БИОЛОГИЧЕСКАЯ АНТРОПОЛОГИЯ

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THE MAIN DIRECTIONS OF RESEARCH OF PHYSICAL DEVELOPMENT IN THE CONTEXT OF PSYCHOLOGY, PSYCHOPHYSIOLOGY, GENETICS AND SPORTS ANTHROPOLOGY: A REVIEW BASED ON THE ARTICLES PUBLISHED IN «LOMONOSOV JOURNAL OF ANTHROPOLOGY»[1] FOR THE LAST 15 YEARS

Introduction. *This work continues the series of articles devoted to the assessment of the main directions of auxology development in Russian anthropology. This part presents and describes the work of the staff of the Research Institute and Museum of Anthropology of Lomonosov Moscow State University, the Department of Anthropology of the Faculty of Biology of Lomonosov Moscow State University, as well as the Russian University Sport (SCOLIPE) and the Federal Science Center of Physical Culture and Sport (VNIIFK).*

Materials and methods. *In this part of the work, articles devoted to the comprehensive assessment of the research of physical development in the context of psychology, psychophysiology, genetics and sports anthropology, which were published in the «Lomonosov Journal of Anthropology (Moscow University Anthropology Bulletin)» from 2009 to 2022 were used as a source of information.*

Results and discussion. *The described works evaluate, firstly, the psychosomatic connections of self-esteem and soma parameters that determine it, as well as the specifics of the processes of growth and adaptation in biological and psychological aspects. Secondly, the intra-group variability of neurophysiological parameters (EEG parameters) and the analysis of their correlations with somatic indicators are considered. Thirdly, the contribution of genetic factors to the development of morphological trait systems, primarily associated with increased body weight and obesity, is evaluated. In addition, the results of studies devoted to the search for predictors of sports success and the analysis of the physical status of athletes of various specializations are presented.*

Conclusion. *The number of works similar to those described in this review is steadily growing every year, which suggests an increasing integrative nature of anthropological research.*

Keywords: biological anthropology; social anthropology; genetic variability; anthropological variability; 7-20 years; schoolchildren and students

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[1] Before 2023 parallel name – «Moscow University Anthropology Bulletin».

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Introduction

In the final part of the work on assessing the areas of interest of domestic auxologists, the main attention is focused on not so classical, but no less important aspects that are as interdisciplinary as possible. The aim was to picture the directions in the study of psychological, psychophysiological and genetic aspects of auxological researches as well as of the anthropology of sport. The number of these works is not so large, but as this study has shown, it is steadily growing every year, so it can be concluded that anthropology is becoming an increasingly interdisciplinary science also in our country.

Psychological and psychophysiological aspects of auxological research

First of all, it is necessary to note the work based on the results of complex anthropological and psychological testing of 124 Russian girls and 74 boys aged 20 to 23 years. It was shown that the majority of girls (54%) and 42% of boys are characterized by satisfactory morphophysiological adaptation, about 30% of the surveyed of each sex entered the group with functional stress. Unsatisfactory adaptation was recorded 3 times more often in boys (20%) compared to girls (6%). According to the results of the assessment of general psychological adaptation, good indicators were noted in 66% of boys and 44% of girls. At the same time, representatives with stress of general psychological adaptation among girls were 1.5 times more common (p<0.01), compared with boys (56% and 34%, respectively). The results of the analysis of the relationship between the level of cortisol and various stress resistance indicators showed a stable tendency to increase the level of salivary cortisol with increased neuroticism, situational and basic anxiety and a simultaneous decrease in psychological adaptation indicators, which corresponds to the physiological effect of this hormone. Boys and girls with high levels of salivary cortisol are characterized by relatively smaller skeletal dimensions, reduced subcutaneous fat deposition, low active cell mass (an indirect indicator of relative inactivity), good adaptation to excessive passive rest and reduced adaptation to high energy consumption. If we talk about the joint variability of morphophysiological and psychological adaptation indicators in the surveyed boys and girls, it is shown that with an increase in

the muscular component of the physique, psychological adaptation improves in both sexes and indicators of neuroticism, situational and basic anxiety decrease. Deterioration of general psychological adaptation is observed in boys and girls with small skeletal size and reduced fat deposition (gracile physique), low active cell mass (an indirect indicator of relative inactivity) and high levels of salivary cortisol [Negasheva, Manukian, 2016].

