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MODERN TRENDS OF SPORT PSYCHOLOGY IN RUSSIAN PSYCHOLOGICAL SOCIETY[1]

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El artículo describe las principales tendencias de la psicología del deporte en Rusia. En la actualidad, la psicología del deporte en Rusia y en otros países muestra un nuevo estadio de desarrollo, que se atribuye a la aceptación de la influencia de las características psicólogicas en el rendimiento atlético. La psicología del deporte rusa pretende desarrollar métodos y técnicas óptimas que faciliten la mejora del rendimiento deportivo y la detección de tendencias desfavorables. En el artículo, se describen los principales enfoques teóricos y líneas de pensamiento psicológicas que fundamentaron el curso histórico de la psicología del deporte rusa. Se debaten también los principios metodológicos para el desarrollo de habilidades físicas en los jóvenes atletas. A la vez, se presentan las nuevas vías de investigación de la psicología del deporte en Rusia: percepción del tiempo, atención, atención visual en los escenarios de campo, anticipación, entrenamiento mental e imaginación motora. Cada uno de dichos temas destaca los recientes avances de la psicología del deporte en Rusia con una perspectiva general de los principales estudios, mostrando sus hallazgos específicos y su interpretación desde el punto de vista científico contemporáneo. Además, se propone un enfoque en tres pasos para el desarrollo de las intervenciones en imaginación mental en los deportes. Desde el punto de vista teórico puede ser utilizado para estandarizar la investigación sobre imaginación mental en los deportes, controlando sistemáticamente todas las variables que pueden tener influencia en los resultados del estudio. En general, el artículo abarca tanto los aspectos teóricos y metodológicos de la psicología del deporte en Rusia, como ejemplos de estudios específicos que proporcionan una oportunidad para futuras líneas de investigación.
Palabras clave: *Psicología del deporte, sentido del tiempo, atención visual, anticipación, imaginación motora, entrenamiento mental.*

The current article is devoted to the main trends of sports psychology in Russia. At present, sports psychology in Russia and abroad is at a new stage of development, which is attributed to the acceptance of the notion that psychological characteristics influence the athletic performance. Russian sports psychology is basically aimed at the development of optimal methods and techniques facilitating the improvement of sport performance and detecting adverse tendencies in athletes. Several main theoretical approaches and psychological schools of thought that determined the historical course of Russian sports psychology are described in the article. Methodological principles for physical skills development in young athletes are discussed as well. The following modern research avenues of Russian sports psychology are also presented in this paper: time perception, attention, visual attention in field settings, anticipation, mental training and motor imagery. Each of these topics highlights the recent advances of sports psychology in Russia with an overview of the key studies providing their specific findings and interpretation in terms of contemporary scientific views. In addition, the three-step approach is proposed for the development of mental imagery interventions in sports. From the theoretical perspective, this approach can be used to standardize mental imagery research in sports by systematically controlling all variables that can influence study results. Overall, the article encompasses both the theoretical methodological aspects of Russian sports psychology and the examples of specific studies providing an opportunity to look forward to future lines of research.
Key words: *sport psychology, sense of time, visual attention, anticipation, motor imagery, mental training.*

Although the foundations of sports psychology were laid a century ago in Russia, a new stage of its development is currently taking place (Zinchenko et. al., 2011). Practically all athletes across the world recognize that their performance is influenced by psychological variables (Grushko, Leonov, 2015). Since the dawn of sports psychology in Russia, various methods and techniques continue to be developed to improve athletic performance.

Outstanding contribution to the development of Russian sports psychology as a field of science was made by P. Rudik, T. Nikitin, A. Nechayev, A.Puni, A. Rodionov, A. Alekseyev, B. Blyumenshteyn, N. Khudadov, G. Gorbunov, N. Stambulova, R. Zagaynov, B. Malkin etc. (Zinchenko et. al., 2011). The main focus of their research dealt with motor behavior and psychological readiness for sport competition. Studies of the sense of time in athletes along with the search

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for methods of its development and perfection were initiated by Gellerstein (Gellerstein, 1958) in the 1950-s. It should be also noted that one of the most comprehensive and widely implemented theories of movement is the Bernstein's (Bernstein, 2008) model of the construction of movement postulating different organizational and, at the same time, evolutionary levels involved in different movement generation and control. Importantly, these results and areas of research have not lost their relevance up to the present time.

