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THE INTERSECTING SOCIAL IDENTITIES OF CANADIAN NATIONAL TEAM FEMALE BOXERS: PROMOTING SOCIAL INCLUSIVENESS IN (AND THROUGH) SPORT

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Keywords: intersectionality, athlete identity, cultural sport psychology, narrative.

Abstract. This manuscript presents an overview of the study Intersecting Social Identities of Elite Female Boxers on the Women’s Canadian National Team. The research backgrounds, theoretical framework, and the implications of this study are introduced to illuminate how researchers attend to issues of cultural diversity within sport and to expand understandings of how socially constructed identities shape experiences of marginalization and well-being within Olympic level sport.
Introduction. Traditional sport psychology research is rooted in White, Eurocentric ways of knowing, and has long been critiqued for ignoring issues of cultural diversity within sport and physical activity settings [16] and for emphasizing athletes’ identities as unidimensional and sport-focused [8]. To date, there remains limited understanding of who athletes “are” as diverse, multifaceted people, and how their identities extend into local sport contexts, such as their training environments, to shape their experiences and performances. Ronkainen and colleagues (2015, 2016) conducted meta-analyses of athlete identity in sport psychology and found that researchers extended their focuses from examining the construct and functions of a singular, essentialist athletic identity, to analyzing the powerful impacts of sociocultural considerations about athletes as whole persons with multi-dimensional identities, and how these identities can develop and change within different contexts. In an effort to advance holistic and culturally attuned understandings of athletes and their support needs, critical and cultural sport psychology researchers have re-conceptualized athletes’ identities as being multi-faceted, socially constructed, and continually evolving [17].

Often grounded in constructionism, identity is constructed rather than a stable psychological consequence within one’s mind, wherein language and cultural discourses, or stories, play a central role in its formation process [12, 19]. Douglas (2009) criticized that in mainstream scholarship, athletes have continued to be constructed with a narrow focus on sport dedication, performance, and the competitive nature, failing to recognize that athletes are people who are also doing and being things outside of sport (e.g., as women, students, family members, spiritual beings, community members). When narrow performance-based conceptualizations of athletes are perpetuated within sport contexts, athletes are in jeopardy of fixating on that single identity and lacking alternative narratives to support their life transitions outside of sport [7]. Thus, expanding the understanding of athletes and how they present themselves as holistic people related to the cultural and institutional environment has been called for [10]. Douglas (2009) unfolded her own life stories to illuminate how her identities as a woman and daughter shaped her behaviors and decisions during her professional golf career. McGannon and Schinke (2013) explored how women linked motherhood to physical activity participation, finding that the cultural stories of being a good mother formulated the females’ identities and obstructed physical activity participation. Although the aforementioned writings were not explicitly framed through the lens of intersectionality, the authors did explore multiple, fluid identities and revealed how they are infused within sport contexts. Schinke and McGannon (2015) wrote an editorial in Psychology of Sport and Exercise, the leading empirical journal in sport psychology, to centralize intersectionality within our domain’s research. The authors explained how the diverse sociocultural identities of sport participants need to be considered in sport psychology research and practice, rather than focusing on a singular and taken-for-granted athlete identity [see 8, 12, 19]. The aim is to open up more culturally inclusive sport spaces that are supportive and empowering rather than marginalizing for diverse athletes, and that facilitate athletes’ holistic developments and wellness [10].

Through such efforts, researchers have advanced a cultural praxis agenda that shifts the aim of academic research from knowledge production to social justice activities [15]. By bringing forward the voices and needs of diverse sport participants, such as those who identify as female, racial and/or ethnic minorities, LGBTQ, older adults, and/or disabled, these traditionally marginalized identities were visualized and empowered as parts of whole athlete understandings. Consequently, the perpetuated narratives of white, heterosexual, and masculine within sport psychology research and practice were enriched [see also 7, 12, 14].

An Intersectionality Approach. Emerging from the work of critical feminist and race scholars, intersectionality was initially brought forth to argue...
that the experiences of being black women could not be understood as being black and being women independently [e.g., 5]. Intersectionality thus refers to the critical insights that identities and meanings of race, class, gender, sexuality, ethnicity, dis/ability, and age interact and contribute to people's lived realities [4]. Easteal (2003) used a kaleidoscope metaphor to explain how “our perception is the outcome of a multitude of filters that twist and turn according to our own individual experience and knowledge” (p. 1), and which shape our sense of the world around us. Thus, intersectionality highlights the multiplicity, fluidity, and contextual meanings of identities and the social status people can have within a certain historical and cultural context [11]. Spawned by these intersectional insights, in the current project, we examined how elite female boxers from a national team constituted themselves and their experiences with multiple identities, and implications of the intersecting identities to their performance and psychological well-being.

**Project Review.** This project was the first empirical research in sport psychology exploring the intersecting sociocultural identities of athletes and how these identities connect to various experiences of exclusion and challenge within a national team sport context. Boxing in Canada has a highly diverse athlete population in terms of nationality, race, ethnicity, socioeconomic status, educational status, sexual orientation, and immigrant/newcomer status [18]. Moreover, boxers are often attracted to their sport to achieve a “better life” on various sociocultural levels, with many having experienced ongoing forms of identity marginalization [18]. We chose female boxers because boxing was culturally and traditionally considered as a men’s sport, where females tended to experience more identity conflicts within this environment. Ten female boxers on the Canadian National Boxing Team were recruited. At the time of the interviews, the participants varied in age from 26 to 31 years old (mean = 28.3), and had been selected on the National Team for two to 10 years (mean = 5.6). All of the participants had competed at a World Championship, with four of the 10 boxers being World Championship medalists and six being Major Games medalists.

The intent of this study was to explore how the female boxers’ layered identities, comprised of numerous identity characteristics, interact with the sport environment to influence sport experience and well-being. Intersectionality was used as an analytical lens to understand the participants’ identities as socially constructed, ever-changing, and always in process of creating and being created by dynamics of power [3, 4, 8]. Through revealing the numerous fluidity of athletes’ identities, this lens helped us gain dynamic insights into how female elite athletes engage and interact in the national team environment. These efforts facilitated cultural praxis, which is the centralization of culture as a means of social justice through sport, by revealing how sport psychologists can work with diverse athletes to support them based on how they self-represent [1, 13, 14]. The research was guided by the following questions: 1. How do female boxers construct (story) themselves within the Canadian National Boxing Team? 2. What meanings and experiences do these athletes associate with their identities, particularly in terms of difference and dis/advantage? 3. What are the implications of the athletes’ identities for well-being?

Given that the participants were geographically distributed across Canada, we conducted remote online interviews over Skype [1]. The interview process began with a mandala drawing- an art-based method to elicit rich storytelling from an insider’s perspective of participants about who they are as boxers on a national team. The following conversational interview was based on what the participants drew in their mandala. Each interview lasted 60 to 90 minutes, and was recorded and transcribed. An inductive thematic analysis [2] was performed on the interview transcripts to identify key narrative themes related to their identities.

**Results.** Nine social identities were brought out that appear to be salient and meaningful to the athletes’ sport lives: (1) gender, (2) sexuality, (3) physicality, (4) race and ethnicity, (5) religion, (6) language, (7) socioeconomic status, (8) weight class, and (9) education. We clustered these identities into three groupings based on the associations of their meanings within the participants’ stories, such as identities pertaining to race and ethnicity, language, and religion connected together; gender, sexuality, and physicality to understand female athletes’ dilemmas in a male-dominant sport; and the socioeconomic status, weight class and education, which related to athletes’ life opportunities and career developments. Our research team (2017) published the results of the first identity group with the aim of uncovering the issues of identity expression and oppression in relation to the dynamics of cultural differences and sameness and challenging racial privilege within boxing. In that publication, we demonstrated how minority racial athletes were aware of their skin color and language that separate them from the rest of the team, while the white Canadian athletes were dismissive of race and
ethnictiy. In the second paper of this project (in press), we focused on the intersecting identities of gender, sexuality, and physicality, revealing how boxing is a safe and unsafe gendered space that could empower or constrain women performing different forms of femininity. In the third paper, soon to be submitted, we have analyzed the identities of socioeconomic status, weight-class, and education to understand how the athletes are deprived sport opportunities due to their financial and political disadvantage (i.e. unselected weight categories for Olympic Games), and how such different life situations divided the team and shifted athletes’ life priorities towards and away from boxing.

Conclusion. This study was developed to facilitate more inclusive sport spaces and practices by illuminating how diverse athletes’ experiences within a sport context due to their identity positions have resulted in individuals being privileged or deprived opportunities [7, 18]. When identities are understood as the process and product of shifting narratives, an intersectional approach contributes to social justice for the athletes by revealing power relationships and cultural constraints on their identities [1, 8, 13, 17]. Within the current work, we are committed to empowering the athletes through centralizing their life stories and bringing marginalized topics forward. Athletes continually negotiate their identities in relation to power dynamics, enacting who they are by moving between identities that are valued by their team versus identities that are not valued, leading to moments of open expression and moments of concealment / silence [1]. Their stories reveal possibilities for facilitating more inclusive sport spaces that resonate with who athletes are as people first, and then performers, second. The intention is to create mentally healthy training and organizational environments where athletes will flourish more often. This process of being a national team athlete is not easy for the best of performers, though performance over the long-term becomes much more likely when athletes are supported for who they are, which then frees them to perform to their potential.

Sadly, this understanding of athletes’ identities as layered and integrating several different dimensions, either simultaneously or across time and discussions is not often considered by sport psychologists, the world over. Rather, interventions are often over-simplified, tending to centralize one aspect of an athlete over another. This simplification can contribute to mentally unwell athletes, who might then suffer from burnout, over-training syndrome, and depression catalyzed through their training environment. Opening up examinations of identity also offers the possibility of sensitivity training for coaches and sport psychologist, so that the very best of athletes who might rise to the top in any sport system, lead long-standing athletic careers. At the same time, we would anticipate that more athletes will rise to the top through inclusive practices, not as survivors, but as people who develop to their potential, using sport to achieve their fullest.

Recommendations. Below we provide brief practical sport psychology recommendations that will contribute to healthier identity practices through training environments:

1. Sport psychology practitioners and coaches need to recognize athletes have complex identities rather than a singular and universal athletic identity that narrowly focuses on sport performance. Sport psychology practitioners and coaches need to view and support athletes as holistic people who are doing sport but also pursuing other aspects of their lives. For example, with student athletes, understanding how they balance their dual careers and identities would be of some benefit rather than solely emphasizing dedication to sport, and so, the singular realm of athletics.

2. Researchers and practitioners need to draw attention to the sociocultural backgrounds of their athletes, wherein athletes are integrated and driven by certain cultural values, such as giving the meanings to their lives not only from mental and physical aspects, but also from emotional and spiritual dimensions. Besides, the sport subculture may intersect with a country’s mainstream culture, creating specific challenges for athletes with their identity constructions and sport practices, such as being female athletes within a male-dominant sport, where they might struggle with presenting themselves between femininity and masculinity.

3. Athletes’ identities change within different sociocultural contexts, where meanings and embedded status can shift relating to who they interact with. That is, on some occasions, athletes will be privileged, while in others, they may experience marginalization and silencing within their training environments or sport sub-culture. The fluidity of identities accompanied with changes in values and behavior patterns can result in adaptive and maladaptive psychological consequences. Hence, being aware of the fluidity of athletes’ identities and how to encourage and support more of these identities, would facilitate sport psychology practitioners and researchers in understanding athletes embedded in the dynamics of their sport contexts, as they live their lives and pursue world class performances.


Keywords: gender, sport, change, identification.

Abstract. Every day female athletes perform some kind of a feat, overcome themselves in training and competitions inspiring themselves opt for sport again and again. In course of time features of professional activity become personality traits (masculinity). Our research has given the chance to reveal female athletes capable to make deliberate decisions allowing to balance between gender and sports roles.

Introduction. Among the problems for girls engaged in conditionally male sports (weightlifting, football, hockey, martial arts, boxing, marathon running, triple jump, pole vaulting, hammer throwing, etc.), highlight the development of masculine qualities [1, 3, 5-7, 10]. Athletes note difficulties in intimate personal relationships, related to the fact that the forces and thoughts are engaged in training and competitions, and the love of the athlete can negatively affect the following of the regime for the sake of the desire to spend more time with a beloved person. There may be difficulties in the distribution of leadership in a pair – a successful athlete in sports can be difficult to depend on the desires and plans of a man. Girls are afraid of the prospects of marriage («I'm afraid that I can not find a man with whom we can understand each other», «I do not know what awaits me after the end of a sports career»). There are complaints of excessive aggression («sometimes they accuse me that I am too aggressive towards others», «it can be difficult to restrain ...»). There are difficulties in presenting yourself as a woman – choosing everyday clothes, inability to show women's behavior («I do not like wearing heels», «I feel more confident, free and protected, dressing as a sportswoman»). Fears of becoming overly similar to men, leading to a decrease in self-esteem as a girl, or a decrease in motivation for sports.

The purpose of the study is to find out the conditions under which the process of gender identification of sportswomen of conditionally male sports would be a constructive combination of gender and sports roles.
To be or not to be a man for a sportswoman

The analysis reveals conditions that make the gender identification of athletes more difficult: 1. Deerotization of relations, erasure of the gender boundary. Saying the coach: «For me in training there are no boys or girls, but there are only athletes!», The absence of separate dressing rooms for girls and boys; as a result, the touch ceases to be regarded as an erotic gesture. 2. Uncomfortable living conditions at training camps and competitions. Often in the places of residence athletes lack basic amenities (shower, warm water, heating), sometimes you have to settle for sleeping bags, in hotels there are troubles in the form of bedbugs, cockroaches, mice. The problems of everyday life make the athletes harder, more resistant to stress, encourage to show traditionally masculine qualities. 3. Muscular technologies of mental training of athletes are built on the basis of overcoming obstacles. A vivid example is the words of the sports psychologist R.M. Zagainova: «An athlete can not be pitied, in this case he will feel sorry for himself, and then the end» [12, p. 15]. Sometimes coaches admonish their athletes to be aggressive towards their rival, feel hatred for them. Sports success comes to those who are able to withstand heavy loads, endure pain, fatigue and overexertion.

Sportswomen of conditionally male sports face a number of gender difficulties («a negative attitude towards their body,» «lack of femininity,» «the appearance of male character traits») [9]. The image of an athlete in conditionally male sports is very much like a disciplined warrior overcoming all obstacles in order to achieve the goal. In describing the feminine image, athletes «draw» an airy image of a benevolent girl, open to the world, capable of building harmonious relationships with a man.

So the athlete faces a choice (sometimes unconscious) – either to be successful in the sport, or to be happy in a feminine way, thereby choosing between masculinity and femininity in herself. Therefore, such athletes need additional work to reconcile the role of the athlete and the gender role.

Materials and Methods. Methods of qualitative research were used to collect data: focus groups and structured interviews. Athletes were asked questions about what motivates them every day to make a choice in favor of the training process, which makes them athletes, as well as ways to address gender-related difficulties associated with sports.

The sample consisted of 60 professional sportswomen of conditionally male sports (hockey, contact types of martial arts, weightlifting, soccer, rowing, ski races) at the age of 17 to 23 years old, having high sports grades and at least 5 years of sports experience. Below is a discussion of the material obtained in the study.

«Permanent» action – the components of the process of overcoming themselves

Athletes make decisions every day – go to training or meet friends, go to competitions or take part in extra-curricular activities at the institute (or spend time with their family). Everyday choice only seems to look like situational decisions – whether to go or not for training. Essentially it is much more significant: to the extent that different values are behind each alternative, these choices are actions – a choice between alternative motives, each of which has its own value [2, p. 54]. They represent a permanent (prolonged) act – every time the choice in favor of continuing to play sports as a kind of activity (and, accordingly, the choice between roles – often female athletes than girls). So, the processes of gender identification of female athletes in men's sports have signs of an action.

As a rule, it is difficult to understand on the basis of what the decision was made – the answers of the athletes sound like «I need it», «I get up and go.» Behind it there are implicit processes: weighing the alternatives in correlation with the accepted values, finding additional arguments and resources, building up the prospects for living in sports, assessing risks, opportunities, and others. The requirements of the main activity (sports) are accepted and maintained by daily elections, gradually internalizing themselves into personal qualities. In this light, it becomes clear how the rigidity, willpower, and strength of character become (formed by the person himself) («tempering the character,» «strengthening the will»).