Among the psychological characteristics tested in anthropological studies, a special place is occupied by self-esteem, which is considered the most important indicator of a person's psychological well-being. Taking into account the fact that self-esteem and psychosomatic connections identified on its basis vary depending on age, gender and social status, it can be assumed that the structure of psychosomatic connections is an independent and significant group characteristic. To test this assumption, the work compares the psychosomatic connections found in girls and boys aged 12–15 years, 16–17 years, as well as between the ages of 18 and 28 years. It was revealed that in the group of girls aged 12–15, there are small negative correlations between self-esteem and basic body size; in boys of this age, the correlation coefficients are close to zero. In adolescents aged 16–17 years, the direction of psychosomatic connections and their intensity coincide for both sexes: the correlation coefficients between the self-esteem indicator and morphological signs are quite high in absolute value, negative in sign and reach the level of statistical reliability in several cases. In the group of girls aged 18-28, there is a weakening of psychosomatic connections, but their direction remains the same, which the authors consider as an indicator of positive social adaptation of older girls compared with teenage girls aged 16–17. In young men aged 18-28, the direction of relations is changing in a positive direction. As young men grow up, masculine physique features begin to have a noticeable positive effect on their self-esteem. The results obtained in the work complement and expand modern ideas about the peculiarities of individual age stages, as well as about the gender specifics of the processes of growing up and social adaptation, confirming the importance of studying the structure of psychosomatic connections for a deeper characterization of individual sex-age and social samples [Bakholdina

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et al., 2017]. Analysis of the dynamics of morphology and psychosomatic relationships in two age samples of young people allows us to conclude that girls and boys of the older group demonstrate a significant increase in fat deposition, which in the female sample is combined with a slight decrease in the degree of musculature development. In the male sample, there is an age-related trend in the formation of an abdominal type of fat deposition. The transition from adolescence to adulthood is accompanied by a decrease in the level of negative and an increase in the level of positive psychosomatic connections. The analysis of the age dynamics of psychosomatic connections indicates a general psychological stabilization occurring during the considered age interval. The authors propose to consider the results obtained as evidence of the intensity of transformations occurring during the transition from adolescence to second adulthood, complementing and expanding modern ideas about this period of ontogenesis [Bakholdina, Blagova, 2020].

If we talk about the indicator that makes the greatest contribution to the self-esteem of the adolescent population, then it is necessary to recall the BMI, which determines the ideas of this age group about "normal" and "overweight". A survey of Russians in the Arkhangelsk region (Northwest of Russia) allows us to conclude that among the asthenoid-thoracic-muscular-digestive types of the constitution, satisfaction with the figure in girls significantly decreases. At the same time, almost all girls of the asthenic constitution and only 50% of girls of the thoracic constitution consider their weight to be "normal". If we talk about the muscular and digestive types, then in this case they want to reduce the weight by 2/3 and almost all of the surveyed, respectively. Boys of the digestive constitutional type in 2/3 of cases consider their figure as "satisfactory", muscular and thoracic – in almost half and in 2/3 of cases, respectively, as "good". Based on the results obtained, the author concludes that the interpretation of BMI in the context of self-assessment of the adolescent contingent requires the development of standards that take into account, among other things, the ethnicity of the subject, the level of his puberty, as well as the constitutional type [Zadorozhnaya, 2016].

A comparison of the relationship between morphological features, self-esteem indicators in the field of physical attractiveness and the choice of a strategy for modifying one's own body of schoolchildren from different regions of Russia (Northwest and Southwest) revealed reliable relationships between self-esteem indicators and the examined person's belonging to a certain constitutional type, as well as the value of BMI. There is a higher and increasing with age criticality of girls of all ages in relation to their bodies, a greater interest in controlling their weight compared to boys. The most important parameter of self–esteem for girls is weight, and for boys – body height. The similarity of the standards of the ideal figure in high school girls of the surveyed regions was found initial indicators of self-esteem [Zadorozhnaya et al., 2015].

