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Abstract
Purpose. The problem of visual perception and information processing is very real for both sport and professional activities. The performance of motor activity mostly occurs where there are time pressures and an increase in nervous emotion and physical tension.
Methods. The role of visual perception in information processing and its connection to emotions in elite athletes were studied. 19 elite athletes, Greco-Roman wrestlers, aged 19-22 were examined. The sequence of the study method was: simple visual-movement reaction; reaction to a moving object; speed of perception; scale of emotional excitability.
Results. The results obtained indicate significant links between anger and visual perception in elite athletes. It is likely that emotional factors such as anger are a hindrance to athletes' concentration on the object of the activity. This results in ineffective information processing and leads to a deterioration in visual perception.
Conclusions. The study shows that anger is not a motivational factor in sport activity. Anger as an affective emotion, is a negative characteristic and affects the athletes' general functional state.

Introduction

The problem of visual perception and information processing is very real for both sport and professional activities. The performance of movement activity mostly occurs under time pressures and where there ia an increase in nervous emotion and physical tension [Koral, Dosseville 2009].

Modern sporting activity is characterised by higher psycho-emotional and physical tension which influence the accuracy of motor skill leading to a deficit of time reaction [Shiyan 2013; Koopmann *et al.* 2016]. Progress in sporting activity is accompanied by a broad introduction to sports psychology, and practically to modern technologies. The basics of this approach is understood by the particular personality peculiarities of athletes, including the individual-typological characteristics of higher nervous activity [Borysiuk, Waskiewicz 2008; *cf*. Borysiuk, Cynarski 2009; Borysiuk, Petrynski, Cynarski 2010].

Thus there is a need for a detailed investigation of the process of visual perception and information processing capability in elite athletes.

The first links in perception are the receptors in the corresponding sensory systems. The formation and fulfilment of motor skills in sports activity goes to different hierarchic levels of the nervous system: the afferent part, the analytic part and the efferent (motor) part [Doyon, Benal 2005; Aglioti *et al*. 2008].

At the same time the efficiency of sporting activity is related to a higher level of development of the sensory systems. The sensory systems play a significant role in ensuring the coordination characteristics which are related to combat sport [Ogard 2011; Berezantsev, Davydov, Podlivaev 2012].

The visual sensory system is important in combat sports. During combat fight the visual sensory system perceives objects in the environment at different distance [Filaire *et al*. 2001; Starosta 2015, Iermakov *et al*. 2016].

The most important characteristics of the visual system of the athlete are: field, visual acuity, bandwidth and flow of visual information.

The high speed of information processing allows the athlete to navigate in space, coordinate their movements, determine the position of a rival and counter (anticipate) an opponent's forward actions [Mori, Ohtani, Imanak 2002; Obminski *et al*. 2015].

Human sporting activities include sports which are determined by different levels of regulation and by complex organisation of the mechanisms of neuro-emotional functions [Vallerand 2010, Wienke *et al*. 2016]. Various emotional phenomena can be characterised by their specific influence on inner processes. Such specificity can be represented by changes to the psychophysiological state. The intimate connection between the psychic and physiological parameters forms the psycho-emotional state of an individual. Each psychic phenomenon appears to be related to physiological structures – it can influence physiological processes or be conditioned by them [Korobeynikov, Korobeinikova, Shatskih 2013, Zurita-Ortega *et al*. 2016].

Considering that psycho-physiological functions constitute a major link in the formation of psycho-emotional reactions in situations of extreme conditions, it is logical to expect a connection between the athlete's emotions and their level of cognitive functions, their indicators of perception and their processing of visual information.

That is why the role of visual perception in information processing conditions in elite athletes was studied.

Methods

Participants

19 elite athletes (members of the Ukrainian National Greco-Roman wrestling team) were examined. The age of the athletes ranged between 19-22, and their experience and training was at least eight years.

The experimental study was approved by the Ethics Committees for Biomedical Research in accordance with the ethical standards of the Helsinki Declaration. Written consent to the research was given by the athletes according to the recommendations of the Ethics Committees for Biomedical Research [WHO Regional 2000].

