

PSYCHOLOGY/PHYSIOLOGY

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Applied aspects of improving pupils' and students' adaptive capacity

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Abstract

Background. The stressful learning conditions in schools and universities demand improvement to pupils' and students' adaptive capacities. This necessitates the introduction of programs ensuring their mental health and effective learning.

Objectives. This research tests the monitoring of pupils' and students' psychophysiological states (PPS) as an effective way of controlling and improving their adaptive capacity.

Methods. Respondents were school pupils (n = 28) and university students (n = 44) from Ukraine. The monitoring was carried out over three months (school pupils) and eight months (university students). Two authors' methods of express PPS diagnosis [Kokun 2006] were used in the research: the scaled PPS self-assessment (indicators: states of health, activity, mood, fitness to work, life satisfaction, interest in learning, satisfaction with learning) and the technique of biogalvanometric pps monitoring (recording finger skin potentials).

Results. Results showed the existence of gender differences in pupils' and students' PPS, peculiarities to their PPS dynamics during long periods of study, and characteristic types of adaptation. The results obtained provided an opportunity to substantiate the recommendations for controlling and increasing pupils' and students' adaptation capabilities depending on the peculiarities of the individual dynamics of their psycho-physiological states, certain adaptation types and direct changes in the psychophysiological state indicators.

Conclusions. The results obtained have testified to the possibility of effective use of pupils' and students' PPS monitoring as a way of controlling and enhancing adaptation capability.

Introduction

One of the important tasks of education organization in schools and universities is provision of effective psychophysiological support for pupils and students. This is due to the fact that the requirements and conditions at learning exceed often their existing adaptive capacities [Makarenko *et al.* 2006; Grigoryeva, Shamionov 2014; Lee, Choi, Chae 2017]. At the same time, it should be borne in mind that age-related changes, the specifics of educational conditions and requirements at different educational institutions often lead to significant differences in adaptation responses between secondary school pupils and university students [Popescu *et al.* 2014; 2017].

Educational activities of school pupils and university students are usually related to acquiring, processing and communicating (oral, written) information through feedback channels and are characterized by high emotional stress, regular fatigue, periodic stress situations [Kokun 2012; Lee, Choi, Chae 2017; Rahmati 2014]. The main factor that causes their psychic overload and fatigue is informational stress, which means the need to process large amounts of information in a short time-frame [Dyrbye *et al.* 2008]. The following is also referred to as stress factors inflicting often a severe negative impact: misunderstanding or lack of knowledge on the subjects, lack of time, inappropriate nutrition, lack of motor activities, high stress during exam periods, conflicts with

teachers or lecturers [Grigoryeva, Shamionov 2014; Ped-ditzi, Spigno 2012]. It should be noted that influence of these factors can be different not only because of the above-mentioned age-related changes, the specifics of educational conditions and requirements at different educational levels, but also because of perceived family support, educational institution management, teachers' leadership abilities and social climate in a classroom [Devi, Mohan 2015].

As a result of these factors, school pupils and university students may experience a variety of health disorders and a range of psychological problems: depression, anxiety, sleep disturbances, emotional disorders, chronic fatigue, negative somatic symptoms, problems with eating and alcohol [Choi, Cho 2005; Hamdan-Mansour *et al.* 2014; Lee, Graham 2001; Wadson 2002].

Accordingly, there is an urgent need to introduce programs ensuring the mental health of pupils and students [Blair 2002; Cloninger 2008; Fazel *et al.* 2014; Lee, Choi, Chae 2017; Yamada 2000]. However, there are only a few studies concerning the psychophysiological support for pupils and students and they are mainly limited to application of a certain aspect of such support [Karpoukhina, Kokun, Zeltser 2008; Maralova *et al.* 2016; Podrigalo *et al.* 2016]. That is why we have offered to provide such support on the basis of PPS monitoring with the aim to control and improve adaptation capability. This approach corresponds to the modern *paradigm of education* [Cynarski, Blazejewski, Pasterniak 2016; Yermakova 2015].