The daily practice of choice with a constant outcome brings it to automaticity, becomes a skill («just get up and go to training»). Here there is a kind of trap: it is psychologically easier to play the same role day by day, than to switch from role to role during the day. Switching between roles requires the ability to see different contexts, the ability to quickly switch attention, readiness to master different role repertoires and behavior patterns. Over time, the role of the sportswoman becomes a familiar face (appropriated by the mask) and already requires much less effort to execute it. Constantly choosing a sporting role, the athlete continues to broadcast her not only in the context of sports activities, but also in a variety of other contexts. Therefore, daily decision-making by a sportswoman, making a choice (act) is a mechanism
(process) that translates the characteristic of activity into a property of the person (masculinity).

Types of actions processes that determine quality, awareness and maturity of choice

Identification processes can be those that determine the quality of elections (actions): how a person copes with difficulties, what processes are involved in making a decision. Consider the possible options for the election of the athlete in the situation of harmonization of gender and sports roles. Consider them, moving from the least mature to more mature actions – in accordance with the types of actions [2]. As a model situation, let’s take the one in which the parents oppose the practice of masculine sports by their daughter (often a test of the firmness and awareness of the daughter’s intentions).

Option 1 («zero» act) – the athlete does not make a choice at all, ignores her need, efforts are spent on «not seeing». The mechanism is a mental defense that generates tension, and how the retarded consequences are psychosomatic manifestations (illnesses, physical traumas). She does not answer «yes» or «no» to her parents. The girl is displeased with these conversations, she tries to avoid or ignore them («I usually do not answer anything»). At the same time, the girl is going through because of the parents’ objections, internal tension is felt (there is bitterness in the respondents’ voice, tears often appear on the eyes). Attempts to talk openly with parents about their feelings are not done.

Option 2 (pseudo) – athletes or enter into a dispute with their parents, proving the importance of sport in their life («I myself know how I should live, do not interfere»), or they agree with parents, doubt their choice («Sometimes I think: «But the mother is right»). Since the decision is not taken personally, there is a «throwing» from one extreme to another in behavior: there are many doubts and fears for their health and the future outside of sports. But there is always something that keeps them in the sport (emotions, victories, friends, habit, etc.). The absence of a clear solution gives rise to internal tension. Unlike the «zero» act, the athlete already realizes that the girl and the sportswoman are different role positions; she is not ready to lose any of them, and not living fully to either one or the other. The choice is not perfect, attempts to combine the roles are not very productive, because they are superficial, and sometimes even non-constructive. So, if in the first example the athlete is going through because of the lack of support from her parents, then in the second, she worries more because of her own doubts.

Hence the inner shakiness, contradictoriness: on the one hand, the athlete wants to achieve a high sports result, and on the other, is afraid of causing irreparable damage to her health. Therefore, it either works half-heartedly, regrets itself, or, on the contrary, works excessively (with hypercompensation tear), periodically provoking psychosomatic failures. The internal state is the same: a girl can be proud of her body during training, but at the same time consider herself not sufficiently feminine outwardly and be ashamed of the body in other social contexts. It is in the notions of the body that the athletes find the most contradictions. There are often attempts to smooth out the contradiction by adjusting the external image – there are examples when specialists of the model agency taught the athletes to walk on their heels, to show themselves in a profitable foreshortening during the photo sessions. Correcting the external image and movements without changing the internal state only temporarily pushes the difficulty, but the conflict itself is not solved by gender and sports roles. This creates a threat of the development of destructive reactions [4, 11]: either the exertion of tension in the situation (affectation), or an increase in the level of neuroticism. Since deep psychological work with the identity of athletes was not carried out, this led to increased stress due to increased neurotic personality and the effect of the work done quickly disappeared.

Option 3 (responsible action) – the athlete makes a single-valued choice of «or / or». To strengthen the adopted decision, a mechanism of tightening is triggered-supporting its choice (strengthening it with additional arguments), and vice versa, discrediting and deprecating the rejected (or lowered in importance) role [8].

If a girl chooses to be a sportswoman, then she puts her training above all (a few «overplaying», exaggerated), the body is reduced to the status of the instrument. As a consequence, there is a risk for women’s health of athletes, the body is sent to develop according to the male type. For athletes, the convention (the norm adopted in this activity) is expressed in the ability to withstand the physical predetermination of the body – in sports there is constantly going beyond the limits of ordinary physical and mental abilities. In training and competition athletes prove that if you really want, you can step over the physical and mental framework, public stereotypes (that «the woman is physically weak»). The athlete is so immersed in sports that she often does not even imagine what she will do in the future. There is another «trap» – sport occupies all living space, the
The girl already almost does not see herself as an athlete, other social roles become less noticeable. There is a growing risk of relegating romantic relationships to sports. Proposals of parents to finish with sports are often suppressed ("I decided so, they must take my decision"). Often sportswomen do not even notice the risks parents are talking about.

If the girl chooses a gender role, she begins to "cherish" herself in training. Sports success is reduced; these girls do not stay in the sport for long. Nevertheless, whatever the girl chooses, she is free from an intrapersonal conflict, she has made a decision in favor of one of the social roles and successfully implements it. Personal growth is, but relative, as achieved by the price of refusal of flexibility in "addressing the gender issue."

Option 4 (developing deed) – the girl finds constructive ways of optimal combination of both roles. This is the most personally mature of the options considered. The athlete finds the words to explain to her parents her choice to engage in male sports, expresses her confidence in her position. She realizes her roles, plans the future in detail both in sports and after the end of her sports career, understands the causes of parents' unrest, risks are realized and minimized. It does not matter, parents continue to ask "Is it time you finish with the sport?" Or stopped talking, the athlete is so confident in her decision that there is no inner doubt. Confidence in their choice, persistence of the position allows the athlete to reduce intrapersonal contradictions, remove the need to constantly defend their own choices. Personal maturity liberates volitional resources, allowing them to direct them to achieve sports results. Therefore, in order to solve the difficulties of female athletes in the development of gender identity, it should be more mature, it must occur on the internal (personal) plane (at the level of the self-concept). This is of great importance for sports – the athlete feels more confident in training, in competitions, realizing that sport is her own choice. It will be more stable in the results.

**Sportswomen can learn from others sportswomen**

As a survey of sportswomen involved in conditionally male sports has shown, addressing gender difficulties is an important stage in the development of their gender identity. Analysis of the presented strategies allows us to say that the more effective the decision taken by the athlete (or the attitude to the difficulty), the more mature the types of actions he corresponds to. Let's give examples of such statements athletes in accordance with the types of deeds.

**"Zero" act**: "If you do not accept such what you are – it means the man is the wrong one; "While you are doing sports, you cannot become such a full-fledged person. I was hampered by sport. I did not have time to watch what’s in vogue, take care of myself, there was not time to paint, even thoughts were not occupied with it; "There is almost no personal life. If successful, then there is no time for personal life. That’s only if at the training camp in the team there is a guy with whom there will be a relationship, then yes, and if not, no guy will like that, he will cheat on you."

**Pseudo-act**: "You will not explain to everyone that you are a small, frail girl who wants to take care. I do not know how to show this. It’s easier for me to go and decide. I understand that I am perceived quite differently – not what I am. I do not say what I am, I’m afraid that will not work; "I’m physically strong, I’m like a kid, and after the training there are emotions, I cannot be gentle. I want to, but I do not know how; "I will not take away my muscles, I have already gotten used to it, once I chose a sport ... I will not change it, but all the same, girls should be feminine ...; "Being engaged in professionally sports, is so lazy to be engaged in the appearance; "Sports sports, but a girl must be feminine." She does not have to be all in the sport. She must look after herself and learn, develop mentally. Personally, I’m at home as a boy. They prepare everything for me, I do not get out ... Which of my wife will be – I cannot cook; "I always do everything myself. I can even change the wheel myself. In others, truth is a shock. I do not need to ask for help. It’s not difficult for me to do this and the men can prove that I can do it myself."

**Responsible act**: "I tried to make up for my sports childhood – new clothes, a new image every week, hangouts. Realizing that the behavior was not the same, she experienced dissatisfaction with life; "I made my nails for 2 days to make an impression; "I consciously close my personal life, so as not to be distracted. When I’m interested in anything, I give myself all the time; "It is clear that physical education brings health, and a big sport picks up. But I have a goal, and I want to achieve it. The opinion of others in general was indifferent. I have a coach, I trust him, he will not spoil my body, my health. He is a professional."

**Developing act.** Survey of athletes allowed to identify those who are able to make a choice relating to the fourth kind of actions. Sportswomen recognize themselves as an individual who broadcasts the image of a successful sportswoman of her sport (feel "the face" of her sport). "I do not resist persuasion to quit sports, just translate into a joke; "I tell those
who do not understand my sports, about the joyful events that I have in sports»; «It’s painful to watch when a guy does not press an empty bar. There is bewilderment... Then there is a desire to help, hedge. I could do it, so he can do it too «; «People should be motivated by their superiority in power. I’m strong – but you, too, can be strong. I want to be an example «; «I come to the training beautiful – feminine ... When I wear a uniform, I go to the ice, or I put on sneakers – everything, an athlete»; «It’s good for me to have male character traits, just apply them to the place»; «I allow myself to be independent in solving male problems when there is no man near»; «There is a time filter and places where it is possible to show strength. Now I try not to make rude movements, I control the force «; «I know that his parents will not understand if I carry the bag myself, and I do not do it with them»; «I like to read books, take from there images of femininity, manners»; «I try in front of people who want to be more feminine – somehow work on the appearance... I looked at the girls and adults who succeeded in it – what I combine with, tried on myself»; «My everyday appearance creates an image of me and the sport from the public. I can not afford to look neglected ... I look feminine».

If an athlete is capable of taking personally mature decisions, then she can be described as personally mature, able to integrate a gender and sporting role. In this case, the athlete is not torn by contradictions. And this has a positive effect on sports results!

Conclusion. The main condition for constructive combining of gender and sports roles is the ability of the athletes to make mature decisions. As signs of the mature choice of athletes, which are the basis for a constructive solution to the issue of their gender identity, are:

Awareness. The sportswoman deliberately plans her present and future, understands the possible risks of playing sports (changes in body structure, health risks and the formation of gender identity) and ways to minimize them.

Responsibility for own decisions. The girl feels free to make important decisions in her life, is ready to deal with the consequences of her choices and decisions.

Constructive combination of alternative roles and values. The athlete demonstrates the flexibility of behavior depending on the context – she possesses the skills of behavior for both gender and sports roles, she feels the boundaries of manifestation of masculine and feminine qualities.

A sense of inner balance. An athlete girl takes her own personality, builds a unique identity in accordance with her values. She feels herself whole, experiencing a sense of inner balance. The decisions made are ecological for themselves as individuals, which is manifested in the improvement of the quality of life. The athlete consolidates the adopted decisions in behavior, carries them out as a strategy.

These same signs are appropriate to use both for assessing (diagnosing) the degree of maturity / constructiveness of the solution of the problem of gender identity, and as benchmarks in working with male athletes on conditionally male sports.

**Literature**

DETERMINANT FACTORS OF EXTREME SPORTS ACTIVITIES

Keywords: extreme sports activity, level of extremality, risk factors, psychological qualities.

Abstract. The article is devoted to the study of the main factors that determine the extreme nature of sports activity, the study of psychological characteristics of various types of extreme activity and the determination of the influence of various factors on the level of extreme sports activity.

One of the most important problems in this area is the lack of knowledge of the various factors of high psychological stress in sports of extreme orientation.

The experiment involved 192 people aged 18 to 22 years:
– Group No. 1 – 98 students of the GCOLIFK, of various sports specializations;
– group number 2 – 94 students of the Civil Protection Academy of the Ministry of Emergency Measures and Civil Defense of Russia.

The study was done in May 2016 on three factors that determine the level of extremism of various sports (sports disciplines and extreme sports activities):
1. Evaluation of the most significant psychological qualities characterizing athletes, extremals.
2. Risk factors that determine the extreme nature of the sport and sports activities.
3. Classification of social groups of people engaged in various types of extreme activities.

As a result of the study, the main factors determining the extremity of sports activity were identified.

Ключевые слова: экстремальная спортивная деятельность, уровень экстремальности, факторы риска, психологические качества.

Аннотация. Статья посвящена исследованию основных факторов, определяющих экстремальность спортивной деятельности, изучению психологических особенностей различных видов экстремальной деятельности и определению влияния различных факторов на уровень экстремальности спортивной деятельности.

Одна из важнейших проблем в этой области – неизученность различных факторов высокой психологической нагрузки в видах спорта экстремальной направленности.

В эксперименте участвовали 192 человека в возрасте от 18 до 22 лет:
– группа №1 – 98 студентов ГЦОЛИФК, различных спортивных специализаций;
– группа №2 – 94 студента Академии гражданской защиты МЧС и ГО России.
Исследование проводилось в мае 2016 года по трем факторам, определяющим уровень экстренности различных видов спорта (спортивных дисциплин и экстремальных видов спортивной деятельности):
1. Оценка наиболее значимых психологических качеств, характеризующих спортсменов-экстремалов.
2. Факторы риска, определяющие экстренность вида спорта и спортивной деятельности.
3. Классификация социальных групп людей, занимающихся различными видами экстремальной деятельности.
В результате проведенного исследования, были выявлены основные факторы, определяющие экстремальность спортивной деятельности.

**Introduction.** The relevance of the research is explained by the insufficiently developed theoretical and scientific-methodological foundations for providing psychological security for extreme activities and for classifying extreme sports in terms of the degree of extremality. One of the most important problems in this area is the lack of knowledge about the various factors of high psychological stress in extreme sport [1, 2, 3, 4, 5, 6].

We can analyze the factors that determine the extreme nature of the activity and risk according to different grounds. There are «foreseen» factors – those that we can clearly identify, measure and implement the forecast of the degree of their impact on the success of the activity, and there are «unforeseen» ones that we cannot measure, or cannot predict the probability of their occurrence. System-forming safety factors of human activities dealing with extreme activities are [1, 2, 3]: a) objective risk factors or environmental factors; b) factors of uncertainty of activity; c) the factor of accidents in the sport or the rate of accidents in extreme human activities.

The sensitivity of people to perceiving risk depends both on external and internal factors. Internal psychological risk factors in extreme activities are subjective, and represent a variety of variations. The evaluation of risk factors depends on the personal qualities of the athlete, the risk assessment based on his experience and qualifications, age of the younger, mature or older age, assessing his own capabilities and status at the moment.

**The purpose of the study** is to study the psychological features of various types of extreme activities (sports disciplines and kinds of sport) and to determine the influence of various factors on the level of extreme sports activity.

**Subjects:** 192 people aged 18 to 22 years. Group number 1 – 98 students of the GCOLIFK, various sports specializations (young men of 40 people, girls – 58 people). Group 2 – 94 students of the Civil Protection Academy of the Ministry of Emergency Situations and Civil Defense of Russia (all young men). The study was done in May 2016.

**Results.** We conducted a study on three factors that determine the extreme level of various sports (sports disciplines and extreme sports activities).

1. **Evaluation of the most significant psychological qualities that characterize extreme sportsmen.**

The results of our study (Figure 1) almost completely refute the opinion formed by the media, that extreme athletes are people of an antisocial orientation, characterized by negative personal qualities. Our study showed that young people consider extreme athletes to be different: courage (6.9 points out of 10), determination (6 points), adequacy of behavior (5.5), caution (4.8), will to win (4, 5), discipline (4.2), responsibility (4.2), independence (2.6), initiative, the need for leadership and the need for recognition. The first negative quality characteristic of extreme sportsmen was noted only from the 10th place (Figure 1): stubbornness (2.2 points out of 10), recklessness (1.8), ambition (1.8), adventurism (1, 5), aggressiveness (0.8), anxiety, selfishness, carelessness, vanity.

Based on the respondents answers results of the group №1 (ГЦОЛИФК) and №2 (АГЗ МЧС), the calculation of the Spearman correlation coefficient (Table 1) shows a statistically significant correlation dependence.