Measures

The hardware and software complex for psychophysiological diagnostics, the «Multipsuchometer-05» was used. All the methods which we used in our study are the major part of the «Multipsuchometer-05». psychophysiological diagnostics complex. Using this method for our study meant we could re-test our athletes over a period of time to establish practical estimates of their psychophysiological state and to correct for the training process.

The sequence of study methods was: simple visual-movement reaction; reaction to a moving object; perception speed; scale of emotional excitability.

Simple visual-movement reaction represented an elementary response to the visual stimuli. Simple visual-movement reaction consists of two components: the sensory (afferent) and the motor (efferent) [Korobeynikov *et al*. 2011; Khudolii, Iermakov, Ananchenko 2015].

The afferent component – the perception and identification of a stimulus signal, which has some hierarchical levels:

— stimulation of the retina receptor;
— transit of the signal from a sensory neuron to the nerve centre;
— signal processing in the central nervous system.

Efferent (motor) component – the period of movement, which includes the following steps:

— sending signal to the executive body;
— development of excitation in the executive body;
— limb muscle contraction (motion of performance);
— proprioceptive control of the motion parameters.

Procedure

The study proceeded by describing the athletes' response to the visual signal a(red square) which appeared on a display by the dominant hand. The visual signal appeared on the display at random, the time interval between signals being 0,5-2,5 sec. The results of the tests determine both time reaction and stability (as the coefficient of variability, cV).

To determine the balance between acceleration and deceleration of the central nervous system (CNS), the "Reaction to a Moving Object methodology" was used. Reaction to a moving object is a form of complex sensory-movement reaction which, in addition to sensor and motor periods, includes periods of relatively complicated processing of a sensory signal by the central nervous system (CNS).

In this test all the tested athletes were offered 2 pointers – dynamic (target) and static (marker), and each athlete was expected to define the local area within the space. When the athlete being researched reached the marker, he reacted by sending a discreet and timely signal to the monitor. The nature of these two modes is based on the fact that the source of both pointers remains constantly in the athlete's field of vision during the whole test. It is believed that advantage of accelerating (activating) processes over decelerating manifests itself in the tendency to carry out preventive actions. On the contrary, the advantage of decelerating processes (lower level of activation) leads to an increased number of delayed actions.

The balance of nervous processes is defined by a combination of 2 factors: correlation between advancing and impediment and value and sign of average deviation of the marker from the target at the moment of pressing the button.

The results of the test are determined by the parameters: accuracy, stability and excitability.

The "perception speed" method evaluates speed and accuracy in identifying geometric figures, by comparing the given fragments with the set-up targets. A special test signal is integrated in the program (the fragment constitutes between 75% and 50% of the whole). In addition, this methodology allows the schematic formation of visual perception, a person's ability to reflect the general configuration of a formed object or occurrence to be evaluated in a certain time frame. The design of all the test trials in this methodology is identical: 4 numbered target figures were placed in the centre of the area within visible margins. Each figure contained 4 equal intervals, the fragment of the figure was placed above them, and it contained 2-3 intervals. The task for the athlete being researched was to determine which of the given target figures the particular fragment was part of. The athlete answered the question by pressing the correct number button on a special digital keyboard [Dudnyk, Korobeynikov, Jagello 2009; Korobeynikov, Korobeinikova, Shatskih 2013].

The results of the test reflected productivity, speed, accuracy and efficiency. A criterion of productivity indicates the speed of perception and processing, and depends on the mobility of nervous processes. The higher the productivity, the higher the mobility of nervous processes and the speed of information perception and processing. The relative frequency of wrong answers points to the efficiency of perception and processing: the lower this number is, the more effective these processes are. The speed with which an athlete fulfils the task is an essential indicator of speed and efficiency of perception and processing. High speed variables mean that the specified processes of perception and processing are mobile and effective [Starosta 2013; Kozina *et al*. 2015].

The "Scale of emotional excitability" is aimed at defining the individual's emotional excitability. It presented a list of questions aimed at determining the characteristics of the emotional response being studied. The results of the test determine the following parameters: general emotionality, anger, anxiety, control emotions.

All they are calculated separately to determine the high or low tendencies of emotional excitability, then the total emotional excitability score is calculated.