The idea that effectiveness of various activities can be increased successfully through continuous monitoring of the corresponding criteria for these activities describing changes in human states (mental, psychophysiological, biological, etc.) with appropriate guidance of these states is supported greater and greater in the last decade [Karpoukhina, One-Jang 2003; Korobeynikov *et al.* 2011]. In particular, the importance of taking into account variations of mood states as a consequence of pupils' and students' academic stress or overload is pointed out [Hoferichter, Raufelder, Eid 2014]. Such an approach means, in essence, monitoring of a person's psycho-physiological states (PPS).

The concept of monitoring already becomes clear in scientific terminology and is widely used in various fields. PPS monitoring means a permanent and long-term tracking of PPS dynamics in accordance with different indicators to fix or predict moments of critical deviations from its optimal characteristics and to apply urgently corrective measures. Depending on activity specifics, studied persons and the monitoring objectives, different PPS indicators can be used [Anishchenko 2018; Brookhuis, Waard 2010]. PPS monitoring can be considered one of the key measures of psychophysiological support of activities, since existing PPS is one of the most important factors limiting activity success [Anishchenko 2018; Iermakov *et al.* 2016; Karpoukhina, Kokun, Zeltser 2008;

Korobeynikov *et al.* 2002]. Since two interrelated processes are combined in the monitoring – PPS diagnosis (control) and correction – they must be inseparable from each other. Diagnostic results are the basis for a decision about the necessity of correction, its type and dosage. And diagnostic methods can help us judge effectiveness of applied corrective means.

Individual psychophysiological features of a person should be taken into account during monitoring, as well as types and intensity of various factors affecting significantly PPS and their changes. It should be borne in mind that PPS is a very complex multi-level system, involving *selectively* components of various subsystems of a person's psycho-physiological structure; these substructures are united under the influence of a certain life *goal*. Therefore, PPS should be considered first of all in terms of compliance with the requirements of a particular activity [Anishchenko 2018; Bach *et al.* 2018; Kokun 2006].

The monitoring opens additional opportunities to improve activity efficiency, since information received from it, on the one hand, provides real opportunities for individualization, and on the other hand, allows us to determine precisely a time, character and dosage for necessary corrective measures. The logical result is optimization at the level of the PPS "productive" criterion, characterizing efficiency of a certain activity, and at the level of the "homeostatic" criterion, characterizing intensity of psychophysiological resources consumption and preservation of mental and physical health [Karpoukhina, Kokun, Zeltser 2008].

The article presents the research results on monitoring of pupils' and students' psychophysiological states. The performed research identifies the features and differences in adaptation to learning of different people, the dynamics of their psychophysiological states and ways to enhance adaptation capability of school pupils and university students. Moreover, we should note that our approach and procedure aimed at increasing of an individual's adaptation capability and effectiveness by monitoring their psycho-physiological state, which has been successfully tested by us, can be also used not only in the educational sphere but also at various professional fields, sports and fighting arts.

Methods

Participants

The research involved: 1) 28 school pupils of 12 years old (10 girls and 18 boys) of the 7th year from the general educational school No.10 in Kyiv; 2) 44 university students (29 women and 15 men) aged 19–25, of the 2 and 3 academic years from the National Academy of Fine Arts and Architecture (Kyiv). To evaluate the PPS monitoring procedure, we selected a sample of pupils and students,

since they perform the main common activity, for which monitoring was carried out, which was learning. Therefore, for example, the scaled PPS self-assessment (*see* Appendix) remains the same for both samples.

Procedure

The PPS monitoring of school pupils was carried out within three months (from March to May); and that of students was done during the academic year (8 months). Express PPS diagnostics was held once a week on Tuesdays or Wednesdays before the first lesson (8.15 – 9.00). The duration of the diagnostic procedure with the two methods used sequentially was up to 1 min per respondent. Totally, there were performed 12 series of studies with school pupils and 24 series of studies with students (some students took part in 12-22 series).