2. **Risk factors that determine the extreme nature of the sport and sports activities**

We conducted a preliminary survey of respondents [1, 2], which allowed us to identify six main risk factors that determine the extremality of activity (Figure 2).

a) according to respondents, the most significant factor determining the extreme activity of an athlete is the presence of objective external risk factors, such as, for example, avalanches and rock falls in mountaineering, or the presence of a rigid contact in martial arts. This factor is estimated at 8.2 points (on a 10-point scale);

b) in the second place by importance (7.8 points) is a high level of uncertainty of activity and the presence of unstandart, unplanned situations. This factor determines the unpreparedness of the athlete to cover trouble-free performance of actions, for example, in mountaineering, if the athlete does not know all the dangers that he must overcome, he cannot always arrange a reliable insurance, and the combatant

**Conclusion:** The results of our study showed that extreme athletes are people of an antisocial orientation, characterized by negative personal qualities. Our study showed that young people consider extreme athletes to be different: courage, determination, adequacy, caution, will to win, discipline, responsibility, independence, initiative, the need for leadership and the need for recognition. The first negative quality characteristic of extreme sportsmen was noted only from the 10th place: stubbornness, recklessness, ambition, adventurism, aggressiveness, anxiety, selfishness, carelessness, vanity.
is not always ready for an unconventional behavior of the rival;

c) the next most important (6.8 points) is the inability to provide timely medical assistance to the athlete in case of the accident. This factor largely determines the high level of extreme nature of all sports associated with the natural environment (mountain and expeditionary sports, underwater and parachute sports, etc.).

d) an official ban on engaging in this type of activity on the part of the state (illegal activity) is also quite significant in the system of forming the level of activity risk (5.6 points). Since the form of activity is officially prohibited, non-formally trained athletes are forced to conduct it secretly, illegally, without providing the necessary security equipment (on unequipped areas, without medical and technical security services, etc.);

e) publicity of activities and increased attention of the mass media to this type of activity (broadcast on television, publications in the press, the Internet, etc.) is the fifth most significant factor of extremity (4.5 points). This factor is the reason that extreme athletes are ready to take risks when there is a danger to life. The principle – «Company in distress makes trouble less» – works.

f) we were surprised by the low rating of the factor of the athlete’s death possibility, the possibility of getting a serious injury and the associated high psychological risk (1.8 points). Strangely enough, in the assessment of professionals [5,6], this is the factor that determines the level of riskiness of human activity. But we explain such an assessment by the specifics of our respondents – these are not professional sportsmen or professional rescuers, but student youth, some of whom are engaged in sports, but not at the highest level. Therefore, this factor cannot use extreme activities with respect to its risks

The calculation of the Spearman correlation coefficient (Table 2) between the results of the answers on this issue of the respondents of group 1 (GTSOLIFK) and №2 (ASP MES) shows a statistically significant correlation dependence.

3. Classification of social groups of people engaged in various types of extreme activities

Extreme activities involved not only athletes, but also representatives of other social groups (Figure 3). And it is belonging to a particular social
group that largely determines the characteristics of a person’s risky behavior. Earlier, we conducted a classification of social groups engaged in extreme activities in the mountains [1, 2]. In this work, we identified six social groups associated with extreme sports activities:

a) the most risky social group (7.96 out of 10) are professional rescuers (representatives of the Ministry of Emergency Situations), which provide safety and rescue people engaged in risky activities. This category of people engaged in the most strictly regulated by the society activities, which is associated with a very high level of risk. The same group includes representatives of the public rescue teams of mountaineers and mountain tourists – these are professional athletes (instructors, guides) performing the most dangerous operations in the mountains, caves, mines;

b) the second most important social risk group (7.83 points) are representatives of dangerous, risky professions. These are representatives of: security agencies (border guards, representatives of the FSB, Ministry of the Interior, mountain arrows, etc.), divers, miners, aviation and railway operators, geologists, polar explorers, industrial alpinists (builders of hydroelectric power stations, high-altitude power lines, ski bases) Well, in our time, probably, this category includes politicians, bankers and bandits. And of course this social group includes highly skilled professionals;

c) the next in importance (7.7 points) were high-qualified sportsmen engaged in extreme sports activities (mountain, underwater, connected with auto-, motorcycle, bicycle, combat, etc.). Since sport is aimed at achieving athletes the highest results at the limit of physical and mental capabilities of a person, as a rule, representatives of this social group are more often than others in the extreme and critical risk areas;

d) the fourth social group, these are informal people (6.7 points) engaged in officially not registered types of extreme sports activities (freeriders, freeclimbers, streetracers, baseclimbers, basejumpers, monumentclimbers, roofers, hookers, parkourists, etc.). This group includes people engaged in anyone and nothing regulated activities (without rules and restrictions). Representatives of this social group are extremely poorly regulated by society. Their activities are often represented by informal youth associations that oppose themselves to sports organizations (federations, associations and unions in sports) and public associations (political, commercial, mass media), as well as representatives of official authorities (police, traffic police, etc.).

e) unorganized tourists, traveling independently to dangerous areas of the planet («savages»). These are people who travel the world on their own (6.3 points). Their activities are poorly regulated, which makes the

![Figure 2 – The most significant risk factors that determine the extreme nature of the activity](image)

<table>
<thead>
<tr>
<th>External factor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indeterminacy of activities</td>
<td>10</td>
</tr>
<tr>
<td>Impossibility of medical care</td>
<td>9</td>
</tr>
<tr>
<td>Official ban</td>
<td>8</td>
</tr>
<tr>
<td>Publicity</td>
<td>7</td>
</tr>
<tr>
<td>Possibility of death</td>
<td>6</td>
</tr>
</tbody>
</table>

**Table 2 – Results of the correlation analysis of the respondents of group 1 and number 2 on significant risk factors that determine the extreme nature of the activity**

<table>
<thead>
<tr>
<th>N</th>
<th>p</th>
<th>p</th>
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<tbody>
<tr>
<td></td>
<td>0.05</td>
<td>0.01</td>
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<td>6</td>
<td>0.85</td>
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</table>
representatives of this social group extremely dangerous. Among them are people who are prepared for this activity, as a rule, former athletes, and people who do not represent the dangers with which they are facing;
e) the least extreme group are organized tourists, traveling to dangerous areas of the world through travel agencies (5.5 points). It includes: tourists, holidaymakers at ski and tourist bases (outdoor activities), travelers (outdoor), people making trekking, city tourists (ethno, cultural and economic tourists), etc.

Representatives of each group have their own, and quite predictable, level of extremism, accidents, specific features and ways of organizing activities. And accordingly for each group specific methods and technologies of pedagogical influences should be applied to ensure the safety of activities.

The calculation of the Spearman correlation coefficient (Table 3) between the results of the answers on this issue of the respondents of group No.1 (GTSOLIFK) and No.2 (AGZ MES) shows a statistically significant correlation dependence.

**Conclusion.** As a result of the study, the main factors determining the extremity of sports activity were identified.

**Table 1 – The results of the correlation analysis of the respondents of groups Nos. 1 and 2 depending on the social group**

<table>
<thead>
<tr>
<th>Social Group</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional rescuer</td>
<td>8</td>
</tr>
<tr>
<td>Dangerous profession</td>
<td>7</td>
</tr>
<tr>
<td>Athletes of the highest qualification</td>
<td>6</td>
</tr>
<tr>
<td>Informal</td>
<td>5</td>
</tr>
<tr>
<td>Individual tourists</td>
<td>4</td>
</tr>
<tr>
<td>Organized tourists</td>
<td>3</td>
</tr>
</tbody>
</table>

**Figure 3 – The most extreme social groups**

**Table 1 – The results of the correlation analysis of the respondents of groups Nos. 1 and 2 depending on the social group**

<table>
<thead>
<tr>
<th>N</th>
<th>P 0.05</th>
<th>P 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0.85</td>
<td>–</td>
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**Literature**


«PSYCHOLOGICAL NICHES» IN SPORT:
SPATIAL MEASUREMENTS

Keywords: psychological niches, phenomenon, sport, single combat, activity space, success.

Abstract. The effects of interaction between subjects of joint activity are discussed. Based on the analysis of literature and the study of styles of activity, it is stated that in various sports there is a stable proportion of subjects with certain complexes of individual characteristics (anatomical, morphological, psychophysiological, personal), associated with different «ranges» of their success. Formed among athletes different types of activity styles are focused on the actualization of different stable segments of «activity spaces». It is possible to distinguish social, psychological and biological determinants of the phenomenon «psychological niches».

The study was carried out within the framework of the State task of FASO, theme № 0159-2017-0005 «Resource functions of abilities of different levels: the effects of integration and differentiation in the structure of individuality».

Introduction. The problem of generalizing and presenting the picture the «whole» is acute enough in relation to socio-psychological phenomena. It will not be erroneous to claim that the overall picture, the integral vision by scientists of the interactions of a variety of socio-psychological phenomena, still remains in the sphere of assumptions, scientific forecasts, concepts and wishes; more often such questions are not even raised.

In psychology the theme of interaction between different social groups representatives is studied and covered one-sidedly. It is definitely not the central theme. The most adequate material for discussing the problem, conventionally called «psychological niches» (PN), we find in the sphere of sports. According to the model of sport, to be more precise – the high performance sport (HPS), – in 1970-2000. a rather extensive empirical material was accumulated, that allows us to reasonably discuss the problem mentioned above, which on a broader scale can be defined as the distribution of interacting subjects (individuals, individuals) in social space.

Materials and Methods. Research aim is to study and to describe the phenomenon of «psychological niches» on the model of sport; analysis of its social, psychological and biological determinants.

Organization of research included: 1) Analysis of scientific literature. 2) Included observations (working as a practical psychologist in teams and sports...
colleagues) 3) Psychodiagnostic: express methods of studying the typological properties of the nervous system of E.P. Ilyin, test questions of G. Eysenck and R.B. Cattell were used; the author's technique «Styles of activity» was used to study the features of the styles of wrestlers’ activity [18] (more than 150 people of the sportmen of the higher category, freestyle wrestlers, classical and judo were surveyed). 4) Interrogation of experts (where quality trainers of the highest category (12 people) were involved.)

Research tasks: 1) To describe the manifestations and main effects accompanying the formation, functioning, fixing, preservation of the phenomenon of «psychological niches» in sport; 2) To reveal the biological, psychological and social mechanisms of the formation and functioning of the phenomenon «psychological niches».

Results. Interaction of subjects in social field. In biology from the middle of XIX century, the concept of «biological niches» appeared. In works of C. Darwin, D. McFarland, R. Hind, and others, it was understood as the role of the animal in the biological community, determined by its relationship with other organisms and with the physical environment; the boundaries of the population and the characteristics of the behavior of individuals, determined by their symbiosis and competitive relations with other animals, providing the best conditions for survival. The phenomenon of «biological niche» reflects mechanisms of environment adaptation of a species as a whole, rather than a single individual; species as a biological «units», in turn, is part of the system of interaction with other species – the biocenosis. On the one hand, the selection and description of the «biological niche» was the result of observations by naturalists, on the other – the search for «units» of the living, allowing to explain the laws of its evolution and to find the basis for the formation of a new methodology of discipline. If we recognize the relevance of distinguishing the «units» of the psychic, the «units» of social (groups of interacting people – participants in joint activities, communication, perception, etc.), if we recognize the importance of studying the role of group effects, then the issues of studying the interaction of individuals as individuals, and their interaction with «us» and «them» in space and time, should also be recognized as relevant.

The high performance sport as a model for the phenomenon studying. In the the high performance sport (HPS) the interaction of people in their «us» and in «them» groups is most striking, due to its features: 1) The rivalry of people in sports is extremely expressed; it is not hushed up, not tabulated, not camouflage by plausible motivations; 2) There is one result of rivals meeting, clearly and differentially fixed (a mutually exclusive measure of their success, often without compromise solutions, often without secondary benefits for the loser); 3) The ultimate tension of physical and mental abilities in the process of rivals interaction; 4) High personal significance of the outcome of their struggle; 5) Short period of rivals meeting (therefore, giving the opportunity for a correct study of different phases of the phenomenon); 6) Relatively short period of a person's life in sports; all stages of subjectogenesis are extremely expressed (from the beginning of mastering it by this activity to its completion); 7) Clear and differentiated assessments of the success of the athlete at all stages of his career (measure progress at different ages, results in tournaments, measures to change activities in different situations, connection with the state of the external environment and internal)

Social, psychological and biological determinants of the phenomenon. Analyzing the materials of literary sources, it is possible to single out a number of interesting facts. So, in independent differential-psychological researches, the unequal success of individuals with different individual psychological characteristics was systematically noted [1, 5, 6, 7, 8, 10, etc.]. There are significant differences in the proportion of body parts of individuals (body length, legs and arms, hips and shins), preferring these or those kinds of sports, and within the species boundaries – different distances, specializations, roles, styles of activities, different technical actions and tactical and technical combinations. Representatives of different body types differ most often and according to their sporting results. Some of them often achieve high results, others less often [2, 3, 4, etc.]. Let us also highlight the distribution of individuals both within the boundaries of the sport and specializations in it, depending on their psychophysiological organization. Thus, in foil and epee fencing there are more individuals with a weak nervous system, mobility of excitement, balance in external and internal balance, while in saber fencing there are more individuals with a strong nervous system, inertia of excitation and inhibition, balance in external and internal balance prevail; in rhythmic gymnastics – with a weak nervous system, inertia of excitation and inhibition [1]. Among the classical wrestlers, there are more individuals with a weak nervous system, inertness or weak mobility of excitation, balance or predominance of inhibition by external balance and internal balance; among of free-style wrestlers there are more
individuals with a strong nervous system, medium and high mobility of excitation, medium mobility or inertia and inhibition, even-tempered in the internal balance; among judo wrestlers there are more with a weak nervous system, inertia of excitation, moderate mobility of inhibition, equilibrium or predominance of external stimulation and internal inhibition [10]. In sports games – at the beginning, representatives of one type are more active and efficient, in the middle – the second ones, at the end of the meeting – the third ones; in a situation of success, ones are more reliable and effective, others are unsuccessful [1, 6, 11]. In each sport there is a specific shift in the profiles of personal traits, more or less accentuation of personality traits of outstanding athletes [1, 6, 7, 10, 11], persons with different functional asymmetry [3, 4, 5], individuals who perform more successfully in personal or team competitions [6, 7, etc.].

A manifestation of a peculiar positioning in the activity area can be considered transitions of athletes in another weight category (this lets escape from the inconvenient main rival, use another typical tactic). The «legitimate analogues» of the phenomenon under discussion must be recognized as the choice and fixed role for the athlete in sports games; many outstanding athletes declared themselves in this role and could hardly become such in the performance of other roles; this is the formation of a peculiar style of activity [1, 6, 7, 11].

Distribution in the activity area of different styles representatives. Interesting facts have been repeatedly noted in our previous researches [8, 9]. In each sport, several styles are distinguished, styles are understood as stable psychological systems of human adaptation in the environment. But in a competitive environment, people (including sportsmen) do not just exist, function, but they are actively fighting (including among themselves) for more efficient performance of activities. As a rule, success accompanies those who make full use of the necessary resources, who keeps and protects their «range» of resources from destruction better (for example, spends the entire fight at an average pace, at medium distances, encouraging the enemy to often attack), who better blocks the use rivals resources of their «range» (for example, does not allow the «tempo» to fight at a high pace, using its advantage in the functional preparedness). Thus, in the general activity space, a kind of stable subspaces typical for representatives of different styles are regularly created (built, crystallized, structured). Sportsmen as it were «distributed», «dispersed», «divided», steadily «positioned» in this common space. (This complex phenomenon must first be well described and understood before an adequate scientific concept is found, while for the time being we use a number of equivalent concepts, including those cited.)

Let’s supplement the empirical material at our disposal with the analysis of the literary material – according the survey data of members of junior teams, youth picked teams and picked national teams (classic wrestling, free, judo). We add the following to the above facts. In our researches, 3-4-6 typical styles of activity are distinguished, the main features of which are reproduced by other specialists on models of different sports [1, 6, 7, 8, 9, 10, etc.]. The first two main styles reflect two polar types of adaptation of subjects to the requirements of activity and environment – the types of «reactive» and «preventive» adaptation (According to E.A. Klimov): the styles of some formed according to the «logic» of the activity and vary variably when the conditions of it change; secondly – through various «adjustments», additional contours of regulation and management of operating conditions, leading them to the optimal option.

In different sports, researchers note a stable proportion of representatives of different types of styles (or rather, disproportion), more often in the proportions: 40% – 30% – 20% – 10%. Proportion (disproportion) of representatives of different styles, as a rule, is supported by their different successes: some of them often achieve high results, others more rarely, third and fourth ones remain outsiders (see reviews [1, 2, 3, 4, 10]. At the same time, representatives of different styles take into account different characteristics of an opponent, reflecting its different qualities, different sides of physical, tactical and technical and psychological preparedness. Metaphorically speaking, some athletes are attuned and oriented to one kinds of segments of the activity space, others – to the second ones, third group to the third ones. The whole space of activity appears to exist in the aggregate of its relatively independent segments [10].