If we talk about the social aspect of the system of psychosomatic connections as one of the complex group characteristics, it should be noted the study of Russian and foreign students studying at Moscow universities. This work was carried out within the framework of the inter-university cooperation devoted to the study of the problems of adaptation of foreign students to life and study in Russia in line with biological and social impacts on microevolutionary processes in modern populations. It was shown that in the group of male foreign students, the intensity of psychosomatic connections is low, none of the private self-assessments stands out as the most significant. At the same time, Russian students demonstrate a great connection between morphological and psychological characteristics, the most significant in this case is the self-assessment of other people's attitudes. It is in this area that the negative perception of such features of one's own body as the level of fat deposition or macrosomia manifests itself. In general, according to the intensity and direction of psychosomatic connections, the authors conclude that there is a fairly high level of adaptive tension in this cohort. In groups of girls, the analysis is more informative: for foreign students, among all private self-assessments, the most significant is the assessment of their own intelligence, which reflects a real concern about not being able to cope with learning in a foreign language in unfamiliar conditions. Moreover, the lowest estimates of this parameter are characteristic of girls with a larger body weight and large girth parameters. The intensity of psychosomatic connections among Russian students turns out to be slightly

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higher than among foreign boys and is more related to the "happiness" parameter: girls with an extreme distribution of fat deposition, with a moderately developed endomorphic component and a more gracile skeleton feel happier. The authors conclude that the vectors of psychosomatic connections in the sample of foreign students may reflect traditional national ideas about the relationship of body features with indicators of health and attractive appearance. The predominance of negative relationships for foreign girls can be considered as evidence of a high level of adaptive stress in a difficult social situation associated with the need to adapt to unusual living conditions. The approach proposed in the paper can be considered as a new promising method for the comprehensive study of socially and ethnically diverse samples [Bakholdina, Titova, 2018].

A separate interest of auxological research is the assessment of intra-group variability of neurophysiological indicators (EEG parameters) and the analysis of paired (separate) correlations of neurophysiological and somatic indicators. Thus, the pilot work is to analyze the data of 33 boys and 65 girls, for whom detailed questionnaires, standard anthropometry, psychological tests, as well as electroencephalogram registration (10 leads, 4 ranges) were conducted. First of all, a "systematic" difference between the values of asymmetry and kurtosis for most of the considered EEG indicators from the values characteristic of the normal distribution was revealed. The vector of intersex differences for most EEG parameters has an opposite orientation compared to somatic signs, which confirms the well-known fact of greater severity of brain activity in women. The frequency of non-random associations of somatic signs and EEG parameters does not exceed 5% of the threshold for girls (4.9%) and is even less significant for boys (2.3%). The largest number of non–random correlations of EEG parameters were revealed with longitudinal and transverse skeletal dimensions, the smaller number with indicators of subcutaneous fat deposition and body weight. This contrast is especially significant for the male half of the sample: in young men there were no associations of EEG parameters with body weight at all, and with skinfolds only in two cases. The greater number of associations of EEG parameters with the skeletal component of the soma is in good agreement with the fact that the genetic factor

dominates in the variability of the EEG, and the genetic determinism is also strongest in the variability of skeletal sizes compared with the variability of the muscular and especially fat component of the soma. The largest number of non-random connections of soma and brain activity is recorded in the alpha range of the EEG, i.e., in the resting range, and here sex differences are especially noticeable – 53 non-random connections in girls compared with 23 in boys, or in percentages: 6.0% and 2.61%, respectively. The level of physiological and somatic correlations for girls ranges from R = 0.4–0.5, for boys higher – R=0.6–0.7. The number of intersystem connections of neurophysiological and somatic parameters is expected to be small, indicating the well-known autonomy of the considered systems of signs within the integrity of the organism and the independence of their intra-group variability. Their number, or the reliability of predicting the parameters of brain activity by somatic signs, increases from male to female, in the case of skeletal sizes and for the alpha range of EEG [Gorbacheva et al., 2016].