The studies were conducted with the permission of the institution's management, parents' permissions (for the school pupils) and personal consent of the participants.

Measures

Two authors' methods of express PPS diagnosis [Kokun 2006] used in the research:

1. The scaled PPS self-assessment [Kokun 2006]. Indicators were: states of health, activity, mood, fitness to work, life satisfaction, interest in learning, satisfaction with learning (the research form is provided in Appendix). The respondents were asked to evaluate subjectively the specified indicators of their states at the present moment by marking corresponding places on the non-graded scales (straight lines of length 100 mm) with a vertical line, taking into account that the left edge of the scale means minimum, and the right one means the maximum possible estimation of a certain characteristic. Quantitative indicators (from 1 to 100) were obtained by measuring distances in millimeters from the left edge of each scale to marked places.

This technique allows a researcher to evaluate quickly and accurately various PPS components (by choice of the researcher), including emotional, motivational and other components. The most important advantages of the technique are its convenience, flexibility, informational capacity, quickness in application, its possibility of classification and comparison of data obtained. It meets the main requirements of the psychodiagnostic methodology: scale intervals, validity, discriminatory power, availability of normative data. As for its reliability, such classical approaches as rehearsal or internal consistency cannot be applied in principle, because of their specific character. After all, the techniques are intended for repeated data acquisition in their dynamics, not for stable characteristics, and each of its scale measures a relatively independent indicator, which can be included and excluded depending on study objectives. For the same reason, only those types of

validity can be applied to the technique that are applicable in principle: obvious, constructive and competitive.

The technique of biogalvanometric PPS monitoring, recording finger skin potentials in microamperes (μA) and millivolts (mV) [Kokun 2006]. The diagnostic device consists of a digital multi-meter, 25 x 25 mm copper and zinc electrodes fixed on a plate made of an insulating material and two wires linking electrodes to contact terminals of the multi-meter. The diagnostic procedure is the following: the multi-meter switch is placed in "200 μ " position; a respondent is asked to press the pads of their middle fingers to the electrodes simultaneously and parallel to the table surface (the right hand is pressed to the copper electrode, the left hand is done to the zinc one). First, the maximum indicator value on μA display is recorded. After this, the switch is placed in "200m" position and the maximum indicator value in mV is recorded. During researching, we observed a constant temperature regime of 21-22 ° C in the diagnostic room.

Statistical analysis

For statistical analysis, we used SPSS 22.0.0 programming package. The data obtained in research have the normal distribution of studied data (One-Sample Kolmogorov-Smirnov Test). Independent Samples Student's T-Test and Pearson correlation coefficient were used. We analyzed significant correlations between the main groups of variables that were registered in the study.

Results

The results show that schoolboys, in comparison with schoolgirls, have, in average, 6 PPS indicators significantly higher among 9 registered indicators over the entire period of studies. As for students, even more indicators were higher: 8 out of 9 (Table 1).

It should be noted that the results obtained regarding the higher self-assessment and the finger skin potentials of males are consistent with the results obtained from the questionnaires and psychological diagnostics performed on the same sample in our pre-monitoring studies. In particular, women indicate a greater number of signs of fatigue because of learning efforts; they have higher levels of social frustration and personal anxiety and a smaller number of motor activities.

