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DYNAMIC LATENCY TIME VISUAL-MOTOR RESPONSE  
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e-mail: [esspe@i.ua](mailto:esspe@i.ua)**ДИНАМІКА ЛАТЕНТНОГО ЧАСУ ЗОРОВО-РУХОВОЇ РЕАКЦІЇ МОЛОДІ. Віктор П'ЯТКОВ<sup>1,2</sup>, Яцек БІЛІНСЬКИЙ<sup>2</sup>, Олександр ПЕТРИВ<sup>1</sup>.** <sup>1</sup>Львівський державний університет фізичної культури, м. Львів, Україна, <sup>2</sup>Університет інформаційних технологій та управління в Рязеві, м. Рязів, Польща, e-mail: [esspe@i.ua](mailto:esspe@i.ua)**Анотація.** У роботі розглянуто систему експрес-діагностики зорово-рухової функції людини. За допомогою методу комп'ютерної реєстрації та аналізу часових параметрів виявлені статистично достовірні дані. Доведено знання про позитивний вплив фізичних вправ на роботу зорово-рухового апарату.**Ключові слова:** візуально-рухова реакція, діагностика, вправи, здоров'я, наука.ДИНАМИКА ЛАТЕНТНОГО ВРЕМЕНИ  
ЗРИТЕЛЬНО-ДВИГАТЕЛЬНОЙ РЕАКЦИИ  
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и управления в Жешуве, г. Жешув, Польша,  
e-mail: [esspe@i.ua](mailto:esspe@i.ua)**Аннотация.** В работе представлена система экспрес-диагностики зрительно-двигательной функции человека. При помощи высокоточного метода компьютерной регистрации и анализа временных параметров выявлены статистически достоверные данные. Дополнены знания о положительном влиянии физических упражнений на работу зрительно-двигательного аппарата.**Ключевые слова:** зрительно-двигательная реакция, диагностика, упражнения, здоровье, наука.DYNAMIC LATENCY TIME  
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e-mail: [esspe@i.ua](mailto:esspe@i.ua)**Abstract.** This paper presents the objective characteristics of latency time of simple visual-motor response of a human. Primary data was obtained using the exact method of computer time recording. Knowledge is supplemented with dynamics of latency time in visual-motor system operation.**Keywords:** visual and motor function, latency time, dynamics, health, sport.**Topicality.** In the field of physical culture and sports, as well as in tourism there is an objective need to identify quantitative parameters of latency time of simple visual-motor response of human to assess and further improve motor activity [1–3].**The problem** of express diagnosis of a human's functional state in terms of students' physical activity is always current. In this regard, we continue to explore the possibilities of objectification of visual-motor function assessment as one of the health criteria which is not studied enough.**Analysis publications.** Recent studies have found an objective need to identify quantitative criteria of students' physical activity. Among available technical means of functional diagnostics, characterized by sufficient mobility and accessibility, one should note computer time recording models for visual-motor response and mathematical and statistical methods for data processing. Such means and methods are optimal for research of the student audience, since they can be installed on a modern laptop and desktop computers, and simulate study simply pressing one or two buttons on the keyboard [4]. Previous studies have found evidence of a positive impact of training exercises on response in general, but there are still discussions with objectification and clear classification of quanti-

tative parameters [5-8], so for express diagnosis we chose one of the most reliable and objective criteria: a human's visual-motor response time.

**The aim** of the study was to determine the dynamics of the latency time of simple visual-motor response for students of sports faculty of Lviv State University of Physical Culture, and for students of Travel faculty of University of Information Technology and Management in Rzeszow.

**Methods** and organization of studies. To achieve this goal the following methods are used in this paper:

- 1) analysis of literary sources by theme of studies;
- 2) computer recording and visualization of response time;
- 3) mathematical and statistical data processing.

The studies were conducted in the period from 15.10.2012 till 10.14.2015 in Lviv State University of Physical Culture (Ukraine) and the University of Information Technology and Management in Rzeszow (Poland). The study engaged 40 students of the above mentioned institutions of higher education: two equal groups of 20 persons from each institution. There were conducted 400 measurements of visual-motor response time using a new computer model of a visual form in integrated environment of Visual Studio 2010 developed by ourselves. The model is distinguished due to the fact that the procedural form module determines and displays the data of latency time of simple visual-motor response on monitor, while recording them in a database.

The measurement data are processed using a spreadsheet of Microsoft Excel 2007 and are shown below (Table 1).

