Criteria for selection of students for the elective course in the specialization «sports orienting»

UDC 796.56

Postgraduate student **D.M. Zagorodnikova**[1,2]
Dr. Hab., Professor **L.V. Kapilevich**[1,2]
[1]National Research Tomsk State University, Tomsk
[2]National Research Tomsk Polytechnic University, Tomsk

Corresponding author: zag.dari@yandex.ru

Received by the editorial office on 22.05.2024

Abstract

Objective of the study was to determination of criteria for the initial selection of students for an elective course in the specialization «Orienteering».

Methods and structure of the study. The experiment was attended by NI TSU students aged from 18 to 21 years, 36 females and 25 males, specializing in «General Physical Training». Testing of cognitive abilities, physical fitness, as well as completion of a distance in the «cross-choice» discipline was carried out.

Results and conclusions. The factors that determine the criteria for the initial selection of students to specialize in orienteering at the university have been identified. For men, this is the level of development of spatial thinking and working memory, the level of development of spatial thinking and short-term memory, the relationship between the development of short-term memory and the distribution and volume of attention and the performance of physical activity in an aerobic mode, endurance when performing specific work. For women, the determining factors were the level of development of spatial thinking and short-term memory, endurance when performing specific work, and the level of development of operational thinking. We recommend using the obtained data when selecting students for orienteering sports sections.

Keywords: *orienteering, cognitive abilities, physical training, student sports, sports selection.*

Introduction. Orienteering is a complex sport where the training process of athletes should include not only physical training, but also technical, tactical and intellectual. Today, this sport is spreading significantly in universities [5, 6]. And in connection with the popularization of orienteering among students at different levels of competition, the problem of training highly qualified athletes arises. Often, athletes with such qualifications enter universities with a sports focus and rarely choose universities where the profile is not «physical culture and sports». Thus, coaches of «non-core» universities are faced with a shortage of qualified athletes in university teams.

Objective of the study was to determination of criteria for the initial selection of students for an elective course in the specialization «Orienteering».

Methods and structure of the study. Two types of preparation were identified as criteria: intellectual and physical, because athletes at a distance are in a working mode at the level of PANO, and sometimes higher, and at the same time use cognitive abilities to work with a sports card [1]. The following cognitive abilities were taken as indicators of intellectual preparation: spatial perception of direction, operational thinking, visual-figurative memory, working memory, distribution and volume of attention. Speed and endurance were chosen as the criteria for physical fitness, because… in the federal standard of sports training for the sport «orienteering», it is these qualities that have a significant impact on the result [8, 10].

The study was conducted at the National Research Tomsk State University in September 2023. The study involved NI TSU students aged 18 to 21 years, 36 females and 25 males, studying in the «General Physical Training» specialization weekly, 2 times a week for up to 80 minutes. Physical fitness indicators were tested, mental processes were diagnosed, and orienteering distance was covered in a forested area.

Physical fitness testing included standards from the All-Russian Sports Society GTO tests, 100 m run; 2000 for women and 3000 m for men. To diagnose cognitive mental processes, the following were used: a test using the «Compass» method; «structures of intelligence» – for diagnosing spatial thinking [2, 7]; short-term memory test for images; «Remember and dot the dots» – diagnostics of short-term memory [2, 3]. «Random Memory» – diagnostics of RAM [4]. Test for speed of thinking – diagnostics of operational thinking [9]. «Red-black tables» – diagnostics of the distribution and volume of attention [2].

As the third indicator, the «cross-choice» orienteering distance was chosen, planned for ±2 km with 8 control points (CP), where students must collect all the CP in any order in the shortest time. The results were processed by factor analysis, which solved the problem of reducing the number of variables and determining the relationships between them. The statistical program STATISTICA 64 was used.

Results of the study and discussion. At the first stage of the study, the magnitude and degree of influence of each factor on the total variance of the sample was determined, where the number of variables selected for this study (physical fitness testing, diagnostics of cognitive mental processes, orienteering distance completion) was taken as 10 factors. Thus, out of 10 factors, 4 are key for the men's group, and 3 for the women's group, because their own numbers are greater than 1. To identify the factor structure of students completing the orienteering distance, the matrix of factor loadings was rotated using the Varimax criterion for two groups (Tables 1, 2).

Analysis of the matrix of factor loadings after rotation in a group of male students allows us to identify four factors that are decisive for sports selection:

– factor: high values indicate the results of passing the «compass» and «random access memory» tests. The first factor can be defined as «the level of development of spatial thinking and working memory»;

– factor: high values show the results of passing the 2structure of intelligence» and «memory for images», which determines the «level of development of spatial thinking and short-term memory»;

– factor: factor loadings of students results in the following tests have high values: «remember and dot the dots», «red-black tables» and «100 m run». The third factor can be defined as «the relationship between the development of short-term memory and the distribution and volume of attention and the performance of physical activity in an aerobic mode»;

– factor: the results of completing the orienteering distance and running 3000 m are of high im-

Table 1. Results of factor analysis after the procedure of rotating the results in the male group

Variables	Factor 1	Factor 2	Factor 3	Factor 4
«Compass»	0,748507*	-0,226997	0,332561	-0,046062
«Structures of intelligence»	0,091224	0,879920*	0,170894	0,122339
Memory for images	-0,016953	0,903960*	-0,023741	0,043092
«Remember and dot the dots»	0,291186	0,101942	0,750869*	-0,011177
«Main memory»	0,849477*	0,197951	0,115853	0,039152
Speed of thinking test	-0,482414	-0,228317	0,351493	-0,526293
«Red and black tables»	0,392406	0,027579	0,796714*	0,052620
100 m run	-0,109196	0,073624	0,735254*	0,352995
3000 m run	-0,125171	0,226147	0,137922	0,886832*
Completing the orienteering course	0,332386	-0,229170	0,140756	0,737129*

**– significance of results, p≤0,05.*

portance. It can be determined that the 4th factor characterizes «endurance when performing specific work».

