.Y., Golubev A.I. (2018). Psychophysical training specifics in sport tourism. *Teoriya i Praktika Fizicheskoy Kultury*, (10), 67-69.
- Grimaldi-Puyana M., Sánchez-Oliver A. J., Alcaraz-Rodríguez V., y Pérez Villalba M. (2017). Satisfacción laboral de trabajadores de actividades deportivas y recreativas en turismo activo. *Espiral. Cuadernos del Profesorado*, 10(21), 140-148.
- Kazmierczak M, Ewa Melchrowicz-Moško E. (2013). Turystyka sportowa – specyfika i trendy rozwojowe [Sport tourism – a characteristic and development trends]. *Folia Turistica*, 28. Polish.
- Kobenok G.V., Kozinenko I.I. (2010). The Impact of Tourism on the Formation of Motivations to a Healthy Lifestyle of Students and Students. *Bulletin of Cherkasy University*, 191(3), 54-59. Ukrainian.
- Kokun O., Imas Y., Vovkohon A., Potop V., Korobeynikov G., Korobeynikova L., Gorashchenko A., Poleyeva-Secaryanu A. (2018). Physical education and sports as a tool for formation of students' psychophysiological readiness to their professional work. *Journal of Physical Education and Sport*, 18(2), 966-971. <https://doi:10.7752/jpes.2018.02143>
- Korobeynikov G.V. (2001). Interrelation of subjective representation of integrity and satisfaction with life with the state of cognitive functions in people of different ages. *Psychology of maturity and aging*, 1(13), 97-109. Russian.
- Kravchenko T.P. (2018). Specificity of formation in the senior adolescents value attitude to their own health in the process of tourist-local lore work. *Bulletin of Chernihiv National Pedagogical University. Series: Pedagogical Sciences*, 152(2), 88-92.
- Mhanna R. (2018). Sport tourism: new challenges in a globalised world. *J of Sport & Tourism*, 22(4), 349-351. <https://doi:10.1080/14775085.2018.1532948>
- Mikkonen J, Pasanen K, Taskinen H. (2010). Impacts of cultural events in Finland – Development of a Finnish event evaluation tool. *Scandinavian Journal of Hospitality and Tourism*, 9, 2-3.
- Paliichuk Y., Dotsyuk L., Kyselstia O., Moseychuk Y., Martyniv O., Yarmak O., & Galan Y. (2018). The influence of means of orienteering on the psychophysiological state of girls aged 15-16-years. *J of Human Sport and Exercise*, 13(2), 443-454. <https://doi.org/10.14198/jhse.2018.132.16>
- Pasichnyk V., Pityn M., Melnyk V., Karatnyk I., Hakman A., Galan Y. (2018). Prerequisites for the physical development of preschool children for the realization of the tasks of physical education. *Physical Activity Review*, 6, 117-126. <https://doi.org/10.16926/par.2018.06.16>
- Ratkowski W., Ratkowska J. (2018). Sports events as a determinant of sport tourism. *Baltic J of Health and Physical Activity*, 10(1), 86-94. <https://doi:10.29359/BJHPA.10.1.09>
- Samoluk A.A. (2012). Theoretical principles of formation of creative activity of students of the main school in the process of tourist-local studies work. *Pedagogical almanac*, 16, 42-49.
- Sobolev S., Rozhin S., Soboleva N., Ryabinina S., Ratueva O. (2017). Technique of indoors vertical rails “climbing” in sports tourism at individual distance. *Journal of Physical Education and Sport*, 17(3), 1078-1083. <https://10.7752/jpes.2017.03165>.
- Tomenko O. (2013). Relationship between the indicators of somatic health, motor activity, theoretical preparedness, mastery of motor activity and the motivational-value sphere of schoolchildren. *Sports Herald of the Dnieper*, 2: 53-57. Ukrainian.
- Van Rheenan D., Cernaianu S., & Sobry C. (2016). Defining sport tourism: a content analysis of an evolving epistemology. *J of Sport & Tourism*, 21(2), 75-93. <https://doi:10.1080/14775085.2016.1229212>
- Vaskan I., Moseychuk Y., Koshura A., Kozhokar M., Tsybanyuk O., Yarmak O., Galan Y. (2018). Comparative analysis of indicators of the morpho-functional condition of the young men aged 15-16 years during the process of physical education. *J of Physical Education and Sport*, 18(4), 2504-2508. <https://doi:10.7752/jpes.2018.04375>
- Voitovich I.M. Control of technical preparedness of pupils of specialized sports classes in tourism. *Physical education, sports and health care in modern society*, 11(3), 31-36.