Factography, phenomenon and scientific concepts. A key condition for each developed activity is its essence as a joint activity of the subjects, differently organized and differently functioning at its different levels, in its different segments. Distinguishing the interactions of the subjects, we distinguish several levels of this interaction. The closest connections (at the psychophysiological, personal and social level) are formed between the trainer and his pupil – the first level of interactions between subjects. As a second level of organization of activities, let’s highlight systematic active
interactions with partners (athletes – young and veterans, members of the sports team, doctors, masseurs, a psychologist). The third level of organization of activity is called active interaction with rivals. Everything is decided in a personal meeting of two rivals – original partners in their joint activities. The fourth level recognizes the activity of judges, administrators, fans. Their role is often underestimated (if the athlete succeeds) or hypertrophied (in case of failure).

Psychological niches in sports. The most studied aspects of the discussed problem will be considered the analysis of the role of biological determinants (natural human aptitude, in particular, anatomo-morphological features as a factor of success in different types of activities, including sports, the preference for different technical and tactical-technical actions, different tactics in dependence of anatomical-morphological, psychophysiological and personal characteristics of a person). It is clear that the advantages of an athlete in physical strength (or strength preparedness) will induce the use of an attacking power style, the advantages in endurance (functional preparedness) – tempo, in dexterity and coordination – of the game and counterattack style. But what else can influence the similar distribution of people in the social space, in particular, in the space of one kind of sport? Why in similar, at first sight types (fencing on epees (rapiers) / on sabers, running at 100-200 m. / 400-800 m., Gymnastics / rhythmic gymnastics, throwing a spear / hammer (core), diving / trampoline, etc.) there is a domination of persons with opposite typological complexes?

What can influence the formation of PN, in addition to stable features of a person (his psychophysiological and personal organization)? These are typical psychophysiological conditions, structures of emotional experiences typical for different activities, typical strategies for achieving social success; ie. procedural aspects of activity (determined by the biomechanics of movements, the dominant mechanisms of oxidation, postural-tonic reactions, etc.). Even a slight shift in the duration of intensive activity over time – 10-20 seconds, 40-60, 120-180 seconds or more, leads to minor changes in the biomechanics of movements, but to the transition of the body to different physiological regimes that provide this activity (creatine-phosphate, glycolytic, alactic / lactic or aerobic oxidation), generating various psychophysiological conditions and, accordingly, emotional experiences.

Indeed, there are close activities, or specializations: a short / long sprint; fencing on a epee (rapier) / on sabers; freestyle / classic wrestling; in wrestling and in boxing – a semi-heavy weight category / heavy, etc. The principal difference between them is as follows: the leading, «key» abilities required for the success of the subject (in this case, motor, locomotive – coordination, power, speed, functional) in the neighboring specialization are complemented or, on the contrary, compete with the abilities of other groups (in this case, depending on the inclinations, including – the psychophysiological organization of the individual), with typical psychophysiological conditions (arising in the process of training, competitions, in interactions with the partners), with structures of strong-willed personality qualities, etc.

So, the important difference between fencing on epees (rapiers) and on sabers, is that in the second case there are not only injections but also blows with a blade (at each training session, at each tournament!). So, the pain thresholds of the individual (in persons with a strong and inert nervous system they are higher, therefore, they are easier to tolerate, are more patient in pain) become the factor of choosing a sport and specialization. Weakness and mobility of nervous processes contribute to the development of coordination abilities, these fencers have better «technique» and tactics, which give them noticeable advantages. Nevertheless, it is understandable why they will often leave the «saber» and focus on fencing with epees and rapiers. Freestyle wrestling is more «tough» and the probability of injury is higher in it than in classical wrestling and judo. Gymnastic exercises involve a constant risk of serious trauma (which is less likely in rhythmic gymnastics). Therefore, not only the coordination abilities, that promise the young athlete rapid progress, are important, but also the person’s attitude to risk (they also depend on his psychophysiology, including) play an important role. Consequently, people with a weak nervous system, with mobility of nervous processes prefer judo and classical wrestling, rather than free, rhythmic gymnastics, rather than sports one.

In the short sprint (100-200 m), speedy qualities of the runner are decisive (the development of speed abilities is facilitated by the weakness and mobility of the nervous processes, as the makings of these abilities). In the long sprint (400 m) and at medium distances (800-1500 m), a large oxygen debt arises during running, causing extremely unfavorable human conditions. People with a strong and inert nervous system are easier to tolerate, they are more patient. It is understandable that in the experience of testing themselves at different distances, in the balance of performance and procedural factors, people are more often moved to one or another specialization within the boundaries.
of the sport. In different sports rivalry also has a different emotional colour. Rigid contact confrontation – single combat – on the carpet, in the ring is not identical to the competition on the track, in the sector; it is not identical to the competition in the teams in contact sports games, the more so – the competition in the games «through the grid.»

Conclusion. If the biological and psychological determinants of the phenomenon «psychological niches» can be considered sufficiently studied, then social ones should be the subject of systematic research. It should be noted that social determinants, such as the social status of activities, are the prestige of a particular sport, the social significance of the success of athletes’ performance in the international arena, the uniqueness and cost of the infrastructure of individual species, the amount of material investments required for occupations of one kind or another, – can also become objects of purposeful management.

Literature
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VOLUNTARY MOBILIZATION OF ATHLETE’S NERVOUS SYSTEM IN CASE OF SIMULATION OF SPORT ACTIVITY

INTRODUCTION. Any sports activity and, in particular, competitive causes the athlete not only physical, but also emotional tension. Emotions activate the structures of the limbic system of the brain and provide additional mobilization of body resources in extreme conditions. Researches of a special psycho-physiological state, in which an athlete can enter in competitions, are often found in both domestic and foreign literature [1, 7, 13, 15]. According to authoritative experts, in the field of sports psychology [8], in the context of training an athlete for competitions, it is more correct to speak not of the optimal level of activation, but of the optimal activation state.

This fully agrees with the theoretical concept of individual zones of optimal functioning, proposed by Yu. L. Hanin [7]. The author claims that for each athlete there are certain limits of permissible excitation (excitement). If the athlete is in his individual zone, he

Keywords: heart rate variability, nervous system emergency mobilization, elite rowers.

Abstract. Empirical research aimed to reveal the physiological indicators of athlete’s nervous system emergency mobilization during short and intensive physical activity was carried out. 17 elite athletes took part in this study (9 males, 8 females; rowing, kayaking, canoeing). The results show that standard deviation of heart rate and standard deviation of RR-interval duration are both the most sensitive indicators of athlete’s functional state changes.
acts in the best way. If the level of his excitement is lower – for an excellent performance he lacks energy, but if this level is higher than his individual norm – excessive excitement leads to the appearance of various negative consequences (too high tension in the muscles, the inability to concentrate on the task, negative emotions, toxic thoughts, nausea, somatic pains of different localization, etc.), which leads to an inevitable deterioration in the quality of the performance.

Therefore, it is so important to determine the individual boundaries of the state of the athlete’s optimal functioning. This can be done with the help of modern equipment that produces high-precision recording of various physiological parameters that reflect the level of activation of the nervous and other human systems: heart rate variability, muscle tension, peripheral body temperature, skin galvanic reaction, respiratory system parameters, etc. After that, using the appropriate hardware techniques working on the principle of biofeedback (BFB), you can teach the athlete to enter arbitrarily in the zone of its optimal functioning [3, 10, 14].

The method for skin galvanic reaction and evaluating skin conductivity measuring (or skin resistance) is widely used to assess the degree of psychoemotional stress in a person [6], in assessing stress [12], driving load (Healey & Picard, 2005). This method has a very high sensitivity, because at the slightest change in a person’s state, the sympathetic department of the VNS activates, which causes an increase in sweating and a drop in skin resistance (or conduction enhancement).

Another widely used indicator of the functional state of a person is the variability of the rhythm of the heart. To quantify the heart rate variability and, accordingly, the state of regulatory mechanisms, three main approaches are used: temporal analysis of heart rhythm, frequency (wave) heart rate analysis and geometric analysis of heart rhythm [2, 5].

Also in psychophysiological researches, the measurement of the peripheral temperature of the phalanges of the fingers of the hand is used to assess the functional state. The binding between peripheral temperature and psychoemotional stress is as follows: under stress, the sympathetic department of the VNS is activated, its fibers have a vasoconstrictive effect on the peripheral vessels, the finger receives less blood and its temperature decreases. With relaxation, the reverse process occurs.

Thus, the purpose of the present research, supported by FMBA RF, was to study the physiological support for the state of emergency mobilization and to identify...
the most sensitive indicators for the development of biofeedback protocols for training arbitrary entry into this state.

**Materials and Methods.** The research involved 17 athletes (9 men and 8 women): candidates for masters of sport, masters of sports, masters of sports of international level, members of the Russian national teams, champions and record-holders of Europe and the world in rowing and canoeing. 

Physiological indicators were recorded in the initial state (background1) with closed and open eyes, then during work on the rowing machine (work) corresponding to the sport and in the recovery period (background2). Printing equipment and software BiographInfinity of ThoughtTechnology (Canada) was used. The following parameters were recorded: photoplethysmogram (for measuring heart rate and calculating heart rate variability), skin conductivity (for assessing the tone of the sympathetic part of the autonomic nervous system and the degree of psychoemotional stress of the athlete), finger temperature (for assessing the tone of the peripheral vessels and the sympathetic department of the VNS), pneumogram (for measuring the frequency and amplitude of respiratory movements).

Results. In our study, we studied the dynamics of athletes’ physiological indices (rowing, kayaking and canoeing) in the process of performing a short but intensive work, their usual sporting activity (in the corresponding rowing simulator). Physiological indicators of the activation level (heart rhythm, respiration, skin conduction, finger temperature) were recorded on a polygraph before the work began, during the 1-minute load and during the recovery period after the load. The mean values and standard deviations of the obtained indices are given in Table. 1. 

In this sample, only two indicators changed reliably from the background state to the work: the standard deviation of the heart rate (HR) and the standard deviation of the duration of the RR-intervals (SDNN). Both these indicators statistically significantly increased during work on the simulator by all criteria (p=0.013 and p=0.031 respectively, according to the t-test).

Then during the recovery period (background2), these indicators decreased, but remained slightly higher than the originating values (in the background1). The standard deviation of HR and SDNN reflects such a phenomenon as heart rate variability: the higher their values, the higher the heart rate variability. A sufficiently high level of heart rate variability is considered an indicator of the favorable state of regulatory mechanisms in the human body [4] and good adaptive capabilities of the cardiovascular system [11]. In this regard, we can say that in highly skilled athletes in our sample, in the habitual situation for them, emergency psychophysiological mobilization leads to adequate activation of the cardiovascular system with an increase in the variability of the heart rhythm in some indicators.

It should be noted that not only these indicators, but also all the rest of the recorded during the experiment, there were no significant changes between background1 and background2, so we can speak of the rapid restoration of the physiological resources of highly skilled athletes after a brief and rather familiar work. And also the absence of changes between the background1 and the background2 indicates that the revealed changes in the state of work are caused

**Figure 1 – Dynamics of changes in the indicator standard deviation of heart rate**

**Figure 2 – Dynamics of changes in SDNN**
with an increase in the variability of the rhythm of the heart. The most sensitive indicators reflecting the change in the functional state of a person (in transition from the initial state to work) were two indicators of heart rate variability – the standard deviation of heart rate and the standard deviation of the duration of RR-intervals.

Identified large individual differences in the dynamics of physiological indicators in emergency psychophysiological mobilization allow us to talk about the need for an individual approach to developing trainings based on the biofeedback method for training athletes to manage their own condition.

Unambiguous dynamics was observed only in skin conductivity indices (growth during mobilization) and amplitude of respiratory movements (growth during mobilization). Thus, in the absence of the possibility of an individual approach, BOS-training aimed at achieving adequate mobilization can be carried out according to SDNN, skin conductivity, and respiratory amplitude.

**Conclusion.** The analysis of empirical data lets us conclude that for highly trained sportsmen, emergency psychophysiological mobilization leads to an adequate activation of the cardiovascular system precisely by the load and the psychophysiological mobilization of the athlete.

A small number of reliable changes in the group as a whole made it possible to assume pronounced individual differences between the athletes. An example of the individual dynamics of physiological indicators is shown in Fig 3.

The study of the individual characteristics of the response to work on the simulator showed that the athletes did respond to the mobilization in different ways. So, as for the dynamics of finger temperature, for 5 athletes it grew, for 7 it remained unchanged, for 4 – it decreased during the load. The respiratory rate grew for 5 athletes, for 3 remained unchanged, and for 6 had a decrease. Amplitude of respiratory movements and skin conduction increased in all athlete.

**Figure 3 – Individual dynamics of physiological indicators in an athlete (rowing) at rest (with closed and open eyes) (background1), while working on the simulator and during the recovery period (background2)**


**Literature**


REACTION TIME DIAGNOSIS IN VARIOUS SPORTS
ДИАГНОСТИКА ВРЕМЕНИ МОТОРНОЙ РЕАКЦИИ В РАЗЛИЧНЫХ ВИДАХ СПОРТА

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Keywords: reaction time, choice reaction time, psychophysiology in sport, Dynavision D2.

Abstract. Many sports place demands on response time. Theoretical approaches and experimental data in this area were analyzed in the article; different types of reaction (simple reaction time, choice reaction time) are presented in the article. Performance standards in testing reaction time via Dynavision D2 first published. This article is addressed to the coaches, sport scientists and practicing psychologists.
Introduction. A significant part of the tests that were overcome by the athlete during the training process and competitions, precedes the high requirements to the accuracy and speed of response to the conditions of the situation or the actions of other athlete, primarily rivals. Successful implementation of the reception in martial arts, timely start after a signal in cyclic sports, a properly chosen maneuver in races or an operatively executed pass in game sports are based on a correct understanding of the situation, a high concentration of the athlete and the speed of the motor response. Often coaches and athlete themselves fail to characterize the failure as follows: «not enough speed» or «the opponent was faster», often referring not so much to the speed of movement as the speed of response. In the light of the foregoing, the researcher and practitioner are faced with the question of effective training and correct diagnosis of the reaction time, not only reaction to a single signal, but also a more complex selection reaction combined with making the right decision in time deficit conditions.

From the end of the nineteenth century (remember the work of M. Steggerd «Physical characteristics of athletes») in sports science cyclically alternate acceptance and rejection of the idea of model characteristics, or parameters by which to evaluate the data of each individual athlete. Without taking part in this discussion, the main task of this work was defined as the presentation and analysis of some information about the time of a simple and complex reaction in various sports. The data presented below are partly collected by the authors themselves, partly found in the materials of other researchers. Trainers and sports psychologists, based on this work, will be able to correct the idea of the reaction time of the athletes undergoing testing and to identify areas for additional training that can increase the results in the competitions.

The role of diagnostics and training of reaction time is emphasized in a large number of works devoted to the aspects of psychological training of athletes of various sports [4, 6, 8, 14]. For example, in cyclical types of sports, rapid response to an acoustic signal triggering a start («simple motor reaction») [5, 8], in combat and game sports – quick response in conditions of two or more alternatives, including in the presence of deceptive actions by an opponent («choice reaction» / «complex motor reaction») [6, 7, 9, 15, 21, 22]. In shooting disciplines: when firing on moving objects – the speed of response to a visual signal (a simple visual-motor reaction); in practical shooting – the speed of response in conditions of two or more alternatives («reaction of choice» / «complex motor reactions») [4].

Diagnosis of a simple motor reaction and reaction of choice. Testing the time of motor reaction is a common attribute of most research in sports psychology, however, in many works the description of testing protocols is not always presented: for example, instructions given to an athlete before testing, duration of test tasks, and hardware-diagnostic equipment. In this regard, the problem arises of comparing one data with other ones obtained on a sample of sportsmen-representatives of similar sports, or sportsmen of a higher level of training. This problem is especially topical for practicing sports psychologists, who have to rely primarily on comparing individual indicators.

In the table below, we systematized the data of the motor reaction time indices in gaming, cyclic, applied sports and martial arts, presented by various authors for the period from 1980 to the present (with the availability of data indicating the qualification and sample
The table is supplemented by the results of our research, obtained on a sample of athletes (N=187), engaged in various sports. To diagnose the reaction time of athletes in our study, we used the hardware diagnostic complex «Thought Technology» (Fig. 1).

