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## **DEVELOPMENT OF AUTOMATED INFORMATIONAL SYSTEM OF TESTING THE PSYCHOFUNCTIONAL FITNESS OF CHILDREN FOR PHYSICAL CULTURE CLASSES WITH BEGINNER JUDO EXERCISES**

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**Key words:** judo, sports for children and young people, psychological testing, functional diagnostics, sports orientation, sports selection, stage-based control in sports.

**Annotation.** The purpose of this study was to develop scientifically based suggestions and the testing information system in order to implement beginner judo exercises into physical culture programs and training of minors based on their psychofunctional fitness within the sports reserve training. As a result of the conducted research, based on relevant Russian and Foreign methods for determining psychofunctional maturity and fitness of the child to engage in judo classes, the hardware and software complex “Sports orientation of children to judo” was developed. The hardware and software complex identifies and evaluates psychological, psychophysiological state, functional and morphological status, as well as the physical development of children. Using the data obtained, the software forms a clear conclusion on psychofunctional fitness and progress when engaging judo classes, allows implementing the stage-based control.

**Introduction.** The preschool age includes the end of the early childhood period (3-4 years) and the first childhood period (4-7 years) and serves as an important stage of the child’s development. This is a period of active development of motor, cognitive, creative abilities, based on maturation of organic structures, formation and perfection of the work of functional systems of the child’s organism [2, 6]. Psychological and biological development of children of preschool age 3-6 years allows engaging physical culture classes with elements of sports disciplines, judo in particular, contributes to the improvement of children’s state of health and to the learning of useful and strong motor skills [7-10]. However, there is currently no scientifically based system of physical culture classes with judo elements for minors within the sports reserve training, which considers the psychofunctional fitness.

The study was carried out in accordance with the state contract of the FSBI NCFRCC of the FMBA of Russia № 129.001.20.14 from June 21, 2020 for carrying out the applicative research project “Development of scientifically based suggestions and the informational system of testing for implementing beginner judo exercises into physical culture programs and training of minors based on their psychofunctional fitness within the sports reserve training”, classification code: “Judo 20”.

The purpose of this study was to develop scientifically based suggestions and the testing information system in order to implement beginner judo exercises into physical culture programs and training of minors based on their psychofunctional fitness within the sports reserve training.

**Methods and organization.** When developing testing protocols and software and hardware means, we took the hardware and software complex “Sports orientation of children and adolescents” as a basis [1, 3, 4].

Following methods were used:

- spirometry (identifying vital capacity (VC));
- anthropometry (identifying height, weight, arm and leg length, girth of the chest and wrist), dynamometry (identifying back strength, strength of the right and left hands, time of holding 50% of tension from the maximum power);
- psychological and psychophysiological methods of research (identifying the level of mental maturity, mental workability and performance, concentration of attention, temperament, qualities of the nervous system, time of simple and complicated sensomotor reaction);
- informational and technical methods (object-oriented programming using the software product, tool for fast application development, system used by programmers for developing software on the Borland C++ Builder);
- mathematical statistics methods (non-parametric methods of comparing samples, identifying the standard error of the mean, Wilcoxon test using the Statistica 13.0 software).

**Results and discussion.** In order to determine fitness and predisposition of 3-4 years old minors to engage in physical culture classes with beginner judo exercises, based on their psychofunctional fitness, a special testing protocol was developed. This protocol includes three testing blocks: psychological tests, tests for functional diagnostics and physical development. Based on implementation of aforementioned protocols, the hardware and software system “Sports orientation of children to judo” was developed, including the remote with electronic measuring elements and LEDs and specialized software. The software includes the remote software and the computer software. All automated psychologically diagnostic methods were verified and tested for their validity.

The main window of the hardware and software complex “Sports orientation of children to judo” is presented on fig. 1.



Fig.1. Main window of the hardware and software complex “Sports orientation of children to judo”

Note: the original language of the software is Russian.

The program window with psychological personality tests for general awareness, general intelligibility, attention, cogitation and perception is presented on fig. 2.