The second stage of this work, conducted on a more extensive sample (62 boys and 130 girls) with the involvement of a larger set of EEG parameters (including power and coherence), revealed the following patterns. The percentage of non–random psychophysiological connections, summed up over all the studied EEG ranges, is 6.5% in boys and 9.7% in girls. In girls, a large frequency of reliable psychophysiological correlations falls on the theta and alpha ranges, in boys – on the beta range. In girls, the indicators "independence" and "modeling" of the self-regulation test have a greater number of reliable connections with EEG parameters, these connections are mainly in the alpha range of the EEG; in boys, EEG connections predominate, also mainly in the alpha range, with the parameter "independence" and with the level of personal anxiety. At the same time, the number of reliable connections of somatotype components with EEG parameters is 2.6% in girls and 11.3% in boys, the number of psychosomatic connections has a comparable level in girls – 6.7%, and has not been revealed for boys. The level and frequency of reliable correlation coefficients of somatic signs, EEG parameters and psychological characteristics indicate trends in the joint variability of the parameters of the three systems of signs, although they do not generally allow us to

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talk about the reliability of the prediction of individual psychological properti [Fedotova et al., 2017].

The third stage of the study consisted in assessing psychophysiological, psychosomatic and physiosomatic associations for a sample of practically healthy young women using factor analysis methods. To obtain an integrated picture of the connections of the three feature systems, four combinations were used: somatic and EEG parameters, somatic indicators and psychological characteristics, EEG parameters and psychological characteristics, simultaneously all three feature systems. Based on the results obtained, the authors conclude about the relative independence of the intra-group variability of the indicators of the three feature systems and postulate the autonomy of the variation of the indicator complexes within each of the systems under consideration. So, within the morphological system of signs, longitudinal skeletal dimensions and fat deposition indicators independently vary, within the neurophysiological system – EEG power and coherence indicators, coherence indicators for different sub-ranges of the alpha rhythm of the EEG. The feedback of indicators of personal anxiety and indicators of self-regulation within the psychological system of signs is also shown [Fedotova et al., 2018].

Genetic aspects of auxological research

In the context of the rapidly growing percentage of overweight and obese children and adolescents, comprehensive studies evaluating the contribution of genetic factors to the development of increased BMI values deserve the most attention. No less interesting are the works devoted to the analysis of polymorphism of some other genes, the expression products of which affect the characteristics of physical development.

One of the first studies of this kind published on the pages of our publication is the work on the assessment of the relationship of the polymorphism of the apolipoprotein E gene (*APOE*) with soma indicators [Spitsyn et al., 2009]. In the examined group of Moscow students, the authors identified 5 polymorphic variants that occur with the same frequency in individuals of both sexes. According to the results of the canonical analysis of the combined sample, differences in *APOE* genotypes were confirmed only for the complex of skinfolds. Two of the obtained five polymorphic variants (4/4 and 2/4)

are characterized by increased fat deposition with its predominant localization in the body area. The homozygous variant (genotype 4/4) associated with elevated cholesterol levels is characterized by the maximum thickness of skinfolds.

Studies in the field of anthropogenetics and functional genomics have revealed the genetic determinants of increased fat accumulation and, as a consequence, the development of obesity in children and adolescents aged 10–17 years living in the Arkhangelsk region. A molecular genetic analysis was performed to identify associations between *T/A* (*rs9939609*) polymorphism of the *FTO* gene, as well as *C/A* (*rs696217*) polymorphism of the *GHRL* gene and the risk of obesity. Analysis of the frequency of occurrence of these genes in the three formed subgroups indicates the presence of non-random differences in the *FTO* gene associated with increased fat deposition. Thus, for subjects with at least one minor A-allele of this system in the genome, higher indicators of fat mass determined by the results of bioimpedance analysis, as well as a large thickness of skinfolds, are detected [Bondareva, Godina, 2013].