The athletes task is to react to the appearance of a visual stimulus in a relevant way: when testing a simple visual-motor reaction, the athlete needed to press the joystick button or the pedal; when testing the response of choice (from two alternatives) – react with the right or left hand / foot when the stimulus appears on the right or left side, respectively. The testing time was 3 minutes, the stimuli appeared on the screen chaotically, with irregular frequency. For the analysis of the data, program complexes were used: SPSS 17.0 (Mann-Whitney criterion, Spearman correlation coefficient), Dynavision D2 software, Reaction Time «Thought Technology».

### Table 1 – The parameters of motor reaction time in different kinds of sport (beginning)

<table>
<thead>
<tr>
<th>Kinds of sport</th>
<th>Simple motor reaction</th>
<th>Choice reaction time</th>
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<tr>
<td><strong>Game sports</strong></td>
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<tr>
<td>Basketball</td>
<td>Arms: 218.27±21.87 ms [1]</td>
<td>Arms: *270.59±26.41 ms; N=18 (m=10; f=8), age: 15-16 years old; qualification: 1-2 senior category</td>
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<td>Tennis</td>
<td>Arms: «Successful» = 215.9 ±7.5 ms; «Unsuccessful» = 232.1 ±7.1 ms; N=45 (f=21; m=24); average age =16.2±0.8 years old: w=15.5±0.9, m=16.1 ±0.7 [15]. 260.57±23.23 ms [1]</td>
<td>Arms: *247.12±20.20 ms; N=11 (m=11); qualification: MS</td>
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<td>Football</td>
<td>Arms: 214.86±15.23 ms; N=18, age: 12-15 years old [7]. Low level: 271-280 ms; below average: 271-253 ms; average: 253-217 ms; above average: 217-199 ms; high: 199-190 ms; age: 11-15 years old [20]</td>
<td>Arms: 313.1 ±33.16 ms; N=18, age: 12-15 years old. [7]. * 244.06±19.48 ms; N=29 (m=29), age: 18-25 years old; from 1 senior category and higher; Legs: *310.40±28.35 ms; N=45 (m=45), age: 18-25 years; I senior category, CMS</td>
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<td><strong>Martial arts</strong></td>
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<tr>
<td>Judo / Sambo</td>
<td>Arms: adults, juniors, youths: before loading = 214.8±7.97 ms; after loading = 201.8±8.54 ms; N=49 (m=49); highly qualified: before loading = 228.5±5.35 ms; after loading = 219.6±5.07 ms; N=22 (f=22), average age =21.0±0.5 years old [9]. Men = 211.57±14.75 ms; women = 199.67±11.59 ms [1]</td>
<td>Arms: *263.01±23.19 ms; N=14 (m=14), age: 19-29 years old; qualification: MS, MSIC. *280.02±27.35 ms; N=34 (m=34), age: 13-15 years old. Legs: *349.00±42.32 ms; N=34 (m=34), age: 13-15 years old</td>
</tr>
<tr>
<td>Taekwondo</td>
<td>Arms: women = 276±10 ms; men = 278±10 ms; N=43 (m=26; f=17), qualification: MS, MSIC [17]. Women = 214.73±22.64 ms; men = 230.69±26.09 ms [1]</td>
<td>Arms: women = 355±11 ms; men = 374±13 ms; N=43 (m=26; f=17), qualification: MS, MSIC [17]. Legs: 279.0 ms; N=7, age: 16±1 years old, qualification: white and yellow belts [12]</td>
</tr>
<tr>
<td>Kickboxing, Boxing, Mixed Martial Arts</td>
<td>Arms: from 0.12 to 0.25 sec [11]. Attacking style = 0.17±0.01 sec; counterattacking = 0.15±0.007 sec; combined = 0.15±0.01 sec; N=19 (m=19), qualification CMS in boxing and above [16]. 330±37 ms; N=28 (m=28), qualification: students involved in the section of Thai boxing [2]</td>
<td>Arms: *274.44±30.19 ms; N=10 (f=10), qualification: MS, MSIC</td>
</tr>
</tbody>
</table>
The reaction time indicators for sportsmen of various sports were obtained and systematized during the passage of the test protocol «Standard». Let’s list its characteristics: the lamps of the device panel work in one (red) color; the athlete is tested at his own pace: a new stimulus is presented after a successful reaction to the previous one; the lamps one by one light up in a chaotic order over the entire area of the instrument panel; operating time is limited to 60 seconds; work is carried out with both hands; no interference during operation; the athlete performs the task 2 times (the first – for the purpose of warm-up).

This protocol allows to diagnose and develop motor coordination in equal measure both in the nearest and peripheral areas of the visual field. As a result of the analysis of the test data of athletes (N=271), engaged in various sports, we were allocated orienting norms (Table 3, 4). Due to the fact that the sample of the study consisted of subjects

Table 2 – The parameters of motor reaction time in various sports (continuation)

<table>
<thead>
<tr>
<th>Kind of sport</th>
<th>Simple motor reaction</th>
<th>Choice reaction time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclic and applied sports</td>
<td>(hereinafter, the results of diagnostics of a simple sensorimotor reaction are presented, since the selection reaction in these species sports is practically not tested)</td>
<td></td>
</tr>
<tr>
<td>Skating</td>
<td>Legs: 1 week of training reactions to the starting signal = 292.65 ms;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 weeks = 211.35 ms;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N=10, adults; members of the Canadian national team on the short track [8]</td>
<td></td>
</tr>
<tr>
<td>Swimming</td>
<td>Arms: 154.02±0.02 ms; I (sportsmen with highly expressed sprinter abilities);</td>
<td></td>
</tr>
<tr>
<td></td>
<td>162.0±0.02 ms; II (with mixed abilities with a predominant predisposition to sprint work);</td>
<td></td>
</tr>
<tr>
<td></td>
<td>188.03±0.02 ms; III (athletes with mixed abilities with a relatively uniform level of their development);</td>
<td></td>
</tr>
<tr>
<td></td>
<td>215.02±0.02 ms; IV (mixed abilities with a predominant predisposition to stayer work);</td>
<td></td>
</tr>
<tr>
<td></td>
<td>243.03±0.03 ms; V (with pronounced stayer abilities) [20].</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Men = 212.78±21.44 ms;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>women = 203.85±15.60 ms [1].</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Legs: *Men: MP discharge – 292.5±50.93 ms;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CMS and more – 261,36±5,93 ms.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Women: MP discharge – 278.11 ±37.96 ms;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CMS and more – 271.02±24.83 ms.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N=53 (m=30; f=23)</td>
<td></td>
</tr>
<tr>
<td>Triation</td>
<td>Arms: 180-205 ms;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N=13 [5]</td>
<td></td>
</tr>
<tr>
<td>Cross-country skiing</td>
<td>Arms: Men = 214.00± 12.70 ms;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>women =212.78±14.37 ms [1]</td>
<td></td>
</tr>
<tr>
<td>Mountaineering and climbing</td>
<td>Arms: reaction to the light signal: 269.09 ms (data 1971) and 257.4 ms (data 1972);</td>
<td></td>
</tr>
<tr>
<td></td>
<td>response to an acoustic signal: 176.7 ms (data 1971) and 167.1 ms (data 1972);</td>
<td></td>
</tr>
<tr>
<td></td>
<td>National team for mountaineering [13]</td>
<td></td>
</tr>
<tr>
<td>Jumping into the water</td>
<td>Arms: Men = 215.69±23.97 ms;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>women = 224.70±25.30 ms [1].</td>
<td></td>
</tr>
<tr>
<td>Artistic gymnastics</td>
<td>Arms: Women = 229.63±25.33 ms [1].</td>
<td></td>
</tr>
<tr>
<td>Jumping on the trampoline</td>
<td>Arms: Men = 206.14±17.80 ms;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>women = 219.60±21.03 ms [1]</td>
<td></td>
</tr>
</tbody>
</table>
Conclusion. So, by summarizing in the tables the indicators of a simple reaction, selection reactions, and incl. complex motor reaction, we return to the problem of response in sports and special training. Practically the most important question in this area is the following: what is the measure of the effectiveness of additional narrowly directed trainings?

The carried out theoretical and empirical work should be considered as a kind of reserve for the of different age groups, we compared the response time of athletes of the same age or sport. Statistically significant differences between teenager-athletes were obtained: sambo and basketball (p<0.05); sambo and swimming (p<0.01). Among athletes of youthful age, differences were obtained by comparing groups: football and rock climbing (p<0.01); taekwondo and rock climbing (p<0.01). There were no statistically significant differences among the groups of adult athletes, which can be explained by the special characteristics of sports activity: football, judo, sambo and kickboxing, suggest high variability of the athlete’s actions (including the implementation of activity in time-limited conditions); which, undoubtedly, has an impact on the formation of such a professionally important quality as the reaction time.

Table 3 – Generalized data on the choice reaction times

<table>
<thead>
<tr>
<th>Kind of sport</th>
<th>N</th>
<th>Simple motor reaction, sec</th>
<th>Std. dev.</th>
<th>Norm, sec</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower bound</td>
<td>Upper bound</td>
</tr>
<tr>
<td>Arms (n=139)</td>
<td></td>
<td></td>
<td>0.77</td>
<td>0.99</td>
</tr>
<tr>
<td>Legs (n=105)</td>
<td></td>
<td></td>
<td>0.75</td>
<td>0.11</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>0.76</td>
<td>0.96</td>
</tr>
<tr>
<td>Std. dev.</td>
<td></td>
<td></td>
<td>0.72</td>
<td>0.10</td>
</tr>
<tr>
<td>Min</td>
<td></td>
<td></td>
<td>0.72</td>
<td>0.10</td>
</tr>
<tr>
<td>Max</td>
<td></td>
<td></td>
<td>0.79</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Table 4 – Test norms for the standard protocol

<table>
<thead>
<tr>
<th>Kind of sport</th>
<th>N</th>
<th>Simple motor reaction, sec</th>
<th>Std. dev.</th>
<th>Norm, sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Martial arts</td>
<td>76</td>
<td>0.77</td>
<td>0.09</td>
<td>0.66</td>
</tr>
<tr>
<td>Game sports</td>
<td>99</td>
<td>0.75</td>
<td>0.11</td>
<td>0.64</td>
</tr>
<tr>
<td>Complex coordination sports</td>
<td>31</td>
<td>0.78</td>
<td>0.06</td>
<td>0.72</td>
</tr>
<tr>
<td>Shooting sports</td>
<td>19</td>
<td>0.79</td>
<td>0.10</td>
<td>0.69</td>
</tr>
<tr>
<td>Cyclic sports</td>
<td>46</td>
<td>0.84</td>
<td>0.15</td>
<td>0.70</td>
</tr>
</tbody>
</table>

Table 5 – Test norms for the standard protocol: updated data on sports and age of athletes

<table>
<thead>
<tr>
<th>Kind of sport</th>
<th>N</th>
<th>Sex</th>
<th>Age</th>
<th>Average reaction time, sec</th>
<th>Std. dev.</th>
<th>Norm, sec</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower bound</td>
<td>Lower bound</td>
</tr>
<tr>
<td>Basketball</td>
<td>31</td>
<td>m, f</td>
<td>teenage</td>
<td>0.82</td>
<td>0.12</td>
<td>0.70</td>
</tr>
<tr>
<td>Football</td>
<td>39</td>
<td>m</td>
<td>adult</td>
<td>0.70</td>
<td>0.08</td>
<td>0.62</td>
</tr>
<tr>
<td>Judo, Sambo</td>
<td>52</td>
<td>m</td>
<td>youthful</td>
<td>0.72</td>
<td>0.08</td>
<td>0.63</td>
</tr>
<tr>
<td>Kickboxing, Boxing</td>
<td>14</td>
<td>m</td>
<td>adult</td>
<td>0.72</td>
<td>0.08</td>
<td>0.64</td>
</tr>
<tr>
<td>Taekwondo</td>
<td>17</td>
<td>m, f</td>
<td>youthful</td>
<td>0.73</td>
<td>0.06</td>
<td>0.67</td>
</tr>
<tr>
<td>Climbing</td>
<td>20</td>
<td>m, f</td>
<td>youthful</td>
<td>0.79</td>
<td>0.06</td>
<td>0.73</td>
</tr>
<tr>
<td>Swimming</td>
<td>29</td>
<td>m, f</td>
<td>teenage</td>
<td>0.87</td>
<td>0.16</td>
<td>0.71</td>
</tr>
</tbody>
</table>

The foreign literature there are discussions about the effectiveness of the transfer, or «transfer» in relation to this or that sport-specific activity. At the moment, the answer can only be conditional. To accurately determine the appropriateness of special actions, a correct experiment with a control group is required, while elite athletes, unfortunately, may not always be involved in a large-scale study.

The choice reaction (under the conditions of two alternatives), ms

<table>
<thead>
<tr>
<th>Kind of sport</th>
<th>N</th>
<th>Left</th>
<th>Right</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arms</td>
<td>139</td>
<td>266.1</td>
<td>261.0</td>
<td>332.95</td>
<td>331.0</td>
</tr>
<tr>
<td>Legs</td>
<td>105</td>
<td>208.22</td>
<td>263.2</td>
<td>259.02</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Kind of sport</th>
<th>N</th>
<th>Left</th>
<th>Right</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arms</td>
<td>139</td>
<td>266.1</td>
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<td>332.95</td>
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</tr>
<tr>
<td>Legs</td>
<td>105</td>
<td>208.22</td>
<td>263.2</td>
<td>259.02</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 – Generalized data on the choice reaction times

<table>
<thead>
<tr>
<th>Kind of sport</th>
<th>N</th>
<th>Sex</th>
<th>Age</th>
<th>Average reaction time, sec</th>
<th>Std. dev.</th>
<th>Norm, sec</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower bound</td>
<td>Lower bound</td>
</tr>
<tr>
<td>Arms</td>
<td>139</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legs</td>
<td>105</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
further collection and specification of data, as well as indicative information for a coach, psychologist or sports doctor, as well as those athletes who are interested in studying the reaction speed and increasing its rates for new victories.

**Literature**


DIAGNOSIS OF PSYCHO-EMOTIONAL STATE OF SAMBO SPORTSMEN

Introduction. Emphasizing the significance of the motor acts of man as a demonstration of the brain activity, its reflex activity, the basic Russian physiologist Sechenov I.M. wrote «All the infinite variety of external demonstrations of brain activity is reduced to only one phenomenon – the muscle movement» [1, 4].

But the lack of quantitative and qualitative characteristics of the influence of emotional states on the quality of performance of athletes makes it difficult to bring recommendations to the practice of competitive activities.

Materials and Methods. The experiment was carried out to diagnose psycho-emotional status by recording the activation of psycho-emotional status, functional asymmetry of the cerebral hemispheres and psycho-emotional stability.

Laboratory experiment was carried out on the basis of the Russian State University of Physical Culture, Sport,
Figure 1 – Diagnosis of the activation of psycho-emotional states (PS) and functional asymmetry of the cerebral hemispheres (FAH) of the experimental group (n=30)

Figure 2 – Diagnosis of psycho-emotional stability of the experimental group (n = 30)
Youth and Tourism (SCOLIPE) with the use of psychophysiological diagnostics of emotional status on instruments Yu.A. Tsagarelli «Activationmeter» (AM-6) and on the complex UPDC-MK «Neuroscope NS-410A». In the study, 60 athletes participated in the training stage and the stage of improving athletic skill at the age of 18 to 25 years, specializing in sambo. They are: HMS – 5 people, MSIG – 6 people, MS – 8 people, SM – 41 people.

**Results.** Indicators of activation of the right and left hemispheres, as well as the index of their FAHs have great diagnostic value, because the functions of each hemisphere have their own specific characteristics, which imprint on any human activity (Figure 1, 2).

When interpreting any indicator of FAH, the sign and the magnitude of the result percent should be taken into account. The «+» sign indicates the left hemispheric displacement of the FAH, and the «–» sign indicates the right hemispheric.

The predominance of the left hemisphere activation in right-handers testifies to the predominance of the abstract-logical component of thinking over the emotionally imaginative. The predominance of the right hemisphere activation indicates the predominance of the emotional-figurative component of thinking over the abstract-logical. Optimum PS contributes to good performance, mental activity, energy, minimal latent response time. The deviation of the PS from the optimum is associated with a decrease in the efficiency of the activity and functioning of the organism.

