

Simple and Complex Sensomotor Reaction for Choice when Teaching Protection Against Armed Attacker

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Abstract—The connection determination between simple sensomotor reaction and the reaction for choice among those, who are taught protection against an armed attacker, with the methodology of teaching and the level of qualification. Psycho-physical readiness development to solve motor objectives is very important for the training of highly qualified specialists in the areas of “Theory and methodology of operating-applied single combats”. At the same time, the time of sensomotor reactions can be one of significant indices of psycho-physical readiness level to solve motor objectives in general. In the conclusion of the held research works we come to the conclusion that different methods used during sports and profession-applied training have different influence on the time of sensomotor reaction and maybe on realized use of this or that teaching in order to create an optimal psycho-physical readiness to professional activity in extreme conditions. It is especially important during psychophysical training of students at “Theory and methodology of operating-applied single combats” specialization. On the basis of the received results we come to the conclusion about high effectiveness of playing and competitive method use during self-defense teaching against the opponent with a knife. It shows the necessity to use playing and competitive method as the main methods during training for activity in terms of close and hand-to-hand combat in various situations.. Further research works in this direction are reasonable to carry out studying the whole range of complex sensomotor reactions and considering interconnections between motivation of the examined contingent and the values of different sensomotor reactions.

Keywords—*sensorimotor reaction; motivation; professional-applied training; protection from armed attack.*

I. INTRODUCTION

Psycho-physical readiness development to solve motor objectives is still an urgent problem. At the same time, it is not important with whom and for what kind of activity the training is realized. The demand to improve the level of psycho-physical readiness is considered among the scientists, who study physical upbringing of schoolchildren, professional teaching of technical specialists and training professionals for the activity in extreme conditions [1,7,8,9,10]. At the same time, the time of sensomotor reactions can be one of significant indices of psycho-physical readiness level to solve motor objectives. Connection between time of sensomotor reactions and success in applied and competitive activity in operating-applied single combats was observed by us during training

professionals for the activity in extreme conditions [1,3,5,6]. This connection with professional-applied activity, especially the activity in terms of close and hand-to-hand combat, also was several times mentioned [2,4,6]. Especially significant is the time of difficult sensomotor reactions for protection against the attacker with side arms [1,4,5]. In order to develop discipline and specialization “Theory and methodology of operating-applied single combats” we decided to study the connection of time of simple and complex sensomotor reaction for choice among people of different qualification, during different training methods use.

The aim of the work is to reveal the influence of self-defense method against an armed attacker on the time of a simple and complex sensomotor reaction for choice.

II. RESEARCH METHODOLOGY

The graduates of “Theory and methodology of operating-applied single combats” specialty should realize their professional activity in terms of training different people for sports and professional activity in extreme conditions, that is why we took it into account while selecting experimental groups. Three groups were formed, which included men (20-30 years-old), who had the course of self-defense. The first group included qualified athletes, who were trained according to “traditional” methodology, which offers to use mainly the method of strictly regulated exercise. The second group included people, who go in for physical culture regularly and who also train according to the traditional methodology. The third group included people, who go in for physical culture regularly and train according to the methodology with preliminary use of game and competitive methods of teaching.

Motor reaction was estimated in milliseconds. Time $t(1)$ conditioned sensory component of sensomotor reaction since the moment of appearing of green circle on the screen (in case of complex reaction for choice as a false object we used blue square) and lowering preliminary pushed button by the respondent. Time $t(2)$, conditioned motor component, since the moment of lowering preliminary pushed button by the respondent till he pushed the second button, fixed 50 cm away from the first button. General time (T) was the sum of two previous components and presented general time of sensomotor reaction.

III. RESULTS

The results of studying simple sensomotor reaction are presented in table 1. During the received results analysis we mention that qualified athletes showed the results, which didn't differ from the second group. At the same time, the respondents from the third group showed less time both in each of the components and in general time of simple reaction with a high level validity of difference ($p < 0,001$). One of the reasons for such condition was insufficient motivation and the held survey proved it. Qualified athletes accepted this task as "too simple", "boring" and etc.. The same comments were received concerning the methodology of teaching with the main use of strictly regulated exercise method. The connection between motivation and the level of psycho-physical readiness to act in terms of extreme conditions wasn't the topic of our research work and should be studied, as it can be one of important features of an optimal combat state (OCS). But low effectiveness of strictly regulated method was revealed by this research validly ($p < 0,001$).