The analysis of the results was made using the following definitions:

1–3 points – low level;
4 – tendency to low level;
5–6 – average level;
7 – tendency to high level;
8–10 – high level.

The "Scale of emotion excitability" method makes it possible to assess the emotional stability of the individual, their ability to control emotions and to establish certain individual characteristics of each participant.

After testing by each method the person has to rest for two minutes to mobilise their physical activity and tune to the next task.

Statistical analysis

The statistical analysis was performed with the help of the Statistica 6.1 programming package. The data obtained in research correspond to the normal distribution of studied data, and the parametric statistics methods of the Fisher test criterion were applied.

Results

The first block of the study was aimed at determining the emotional background of the athletes. The parameters: anger, timidity, control of emotions and general emotion were studied by using the "Emotion excitability" method.

The data on the emotional background of the athletes are showed in Table 1.

The second block of the study was aimed at identifying the characteristics of visual perception in the athletes. The simple visual-movement reaction is characterized by a latent period and stability. The reaction to the moving object was determined at each of the parameters: accuracy, stability and excitability of athletes (Table 2).

The third block of the study was directed to the study of indicators of speed perception: productivity, speed, accuracy and efficiency (Table 3).

Our analysis of the data we obtained shows that we can take the parameters of the latent period of visual-motor reaction as a criterion of efficiency of visual perception [Korobeynikov 2001; Dudnyk, Korobeynikov, Jagello 2009].

The meanings of perception speed and emotional excitability are the background.

The analysis indicated that there was an absence of people with low levels of speed response among the athletes being investigated. This fact testifies that elite athletes are characterized by a low reaction latency time [Gierczuk 2013].

According to the level of visual speed response, the athletes were divided into two groups.

First group – athletes who had a high level of speed response: latent period between 120 ms and 240 ms. This group was represented by 7 athletes.

Second group – athletes who had an average level of speed response: latent period above 240ms. This group comprised 12 athletes.

The next study was a comparative analysis between the two groups of athletes by means of simple visual-movement reaction, reaction to a moving object, perception speed and emotional excitability (Table 4).

Table 1. Mean results for emotional background of athletes (n=19)

Individual being studied	Emotional background				
	General emotion, (secret unit)	Anger (secret unit)	Timidity (secret unit)	Control of emotions (secret unit)	Final score, emotional excitability (secret unit)
1	11	8	3	3	25
2	16	9	10	8	43
3	13	11	10	8	43
4	17	9	9	3	38
5	18	8	5	9	3
6	15	11	6	7	39
7	11	8	4	3	26
8	23	9	7	7	46
9	24	14	6	9	53
10	10	2	5	3	20
11	25	8	5	10	48
12	25	12	10	11	58
13	18	11	4	11	44
14	14	13	8	3	38
15	20	11	6	6	43
16	15	11	7	4	37
17	13	8	4	5	30
18	18	9	8	4	39
19	21	9	5	6	41

Table 2. Mean results for visual-motor reactions of athletes (n=19)

Individual being studied	Simple visual-motor reaction		Reaction to a moving object		
	Latent period, (ms)	Stability, (cV), %	Accuracy, (secret unit)	Stability, (secret unit)	Excitability, (secret unit)
1	253,54	10,72	2,0413	4,3166	0,0932
2	229,87	16,709	2,4216	3,4103	0,2736
3	285,25	15,965	2,7378	2,8936	-1,108
4	242,41	11,572	2,5555	2,6888	-1,163
5	252,45	17,571	2,5876	2,1817	-1,915
6	312,54	17	3,4829	2,9333	-2,459
7	238,87	13,83	3,1225	4,4317	0,9162
8	226,77	9,2612	3,3575	2,4341	-2,166
9	313,12	8,3275	3,6937	5,5992	-0,115
10	222,23	14,59	2,1445,	2,823	0,399
11	230,29	16,078	2,9779	2,9396	-1,929
12	266,22	24,258	2,3219	3,9793	0
13	228,77	14,334	2,6047	3,2769	-0,565
14	257,06	13,698	2,0349	2,9857	0,0451
15	255,51	23,445	2,2834	3,0214	-0,407
16	245,41	11,862	2,7172	4,3563	0,7508
17	244.93	16,514	3,3198	4,723	-0,128
18	273,67	27,716	2,9622	6,7873	0,4107
19	247,03	13,917	3,1125	3,3769	-0,831