Excessive indicators of the PS indicate the over excitation of sambo wrestlers. In such conditions there can be rapid reaction, increased aggression and nervousness in relations with people, the possibility of nervous breakdowns, etc. right up to the stupor. Too low PS indicators are associated with a drowsy state. Here there is a small activity, a slowing down of reactions, a sluggish mental activity. The indicator of psycho-emotional stability is a quantity inversely proportional to the degree of increase in psycho-emotional tension under the influence of a stressor [2, 3].

**Literature**


THE IMPACT OF ATTENTION TRAINING ON THE COMPETITIVE RESULTS OF YOUNG ATHLETES

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Sopov Vladimir – PhD, Professor at the Russian State University of Physical Education, Sport, Youth and Tourism (SCOLIPE), Moscow, Russia, vladimirsopov@mail.ru

Keywords: attention, concentration, attention stability, attention capacity, attention switching, distribution of attention, attention training, equestrian sport.

Abstract. In this paper, we analyzed the efficiency of application the methods for attention training to increase the competitive results of the young athletes involved in dressage and show-jumping. It was shown that the systematic use of exercises for attention development during two months leaded to athletes' attention improve, and to improve the competitive results.

Introduction. Attention is associated not only with the processes of perception, but also with human motor activity. It is the insufficient concentration during the competition that often explains athletes’ failures [2-7, 9]. Numerous studies have shown that both insufficient and overabundant attention concentration can impair the effectiveness of performing well-learned skills [2, 8]. However, despite the rather high interest in the problems of attention in sports, there is a limited number of empirical studies in the scientific literature on the application of attention training methods in sports activities and their impact on competitive results [4-6]. Research in this area was mainly carried out in team game sports, but in individual sports the results may also depend on attention.
Especially this dependence is observed in equestrian sports, where the athlete’s attention should be focused not only on their actions and external objects, but also on the actions of a horse. Features of activity in each sport put forward the specific requirements to develop separate attention qualities. At the moment, in the scientific and methodical literature, the question of concrete recommendations on attention training for young athletes in both dressage and show-jumping is opened.

In this regard, the purpose of this study was to identify the specific characteristics of the high level athletes’ attention in dressage and show-jumping to build model characteristics with the subsequent development of techniques to improve the attention qualities of young athletes.

**Materials and Methods.** The study was conducted on the basis of sports schools «Yunost Moskvy». At the first stage of research the diagnostic of attention qualities for masters of sports (MS) was carried out, the model characteristics were developed.

At the second stage results of young athletes’ diagnostics with model characteristics were compared, individual programs on attention training (Xat) were developed.

At the third stage, the medium level athletes in dressage and show-jumping were divided into six groups – 2 experimental (EG) and 4 control (CG). Attention training were conducted according to the experimental plan (Figure 1). As the program of attention development used a modified ideomotor training, for each sport has been allocated 2 control groups: one of them (CG-2) no impact was made, another (CG-1) was performed only ideomotor training in its classical version (Xid) and in the volume corresponding to the experimental group.

At the fourth stage we repeated diagnostics of athletes’ attention characteristics in both control and experimental groups; changes in competitive results which were estimated by means of official competitions protocols were analyzed, and it was measured in percent for dressage and in seconds for show-jumping.

The study involved 59 athletes: 19 masters of equestrian sports (9 in dressage and 100 in show-jumping) (age 20-31 years old) and 40 young athletes (20 in dressage and 20 in show-jumping) level of the candidate of master of sports (CMS) and below (14-19 years old).

For the diagnosis of separate attention qualities, we used computer tachistoscope, the technique of «Landolt Rings», and Schulte tables.

To develop the attention qualities, we selected methods, some of which were used in similar studies [1, 5], some were used for the first time. They can be divided into general-preparatory and special-preparatory techniques. For general (regardless of the sport) attention development, exercises such as continuous observation of moving and stationary objects with distribution of attention to several objects or switching of attention between them, as well as with retention of objects in the field of peripheral vision were used [1]. In order, to develop the amount of attention, athletes were offered to memorize and reproduce the maximum number of details of the image presented for a few seconds [5].

As the additional special-preparatory techniques for the attention development we used ideomotor training, which, when making some features, could be aimed at:

1) the development of the attention volume, if it was necessary to keep in mind as many as possible elements of movement and body parts involved in it;
2) development of attention stability when it was required to carry out ideomotor representation of certain motor skills for a long time;
3) development of attention switching when needed during ideomotor training to quickly switch from one set of feelings and events for others.

Statistical processing was carried out in the program SPSS 21.0 using correlation analysis (r-Pearson) and evaluation of the differences (U-Mann-Whitney criterion and T-Wilcoxon criterion).

**Results.** Diagnosis of attention qualities was carried out for the 19 MS athletes in equestrian sport. It was revealed that MS in dressage had a greater intensity of attention (p<0.01), and lesser ability to switch (p<0.05), and to distribute attention (p<0.01) than MS in show-jumping (Figure 2). Model characteristics of attention qualities for dressage and show-jumping were

---

**Figure 1 - An experimental plan to assess the impact of the attention developed method to the competitive results of young athletes**

<table>
<thead>
<tr>
<th>Experimental plan</th>
<th>R</th>
<th>O&lt;sub&gt;1&lt;/sub&gt;</th>
<th>X&lt;sub&gt;at&lt;/sub&gt;</th>
<th>O&lt;sub&gt;2&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG (10+10*)</td>
<td>R</td>
<td>O&lt;sub&gt;1&lt;/sub&gt;</td>
<td>X&lt;sub&gt;at&lt;/sub&gt;</td>
<td>O&lt;sub&gt;2&lt;/sub&gt;</td>
</tr>
<tr>
<td>CG-1 (5+5)</td>
<td>R</td>
<td>O&lt;sub&gt;1&lt;/sub&gt;</td>
<td>X&lt;sub&gt;id&lt;/sub&gt;</td>
<td>O&lt;sub&gt;2&lt;/sub&gt;</td>
</tr>
<tr>
<td>CG-2 (5+5)</td>
<td>R</td>
<td>O&lt;sub&gt;1&lt;/sub&gt;</td>
<td>X&lt;sub&gt;id&lt;/sub&gt;</td>
<td>O&lt;sub&gt;2&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

R – randomization, O – diagnosis, X – impact, * - number of subjects
and distribution of attention \((p \leq 0.01)\) compared to young athletes. Correlation analysis showed that for both dressage and show-jumping, there is a positive relationship between the ability to switch and to distribute attention \((p \leq 0.001)\), as well as between intensity and distribution of attention \((p \leq 0.05)\).

After carrying out the prior diagnostics of young athletes’ attention, we randomly divided them into experimental and control groups. Prior to the analysis, the data was calculated by means of indicators of average value and standard deviation \((x \pm \sigma)\).

In the main part of the experiment took part 40 athletes CMS level and below. Comparison of average and high level athletes’ attention qualities showed that in dressage MS in comparison with young athletes had higher intensity of attention \((p \leq 0.01)\), stability \((p \leq 0.05)\) and ability to distribute \((p \leq 0.05)\). In show-jumping, MS showed higher intensity \((p \leq 0.01)\), switching \((p \leq 0.01)\) and distribution of attention \((p \leq 0.01)\) compared to young athletes. Correlation analysis showed that for both dressage and show-jumping, there is a positive relationship between the ability to switch and to distribute attention \((p \leq 0.001)\), as well as between intensity and distribution of attention \((p \leq 0.05)\).
experiment, no significant differences in individual qualities of attention and competitive results between the groups were revealed. For each athlete in experimental group, comparison with model characteristics was carried out and those qualities of attention which need to be developed were revealed. For example, for athlete B1 engaged in dressage (Figure 3), it was necessary to increase the intensity, stability and volume of attention. As for the subject B1, similar schedules were constructed for each of athletes in experimental group and on their basis the programs of attention training were developed.

After 8-8.5 weeks from prior diagnostics, during which training in groups were held according to the experimental plan, repeated, similar diagnostics of young athletes’ attention qualities were carried out. In young athletes engaged in dressage, in the experimental group there was a statistically significant improvement in attention intensity (p≤0.01), stability, volume, and distribution of attention (p≤0.05). In show-jumping after attention training, the athletes of the experimental group had a higher ability to distribute attention (p≤0.01), intensity and ability to switch attention (p≤0.05). In control groups (CG-1 and CG-2) no changes were found before and after the experiment.

As the main indicator of sports efficiency, we analyzed the subjects’ competition results. For the dressage athletes, only in experimental group increase in the competition percent (p≤0.01) was revealed (Figure 4). In the group of athletes involved in show-jumping, a difference in experimental group was found, showing a decrease in the average time of distance passage (p≤0.05). In CG-1, there was an improvement in time, which, however, was not statistically significant due to the small sample size.

**Discussion.** Based on the high level athletes’ attention diagnosis, it can be assumed that the athletes in dressage and show-jumping use different strategies to retain control over complex coordination activities. High level athletes in dressage perform successfully by attention keeping for a large number of objects with high intensity; and in show-jumping – by distributing and switching attention between key objects. For example, switching attention between their actions, horse behavior, and barriers that must be overcome. Perhaps also, in show-jumping to a greater extent need to quickly switch attention from one barrier to another.

The received results confirm that the applied technique of attention training, as a whole, influenced the athletes’ attention qualities both in dressage and in show-jumping. Based on the experiment results, we can conclude that the method of attention training in experimental group, and the use of ideomotor training in CG-1 had a positive impact on the athletes’ competitive efficiency. However, young athletes in dressage, engaged in the attention development, were able to significantly improve their results, in comparison with those who were engaged only in ideomotor training. In show-jumping, young athletes improved their competitive results through the use of attention training.
development methods, as well as through ideomotor training. This confirms our hypothesis that application of attention training increases competition results.

Conclusions:
1. On the basis of high level athletes’ diagnostics the attention model characteristics were developed for both dressage and show-jumping.
2. It is shown that young athletes involved in dressage and show-jumping were significantly different from the masters of sports on many qualities of attention.
3. On the basis of model characteristics and young athletes’ individual diagnostics, the programs of attention training which were specific for each kind of sports were made for each athlete.
4. It is revealed that the systematic use of exercises for the attention development changes the ability of the athlete to express individual attention qualities and has a positive impact on its competitive results.

Literature
THE STUDY OF THE FUNCTIONAL STATE OF THE CENTRAL NERVOUS SYSTEM OF YOUNG BOXERS IN THE BACKGROUND OF THE USE OF AUDIOVISUAL STIMULATION

ИССЛЕДОВАНИЕ ФУНКЦИОНАЛЬНОГО СОСТОЯНИЯ ЦЕНТРАЛЬНОЙ НЕРВНОЙ СИСТЕМЫ ЮНЫХ БОКСЕРОВ НА ФОНЕ ПРИМЕНЕНИЯ АУДИОВИЗУАЛЬНОЙ СТИМУЛЯЦИИ

Keywords: functional state of the central nervous system, specially-preparatory stage, young boxers, audiovisual stimulation.

Abstract. The article presents the results of a study of indicators of the health of the nervous system of young boxers in the background of the use of audiovisual stimulation.
**Introduction.** Training loads of special-prepared, precompetitive and competitive periods lead to a tension of compensatory-adaptive mechanisms with the development of reversible and irreversible disadaptation phenomena [10]. Proceeding from this, timely recognition and correction of developing dysfunctions of the body systems of young athletes, monitoring of their health is necessary.

In the framework of these measures, an important place belongs to the use of highly effective modern methods and methods of psycho-physiological support of the training process. The methodological arsenal of prevention and correction means of disadaptive conditions requires constant improvement and the search for new methods. Taking into account the difficult economic conditions, priority should be given to the application of the most effective, short-term and accessible methods of correction and rehabilitation. In this sense, activities with the application of rhythm imposition methods based on the bioresonance principle, in particular, audiovisual stimulation, are promising.

The available literature data testify to the effectiveness of the use of these methods for optimizing the adaptation process, increasing emotional resistance to stress, treating borderline neuropsychic disorders, and increasing mental performance [3-9]. This allowed us to put forward a working hypothesis about the possibility of using the method of audiovisual stimulation to correct the functional state of the body in persons experiencing difficulties in the training and competition period. Audio-visual stimulation (ABC) is a rhythmological effect on the body through the visual and auditory analyzers involving the cortical, limbic structures and the reticular formation of the brain [7]. Thus, influence on neurohumoral regulation of a person is carried out. However, the mechanisms of action and effectiveness of audiovisual psychophysiological impact on the psychoemotional state, efficiency, functional reserves of the central nervous system of athletes remain to this day little studied.

The purpose of the research is the psychophysical substantiation and the identification of the effectiveness of the use of audiovisual stimulation sessions to enhance the functional state of the central nervous system of young boxers.

Materials and Methods. The study was conducted on the basis of the laboratory of psychophysiology and experimental psychology of the Bashkir State Pedagogical University. M. Akmullah, the sports complex of the Bashkir State University and at the stadium «Dynamo» in Ufa.

Researches were conducted in a special preparatory period. This stage was chosen in connection with diverse, high physical loads, which should lead to significant functional reorganization in the body of athletes. At the beginning and at the end of the study, the athletes underwent an in-depth examination at the Republican Medical and Sports Dispensary and were found healthy.

In the conditions of the training process, 72 athletes aged 13-14 years were examined, who made up the control group (CG) and the experimental group (EG). The control and experimental groups were homogeneous by age, years of boxing and level of preparedness. The admission of young athletes to a physiological examination was carried out on the basis of the written consent of one of the parents and the administration of the sports school.

To assess the functional state of the central nervous system (CNS) of young boxers, the chronoreflexometric technique of T.D. Loskutova was used. [1] in the modification of M.P. Moroz [2]. The method allows to evaluate the current functional state of the subjects according to the parameters of the visual-motor response to the presentation of a light stimulus. The technique was carried out with the help of the psychophysiological testing device «Psychophysiologist» (Ltd. Medikom MTD, Taganrog).

The mathematical-statistical processing of the experimental material was carried out using the Microsoft Excel spreadsheet editor and Statistica 6.0 software package. To determine the differences in the physiological indicators of boxers 13-14 years old, the method of comparing the groups by the t-test of the Student was used at a significance level p <0.05, p <0.001.

Results. The analysis of scientific publications on boxing and practice of sports training determined the importance of studying the level of efficiency of the central nervous system of boxers in a special preparatory period [10]. Therefore, we conducted an analysis of the effect of stimuli of various modalities (light, sound) on the frequency of brain biorhythms, which affect the biological activity of the brain and the functional state of individual body systems, in particular, the functional state of the central nervous system. As corrective measures, audio-visual stimulation sessions were performed on the portable software-hardware complex «PhotoSonix», which is released serially and is permitted for medical use. The complex includes hardware, general and special software.

The hardware complex includes the following devices:
was 24 minutes at a frequency of 8-28 Hz. The experiment was conducted under the control and direct participation of trainers and assistant coaches. Simultaneously, 6 people were invited to audiovisual stimulation sessions, along with the assistant coach, the instruction was explained and the program was launched. So, for one training was conducted work with 36 boxers.

Table 1 presents the results of a study of the functional state of the central nervous system of young boxers against the background of the use of audiovisual stimulation.

<table>
<thead>
<tr>
<th>Performance level</th>
<th>Groups of subjects</th>
<th>Before experiment</th>
<th>After experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity</td>
<td>%</td>
<td>Quantity</td>
</tr>
<tr>
<td>Limited</td>
<td>CG</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>EG</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Normal</td>
<td>CG</td>
<td>10</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>EG</td>
<td>5</td>
<td>13.8</td>
</tr>
<tr>
<td>Slightly lowered</td>
<td>CG</td>
<td>8</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>EG</td>
<td>12</td>
<td>33.4</td>
</tr>
<tr>
<td>Reduced</td>
<td>CG</td>
<td>18</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>EG</td>
<td>19</td>
<td>52.8</td>
</tr>
<tr>
<td>Significantly reduced</td>
<td>CG</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>EG</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

– a program control unit that provides generation of auditory and visual stimuli for the purpose of correcting the functional state of the central nervous system. It includes various versions of programs for psychophysiological rehabilitation, as well as restoration and preservation of working capacity, normalization of sleep, provides the possibility of individualizing the impact; – additional devices: special glasses with LEDs, headphones.