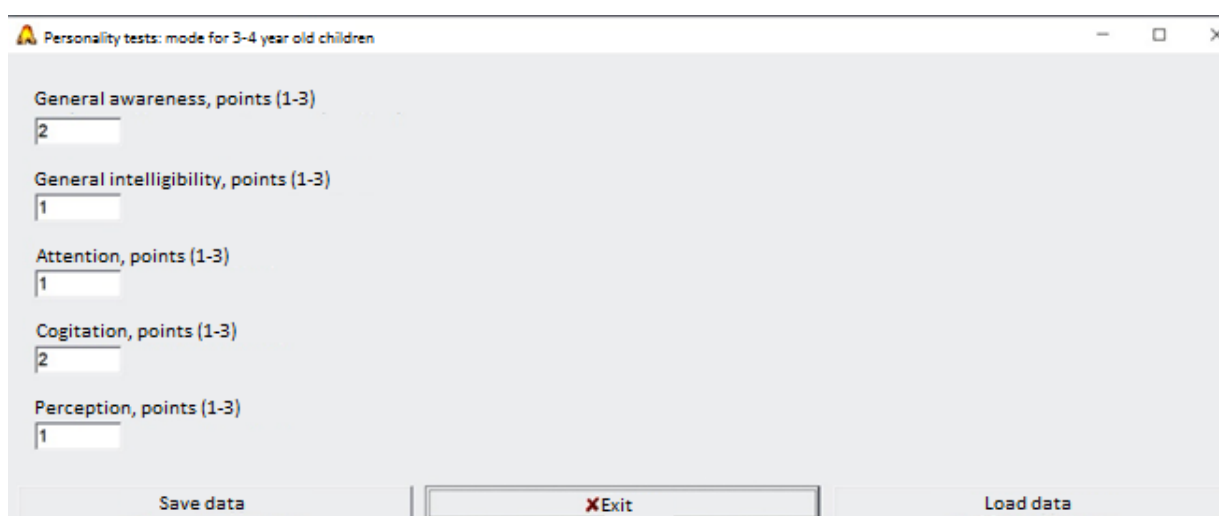


Fig. 2. Window of the hardware and software complex “Sports orientation of children to judo” with psychophysiological personality tests

Note: the original language of the software is Russian.

Psychophysiological tests, which are understandable for children, include time of simple sensomotor reaction to light and sound signal, time of choosing reaction, tapping test, and are implemented into the psychophysiological tests block (Fig. 3).

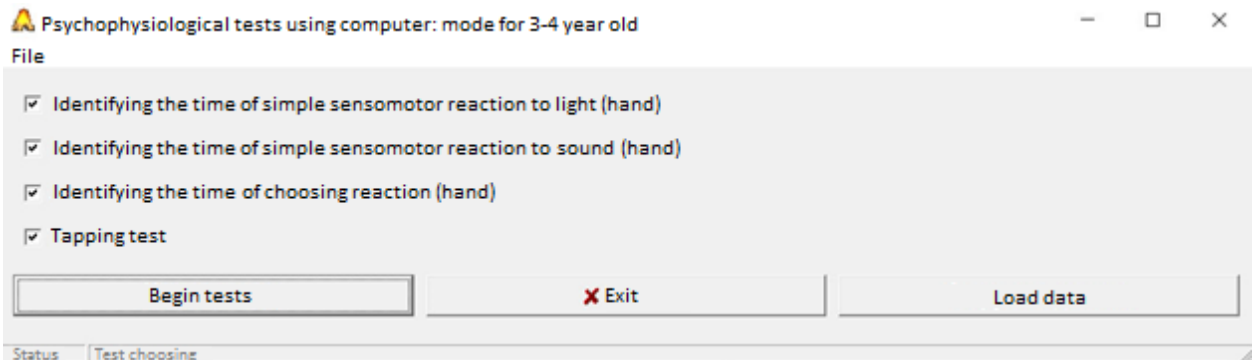


Fig. 3. Window of the hardware and software complex “Sports orientation of children to judo” with the psychophysiological tests block

Note: the original language of the software is Russian.

Measured data of functional and morphological status of the child is imported into the specific window of the software (Fig. 4).