Development of physical activity among children is the traditional focus within the educational programs (Diachenko, 2001). Particular attention was paid to the formation of motor skills by means of showing, verbal instructing and the use of visual aids. In the works of Venger (1988) visual aids were introduced by visual models, which were used as a basis for the development of physical education. Development of physical skills also "stands in direct connection with symbol acquisition" (Vygotsky, 1984). In terms of Vygotsky's cultural-historical approach, the formation of physical activity of children was considered in the logic of acquiring cultural tools. This approach is applied in working with elite athletes (Zinchenko, 2011).

Currently, research in the field of sports psychology in Russia is generally aimed at both psychological diagnostics and training with a special emphasis on the perceptual-cognitive expertise and mental skills domains (Zinchenko, 2011). The main purpose of research is to identify essential psychological features (enabling the achievement of optimal results) in order to take into account the focus on their development in the approach to work both in the general framework of a certain sport, as well as on an individual level of every athlete. The ensuing practical issues involve creation of reliable measures for these features, and methods for their development and maintenance are being specifically tailored to match athletic needs at different levels of sports expertise. Another relevant topical issue for coaches and sport psychology practitioners is to maximize their trainee's potential achievements by taking advantage of starting sports training as early at professional development as possible. This requires specially designed psychological techniques and approaches. At the same time, one of the latest trends consists in bringing innovative technologies and approaches such as virtual reality, eye tracking system, mental training into sports practice (Zinchenko, 2011, Velichkovsky et al., 2017).

The outcome in sport competitions depends on a combination of various factors with perceptual-cognitive skills (attention and memory, time perception, anticipation and decision making, sensorimotor coordination etc.) being ones of the most relevant to psychological research and interventions. Well-developed perceptual-cognitive skills are crucial for different sports in order to outsmart opponents by anticipating their actions and making better decisions. In the diagnostics of the perceptual-cognitive skills in athletes the following instrumental methods were applied: eye tracking, biofeedback, integrated systems of the assessment of psychomotor and cognitive variables. The implementation of the instrumental methods provides a number of benefits to the process of psychological support of athletes. By using these methods sports psychologists can get objective measurements of different variables which are crucial in different sports and can also get an immediate feedback of ups and downs in athletes' performance.

METHODS

The paper provides the fundamental approaches of Russian sports psychology, which are currently most important and which determine the vector of its development. It also highlights some relevant foreign concepts that were reflected in the works of Russian scientists and underlay the concepts being elaborated by them.

SENSE OF TIME IN SPORTS

"The sense of time" is understood as a mental function, a person's activity mediated by one's reflexive relationship towards cognitive or motor acts, one's changing, lasting state or towards the states of perceived external objects. The diagnostics of sense of time can be carried out by the methods of estimation, measuring, reproduction and comparison of the duration and sequence of different events and processes, including one's own movements and actions.

Going by the accuracy and stability in solving these problems and by the influence of different factors on their solution, one can assess the characteristics of sense of time, which may vary considerably from person to person.

The tasks of studying the perception of time are determined by the extent to which characteristics of the sense of time are close in the athletes of one team, and how they can be taken into account and improved upon at the time of their pre-competition training. The implementation of these tasks was initiated by the need to design and develop a tester-simulator, that allows transforming diagnostic techniques into developmental exercises, based on the principle of "movement control by feeling" (A.V. Zaporozhets), and the use of psychological feedback (information) on temporal characteristics of athletes' actions while working with them (S.G. Gellerstein).

Since the 1950-s the methods of diagnostics and evaluation of time perception in Russia are being intensively studied as ways of developing and perfecting the sense of time, especially in athletes (Gellerstein, 1958; Bespalov & Leonov, 2008). In Gellerstein's research (1958) it was shown that training of temporal perception affected sportsmen accuracy, speed of executable movements, and eliminated premature or deferred starts. Subjective time pacing can be assessed by different methods such as: reproduction, production, comparison, estimation of time intervals or by tapping at a pace of "once per second," which can reflect the ability to produce the conventional time unit by activating the internal representation of one second.