Table 3. Mean results for perception speed of athletes (n=19)

Individual being studied	Perception speed			
	Productivity, (secret unit)	Speed, (bit/min)	Accuracy, (secret unit)	Efficiency, (secret unit)
1	67	18,249	0,9178	49,714
2	51	15,249	0,836	33,21
3	30	8,4926	0,8823	21,078
4	51	16,249	0,7846	30,294
5	66	17,749	0,92925	49,835
6	63	17,249	0,913	46,413
7	62	17,49	0,8857	43,793
8	56	14.748	0,9491	43,502
9	40	12,749	0,7843	23,747
10	77	20,248	0,9506	59,941
11	62	17,498	0,8857	43,793
12	16	4,7495	0,8421	10,526
13	44	12,486	0,88	30,8
14	55	15,499	0,887	38,933
15	47	13,748	0,8545	31,57
16	41	13,247	0,7735	23,852
17	64	16,999	0,9411	49,15
18	30	8,2493	0,909	21,969
19	40	10,748	0,9302	30,232

Table 4. Mean results for perception and emotional parameters of athletes (n=19)

Means	First group (n=7)	Second group (n=12)
Simple visual-motor reaction		
Latent period (ms)	232,75±3,79	266,39±7,25*
Stability (%)	14,62±1,03	16,25±1,73
Reaction to a moving object		
Accuracy (secret unit)	16,86±0,27	15,0±0,15
Stability (secret unit)	3,07±0,27	3,97±0,36
Excitability (secret unit)	-0,71±0,48	-0,40±0,24
Perception speed		
Productivity (secret unit)	59,71±4,03	45,33±4,49*
Speed (bit/min)	16,49±0,95	13,01±1,21
Accuracy (secret unit)	0,90±0,01	0,86±0,01*
Efficiency (secret unit)	43,55±3,70	31,45±3,56*

Note: * - p < 0,05, comparing with the first group athletes

Table 5. Mean results for emotion excitability of athletes (n=19)

Means	First group (n=7)	Second group (n=12)
General emotion (secret unit)	17,28±2,11	17,16±1,30
Anger (secret unit)	7,85±1,05	10,50±0,55*
Timidity (secret unit)	5,71±0,80	6,83±0,64
Control of emotions (secret unit)	7,28±1,20	5,75±0,75
Final score, emotional excitability (secret unit)	32,85±6,42	40,33±2,54*

Note: * - p < 0,05, comparing with the first group athletes

The results indicate that the first group of athletes, in comparison to the second group, has significant lower meanings of parameters of latent period of visual-movement reaction (Table 4). This fact shows a higher speed of information processing among athletes in the first group.

The study of reaction-times to the moving object identifies that for each parameter there are no differences between both groups of athletes (Table 4). This result is probably characterised by an absence among athletes, of people who have lower levels of speed response.

A comparative analysis of athletes with different levels of visual response indicates significant differences for the perception speed method across the following parameters: productivity, accuracy and efficiency (Table 4). It indicates a higher level of information processing among athletes in the first group and shows that this group have the best possible sensory motor function.

Table 5 illustrates the data relating to the mean results for emotional excitability in athletes with different levels of visual-movement reaction.

According to the results on the “Scale of emotional excitability”, significant differences between the first and second groups of athletes on the parameters of anger (Table 5) are observed.

S significant differences among the two groups of athletes on the parameters of: latent period of visual-movement reaction; perception speed and emotional excitability, were detected during the study.

Summarising, we can indicate that the first group of athletes is characterised by lower mean results for the latent time of visual reaction, high mean results for perception speed (productively, accuracy and efficiency) and lower mean results for anger. The second group of athletes is characterised by average mean results for latent time of visual reaction, average for perception speed and significantly high mean results for anger as compared to athletes in the first group. This fact corresponds with data on the connection between emotions and emotion regulation strategies which are used by athletes [Lane *et al.* 2011].