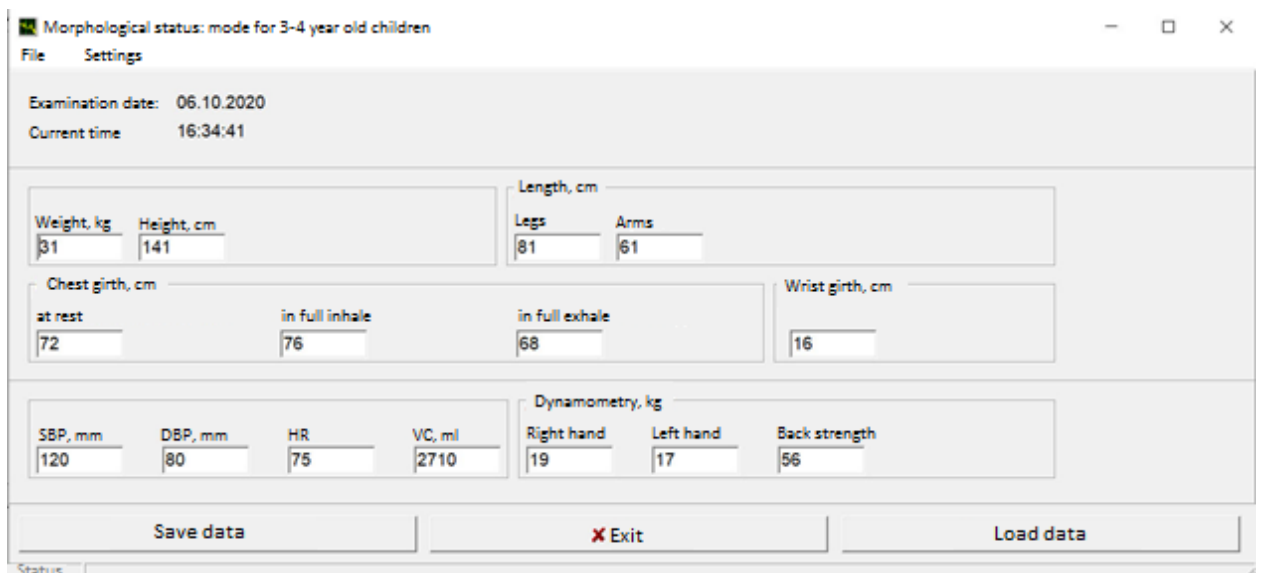


Fig. 4. Window of the hardware and software complex “Sports orientation of children to judo” with performing psychophysiological tests

Note: the original language of the software is Russian.

After psychological, psychophysiological testing and inputting the test results, the software evaluated psychological, psychophysiological, functional and morphological state of the child, forms suggestions for psychofunctional fitness and

progress in judo classes, based on the current state and expected prediction of its development. Data with results of computerized psychological, psychophysiological and non-computer tests is written into the computer's memory by using MS Word and Excel files.

For the stage-based control of minors, who engage in physical culture with judo elements for 1-2 years, additional psychophysiological tests were included into already present testing protocols (Shulte tables, test for identifying individual time), as well as tests for physical fitness. Evaluation of physical fitness includes the Beep test for identifying physical performance, as well as tests for identifying dexterity (3x10m shuttle run), flexibility (bending forward from standing position), power-speed abilities (standing long jump). Window of the software with the block of tests for physical fitness is presented on fig. 5.

Physical fitness: mode for 3-4 year old children

File

Examination date: 22.04.2021  
Current time 14:23:51

Test description  
Test subject type: boys Age: 6,52 years

Coordination abilities  
3x10 m shuttle run, s  
10,50

Speed-power abilities  
Standing long jump, cm  
152

Flexibility  
Bending forward from standing position, cm  
10,0

Save data Exit Load data

Fig. 5. Window of the hardware and software complex “Sports orientation of children to judo” with the block of physical fitness tests

Note: the original language of the software is Russian.

Thus, the specific testing mode was created – the stage-based control. According to results of testing, a specific evaluation scale of results of 4-5 and 6-7 year old children, who engage in physical culture with judo elements, was developed.

Using the developed hardware and software complex “Sports orientation of children to judo” groups of 3, 4-5 and 6-7 year old children were tested. Mean indicators of tests results were calculated and scales for evaluation of psychological, psychophysiological indicators, the morphofunctional state and physical fitness of children were developed.

The software was registered in the Federal Institute of Industrial Property (Certificate of official registration of the program for computers № 2020662507, 14.10.2020) [5].

**Conclusion.** Thus, using relevant Russian and Foreign methods for identifying psychofunctional maturity and fitness of the child to engage in judo classes, prediction of sports talent and studies in the field of automated psychological diagnostics the hardware and software complex “Sports orientation of children to judo” was developed. This complex identifies and evaluates psychological, psychophysiological state, functional and morphological status, as well as physical development of children. Using the data obtained, the software forms a clear conclusion on psychofunctional fitness and progress when engaging judo classes, allows implementing the stage-based control.

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