For the psychophysiological impact, natural stimuli were used: light and sound for changing the psychomotor state. The complex is practical and easy to use. The sportsman wore headphones, glasses with LEDs, closed his eyes, and then ran the chosen program. The device supplied specially selected light and sound signals, which affect the central nervous system. This provided psychophysiological correction of the functional state of the central nervous system, normalization of the processes of excitation and inhibition, removal of excessive tension, inducing sleep, restoring efficiency, reducing overwork and psychosomatic disorders.

The sessions of audiovisual stimulation were conducted every day during the training process of sportsmen, except Sunday, as the training process includes one day to restore the body. Three «PhotoSonix» devices were used, each assuming work with two subjects. In total, 10 sessions of audiovisual stimulation were conducted with the athletes of the experimental group under program No. 13 Alpha / Theta relaxation, which helped to learn how to move from one state to another. The duration of the Alpha / Theta relaxation program was 24 minutes at a frequency of 8-28 Hz. The experiment was conducted under the control and direct participation of trainers and assistant coaches. Simultaneously, 6 people were invited to audiovisual stimulation sessions, along with the assistant coach, the instruction was explained and the program was launched. So, for one training was conducted work with 36 boxers.

Table 1 presents the results of a study of the functional state of the central nervous system of young boxers against the background of the use of audiovisual stimulation.

**Discussion.** It is noteworthy that in the course of the forming experiment in the study groups «limited» and «significantly reduced» levels of the functional state of the nervous system of young boxers were not recorded.

Reserches showed that in the special preparatory period, the «normal» level of the CNS performance decreased by 14.1% in the CG and, accordingly, the «slightly lowered» level of the level of the CNS efficiency increased. The «reduced» level remained practically unchanged. We are inclined to associate such a redistribution of the levels of the working capacity of the central nervous system with the peculiarity of the structure of the special preparatory stage and the tasks facing it. It is known that this stage includes three microcycles (Mc): at the 1st Mc of the preparatory period, the organism «draws» into the work of high intensity by using a variety of training aids in accordance with the tasks of the stage, the 2nd Mc is the «shock» – training the loads reach their maximum, in the 3rd Mc the loads are significantly increased.
reduced to detect the cumulative effect of the use of training aids [10].

Redistribution of the levels of the functional state of the central nervous system, found in the athletes of the experimental group in the special preparatory period, in our opinion, is a sign of the optimal neuropsychic stress associated with the adaptation of the body of boxers to training and psychoemotional loads against the background of the use of ABC. This is evidenced by an increase of 14% in the number of young athletes with a «normal» level of functioning of the central nervous system. Reducing the number of young boxers with a «lowered» level of the CNS efficiency by 41.7% is, in our view, a reflection of the redistribution of the relationships between the processes of excitation and inhibition in the cerebral cortex of athletes as a result of the use of ABC.

Conclusion. The sessions of audiovisual stimulation can be recommended for use in the training process as an effective tool in a complex of means and methods that enhance the functional state of the central nervous system of young boxers.

Under the influence of audiovisual stimulation a redistribution of the levels of the functional state of the central nervous system occurred in the athletes of the experimental group. The experimental group noted an increase in the number of young athletes with a «normal» level of functioning of the central nervous system by 14%, in the control group their number decreased by 14.1%. In the experimental group there was a decrease in the number of young boxers with a «lowered» level of the CNS efficiency by 41.7%, in the control group – by 5.6%.

**Literature**


SPEED AND ACCURACY CHARACTERISTICS OF OPERATIONAL DECISIONS OF SUBJECTS IN EXTREME ACTIVITY

Keywords: extreme activities, operational solutions, reaction time, stress, model characteristics, professional selection.

Abstract. The authors carried out a comparative analysis of speed and accuracy characteristics of the operational decisions the subjects of extreme activity. They show significant differences in cognitive performance between professionals and novices. The results of the model allow us to determine the characteristics of law enforcement officers on cognitive performance and can be used in the system of vocational qualification.

Introduction. Extreme activities are caused by the impact of risk factors, the need to make decisions in terms of information overload and time constraints. Representatives of dangerous professions of high qualification successfully resist the impact of various stressors, overcome the effects of increased stress on the psyche, and are able to maintain high working capacity under stressful conditions [1, 2, 3].

The modern system of preparation for extreme activities relies, basically, on the general patterns of adaptation of the organism to stresses, but does not fully take into account the general and individual psychophysiological and psychological mechanisms for ensuring this activity [3]. The determination of model characteristics of extreme activity subjects by cognitive indices can contribute to the improvement of the system of professional selection and programs of professional and applied training.

Purpose of the study was to conduct a comparative analysis of the dynamics of speed and accuracy parameters of operational decisions of subjects of extreme activity (professionals and novices), in the context of increasing complexity of the intellectual and stress components of the task.

Materials and Methods. The laboratory experiment was carried out using the universal psychodiagnostic complex «UPDK-MK» in the Research Institute of Sports Problems of the SCOLIPE on a contingent of representatives of law enforcement agencies. Further in the text the following terms will be used: professionals (N = 15), beginners (N = 38). The following diagnostic methods were used:
1. Visual-motor reaction – the test is designed for component-by-stage evaluation of reaction time of the subject.

2. Reaction to a moving object (RMO) – is one of the variants of the anticipatory reaction and allows to determine the individual characteristics of the subject in exact response to a moving object.

3. Stress-resistance-M-test is designed to assess the level of frustration resistance of the subject.

4. Attention distribution – the test is designed to assess the ability of the subject to simultaneously monitor and, if necessary, quickly and accurately perform the most urgent task, without losing control of other tasks.

Results. A comparative analysis of the data obtained in the laboratory experiment (more than 9000 individual measurements) of two groups of representatives of extreme activity.

RMO. Professionals (M1) showed statistically insignificant superiority over newcomers (M2) in the accuracy of anticipatory reactions (M1 = 5.07 ± 0.45, M2 = 4.21 ± 0.39 out of 10 samples).

Stress-resistance-M. In tests for differentiation reaction and reaction in frustrating conditions, professionals demonstrated significant accuracy at the level of p≤0.05.

Below is the dynamics of the reaction time in two groups of subjects in order of complication of the stress and intellectual components of the tasks:

1) the time of a simple reaction – M1 = 0.281 ± 0.002; M2 = 0.289 ± 0.001; p ≤ 0.05;

2) the time of differentiation reaction – M1 = 0.369 ± 0.004; M2 = 0.392 ± 0.002; p ≤ 0.05;

3) reaction time in frustrating conditions – M1 = 0.341 ± 0.004; M2 = 0.379 ± 0.002; p ≤ 0.05;

4) reaction time in conditions of attention distribution between visual stimuli – M1 = 0.445 ± 0.002; M2 = 0.481 ± 0.01; p ≤ 0.05;

5) time of reaction to visual stimuli in conditions of attention distribution between visual and auditory stimuli – M1 = 0.553 ± 0.004; M2 = 0.572 ± 0.003; p ≤ 0.05;

6) time of reaction to auditory stimuli in conditions of attention distribution between visual and auditory stimuli – M1 = 0.633 ± 0.009; M2 = 0.723 ± 0.001; p ≤ 0.05.

The figure graphically represents the dynamics of the reaction time in the groups under study.

Thus, the test groups of professionals demonstrate a statistically significant advantage over the test subjects of the novice group for all speed indicators. The groups demonstrate a proportional increase in reaction time due to the complication of the intellectual component of the tasks. There is also a shortening of the reaction time in frustrating conditions in both groups; professionals improve the accuracy of response, and beginners significantly worsen this indicator.

Figure – Dynamics of the reaction time in the study groups
Conclusions:

1. The tests used in the work showed their high sensitivity (0.01-0.03 sec) when comparing subjects of extreme activity with different qualifications by cognitive indices.

2. Highly qualified representatives of extreme professions have the advantage over newcomers in the speed and accuracy parameters of operational decisions in frustrating conditions and on the speed parameters of operational solutions in the context of the increasing complexity of the intellectual component of the task, which may be assumed to be the result of extreme preparedness. There is a tendency of growth of temporal differences between groups with complication of conditions of performance of tasks of the test.

The data obtained in the experiment make it possible to determine the model characteristics of employees of the law enforcement agencies by cognitive indicators that can be used in the professional selection system, and also outline additional guidelines for professional and applied training.

Literature


**Introduction.** April 15, 2013 during the Boston marathon there was a terrorist attack (explosion). In connection with the possibility of the emergence of such an extreme situation in the sporting and professional activities of any person, it seems to us relevant to study activities in similar situations.

Considering the problem of the impact of strong sound signals on human beings, as well as literature sources, it can be stated that certain data have been accumulated on the mechanisms of action of acoustic stressors on the organism and the processes of its adaptation. Physiological and mental mechanisms of perception and processing of high intensity of stressful information signals are relatively well studied in industrial production. Acoustic effects can have a destructive effect on human organs [1]. Investigations of relatively low-intensity, long-term acoustic factors, the effects of which continue or are repeated at a certain frequency, have been widely conducted in industry. Studies on the impact of sound effects «shock» or «explosive» type are relatively few [2, 4], which states the possibility of observation, but does not provide a sufficiently complete picture of the physiological, mental and adaptive processes, depending on such influences.

We hypothesized that a certain reaction to an unexpected loud sound (pat, etc., including an explosion) is an unconditioned reflex formed in the process of evolution. Such an impact includes a conditioned genetically protective response and is noted in the scientific literature [5]. A loud signal almost always has a stressful effect, in case of unexpectedness it can be extreme, and with repeated actions it can cause adaptive changes in the body [4].

The study is intended to determine the features of the functional-motor activity in the structure of the behavioral response as to as a reaction to short extreme acoustic effect.

**Materials and Methods.** The experiment was attended by cadets-pilots of the Ulyanovsk Higher Civil Aviation School, engaged in sports (track and field athletics), in the number of 20 people. The age of participants was 18 ± 0.5 years.

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Keywords: sport, stress, reaction activity.

Abstract. The authors discuss the impact of sound effects «shock» or «explosive» type structure on the human behavioral response. In the experiment, they note individually-typological motor-mental reaction to the impact of extreme acoustic stressor.
Two series of experiments were carried out. The subjects were asked to run a distance of 1000 meters twice: the first time without the stressor, the second time with an acoustic stressor. The first part of the experiment was held at the stadium in the form of a control race, with an individual start. The second part of the experiment, where the extreme situation was modeled, was held three days later, it was also carried out individually with each participant only once. As a stressor, an explosion sound was reproduced, the volume of this sound was 130 decibels 0.02 s long at the 900-meter distance mark. Thus, the impact was carried out with a relatively stable state of the athlete’s body during intense muscle work in the running process.

Before the experiment, the participants were given the task: by all means to finish the distance (without specifying the planned extreme situation). So, the acoustic effect for them was relatively unexpected.

In the experiment, features of functional motor activity were recorded: the heart rate with the Polar pulse tachometer and the tremor level of the fingers – a tremor meter (patent No. 78655, author Meshcheryakov AV). To monitor the behavioral reaction, video shooting (the last 150 meters of the distance) and anamnesis were carried out (sensations were interviewed during the «explosion», during the subsequent run and after the finish).

**Results.** Survey data are presented in the table. In the first part of the experiment the participants had stable and comparatively equal heart rate (beats per minute) and tremor (oscillations per minute): the heart rate increased from 86 ± 5 bpm to 180 ± 9 bpm; tremor increased from 20 ± 6 to 42 ± 8. In the second part of the experiment, the differences in the indices in the subgroups were noted: heart rate and tremor of the fingers were relatively higher after running through the distance with acoustic action in comparison with overcoming the distance without exposure. The sports result decreased by 8-12 seconds.

Analyzing video (slow playback), various reactions of the experiment participants to extreme acoustic effects were noted. As a result of manifestations of reactions, according to changes in the structure of movements, three types of response were identified, according to which participants were divided into 3 subgroups.

1 subgroup (7 people):
- extensor reaction – altered movements of the arms and trunk in the run structure. Under the influence of the stressor, the young men shuddered, jumped upwards on the run with hands up; immediately after that their run was accelerated at the expense of the tempo of movements.

2 subgroup (10 people):
- flexor reaction – the change in movement during the impact was characterized by flexion of limbs (arms and legs), as well as torso forward; subjects continued to run, slowing down, looking around.

3 subgroup (3 people):
- panic reaction – the subjects stopped abruptly, crouching and covering their heads with their hands, after which they began to look around, refusing to continue running.

Along with specific reactions, visible effects of stress were noted:
- short-term tension of the musculature of the body during the «explosion» – flinch;
- retraction of the neck in the shoulders – flexor motor reaction;
- an external manifestation of fright – mimicry;
- severity of motor-emotional reactions – screaming and «squeezing»;
- a distinct change in the structure of the race according to technical and rhythmic indices.

The study of the motor reactions of the organism under the influence of extreme stressors made it possible for the subjects assigned to different groups to observe the following: after the race, the subjects of the 1 subgroup continued to walk actively, gesture with their hands, and exchange opinions vividly. Subjects 3 subgroups, on the contrary, moved less, their hands were almost not included in the movements, they were mostly on the belt. Subjects 2 subgroups also showed some inhibition and awkward movements.

### Table – Subjects’ test results

<table>
<thead>
<tr>
<th>Number of the experiment</th>
<th>Group</th>
<th>Heart Rate before race, bpm</th>
<th>Heart Rate after race, bpm</th>
<th>Tremor before race, vpm</th>
<th>Tremor after race, vpm</th>
<th>The result of the race, min, s</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>general (n=20)</td>
<td>86±5</td>
<td>180±9</td>
<td>20±6</td>
<td>42±8</td>
<td>2,48±4 s</td>
</tr>
<tr>
<td>2</td>
<td>1 subgroup (n=7)</td>
<td>86±4</td>
<td>190±3</td>
<td>22±4</td>
<td>58±8</td>
<td>2,56±4 s</td>
</tr>
<tr>
<td></td>
<td>2 subgroup (n=10)</td>
<td>86±5</td>
<td>186±6</td>
<td>22±4</td>
<td>53±6</td>
<td>3,00±6 s</td>
</tr>
<tr>
<td></td>
<td>3 subgroup (n=3)</td>
<td>86±5</td>
<td>180±5</td>
<td>22±4</td>
<td>48±6</td>
<td>did not finish</td>
</tr>
</tbody>
</table>
Conclusions:
1. The extreme value of the acoustic stressor is noted as a factor inhibiting the working activity with a sharp sound of an explosive nature.
2. There is an individual-typological motor-psychic reaction to the impact of an extreme acoustic stressor.
3. During the aftereffect of an acoustic stressor, intense muscle activity and communication contribute to relieving tension.
4. Individual-group differences in the manifestation of the reaction are due not only to different excitability (the power of the nervous processes), but also to the level of stability of the target device to stressful effects of extreme intensity.

Literature
TRAINING AND COMPETITIVE RANKING OF EXERCISES ACCORDING TO THE LOAD INTENSITY IN THE CLAY PIGEON SHOOTING

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Keywords: clay target shooting, skeet shooting, target, training load, load intensity, distribution of load, visualization, visual-mental rehearsal of the shot, training without cartridges.

Abstract. A questionnaire has been developed and a survey of athletes, specializing in clay pigeon shooting on issues related to the training process has been carried out. We established the athletes load intensity in different training periods. It was determined a well-balanced training structure for shooters with different qualifications.
**Introduction.** Clay pigeon shooting – is a complex of sports exercises, based on a large volume of training load that requires concentration and accuracy of muscular efforts from the athlete. Great physical loads are accompanied with high psychophysical efforts. Therefore, high and stable shooting effectiveness can be achieved when properly structured training process is optimized with exercise selections, intensity and a rhythm of their performance.

The aim of investigation is to determine athletes training structure, considering their load intensity by analyzing training load of athletes of different qualifications in a skeet shooting during their basic training for the competitions, as well as in their precompetitive cycle.

**Materials and Methods.** A questionnaire development and survey of athletes, specializing in clay pigeon shooting on issues related to the training process. 45 athletes of different qualification were involved in the survey.

An analysis of data obtained as a result of questionnaire, as well as the main parameters of the training process, which are given in the basic M.I. Polyakov educational-methodical manual in skeet shooting «Strel’ba po letyashim mishenyam» (hereinafter – the Polyakov manual).

**Results.** The load intensity volume in the clay pigeon shooting is estimated by the following parameters:

a) A number of shots, fired at a certain stage (at the certain training, precompetitive period, in basic training period, during the year, etc.);

b) A number of symbolic shots, made on simulators or directly on the shooting site, or the shots mentally made by a shooter;

c) Time spent for performing the work mentioned above.