In order to detect links between the indicators of sensory-movement reactions, perception speed and emotional excitability we used correlation analysis.

The results of the correlation analysis between the means of emotional excitability and neurodynamic function (sensory-movement reaction, reaction to a moving object and perception speed) in athletes with high levels of speed response, are presented in Table 6.

The correlation analysis shows the influence of emotional states on perception speed and reaction to a moving object values, in athletes with high levels of speed response.

The parameter of anger has a reliable correlation with the latent period of visual-movement reaction (Table 6).

The results reveal that where there is an increase in general emotion there is a decline in reproducing performance in respect of accuracy and the stability of reaction to a moving object. Anger has a negative effect on the accuracy of responses (Table 6).

The presence of a negative correlation link between the mean results for control of emotions and for the accuracy of the reaction to a moving object is an indication of a mediating influence by the emotional state to the efficiency of complex sensory-movement reactions (Table 6).

Thus, an increasing level of emotional excitability in athletes with high levels of speed response is significantly affected by a decline in productivity, speed, efficiency and accuracy of perception and information processing.

The results of the correlation analysis between the means of emotion excitability and neurodynamic function (sensory-movement reaction, reaction to a moving object and perception speed) in athletes with average levels of speed response are presented in Table 7.

The data in Table 7 indicate the greater influence of emotional excitability on the manifestation of sensory-movement reaction in athletes with average levels of speed response.

An increase in emotional excitability and a decrease in control of emotions affects the increase of latent period of visual-movement reaction in the athlete (Table 7).

At the same time an increase in timidity results in a decline in accuracy of reaction to a moving object (Table 7).

Thus, we can affirm that the development of emotional excitability in elite athletes with different levels of sensory-movement reaction goes along with different strategies which are related to a balancing of nervous processes and information perception performance.

The results of the study show that an increase emotional excitability is significantly affected by a decline in productivity, speed, efficiency and accuracy of perception and information processing in athletes with average levels of speed response.

The athletes with high levels of sensory-motor response have emotional excitability as an inner psychological state which determines the performance of complex reactions to a moving object. An increase in the level of emotional excitability has a negative influence on the accuracy and efficiency of the reproduction of reactions due to the disturbance to the balance of nervous processes in elite athletes.

Emotional excitability is related to simple psycho-movement reactions in athletes with average levels of sensory-motor response.

The differences among both group of athletes are manifestations of different factors which influence speed processing perception.

The leading factors which influence the effect of emotional excitability on perception and information

Table 6. Results of correlation analysis between means of emotion excitability and neurodynamic function in athletes with high levels of speed response (n=7)

Meanings	General emotion	Anger	Timidity	Control of emotions	Final score, emotional excitability
Simple visual-motor reaction					
Latent period	-0,08	**0,46**	-0,22	-0,04	-0,17
Stability	-0,16	-0,09	0,02	0,28	-0,41
Reaction to the moving object					
Accuracy	**-0,57**	**-0,93**	-0,15	**-0,59**	-0,33
Stability	**-0,50**	0,15	-0,12	-0,38	0,21
Perception speed					
Productivity	-0,39	**-0,91**	-0,27	**-0,64**	**-0,65**
Speed	**-0,43**	**-0,89**	-0,21	**-0,63**	**-0,61**
Accuracy	-0,01	**-0,53**	-0,37	-0,34	**-0,43**
Efficiency	-0,34	**-0,89**	-0,31	**-0,61**	**-0,64**

Note: $p < 0,05$

Table 7. Results of correlation analysis between means of emotional excitability and neurodynamicfunction in athletes with average levels of speed response (n=12)

Means	General emotion	Anger	Timidity	Control of emotions	Final score, emotional excitability
Simple visual-motor reaction					
Latent period	0,18	**0,54**	0,05	**0,56**	**0,44**
Stability	0,17	-0,26	0,21	0,15	0,14
Reaction to a moving object					
Accuracy	0,06	-0,13	**-0,57**	0,24	-0,07
Stability	0,26	-0,05	-0,17	0,04	0,09
Perception speed					
Productivity	**-0,57**	-0,21	**-0,63**	**-0,53**	**-0,72**
Speed	**-0,52**	-0,13	**-0,56**	**-0,56**	**-0,66**
Accuracy	-0,31	**-0,45**	-0,35	-0,05	-0,39
Efficiency	**-0,59**	-0,30	**-0,67**	**-0,46**	**-0,73**

Note: $p < 0,05$

processing, are the control of anger emotions by athletes with high levels of speed response.