TABLE I. TIME OF SIMPLE SENSOMOTOR REACTION IN DIFFERENT GROUPS OF TEACHING PROTECTION FROM THE ATTACKER WITH A KNIFE

Indices/ Groups	Number of test	Time t(1) (ms)	Time t(2) (ms)	Time t(gen.) (ms)
Group 1	1	311,20	153,50	464,70
	2	281,20	130,47	411,67
	3	280,60	134,80	415,40
	4	288,60	152,15	440,75
	5	291,20	150,69	441,89
	6	278,90	122,43	401,33
	X±m	288,6±2,0	140,67±2,2	429,29±3,96
Group 2	1	311,20	157,50	468,70
	2	299,50	155,20	454,70
	3	296,89	149,11	446,00
	4	280,60	158,10	438,70
	5	271,20	144,20	415,40
	6	274,20	130,40	404,60
	X±m	288,95±2,7	149,07±1,77	438,0±4,0
Group 3	1	288,60	120,00	408,60
	2	267,40	179,20	446,60
	3	250,30	109,10	359,40
	4	265,30	124,30	389,60
	5	243,40	113,20	356,60
	6	237,30	99,20	336,50
	X±m	258,7±3,1	124,17±4,7	382,88±6,7
Student's criterion (t)		t₁₋₃=8,1	t₁₋₃=3,17	t₁₋₃=5,94
		t₁₋₂=0,1	t₁₋₂=2,98	t₁₋₂=1,35
		t₂₋₃=7,35	t₂₋₃=4,94	t₂₋₃=7,03

Opposition in terms of close and hand-to-hand combat is a difficult process, in which simple reactions are not so demanded. Any confrontation, sports or applied ones, demands complex sensomotor reactions demonstration. One of the important types of reaction is the time, place and the way of reaction selection to urgent situation change. To fulfill the action or not is one of the most important decisions in close and hand-to-hand combats. That is why with the time of simple sensomotor reaction measuring we

measured complex reaction to the choice in all three groups. The results of reaction to the choice are presented in table 2.

TABLE II. TIME OF SENSOMOTOR REACTION TO THE CHOICE IN DIFFERENT GROUPS OF TRAINING SELF-DEFENSE AGAINST THE ATTACKER WITH A KNIFE

Indices/ Groups	Number of test	Time t(1) (ms)	Time t(2) (ms)	Time t(gen.) (ms)
Group 1	1	320,2	144,48	464,7
	2	285,0	126,60	411,60
	3	283,4	128,38	411,78
	4	290,75	153,15	443,90
	5	291,3	150,34	441,67
	6	280,0	135,5	415,5
	X±m	291,78±2,4	139,7±1,88	431,5±3,65
Group 2	1	484,17	317,16	801,3
	2	415,5	191,75	607,25
	3	473,0	157,75	630,75
	4	445,67	166,8	612,5
	5	401,3	246,0	647,3
	6	430,75	137,5	568,25
	X±m	441,7±5,39	202,8±11,2	644,6±13,5
Group 3	1	346,43	115,86	462,29
	2	389,67	169,0	558,67
	3	401,67	110,11	511,78
	4	320,2	117,0	437,2
	5	320,170	113,5	433,67
	6	368,86	107,14	476,0
	X±m	357,8±5,78	122,1±3,88	479,9±7,99
Student's criterion (t)		t₁₋₃=10,5	t₁₋₃=4,1	t₁₋₃=5,5
		t₁₋₂=15,3	t₁₋₂=5,55	t₁₋₂=15,2
		t₂₋₃=10,6	t₂₋₃=6,8	t₂₋₃=10,4

The received results analysis shows the difference between all groups with high level of validity ($p < 0,001$), in all components of difficult sensomotor reaction. The leaders were the representatives of the first group, whose indices were almost comparable with the values received during simple reaction measuring, which also shows the importance of motivation. This task was characterized by them as "difficult" and "interesting". For the representatives of the second and the third group this task was really difficult. The representatives of the third group did it better and it shows the effectiveness of games and competitive exercises used during self-defense teaching.

The effectiveness of the playing and competitive method during teaching self-defense against the armed attacker was also proved by control tests, where the group of experts estimated the effectiveness of defense among all three groups.

The third group showed the best results in comparison with the first two groups, proving the thesis that the time of sensomotor reactions and especially the time of complex sensomotor reactions is a significant index of psycho-physical readiness to extreme activity in terms of close and hand-to-hand combat.

IV. CONCLUSION

As a result of the held research works we come to the conclusion that different methods used during sports and

profession-applied training have different influence on the time of sensomotor reaction and maybe on realized use of this or that teaching in order to create an optimal psycho-physical readiness to professional activity in extreme conditions. It is especially important during psychophysical training of students at “Theory and methodology of operating-applied single combats” specialization.

On the basis of the received results we come to the conclusion about high effectiveness of playing and competitive method use during self-defense teaching against the opponent with a knife. It shows the necessity to use playing and competitive method as the main methods during training for activity in terms of close and hand-to-hand combat. Further research works in this direction are reasonable to carry out studying the whole range of complex sensomotor reactions and considering interconnections between motivation of the examined contingent and the values of different sensomotor reactions.

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