Another interesting tendency has been found: the schoolgirls show statistical correlations between learning successfulness and all self-assessment indicators ($r = 0,22 - 0,67$; $p \leq 0,01 - 0,001$) and finger skin potentials in μA and mV ($r = 0,23 - 0,25$; $p \leq 0,01$), while the boys do not have any statistical correlation between learning successfulness and these indicators. On the other hand, the boys show statistical correlation between all self-assessment indicators and finger skin potentials in mV ($r = 0,21 - 0,31$; $p \leq 0,01 - 0,001$), while corre-

Table 1. Generalized indicators of express PPS diagnosis of school pupils and university students

INDICATOR	Gender	School pupils					University students				
		n1	n2	S_x	$p \leq$	n1	n2	S_x			
Self-assessment of health	f	10	105	71,7	21,3	-	29	462	59,3	22,7	
	m	18	196	71,0	27,7		15	220	72,3	22,3	
Activity	f	10	105	68,4	22,1	0,05	29	462	61,9	22,4	
	m	18	196	74,2	22,5		15	220	69,5	26,2	
Mood	f	10	105	71,4	25,4	-	29	462	65,9	21,6	
	m	18	196	71,9	26,3		15	220	72,8	26,6	
Fitness to work	f	10	105	63,7	27,2	0,05	29	462	60,7	23,2	
	m	18	196	70,6	25,7		15	220	72,2	28,0	
Life satisfaction	f	10	105	79,5	23,7	-	29	462	64,8	24,9	
	m	18	196	81,0	20,0		15	220	67,6	28,7	
Interested in learning	f	10	105	60,4	32,8	0,01	29	462	63,9	23,5	
	m	18	196	70,6	25,5		15	220	79,3	23,7	
Satisfaction with learning	f	10	105	59,7	32,3	0,05	29	462	57,2	24,2	
	m	18	196	65,6	29,5		15	220	71,6	27,5	
Finger skin potentials	μA	f	10	105	10,2	3,9	0,01	29	462	6,3	3,2
	mV	m	18	196	13,4	9,4		15	220	9,7	6,4
		f	10	105	669,5	31,5	-	29	462	639,4	53,2
		n	18	196	674,0	42,3		15	220	660,4	48,1

Note: n1 – number of the respondents; n2 – total number of measurements.

lations between self-assessment indicators and finger skin potential for girls are insignificant. Such patterns, in our opinion, are due to the fact that PPS self-assessment made by girls is more subjective and largely depend not on their objective status, but on their success in learning (the relations between learning successfulness and self-assessment have a character of mutual influence, and learning successfulness dominates). As for boys, on the contrary, PPS self-assessment does not depend on learning successfulness and is more objective as for the existing PPS parameters (as evidenced by the reliable correlation between self-assessment and objective finger skin potentials in mV).

As for the university students, gender differences in self-assessment and finger-skin potentials are manifested in the fact that men had a significant number of reliable correlations between learning successfulness and self-assessment ($r = 0,16 - 0,28$; $p \leq 0,05 - 0,001$), as well as between finger skin potentials in μA and self-assessment of their states of health, activity, fitness to work and interest in learning ($r = 0,17 - 0,28$; $p \leq 0,05 - 0,001$). As for women, learning successfulness correlates reliably with only three indicators of self-assessment: activity, fitness to work and creative inspiration, and to a lesser extent ($r = 0,12 - 0,22$; $p \leq 0,05 - 0,001$). The only reliable link between self-assessment and finger skin potentials for women is between their state of health and mV ($r = 0,18$; $p \leq 0,001$).

Thus, we can conclude that PPS self-assessment of male university students reflects in a much greater degree their objective status and associated with educational success. The links between learning successfulness and self-assessment have the character of mutual influence,

but in this case, unlike school pupils, objective psychophysiological states prevails over successfulness.

The second analytical stage was aimed at determining the *peculiarities* of the respondent's PPS dynamics. The performed analysis has shown that the pupils' general tendency in the 12 series of studies is: as a rule, the best self-assessment indicators and finger skin potentials for girls and boys were recorded after two periods of rest from learning (after spring vacation and the equal holiday period), as well as in the last series of studies, at the end of the school year. And the worst indicators were recorded just before the vacation and holidays.