For athletes with average levels of sensory-motor response the leading factors which influence the effect of emotional excitability on perception and information processing are timidity, the level of general emotion and the level of control of emotions.

Thus, we can affirm that athletes in both groups differ not only in sensory-motor response but also by the level of emotional excitability which depends upon the balance of nervous processes.

According to existing concepts [Makarenko *et al.* 2001; Borysiuk 2006; Makarenko *et al.* 2011; Starosta 2015; *cf.* Cynarski 2007; Kunysz, Cynarski 2007; Borysiuk, Cynarski 2010; Vallerand 2010; Starosta 2013] the functional mobility, force and balance of nervous processes is a genetically determined characteristics of the human higher nervous system.

Based on the above, it can be argued that the primary link in the forming of emotional reactions submitted the balance of nervous process which is inherent in athletes with high levels of speed of sensory-motor response.

The manifestation of emotional arousal affects the feasibility of perception and the processing of perceptual information. This characteristic is very important for the realisation of competitive activity in combat sports.

Thus programmes for the regulation of elite athletes' emotional state must include individual-typological characteristics of the higher nervous system.

Conclusion

The results we obtained indicate significant links between anger and visual perception in elite athletes. The higher the anger, the lower the rate of speed of response and visual perception in general, in athletes. This link provides a basis to affirm that one of the factors which influences the parameters of visual-movement reaction by athletes is anger.