Sysoeva and colleagues have shown that exercise-induced physiological changes could have a strong influence on

temporal processes including motor timing and time perception (Sysoeva et al., 2013). Studies have revealed the relationship between the production of short-time intervals (up to 1–2 s) and dopaminergic activity (Portnova et al.).

In works of Bespalov and Leonov (Bespalov, Leonov, 2008a, 2008b, 2012) special professional tasks were set for exploring sense of time among sportswomen in synchronized swimming. It was shown that subjective way of silent counting to music in synchronized swimmers serves as a temporary regulation of the motor activity and is a psychological means of synchronization of movements associated with sports. It is based on Vygotsky's approach who considered tools as means of mastering own movements (Vygotsky, 1984).

The proposed method for diagnostics of time perception in synchronized swimming allows to determine the rate of silent counting or sense of athletes' rhythm by objective parameters: accuracy of rhythm's estimation and stability of its production. Also it can be used as a mechanism of feedback in the elaboration of a professional simulator for the development of athletes' temporal perception.

ATTENTION IN SPORTS

The development of attention in certain sports, considering the tasks being solved by the athlete at the competitions, is an important aspect in the psychological training of athletes in Russia (Strydom, 2010; Markov, 2013; Antipova, 2014; Grushko, 2017; Korobeynikova et al., 2017).

Markov (Markov, 2013) in a study with a team of high-level volleyball players pointed out the importance of the dynamic properties of attention, as well as its volume and intensity. This study showed that performing certain exercises for 3 months can improve the characteristics of attention. Thus, the author confirmed the possibility of training and developing attention properties in athletes.

Ilyin (Ilyin, 2010) in a study with water polo players noted their great ability to shift attention, which can be explained by the specificity of this sport. Furthermore, Antipova (Antipova, 2014) found out that athletes in cyclical sports have shown a high level of stability of attention, while high indicators of concentration of attention and short-term visual memory are specific for acyclic sports.

The group of researchers from Lomonosov Moscow State University (Korobeynikova et al., 2017) investigated the dynamic properties of attention in athletes engaged in archery. 65 Russian athletes (intermediate and elite level) participated (N = 65; 34 male; 31 female; Mean age ± SD = 16.29±1.74 y.o.) in this study. The aim of the study was to reveal specific patterns of attention among archers at different stages of their professional development. The study revealed significant differences between groups of subjects by age, professional level and gender. It was found that females, in particular adult athletes, perform the attention tests with lower scores. At the same time, the speed of fulfilling the tasks does not affect accuracy.

VISUAL ATTENTION IN FIELD SETTINGS

Nowadays eye tracking technologies are being actively implemented in the process of psychological training and testing of athletes in different sports. Recent advances in mobile eye tracking equipment have opened up new opportunities to study how athletes detect visual information for planning or regulating their ongoing actions (Button et al., 2017). Within sports context eye tracking studies in Russia are based on "Vision in Action Paradigm" (Vickers, 2007) and conducted in naturalistic field settings: at climbing gym (Grushko & Leonov, 2014), football field (Grushko & Leonov, 2015), golf field (Grushko, 2017) etc.

According to Tikhomirov (1984), eye movements could represent the externalized elements of thinking process. Grushko and Leonov (2014) investigated visual strategies that athletes use to preview rock-climbing routes. The route preview is mental planning of the potential climbing movement patterns, which is crucial for performance in competitive rock-climbing. Depending upon the situation and context (for example, on-sight and lead climbs, unfamiliar routes, etc.) the visual search patterns used during route preview can influence climbing form and, potentially, the very success of the climb (Button et al., 2017).

23 experienced rock-climbers (14 male; 9 female; Mean age ± SD = 16,09[+/-]3,95 y.o.). participated in the study which was carried out in an indoor climbing gym. Athletes were supposed to preview climbing routes (intermediate and advanced level) suitable to their skill level in eye tracking glasses and after that complete the routes in on-sight and lead style.