In doing so, six people team spend for 1 series shooting about 25-30 minutes for both skeet and trap shooting. Relaxing and preparation for the following series is approximately the same. Thus, for a daily training consisting of one hundred targets shooting, a MS (Master of Sport) spend not less than 3.5–4 hours.

If we know the intensity volume on a number of shots with and without cartridges as well as a total time spent for performing this action, one can exactly determine the athlete’s load intensity both for daily and any training period, as well as we can plan it due to the problems being solved on a certain stage of shooters’ preparation.

The intensity of a training exercise is estimated in another way. To determine the intensity of the

<table>
<thead>
<tr>
<th>Type of exercise</th>
<th>Subtypes of exercises</th>
<th>Scores</th>
</tr>
</thead>
</table>
| Training without gun | 1. General physical training  
2. Special physical training  
3. Active recreation (tourism, hunting, fishing) | 1      |
| Training without cartridge | 1. Training on simulators  
2. Warming up  
3. Training with a symbolic shot on the site  
4. Mental rehearsal of the shot | 2      |
| Training without considering firing results | 1. Work on shooting technique  
2. Working out of the firing on certain flight trajectories targets  
3. Testing sites, guns, cartridges, shooting vest, glasses, etc. | 3      |
| Training considering firing results | 1. Testing a reliability the individual elements of shooting technique  
2. Checking the development shooting degree  
3. Self-assessment of the shooting results  
4. Assessing shooting results by a coach | 4      |
| Checking firing | 1. Screening the competition groups  
2. Screening a scoring team  
3. Transferable tests  
4. Offset participation in the competitions | 5      |
| Medium level competitions | All competitions for a year (except for highest rank competitions) | 6      |
| High level competitions | The main competitions of the year | 7      |
### Table 2 – The questionnaire

<table>
<thead>
<tr>
<th>Category</th>
<th>Scores (according to the table of ranking)</th>
<th>The athlete's qualification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (M/F)</td>
<td>2 - 3 ranks</td>
<td>CMS</td>
</tr>
<tr>
<td>Year of birth</td>
<td></td>
<td>75 (100%)</td>
</tr>
<tr>
<td>Qualification</td>
<td></td>
<td>45 (100%)</td>
</tr>
<tr>
<td>Experience in clay pigeon shooting</td>
<td></td>
<td>25 (100%)</td>
</tr>
<tr>
<td>Event</td>
<td></td>
<td>18 (40%)</td>
</tr>
<tr>
<td>Achievements</td>
<td></td>
<td>12.5 (50%)</td>
</tr>
<tr>
<td>When 1, 2, 3-ranks, CMS, MS performed?</td>
<td></td>
<td>5 (12%)</td>
</tr>
<tr>
<td>Amount of training per week/month</td>
<td></td>
<td>5.5 (12%)</td>
</tr>
<tr>
<td>Average time of training (in hours)</td>
<td></td>
<td>3 (12%)</td>
</tr>
<tr>
<td>Amount of series of 25 targets per month</td>
<td></td>
<td>2 (20%)</td>
</tr>
<tr>
<td>Considering firing results, hour/month (%)</td>
<td></td>
<td>2 (20%)</td>
</tr>
<tr>
<td>Amount of physical training per week/month</td>
<td></td>
<td>3 (12%)</td>
</tr>
<tr>
<td>Amount of training camps (per last year, in days)</td>
<td></td>
<td>5 (20%)</td>
</tr>
<tr>
<td>Amount of competitions (per last year, in days)</td>
<td></td>
<td>2 (20%)</td>
</tr>
<tr>
<td>Theoretical lessons per week/month, in hours</td>
<td></td>
<td>2 (20%)</td>
</tr>
<tr>
<td>Practice per week/month, in hours</td>
<td></td>
<td>3 (12%)</td>
</tr>
<tr>
<td>Out of shooting range per week/month, in hours</td>
<td></td>
<td>2 (20%)</td>
</tr>
<tr>
<td>Training without cartridge per week/month, in hours</td>
<td></td>
<td>1 (25%)</td>
</tr>
<tr>
<td>Visual-mental rehearsal of the shot per week/month, in hours</td>
<td></td>
<td>1 (25%)</td>
</tr>
<tr>
<td>Training on shooting equipment per week/month, in hours</td>
<td></td>
<td>1 (25%)</td>
</tr>
<tr>
<td>Experience of new range, gun, cartridges, googles, etc. per month/year, in hours</td>
<td></td>
<td>1 (25%)</td>
</tr>
<tr>
<td>How long visualization is used?</td>
<td></td>
<td>1 (25%)</td>
</tr>
<tr>
<td>Time spent for shooting technique</td>
<td></td>
<td>1 (25%)</td>
</tr>
</tbody>
</table>

### Table 3 – A distribution of training load on clay pigeon shooters in the basic training period (based on Polyakov manual and survey data)

<table>
<thead>
<tr>
<th>Type of training load</th>
<th>Scores (according to the table of ranking)</th>
<th>3-d ranking</th>
<th>1 and 2 ranking</th>
<th>CMS</th>
<th>MS</th>
<th>IMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Total volume of training load, hour/month (%)</td>
<td>–</td>
<td>25 (100%)</td>
<td>45 (100%)</td>
<td>75 (100%)</td>
<td>100 (100%)</td>
<td>120 (100%)</td>
</tr>
<tr>
<td>2. Physical training, hour/month (%)</td>
<td>1</td>
<td>12.5 (50%)</td>
<td>18 (40%)</td>
<td>24 (32%)</td>
<td>30 (30%)</td>
<td>35 (29%)</td>
</tr>
<tr>
<td>3. Training without cartridge, hour/month (%)</td>
<td>2</td>
<td>3 (12%)</td>
<td>5.5 (12%)</td>
<td>14.5 (19%)</td>
<td>20 (20%)</td>
<td>24 (20%)</td>
</tr>
<tr>
<td>4. Training without considering firing results, hour/month (%)</td>
<td>3</td>
<td>5 (20%)</td>
<td>12 (27%)</td>
<td>18 (24%)</td>
<td>21 (21%)</td>
<td>24 (20%)</td>
</tr>
<tr>
<td>5. Training considering firing results, hour/month (%)</td>
<td>4</td>
<td>4 (16%)</td>
<td>8 (18%)</td>
<td>16 (21.5%)</td>
<td>24 (24%)</td>
<td>31 (25.5%)</td>
</tr>
<tr>
<td>6. Checking firing, hour/month (%)</td>
<td>5</td>
<td>0.5 (2%)</td>
<td>1.5 (3%)</td>
<td>2.5 (3.5%)</td>
<td>5 (5%)</td>
<td>7 (5.5%)</td>
</tr>
</tbody>
</table>
According to survey results and Polyakov manual, the training load was determined by types, intensity, and athletes’ qualification (Table 3).

When processing of questionnaires data, we failed to identify stable regularities between the competitive load and athlete’s qualification. Therefore, the load distribution in the competitive period we analyzed according to Polyakov manual, which also does not have a similar distribution. A table of load distribution on clay pigeon shooters in the competitive period is represented below (Table 4).

A diagram of the total volume of load on clay pigeon shooters in the basic training period depending on their qualification (Figure 1) was made based on the tables mentioned above. As we expected, the more the total volume of load the more athlete’s qualification. It varies from 25 to 120 hours per month.
As we can see, a proportion of physical load with a raise of athlete's qualification decreases;

- A proportion of training without cartridge significantly increases when transiting to the CMS level

(Candidate to the Master of Sport) and further remains almost unchanged. During a competitive period the load proportion is slightly higher than in the basic training period;

- A proportion of training without considering firing results curves through maximum for 1-2 – ranking athletes and in the competitive period is significantly lower than during the basic period for all athletes with different qualifications;
competitions is a tenth part of the total load in competitive period. It was composed diagrams of the average statistical training structure for athletes with different qualification based on the analysis of all the data obtained (Figure 4). 1, 2, 3, 4, 5, 6 – training exercises assessed according to ranking table (Table 1) with 1, 2, 3, 4, 5, 6 scores, respectively.

• For 3-d ranking athletes a half of time falls for physical training; Approximately three equal parts: training without cartridge, training without considering firing results and training considering firing results; And completely slight segment – checking firing;

• In the following four diagrams, we can see a tendency of decreasing physical training proportion. In doing so the proportion of training without cartridge increases with shooters’ qualification and significantly higher in the competitive period than in the basic training process;

• A checking firing proportion is slight but a bit increases with rising of athletes’ qualification. In the competitive period, it is much higher than in the basic training.

A distribution of load on clay pigeon shooters in the competitive period is represented in the Figure 3.

In the competitive period, we see that the main training proportion falls for workout, considering firing results. Roughly equal proportions on physical training and workout without cartridge, which are almost twice less than training considering firing results. Training without considering firing results is a small part of the total load during competitive period. Shooting in competitions is a tenth part of the total load in competitive period.

It was composed diagrams of the average statistical training structure for athletes with different qualification based on the analysis of all the data obtained (Figure 4). 1, 2, 3, 4, 5, 6 – training exercises assessed according to ranking table (Table 1) with 1, 2, 3, 4, 5, 6 scores, respectively.

• For 3-d ranking athletes a half of time falls for physical training; Approximately three equal parts: training without cartridge, training without considering firing results and training considering firing results; And completely slight segment – checking firing;

• In the following four diagrams, we can see a tendency of decreasing physical training proportion. In doing so the proportion of training without cartridge
A figure of dependence between the load intensity and athlete’s qualification is represented according to the Table 5 (Figure 6). It shows three lines:

1-st – Load intensity in the training period, I1
2-nd – Load intensity in the competitive period, I2
3-d – Suggested load intensity in the competitive period, I3

Figure 5 – The total load intensity of athletes with different qualification in their training and competitive periods

Figure 6 – Load intensity changes of clay pigeon shooters during training and competitive periods, depending on their qualification
Conclusions:
1. Based on the ranking of load intensity exercises as well as survey data of athletes, specializing in clay pigeon shooting; with the help of the main recommendations of the basic educational-methodical manual in skeet shooting, it was determined a well-balanced training structure for shooters with different qualifications.

2. We established the athletes load intensity in different training periods. In the main training period it is about 2.1 – 2.6, and can rise to 20% in the competitive period. Depending on athletes’ qualification, it is suggested to follow the obtained data on the load intensity levels in the training and competitive cycles.

3. A structure and load intensity levels determined make it possible to optimize the training process on physical and psycho-physiological efforts of an athlete to avoid overtraining and mental tiredness as well as to achieve high stable effectiveness in skeet shooting.

Literature


3. Competition Rules ISSF in the clay pigeon: trap, double trap, skeet (with corrections 2006).-Moscow: Russian Shooting Union.


Introduction. Russian State University of Physical Education, Sport, Youth and Tourism (SCOLIPE) is the main foundation in Russia, which has formed the leading scientific schools in the field of mass and elite sport, genetics, anthropology, hygiene, biochemistry and bioenergy, biomechanics, physiology, psychology, sports activities, theory and methodology of physical education, sports training, sports and restorative medicine, improving and adapted physical education, theory and methods of vocational education, sports management, issues of Olympic and Paralympic movements.

School of scientific and pedagogical control in the field of physical education and sport by V.V. Gorinevsky

Gorinevsky
Valentin Vladislavovich
(1857–1937)

In 1923, the already venerable scholar Prof. Valentin Vladislavovich Gorinevsky joined the State Central Institute of Physical Education (SCIPE) for the organization and management of the department of scientific control. He is actually the author of the first manuscript of medical and biological substantiation of physical education and sport. His «Health exercise and sport» was published in 1925.

Professor V.V. Gorinevsky worked in SCIPE until 1937. His work had an enormous influence on the development of scientific research in various fields of physical education and sport.

Followers: Karpman V.L., Laptev A.P., Smolensky A.V.

National gymnastic school by Stole M.L.

Stole Michael L.
(1911–1976)

PhD, Professor, Department Head of SCOLIPE gymnastics. All of the first undertakings linked in scientific studies in gymnastics was initiated by Stole M.L. His main scientific interest was in the sphere of method of preparation of elite gymnasts. For 20 years, he was leading a comprehensive research group at the USSR national team in gymnastics. Since the late forties M.L.ukran was de facto a head of the national gymnastic school.

Followers: Gubanov V.A., Smolensk V.M. Gaverdovsky Y.M., Lagutin A.B.

School of sport biomechanics by N.A. Bernstein

Nikolai Bernstein
(1896–1966)

One of the most influential scientists of the twentieth century, a corresponding member of the Academy of Medical Sciences, Doctor of Medical Sciences, Professor Nikolai Bernstein laid the foundations of modern biomechanics and human motion control theory. Nikolai worked in GTSOLIFK disappointing short period of time (about a year), but the role and influence of his ideas on sports science is extremely important.

Followers: Donskoy D.D., Zatsiorsky V.M. Godik M.A., Shalmanov A.A.

School of dynamic anatomy and sports morphology by Ivanitsky M.F.

Ivanitsky Mikhail Fedorovich
(1895–1969)

Doctor of Medical Sciences, Honored Scientist, Professor M.F. Ivanitsky was a Department Head of anatomy of GTSOLIFK from 1930 to 1969. He laid the foundations of functional, dynamic and plastic anatomy, which raised teaching and research in these areas to a new level. In 1940 it was
issued the 1st edition of his textbook «Anatomy of a man.». Since then, over a half a century textbooks of Ivanitsky M.F. have been the main source for students of higher educational institutions of physical education. (The 5th edition was published after his death).
Followers: Nikitiuk B.A., Godina E.Z.

**School of physiotherapy, therapeutic and sports massage by Sarkizov-Seraziny I.M.**

**Sarkizov-Seraziny Ivan Mikhailovich (1887–1964)**

Professor, Doctor of Medical Sciences, Honored Worker of Science, Honorary member of the International Federation of Sports Medicine, Sarkizov-Seraziny is a founder of the school of physiotherapy science, sports massage and sports medicine, cold hardening, health resorts and physiotherapy, climatology and climatotherapy.

Ivan Mikhailovich was a Department Head of physical therapy, medical monitoring and sports massage in GTSOLIFK from 1928 to 1964.

Followers: Popov S.N., Biryukov A.A., Kozyreva O.V., Rubtsova N.O.

**School of sport psychology by Rudik P.A.**

**Rudik Peter Antonovich (1893–1983)**

Rudik P.A. – Professor, Doctor of Psychological Sciences, Honored Scientist, a correspondent member of Academy of Pedagogical Sciences. After graduating from Moscow State University in 1919, he was accepted as a teacher of pedagogy and psychology at the newly established Institute of Physical Education in Moscow. From 1932 to 1978 he organized a Department of Psychology there and became a Department Head. He is also a founder of the branch of psychology – sports psychology.

Followers: Rodionov A.V., Sopov V.F., Nepopalov V.N.

**School of theory of physical education by Novikov A.D.**

**Novikov Alexander D. (1906–1972)**

Graduated from GTSOLIFK in 1930, Professor, D.Sc. Alexander Dmitrievich Novikov was a Department Head of theory and methodology of physical education in GTSOLIFK nearly half of his life. It has been established a scientific school which received a worldwide recognition on the basis of this department. The researchers of this school have made a fundamental contribution in the factual basis and the conceptual content of the theory of physical education.

Followers: Matveev L.P., Filin V.P., Suslov F.P., Maksimenko, Vovk S.I., Polievsky S.A.

**School of Athletics by Ozolin N.G.**


Professor Ozolin N.G. is an honored master of sport, an honored coach, Doctor of Pedagogical Sciences, Honored Scientist of Russia, a multiple national champion in the pole vault, Department Head of athletics in GTSOLIFK (1936–1953).

He owns a huge role in the formation and development of national sports science in the development of theoretical and methodological issues of sports training of Soviet athletes.

Followers: Matveev E.N., Arakelyan AA?

**School by Gradopolov K.V. Konstantin Gradopolov (1904–1983)**

Merited Master of Sports, Honored Coach of the USSR, international referee, Doctor of Pedagogical Sciences, Professor K.V. Gradopolov was a Department Head of boxing in GTSOLIFK from 1936 to 1966. Konstantin treated boxing as a noble art of self-defence and a fighting game based on high maneuverability and perfect technical and tactical skills Professor K.V. Gradopolov was able to organize and classify boxing techniques and tactics to a full extend. It is believed, according to the experts, that he is a creator of scientific and methodological foundations of a national school of boxing.

Followers: Degtyarev I.P., Kalmykov E.V.
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