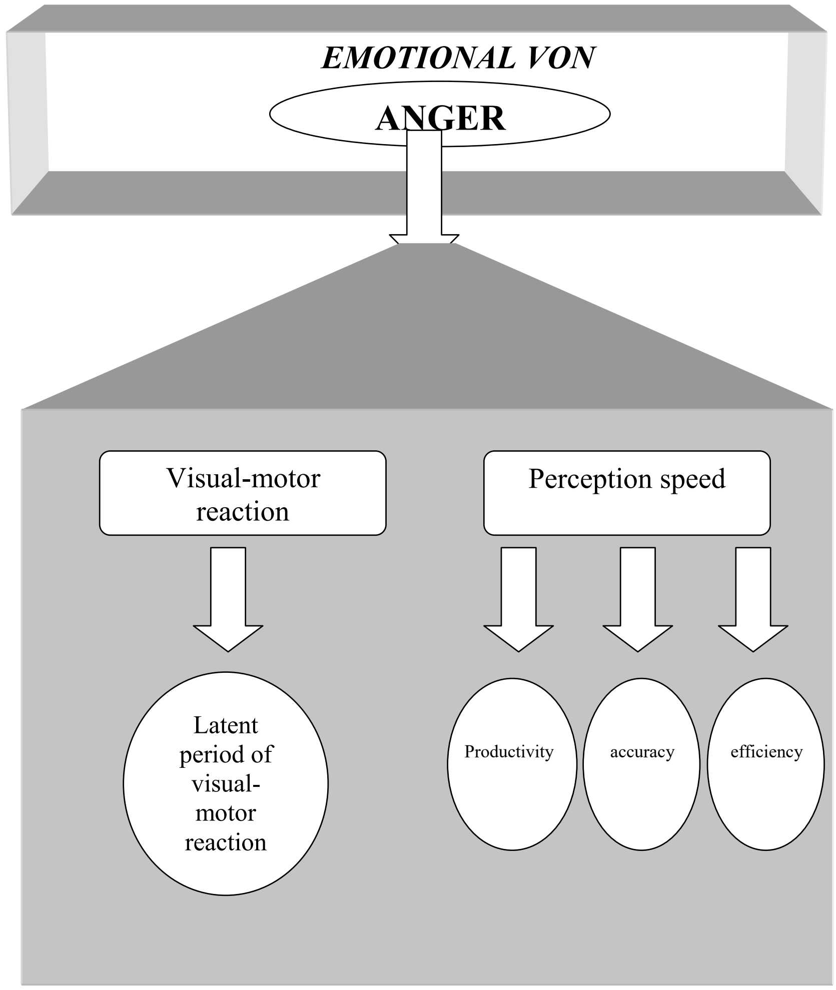

Figure 1. Model of influence of anger to system of visual perception of athletes

It is probable that the emotional factor of anger is a hindrance to athletes’ concentration of attention on an object. This results in ineffective information processing and leads to a deterioration in visual perception. Anger as an affective emotion is a negative characteristic and affects athletes’ general functional state Apart from this, anger also provokes a deterioration of speed reaction, accuracy, productivity and efficiency of information processing and the ineffective performance of coordination of movement in athletes.

Our study partially confirmed the relationship between the influence of the emotional state on the process of visual perception in athletes. The link between speed and productivity of visual perception on the one hand, and anger on the other, were shown. The other meaning of the emotional of athletes, its effect on visual perception were not studied in this investigation. None-the-less, this study has scientific interest and needs a future investigation of the problem.

The results provided can be formulated by the concept of the relationship between the emotion of anger and systems of visual information processing in sporting activity (Figure 1).

In this concept, anger is the factor which forms the system of perception in athletes (Figure 1).

Thus we must hypothesise that anger is not the mobilising factor in sporting activity. We think that anger interferes with the process of reasoning and choice: the person is worried, emotionally excited and panics and as a result loses control of the situation.

During our study valid links between the mean results of visual-movement perception and anger were found.

This was confirmed by the data we obtained: the mean results from the latent period of visual-movement reaction, accuracy, productivity and efficiency of perception speed in athletes in the first group is better than those from the second group of athletes. This testifies to the strong likelihood of adequate visual perception of objects in the outside environment, to optimal estimation of a situation and to fast decision-taking. It is obvious that improvements to visual perception leads to high levels of psychophysiological states both in training and under competition conditions for athletes from combat sports.

Two groups of elite athletes who had a different balance between nervous processes and perception of information processing were identified.

The athletes with high levels of sensory-movement reaction are characterised by better levels of balance between their nervous processes and the possibility of improvement in visual perception.

The athletes with low (average) levels of senso-ry-motor response are characterised by an increase in psycho-emotion tension and a decline in possibilities for improving visual perception.

The increase in the general level of emotional affects decreases the possibility of reproducing accuracy and stability of reaction to a moving object. An increase in anger provokes adeterioration in the accuracy reaction of athletes.

The development of emotional excitability in athletes with different level of sensory-movement reaction occurs for elite athletes via different strategies perception and information processing.

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Przetwarzanie informacji i emocji elity sportowców

Słowa kluczowe: przetwarzanie informacji, emocje, elita sportowców, złość, percepcja wzrokowa

Abstrakt

Cel. Problem percepcji wzrokowej i przetwarzania informacji jest bardzo aktualny dla sportu i aktywności zawodowej. Do wyczynów związanych z aktywnością ruchową dochodzi najczęściej pod presją czasu i wzrostem nerwowych emocji i napięcia fizycznego.

Metody. W badaniu przeprowadzono analizę percepcji wizualnej w warunkach przetwarzania informacji z połączeniem emocji u elity sportowców. Przebadano 19 elitarnych zawodników zapasów w stylu klasycznym w wieku 19-22. Zastosowano metody analityczne obejmujące: prostą reakcję wizualno-ruchową, reakcję na ruchomy obiekt, prędkość percepcji oraz skalę pobudliwości.

Wyniki. Uzyskane wyniki wskazują na znaczące powiązania między gniewem i percepcją wzrokową u elity sportowców. Prawdopodobnie emocjonalny czynnik gniewu jest przeszkodą w skupieniu uwagi na przedmiocie u sportowców. Prowadzi to do nieefektywnego przetwarzania informacji i do pogorszenia percepcji wzrokowej.

Wnioski. Autorzy ustalili, że gniew nie jest czynnikiem mobilizacji aktywności sportowej. Gniew, jako uczucie afektywne, jest negatywną cechą i wpływa na ogólny stan funkcjonowania sportowców.