As for the university students, the indicators of health, activity, mood, and fitness to work, as a rule, increased somewhat for several weeks after the beginning of the academic year. Then one and a half months were held at a relatively stable level, after which they began to decrease. On the session eve, there was a restoration of the indicators to their original level. Approximately the same dynamics was recorded in the second semester. The men's tendency to indicator increasing before the session was more pronounced than that of women. Life satisfaction during the first semester from the beginning of classes to the beginning of the session, was constantly decreasing ($r = -0,18^1$; $p \leq 0,001$), while its dynamics during the second semester was wavelike with a tendency toward improvement ($r = 0,16$; $p \leq 0,001$). The students'

¹ Here and below the correlations of certain diagnostic indicators for the entire sample are shown with the serial number of the study series (12 series of studies with school pupils and 24 series of studies with students).

interest in learning and satisfaction with life during the two semesters gradually decreased, reaching the lowest level about two weeks before the examination session, and then significantly restored on the session eve, but did not reach still the original level.

Both finger skin potentials were gradually reduced during the first semester: μA ($r = -0,16$; $p \leq 0,001$), mV ($r = -0,31$; $p \leq 0,001$), reaching the lowest values in the winter, and gradually increased during the second semester: μA ($r = 0,29$; $p \leq 0,001$), mV ($r = 0,44$; $p \leq 0,001$). Such results indicate a seasonal variation of the PPS bio-energy component, which is completely natural. But it should be borne in mind, because it is obvious that there is a need for additional optimizing measures aimed at preventing the negative effects of students' adaptability reducing them in winter.

The third stage of the respondent's PPS monitoring result analysis was aimed at determination of the respondent's adaptive types. This analysis allowed us to distinguish two main adaptation types of pupils and students: the "stable" type (characterized by relatively stable PPS dynamics for a long period of time) and the "unstable" one (unstable dynamics), which, in turn, can be further divided to several subtypes. These types are based on the systemic approach to evaluation of human psychophysiological states substantiated by Karpoukhina and One-Jang [2003].

As for school pupils, the "stable-improvement" subtype is characterized by the steady PPS dynamics with a certain tendency toward its improvement, and the "stable-deterioration" one has tendency to deterioration. The "unstable-improvement" adaptive subtype show unstable dynamics but with some tendency to improvement, and the "unstable-deterioration" subtype has tendency to deterioration.

As for students, the "stable-high" subtype is characterized by mostly high PPS diagnostic indicators, the "stable-medium" subtype can be described by average indicators, and the "stable-low" subtype is characterized by low indicators. And, accordingly, the "unstable" adaptive type is characterized by unstable PPS dynamics, the "unstable-high" subtype can be described by mostly high PPS diagnostic indicators, the "unstable-medium" subtype is characterized by average and "unstable-low" subtype is characterized by low indicators.

The most adaptive and favorable subtype is "stable", and unfavorable one is "unstable". It is people with the latest subtype of adaptive response require most urgently individual rationalization of their education and leisure regimes, as well as increasing their adaptive capacity with physical education to develop their endurance.

Discussion

Similar to the findings of our study, gender differences concerning the diagnostic indicators of men, primarily

in terms of self-assessment, are often recorded in the studies of various scholars [Marchenko 2016; Yermakova 2015] and should be taken into account at result analysis. In general, the obtained results of self-assessments are higher than the average value, and are close to those obtained by Hamdan-Mansour *et al.* [2014]. In contrast, Podrigalo *et al.* [2016] recorded the fact that the subjective feelings of most students can be evaluated as negative. The results obtained by Grigoryeva and Shamionov [2014] regarding importance of academic motivation and emotional well-being of pupils as important factors for their academic adaptation are consistent with the obtained in our research statistical correlations between learning successfulness and all self-assessment indicators of girls-school pupils.