A study conducted by the same authors on a similar topic using another group (the youth of Saransk) confirmed the fact that the frequency of occurrence of the *FTO* gene genotypes in the examined sample corresponded to the Hardy-Weinberg distribution and, in general, repeat the distribution for European populations. Stable associations between the polymorphism of the *FTO* gene and some indicators characterizing the features of the physique, variations and topography of subcutaneous fat were revealed for young men: representatives of the AA genotype are characterized by relatively higher values of the waist circumference/hip circumference index and a tendency to increased overall fat deposition with a tendency to its localization mainly on the abdomen area. In the female sample, the listed features were found at the trend level, which the authors associate with a more active lifestyle [Bondareva et al., 2016].

It is interesting to study the polymorphism of three genetic systems: transforming growth factor (*TGFb1*), insulin-like growth factor I (*IGF I*) and insulin-like growth factor (*IGF II*) and their relationship with physique features and rates of skeletal maturation in children and adolescents. Comparison of

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patients with scoliosis and the control group allowed us to conclude that there were statistically significant differences in both genotypes and alleles of the transforming growth factor beta-1 (*TGFb1*) system. Sex differences in the genotype distribution frequencies of the *IGFII +3123* locus were revealed. When comparing the frequency of occurrence of *IGFII +3123* genotypes and alleles in cohorts of patients with idiopathic scoliosis and conditionally healthy girls, a connection was established with a high level of reliability: in a subgroup of patients, the AA genotype is significantly less common than among conditionally healthy. Associations with body types in boys have been established for polymorphism of this gene. Differences between genotype frequencies in the groups of boys with asthenic and normosthenic physiques also turned out to be statistically significant [Spitsyn et al., 2012].

Sports anthropology in the context of auxological studies

Physical activity of varying intensity has a significant impact on the development of children and adolescents. From this point of view, studies on the assessment of morphofunctional characteristics of athletes of different ages are worthy of attention.

One of the first articles of this orientation published on the pages of our publication was the work on identifying morpho-functional features in young sambo wrestlers aged 17–20 years living in the northern and southern regions of the Altai Mountains. Athletes of the low-mountain northern regions of the Altai Mountains are distinguished by a longer body height and weight, higher values of the chest circumference, compared with athletes of the high-mountain southern Altai Mountains. Among the former, there are more people with a hypersthenic type of physique, they have higher indicators of muscle strength (hand strength and standing strength) and better indicators of respiratory function compared to sambo wrestlers in the south of the Altai Mountains. There are three main reasons that cause differences in morphofunctional indicators in sambo athletes from the North and South of the republic: extreme climatic conditions, environmental pollution and socio-economic instability of society [Makhalin et al., 2011].

The study of the features of the somatic development of fencers aged 10–18 years during the period of growth and puberty in comparison with children of the same age who do not play sports revealed the following patterns. Athletes differ from the control group in a number of traits that affect athletic performance: body height and limb length, larger than that of control, help to achieve success in the possession of weapons; wider shoulders and pelvis contribute to the most stable position of the body on the track and the most free movement of the upper and lower limbs; a large body weight also contributes to a stable body position when attacking an opponent; a lower level of subcutaneous fat than that of schoolchildren reflects more active physical activity. When practicing fencing, morphological changes in children and adolescents aged 10–18 years occur differently and ambiguously, which, apparently, is associated with age-related transformations of organs and systems, with selection for this sport, with sports experience, as well as with different intensity of applied loads. Among the studied signs, it is possible to distinguish those that throughout the entire age period under consideration characterized the specifics of selection for this type of sports activity, namely: body height and limb length; body proportions; shoulder width and pelvis; the diameters of the distal epiphyses of the thigh and lower leg; the circumference of the forearm; most of skin-fat folds [Koryakovtseva et al., 2014].