Analysis of the matrix of factor loadings after rotation in a group of female students allows us to identify three factors that are decisive for sports selection:

– factor: high values indicate the results of passing the tests «structures of intelligence», «memory for images», «remember and dot the dots». It can be determined that the first factor characterizes «the level of development of spatial thinking and short-term memory»;

– factor: the results of completing the orienteering distance and the results of the 2000 m run have high values. It can be determined that factor 2 characterizes «endurance when performing specific work»;

– factor, the results of passing the test for speed of thinking have high values, which characterizes the «level of development of operational thinking».

Conclusions. Based on the results of the study, factors were identified that determine the criteria for the initial selection of students to specialize in orienteering at the university. For men, this is the level of development of spatial thinking and working memory, the level of development of spatial thinking and short-term memory, the relationship between the development of short-term memory and the distribution and volume of attention and the performance of physical activity in an aerobic mode, endurance when performing specific work. For women, the determining factors were the level of development of spatial thinking and short-term memory, endurance when performing specific work, and the level of development of operational thinking.

The data obtained can be used when selecting students for orienteering sections.

References

1. Kazantsev S.A. K voprosu o vliyanii fizicheskikh nagruzok na sposobnost k prinyatiyu resheniy v protsesse sorevnovaniy po sportivnomu oriyentirovaniyu. Uchenyye zapiski universiteta Lesgafta. 2016. No. 8 (138). pp. 69-72.
2. Mantrova I.N. Metodicheskoye rukovodstvo po psikhofiziologicheskoy i psikhologicheskoy diagnostike. Ivanovo: Neyrosoft, publ. 2007. 216 p.
3. Metodika «Zapomni i rasstav tochki». A. Ya. Psikhologiya, publ. 2023. Available at: https://azps.ru/tests/pozn/tochki.html (date of access: 11.09.2023).
4. Proverka kratkovremennoy pamyati po metodu «Operativnaya pamyat». Interaktivnyy portal-kniga metodik samorazvitiya i dostizheniya uspekha. 2014-2023. Available at: https://metodorf.ru/tests/kratpamyat_operativ.php (date of access: 11.09.2023).
5. Studencheskaya liga sportivnogo oriyentirovaniya g. Tomska «Tvoy AZIMUT». Томск. 2023. Available at: https://vk.com/slsotomsk (date of access: 01.11.2023).
6. Studencheskaya liga. Federatsiya sportivnogo oriyentirovaniya Rossii. Moscow. 2023. Available at: https://rufso.ru/студенческая-лига/ (date of access: 01.11.2023).

Table 2. Factor analysis of the results rotation procedure in the female group

Variables	Factor 1	Factor 2	Factor 3
«Compass»	0,620900	0,283423	-0,338783
«Structures of intelligence»	0,839225*	-0,084374	0,159163
Memory for images	0,773603*	0,222532	0,069496
«Remember and dot the dots»	0,714797*	-0,013360	0,433517
«Main memory»	0,640837	-0,173714	-0,154609
Speed of thinking test	0,169297	0,021916	0,820660*
«Red and black tables»	0,009701	0,443615	0,625021
100 m run	0,284139	0,390452	0,123164
3000 m run	0,000611	0,788067*	0,251527
Completing the orienteering course	-0,025187	0,707028*	-0,465128

*– *significance of results, p≤0,05.*

7. Test struktury intellekta (IST). Test Amtkhauera. 2023. Available at: https://amthauer-ist.com/ru/ (date of access: 11.09.2023).
8. Federalnyy standart sportivnoy podgotovki po vidu sporta «sportivnoye oriyentirovaniye»: utverzhden prikazom Ministerstva sporta Rossiyskoy Federatsii ot 21.11.2022 № 1039. Ministerstva sporta Rossiyskoy Federatsii ot 20.12.2022.
9. Yakushev D.S. Opredeleniye znachimosti otdelnykh komponentov integralnoy podgotovlennosti detey 8-9 let pri pervichnom otbore dlya zanyatiy sportivnym oriyentirovaniyem. Uchenyye zapiski universiteta Lesgafta. 2014. No. 7 (113). pp. 197-198.
10. Cheremiskina I.I. Metodicheskiye ukazaniya dlya prakticheskikh zanyatiy po kursu «Spetsialnyy praktikum po psikhologii». Metodiki diagnostiki svoystv myshleniya. Vladivostok: Morskoy gosudarstvennyy universitet im. admirala G.I. Nevelskogo, publ. 2007. 52 p.