It was stated that the number of fixations positively correlates with the duration of the intermediate and advanced level route preview (r(intermediate level route)=0,781 p<0,05 r(advanced level route)=0,885; <0,05). In addition it was found that in 56% of cases the time spent on advanced level route preview increased compared to the time of an intermediate one. The obtained results are consistent with the experimental studies of the spatial motions conducted by Gordeeva et al. (Gordeeva et al., 1978, cited in Zinchenko, Munipov, 1979), indicating that the duration of the programming stage of action is proportional to the duration and complexity of the route.

By means of qualitative frame-by-frame analysis of eye tracking data (via "Scan-path method") different types of strategies were identified in routes inspection: «ascending», «fragmentary», «zigzagging» and «sequence of blocks».

- ✔ Ascending strategy: climber looks from below to upwards and finishes preview on the top hold.
- ✔ Fragmentary strategy: climber looks at parts of a route and ignores a lot of holds and quickdraws.
- ✔ Zigzagging strategy: moving gaze from side to side as the athlete looks through the route.
- ✔ Sequence of blocks: the athlete gradually looks through the route in blocks of two to four handholds, with particular attention being focused on crux parts of the route.

The authors realized that the most sophisticated strategy «sequence of blocks» also is the most effective for the route

preview, because it is associated with planning the tactics of potential sequence of movements. In addition, Grushko and Leonov (2014) concluded that this strategy should be incorporated in imagery sessions as a preparation for a climbing route.

The case study in golf also dealt with the implementation of eye tracking in natural field settings (Grushko, 2017). Four female elite golf-players participated in the study during regular training sessions on a golf field. The work with golf-players was aimed at an individual approach to instructional self-talk (Hatzigeorgiadis et al., 2011), which contributed to more accurate strikes at a distance of 100 meters or more. After the warm-up athletes were examined by eye tracking system on the golf course. Video analysis was based on qualitative characteristics by «Scan Path». The most typical mistakes were due to shifting attention or inconsistent position of the gaze while executing a strike. For example, even before the strike - 500 msec, the athlete began to examine the balls to be used for the following session. Another typical mistake was a quick transition of the gaze to the aim after the strike. Vickers (2007) noted that successful athletes kept the focus of the gaze at the ball for 250 msec after the strike.

Self-instruction was worked out afterwards. The task was to find necessary self-talk cues which define each stage during the execution of long strikes. Stages were determined according to the elements of technique which should be controlled at a particular period of time. Self-talk consisted of commands for visual control or gaze management (for example, word «ball» was supposed to fix a gaze at the ball, command «aim» - at the place of ball landing). Also there were commands related to the grasp of golf club, leg position. Self-instructions were worked out individually, the only limit being the amount of elements (5-9 words). For example, self-talk for an athlete consisted of 5 commands: ball – aim – ball – swing – strike. More experienced sportsmen used detailed instructions: grasp – approach –point – aim – position – ball – aim - ball. Self-talk was pronounced distinctly, consistently and rhythmically, accompanying the corresponding commands with the same consistent and stable fixation on the above mentioned elements. After completing a series of 30-40 trials in combination with self-instructions, the athletes re-put eye-tracking glasses, and again registered oculomotor parameters during the execution of the strikes.

Via qualitative frame-by-frame analysis of gaze tracking before and after the self-talk implementation significant differences were revealed. As a result of 1,5-hour training of golfers, qualitative improvements in technique were registered, which also led to minimization of the number of attention errors (for example, fixation on extraneous elements of the exercise). The results of the training also contributed, on the one hand, to improving sports performance, including successful performances at competitions (prizes at the Russian Championship), and on the other hand –to increasing the confidence of athletes in executing technical actions, for they became more aware of the routine training process aimed at working off long-range strikes. Thus, combining instructional self-talk technique with modifying gaze strategy according to the cue elements of golf (the ball, hole etc.) allowed to enhance performance: first, by improving shooting accuracy, and second, by managing automatic thoughts and negative emotions which might occur during golf game.

Grushko and Leonov (2015) carried out a study devoted to visual attention in field settings via applying eye tracking in football. The experiment was conducted on a football field. A total of 23 male professional football players participated in the study (Mean age = 21,56; SD=1,5 y.o.).