Table 1

**Latency time of simple visual-motor response for students of tourism faculty**  
*n=200; p<0,05*

№	TIME CHARACTERISTICS, s											
	<i>I</i>		<i>I</i>		<i>I</i>		<i>I</i>		<i>I</i>		<i>I</i>	
1	0,213	1	0,213	1	0,213	1	0,213	1	0,213	1	0,213	1
2	0,196	2	0,196	2	0,196	2	0,196	2	0,196	2	0,196	2
3	0,262	3	0,262	3	0,262	3	0,262	3	0,262	3	0,262	3
4	0,250	4	0,250	4	0,250	4	0,250	4	0,250	4	0,250	4
5	0,255	5	0,255	5	0,255	5	0,255	5	0,255	5	0,255	5
6	0,253	6	0,253	6	0,253	6	0,253	6	0,253	6	0,253	6
7	0,208	7	0,208	7	0,208	7	0,208	7	0,208	7	0,208	7
8	0,376	8	0,376	8	0,376	8	0,376	8	0,376	8	0,376	8
9	0,211	9	0,211	9	0,211	9	0,211	9	0,211	9	0,211	9
10	0,227	10	0,227	10	0,227	10	0,227	10	0,227	10	0,227	10
11	0,272	11	0,272	11	0,272	11	0,272	11	0,272	11	0,272	11
12	0,215	12	0,215	12	0,215	12	0,215	12	0,215	12	0,215	12
13	0,265	13	0,265	13	0,265	13	0,265	13	0,265	13	0,265	13
14	0,257	14	0,257	14	0,257	14	0,257	14	0,257	14	0,257	14
15	0,218	15	0,218	15	0,218	15	0,218	15	0,218	15	0,218	15
16	0,187	16	0,187	16	0,187	16	0,187	16	0,187	16	0,187	16
17	0,312	17	0,312	17	0,312	17	0,312	17	0,312	17	0,312	17
18	0,245	18	0,245	18	0,245	18	0,245	18	0,245	18	0,245	18
19	0,485	19	0,485	19	0,485	19	0,485	19	0,485	19	0,485	19
20	0,673	20	0,673	20	0,673	20	0,673	20	0,673	20	0,673	20

Remark: *I*–10 – tests; *M* – the average;  $\square$  – standard deviation.

Table 1 shows that M average values of latent period of simple visual-motor response for students-tourists have variation range from 0,203 s to 0,412 s.

(Variation = 0,209).

The test results of the second group of students who exercised on a regular basis, have been statistically processed and presented below (Table 2).

Table 2

**Latency time of simple visual-motor response for students of sports faculty**  
**n = 200; p < 0,05**

№	TIME CHARACTERISTICS, s											
	1	2	3	4	5	6	7	8	9	10	M	□
1	0,203	0,172	0,188	0,172	0,250	0,188	0,187	0,157	0,172	0,187	0,188	0,025
2	0,187	0,187	0,188	0,204	0,312	0,266	0,203	0,172	0,172	0,203	0,209	0,045
3	0,189	0,188	0,205	0,189	0,205	0,219	0,189	0,189	0,275	0,194	0,204	0,027
4	0,205	0,203	0,209	0,220	0,281	0,234	0,219	0,209	0,218	0,203	0,220	0,023
5	0,203	0,203	0,219	0,220	0,293	0,238	0,187	0,209	0,218	0,221	0,221	0,029
6	0,234	0,219	0,207	0,221	0,266	0,235	0,203	0,203	0,204	0,219	0,221	0,020
7	0,228	0,266	0,203	0,188	0,297	0,203	0,187	0,219	0,219	0,172	0,218	0,038
8	0,218	0,250	0,219	0,219	0,328	0,250	0,203	0,234	0,188	0,188	0,230	0,041
9	0,250	0,203	0,188	0,189	0,291	0,281	0,234	0,219	0,172	0,205	0,223	0,040
10	0,218	0,219	0,219	0,235	0,235	0,281	0,218	0,187	0,218	0,219	0,225	0,024
11	0,209	0,219	0,282	0,187	0,275	0,282	0,189	0,235	0,189	0,178	0,225	0,042
12	0,206	0,235	0,250	0,219	0,328	0,391	0,234	0,224	0,219	0,203	0,251	0,061
13	0,187	0,189	0,203	0,204	0,297	0,298	0,218	0,334	0,328	0,328	0,259	0,063
14	0,205	0,204	0,235	0,266	0,269	0,260	0,223	0,219	0,250	0,203	0,233	0,026
15	0,237	0,250	0,235	0,219	0,236	0,219	0,251	0,252	0,235	0,221	0,236	0,013
16	0,203	0,203	0,203	0,172	0,312	0,235	0,187	0,231	0,315	0,237	0,230	0,049
17	0,218	0,234	0,256	0,250	0,222	0,206	0,250	0,250	0,250	0,297	0,243	0,025
18	0,234	0,250	0,297	0,235	0,237	0,235	0,218	0,234	0,318	0,234	0,249	0,032
19	0,234	0,235	0,204	0,203	0,259	0,281	0,287	0,266	0,219	0,267	0,246	0,031
20	0,250	0,249	0,235	0,234	0,344	0,201	0,214	0,206	0,247	0,313	0,249	0,046

Table 2 shows that the standard deviation of the latency time of simple visual-motor response for students of sports faculty has variation range from 0,022 to 0,118 and characterizes the level of stability reaction above (Variation = 0,096).