The identification of age-related features of the physique of synchronized swimmers and the establishment of a morphological model of the strongest representatives of this sport was carried out for three age groups: junior (9–10 years old), senior (14–15 years old) and the national team of the country (over 18 years old). It is shown that in terms of physical development, the synchronized girls do not differ significantly from the control group. The body height of the athletes of the Russian national team is higher than the average values for their gender, and the body weight is lower. Under the influence of training loads, young synchronized swimmers experience a slight decrease in the fat component and an increase in muscle. The analysis of the variability of the body proportions of synchronized swimmers of different age groups indicates a purposeful selection to the national team of the country by longitudinal body size. At the present stage of development of synchronized swimming, the selection of promising athletes-retardants is taking place. It was revealed that

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somatotypes with significant mesomorphism predominate in the younger and older age groups, while the athletes of the national team belong to an ectomorphic body type with various variations of 2 other components of the somatotype [Maltsev, Panasyuk, 2021].

Examination of 6–10-years-old boys and young football players of the same age range undergoing the stage of initial sports training allowed us to conclude that the control group has risk factors for excess body weight and the development of obesity, low development of muscle mass, posture disorders, uneconomical functioning of the cardiovascular system in cases of hypotension, reduced function of the external breathing. Young football players are characterized by normal body weight and BMI, lower fat deposition and higher muscle mass, lower frequency of posture disorders, predominance of high lung capacity, lower pulse rate in cases of high blood pressure, better flexibility, speed, strength and coordination. The greatest lag in the indicators of physical development of children who do not play sports is characteristic of 7-years-old children, can be interpreted as the synchronous influence of factors of age-related transformation of higher mental functions, the tension of homeostatic mechanisms of regulation and the beginning of school education with increased physical inactivity. The smallest differences in physical development and physical fitness are characteristic of 6-year-olds, which corresponds to the stage of completion of the half-growth leap. As a basis for the positive impact of sports activities, the authors postulate the continuity of the scope and content of physical education programs and the stage of initial sports training with an emphasis on methods of developing general physical fitness that form the formation of functional life support systems and the musculoskeletal system [Abramova et al., 2019].

Domestic anthropologists are working in this direction, including on the foreign contingent. In particular, the analysis of morphofunctional features in groups of Mongolian children and adolescents with different levels of physical activity was carried out. Based on extensive material (7136 individuals 8–17 years old) it is confirmed that the morphological status of the subjects under the influence of loads begins to change quite early, and by the end of the period under consideration, the intergroup differ-

ence in total body size reaches a maximum (large values are fixed for athletes and are more pronounced in boys). At the same time, the body frame index, which allows making indirect conclusions about the massiveness of the skeleton, differs slightly. Taking into account the age of the subjects, it can be concluded that the influence of sports on the value of this indicator is manifested in the process of growth and physical exertion. The intergroup differences in the magnitude of functional indicators are much more pronounced: the respiratory and hemodynamic systems demonstrate more active work in the case of physically active individuals (more clearly in girls). At the same time, higher indicators of dynamometry of both hands (especially in the case of older schoolchildren), combined with the results obtained above, allow us to talk about positive shifts in the physical strength of the body, directly related to a higher level of physical exertion. The authors conclude that individuals attending sports clubs are more adapted to the effects of the external environment against the background of less active peers, and the greater severity of differences in morphological characteristics in groups of boys, and functional indicators in groups of girls, may be associated with traditional lifestyle, with characteristic gender stereotypes and roles [Permiakova et al., 2021].

Conclusion

Summarizing all the above, it should be noted once again that both auxological research in particular and anthropological research in general in recent years have tended to significantly expand their methodological and practical base. Taking into account the object of research, which is the variability of the *Homo sapiens* in all its manifestations, this approach is justified, since it allows us to consider the contribution to the variability of a whole complex of factors. Psychophysiological, psychological and genetic indicators undoubtedly occupy a dominant place in this series, which is determined by their biological connection with anthropological indicators. Moreover, research in this area has a significant practical output, making it possible to determine the predictors of an individual's sports success even at the stage of choosing the direction of sports

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activities. The number of works similar to those described in this review is steadily growing every year, which suggests an increasing integrative nature of anthropological research.