Our conclusion as for the fact that PPS self-assessment made by girls is more subjective and largely depends not on their objective status, but on their success in learning, and on the contrary, boys' PPS self-assessment does not depend on learning successfulness and is more objective as for the existing PPS parameters is near to the conclusion that there are significant gender and psychophysiological differences among pupils made by Yermakova [2015]. Podrigalo *et al.* [2016] has shown a rather high physiological price of students for their progress in learning, which is corresponds to a large extent to the determined by us significant decline of the university students' indicators of health, activity, mood, and fitness to work with the approaching semester end and the examination session beginning.

An important practical aspect of our work is the opportunity to use the PPS monitoring results in order to increase pupils' and students' adaptation capability. Thus, in the case of a significant decrease in self-assessment indicators of various PPS indicators, it is necessary to determine exactly existing objective and subjective causes for this: deterioration of body physical conditions and health, deterioration of relations with classmates, friends, teachers, etc., deterioration of learning successfulness, occurrence of unfavorable family circumstances, etc. Finger skin potential reduction indicates PPS deterioration on the bio-energy level, and as a consequence, reducing of a body's resistance to diseases, reducing of the potential ability to bear educational and physical loads.

If there is deterioration of indicators related mainly to the psychological and socio-psychological spheres, the optimization should be carried out with the methods appropriate to these areas. If pupils' PPS deterioration appears due to decrease of their bio-energy level and their health, then the necessary measures should be applied. So, the most universal recommendation is: to reduce the load and to rest. It may also be recommended to seek medical advice and undergo a medical examination, to have a physical therapy, to prescribe general tonic and immune stimulating drugs, etc.

Rahmati [2014] notes that one of the preventive ways against academic exhaustion is choosing of a challenging purpose, which leads to higher self-efficacy and lowered exhaustion. Hamdan-Mansour *et al.* [2014] recommend faculty and university administrators to enhance student-faculty interactions at the universities, so that faculties will have a significant role in supporting and promotion of students' academic accomplishment. Yamada [2000] proposes mental health promotion programs for schools. In many cases, adaptation capability increasing and restoring of PPS optimal characteristics can be achieved without use of special methods, but also with bodily exercises [Cynarski 2014; Kriventsova *at al.* 2017; Zuoziene 2013].

In order to determine correctly pupils' and students' adaptation types and to decide on the need to use certain optimization methods, it is necessary to consider in each case by analyzing an individual's PPS dynamics: 1) how much PPS indicators in absolute values differ from the average values that are characteristic for a particular gender-age group; 2) how the dynamics of individual indicators differ from the PPS dynamics characteristic for the corresponding gender-age group; 3) existence, number and magnitude of deviations of various PPS indicators from the individual optimal characteristics. It is also necessary to take into account the aforementioned gender features of the PPS diagnostic indicators, in particular the fact that girls' self-assessments are more subjective. Yermakova [2015] also stressed necessity to take into account significant gender and psychophysiological differences of pupils.

Reduced PPS self-assessments by 20-30%, and finger skin potentials by 5 - 10% from an individual norm can already be regarded as an alarm sign, larger lowering of these indicators is critical. In this case, there is an urgent need to optimize a person's PPS to prevent possible adverse consequences for his/her mental and physical health. Such optimization can be done by providing some recommendations and (or) using optimizing methods.

Of course, PPS monitoring of all pupils or students of a particular educational institution is practically very difficult, given the time and necessary efforts. Therefore, in practice it is expedient to monitor PPS of persons who need it most, if they have a reduced level of adaptation capability and a very unstable PPS type. Their number can be 5 - 15% of the total.

The limitations of our research are: 1) the organizational and educational peculiarities in the institutions where the research was conducted; 2) possible influence of the researcher who carried out all procedures; 4) circadian rhythms and time of day; 5) specific features of the methods used in the research. Also, we must consider in future studies the possible influence of the chronopsychological and chronobiological variables.