**Discussion.** Obtained results of M average values of latent component of simple visual-motor response of tourists vary from 0,203 s to 0,412 s, which in comparison with previous researchers [1-3; 5-8] specifies quantitative characteristics of the phenomena under analysis, and describes them as normal average reaction of practically healthy person.

Variable range of standard deviation of component latency of simple visual-motor response for students of sports faculty (Variation = 0,096), describes a high level of stability of reaction that explains better capabilities in a contest or stressful situations.

Individual differences of time parameters for latent component of simple visual-motor response for students in both groups are displayed in Fig. 1.

Differences in time parameters of student response specify quantitative characteristics of the phenomena under analysis, and describe them as indicators of response above average.

Variable range of average group values of latent component of simple visual-motor response for students of both tourism and sports faculty is a supplement to previously known similar scientific results.

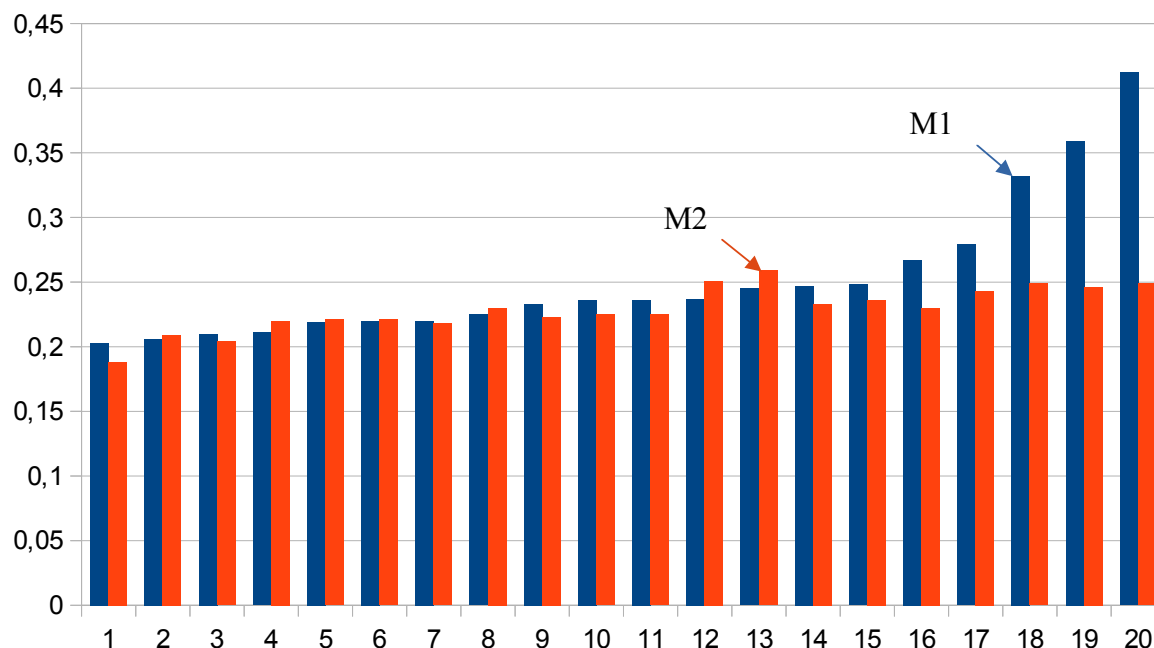


Fig. 1. Individual differences of time parameters for latent component of simple visual-motor response for students:

M1 – latent component parameters for students of tourism faculty;  
 M2 – latent component parameters for students of sports faculty

**Conclusions.** This paper presents the scientific problem solving of objective diagnosis of human's visual-motor function with regard to highly-precise computer recording of latency time of simple visual-motor response. The problem is solved by the method of interactive express analysis of visual-motor response. It was found that students of the tourism industry have statistically significant variability of simple visual-motor response of 0,096 sec., and students of sports faculty have statistically significant variability of simple visual-motor response of 0,209 sec. which was not previously known.

Variable range of average group values of latent component of simple visual-motor response for students of both tourism and sports faculty is a supplement to scientific data.

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