Acknowledgments

References

Abramova T.F., Nikitina T.M., Polfuntikova A.V., Iordanskaya F.A., Zyurin E.A., Petruk E.N., Tarasova L.V., Mikhalev S.V., Gilyarova O.A. The influence of systematic exercise on physical development and physical fitness of children aged 6-10 years. *Moscow University Anthropology Bulletin*, 2019, 3, pp. 5-14. DOI: 10.32521/2074-8132.2019.3.005-014.

Bakholdina V.Yu., Blagova K.N., Samorodova M.A. Age and gender aspects of psycho-somatic associations (using data on three Moscow samples of adolescents and students). *Moscow University Anthropology Bulletin*, 2017, 1, pp. 57-65.

Bakholdina V.Yu., Blagova K.N. Age dynamics of morphological status and psychosomatic relations in two samples of Moscow University students. *Moscow University Anthropology Bulletin*, 2020, 1, pp. 47-57. DOI: 10.32521/2074-8132.2020.1.047-057.

Bakholdina V.Yu., Titova E.P. The structure of psychosomatic relations as regards the adaptation stress estimation in the samples of MSU and RUDN students. *Moscow University Anthropology Bulletin*, 2018, 1, pp. 50-58. DOI: 10.32521/2074-8132.2018.1.050-058.

Bondareva E.A., Godina E.Z. Association of the polymorphic gene systems FTO and GHRL with risk of obesity development in children and adolescents. *Moscow University Anthropology Bulletin*, 2013, 1, pp. 111-119.

Bondareva E.A., Negasheva M.A., Grudieva A.V., Tarasova T.V. T/A polymorphism of the FTO gene is associated with fat accumulation traits in youngsters. *Moscow University Anthropology Bulletin*, 2016, 4, pp. 69-77.

Fedotova T.K., Gorbacheva A.K., Sukhova A.V. Search for new approaches towards studying psychosomatic correlations in anthropology: second stage of the study. *Moscow University Anthropology Bulletin*, 2017, 4, pp. 42-53. DOI: 10.32521/2074-8132.2017.4.042-053.

Fedotova T.K., Gorbacheva A.K., Sukhova A.V., Kovaleva A.V., Kuzmina T.I., Panova E.N. Search of new approaches towards studying psychosomatic correlations in anthropology: third stage of the study. *Moscow University Anthropology Bulletin*, 2018, 3, pp. 61-79. DOI: 10.32521/2074-8132.2018.3.061-079.

Gorbacheva A.K., Kovaleva A.V., Kuzmina T.I., Panova E.N., Sukhova A.V., Fedotova T.K. Search for new approaches towards studying psychosomatic correlations in anthropology: first stage of the study. *Moscow University Anthropology Bulletin*, 2016, 3, pp. 17-35.

Koryakovtseva M.S., Godina E.Z., Rizhkova L.G. Somatic development of young fencers. *Moscow University Anthropology Bulletin*, 2014, 1, pp. 107-114.

Makhalin A.V., Mikhailova S.A., Iliynskih N.N., Iliynskih I.N. Morpho-functional characteristics of young males from Altai Republic practicing sambo. *Moscow University Anthropology Bulletin*, 2011, 4, pp. 99-104.

Maltsev A.Ye., Panasyuk T.V. Age features of the physique of artistic swimmers. *Moscow University Anthropology Bulletin*, 2021, 4, pp. 59-71. DOI: 10.32521/2074-8132.2021.4.059-071.

Negasheva M.A., Manukian A.S. A multi-method approach to investigation of morphophysiological and psychological adaptation in young men and women – students of Moscow universities. *Moscow University Anthropology Bulletin*, 2016, 2, pp. 49-58.

Permiakova E.Yu., Gundegmaa L., Godina E.Z. Morphological and functional characteristics of Mongolian children and adolescents with different level of physical activity. *Moscow University Anthropology Bulletin*, 2021, 1, pp. 5-18. DOI: 10.32521/2074-8132.2021.1.005-018.