In our opinion, further development of use of pupils' and students' PPS monitoring as a way of adaptation

capability controlling should consist in creation of computerized PPS monitoring systems that would enable researchers to shorten registration, processing and to improve storage of pupils' and students' PPS indicators, as well as to give a prompt feedback and recommendations for improving their adaptation capability.

Conclusions

The results obtained have testified to the possibility of effective use of pupils' and students' PPS monitoring as a way of controlling and enhancing adaptation capability in accordance with the previously substantiated approach [Karpoukhina, Kokun, Zeltser 2008].

During the conducted monitoring of the pupils' and students' psycho-physiological states, gender differences in their PPS, peculiarities to their PPS dynamics during sufficiently long periods of learning were determined, adaptation types characteristic for school pupils and university students were determined.

The conducted research provided an opportunity to substantiate detailed recommendations concerning the methods of pupils' and students' adaptation capability controlling and enhancement; these methods depend on peculiarities of their individual PPS dynamics, a certain adaptation type (subtype) inherent to each of them, direct quantitative changes of various PPS indicators etc.

In the future, it is advisable to create computerized PPS monitoring systems that would allow a researcher to shorten registration and processing and to improve storage of pupils' and students' PPS evaluations, as well as to present quickly feedback and recommendations for enhancing adaptation capability. In addition, the authors plan to continue research on the use of psycho-physiological state monitoring in order to increase an individual's effectiveness at various professional fields, combat sports and martial arts.

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Appendix

the worse _____ app _____ the best
 STATES OF HEALTH
 the lowest _____ the highest
 ACTIVITY
 the worse _____ the best
 MOOD
 the lowest _____ the highest
 FITNESS TO WORK
 the lowest _____ the highest
 LIFE SATISFACTION

Fig. 1. A fragment of the form of the express PPS diagnosis with a respondent's estimates

Stosowane aspekty poprawy zdolności adaptacyjnych uczniów i studentów

Słowa kluczowe: monitorowanie, stan psychofizjologiczny, zdolności adaptacyjne, uczniowie, studenci

Abstrakt

Tło. Stresujące warunki nauki w szkołach i na uniwersytetach wymagają poprawy zdolności adaptacyjnych uczniów i studentów. Wymaga to wprowadzenia programów zapewniających im zdrowie psychiczne i skuteczne uczenie się.

Cele. Przeprowadzone badania testowały monitorowanie stanów psychofizjologicznych uczniów i studentów (PPS), jako skuteczny sposób kontrolowania i doskonalenia ich zdolności adaptacyjnych.

Metody. Respondentami byli uczniowie (n = 28) i studenci (n = 44) z Ukrainy. Kontrola została przeprowadzona w ciągu trzech miesięcy (wśród uczniów szkół) i ośmiu miesięcy (wśród studentów). W badaniu wykorzystano dwie autorskie metody wyrażania diagnozy PPS według Kokuna: skalowaną samoocenę PPS (wskaźniki: stany zdrowia, aktywność, nastrój, gotowość do pracy, zadowolenie z życia, zainteresowanie nauką, zadowolenie z nauki) oraz technikę monitorowania PPS biogalwanometrycznego (rejestrwanie potencjału skóry palców).

Wyniki. Wyniki wykazały istnienie różnic w PPS ze względu na płeć uczniów i studentów, specyfikę ich dynamiki PPS w długich okresach badań oraz charakterystyczne rodzaje adaptacji. Uzyskane wyniki dały możliwość uzasadnienia zaleceń dotyczących kontrolowania i zwiększania zdolności adaptacyjnych uczniów i studentów w zależności od specyfiki indywidualnej dynamiki ich stanu psychofizjologicznego, niektórych typów adaptacyjnych i bezpośrednich zmian wskaźników stanu psychofizjologicznego.

Wnioski. Uzyskane wyniki świadczą o możliwości efektywnego wykorzystania kontroli PPS uczniów i studentów, jako sposobu monitorowania i wzmacniania zdolności adaptacyjnych.