Spitsyn V.A., Negasheva M.A., Dukova I.V. Variability and topography of subcutaneous fat in young men and women with different apolipoprotein E genotypes. *Moscow University Anthropology Bulletin*, 2009, 2, pp. 75-80.

Spitsyn V.A., Raygorodskaya M.P., Ryzhkov I.I., Chtetsov V.P., Negasheva M.A. Association of three gene polymorphisms (TGF B1, IGF I and IGF II) with a case rate an idiopathic scoliosis, and also with body constitution and rates of skeletal maturation. *Moscow University Anthropology Bulletin*, 2012, 3, pp. 121-128.

Zadorozhnaya L.V. Body mass index as a factor in the appearance evaluation in adolescents (based on student survey in Arkhangelsk city in 2009–2010). *Moscow University Anthropology Bulletin*, 2016, 4, pp. 85-91.

Zadorozhnaya L.V., Romashko K.S., Godina E.Z. Gender ethnic and age influences on the self-perception of their body in schoolchildren. Moscow University Anthropology Bulletin, 2015, 3, pp. 47-58.

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•• *Вестник Московского университета. Серия XXIII.* •
Антропология • № 1/2024: 5-13 •

•• *Lomonosov Journal of Anthropology (LJA)*•
•• *(Moscow University Anthropology Bulletin)* • 2024, no. 1, pp. 5-13 •

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ОСНОВНЫЕ НАПРАВЛЕНИЯ ИССЛЕДОВАНИЙ ФИЗИЧЕСКОГО РАЗВИТИЯ В КОНТЕКСТЕ ПСИХОЛОГИИ, ПСИХОФИЗИОЛОГИИ, ГЕНЕТИКИ И СПОРТИВНОЙ АНТРОПОЛОГИИ (ПО МАТЕРИАЛАМ СТАТЕЙ В «ВЕСТНИКЕ МОСКОВСКОГО УНИВЕРСИТЕТА. СЕРИЯ XXIII. АНТРОПОЛОГИЯ» ЗА ПОСЛЕДНИЕ 15 ЛЕТ)

Введение. *Настоящая работа продолжает цикл статей, посвященных оценке основных направлений развития ауксологии в отечественной антропологии. В этой части приведены и описаны работы сотрудников НИИ и Музея антропологии МГУ имени М.В. Ломоносова, кафедры антропологии Биологического факультета МГУ имени М.В. Ломоносова, а также Российского Университет спорта «ГЦОЛИФК» и Федерального научного центра физической культуры и спорта (ВНИИФК).*

Материалы и методы. *Конкретно в данной части работы в качестве источника информации использованы статьи, посвященные комплексной оценке исследований физического развития в контексте психологии, психофизиологии, генетики и спортивной антропологии, которые были опубликованы в «Вестнике Московского университета. Серия XXIII. Антропология» с 2009 по 2022 г.*

Результаты и обсуждение. *Описанные работы оценивают, во-первых, психосоматические связи самооценки и параметров сомы, ее определяющих, а также специфику процессов взросления и адаптации в биологическом и психологическом аспектах. Во-вторых, рассмотрена внутригрупповая изменчивость нейрофизиологических показателей (параметров ЭЭГ) и анализ их корреляций с соматическими показателями. В-третьих, оценивается вклад генетических факторов в развитие систем морфологических признаков, прежде всего связанных с повышенными значениями массы тела и ожирением. Кроме того, приведены итоги исследований, посвященных поиску предикторов спортивной успешности и анализу физического статуса спортсменов различных специализаций.*

Заключение. *Количество работ, подобных описанным в этом обзоре, с каждым годом неуклонно растет, что свидетельствует о растущем интегративном характере антропологических исследований.*

Ключевые слова: *биологическая антропология; социальная антропология; генетическая изменчивость; антропологическая изменчивость; 7-20 лет; школьники и студенты*

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