Experimental design was as follows: the player needed to dribble 6 football sticks (chips) as quickly as possible (using the dribbling technique), which were arranged in a certain order in front of the football goal. After the athlete finished dribbling part, his task was to strike in a strictly defined goal area (as in Wood, Wilson, 2011 study). Thus, the task set for the athlete was an imitation of a real game situation - when the player, taking the ball away from his opponents at high speed, strikes the ball into the goal. To create a real life situation a goalkeeper was standing in the football goal. Before the start of the assignment, the athletes were to pull cards with a specified hit zone.

For the analysis, the following characteristics of the oculomotor activity of the athletes were selected in the course of test exercises: number and duration of the fixations, saccades, blinks; number and ratio of express (<150 ms) and cognitive fixations (300 ms) (Schleicher et al., 2008), number and ratio of fixations related to the ambient (100-300 ms) or focal (>300 ms) visual processing (Velichkovsky, 2006).

Assessment of the overall performance of the sports task was carried out on the basis of the following indicators: the speed of dribbling; the accuracy of the kick at goal; the integral indicator of the technique, which was calculated taking into account the accuracy of the kick at goal, the speed of movement with the ball and the absence of errors (shift or miss of chips). The most effective components in gaze patterns of footballers at different stages of dribbling task performance (in pre-start routine, during dribbling and after kicking the ball at goal) were revealed via qualitative frame-by-frame analysis of eye tracking data ("scan-path").

Effective gaze patterns in pre-start routine - short preview of direction of future movements, gaze fixation on the particular zone of the goal (56%), appeared to be related to planning the execution of the task.

In dribbling part, athletes showed the predominance of short fixations (91.3% of cases), which is associated with ambient processing of visual information. In 73.9% of cases, there were long saccades before the strike. More than half of the participants in the test (56.5%) exhibited longer-term fixations before the end of the exercise (before the strike).

Grushko and Leonov concluded, that the results obtained were consistent with the previous studies of Quiet-eye pattern in different sports (Vickers, 2007; Wood, Wilson, 2011) and

indicated, that before the execution of the movement associated with hitting the target (in this study - a specific area of the football goal), the duration of fixation increases. In addition, the authors found that the duration of fixations while dribbling positively correlated with shooting accuracy and efficacy of dribbling technique (r=0,434, p<0,05). The gaze patterns in the period after kicking the ball at goal were actually a post-analysis of the kick, with fixations on goalkeeper actions.

Based on the results obtained during the experimental testing of athletes, specialists directly involved in the psychological preparation of athletes can compare the features of visual attention in athletes of different professional levels in order to identify the most successful strategies for implementing complex sensorimotor coordination, technical and tactical actions.

ANTICIPATION IN SPORTS

Anticipation as a psychological phenomenon plays a significant role in all aspects of sports psychology. It is an essential element of any mental process (Mori, 2013; Akhmetzyanova, 2016). Anticipation is an ability of a person to foresee to some extent the development of events, phenomena, outcomes of actions.

The backgrounds of anticipation phenomenon were elaborated in the theories of functional systems developed by Anohin (1968), as well as in the principles of biological activity and control of movements, formulated by Bernstein (2008) and in the concept of "nervous model of the stimulus" proposed by Sokolov (1979). Pavlov also held the view that the idea of future actions is important. It is based on bilateral relations of kinesthetic and motor cells of the cortical divisions of the brain. He wrote about the fact that when we visualize a movement, its kinesthetic representation, we unconsciously make it (Pavlov,1951).

At present high demands are placed on sport psychologists to improve practical application of anticipation among athletes (Karandashev, 2000). Athletes' probabilistic forecasting is built during their professional development. It takes into account not only the frequency of events, but also the level of formation of functional systems which are reflected in the specific sport experience. The level of their formation and efficiency for specific tasks influences the professional activity of sportsmen: it gives a significant advantage over other less prepared competitors, facilitates making the right decision.

Isaev et al. (2016) conducted a study aimed at finding psycho-physiological characteristics that allow to quantitatively and qualitatively assess the level of anticipation skills among freestyle wrestlers (24 male; Mean age±SD=19,5±2y.o.).

The effectiveness of the teaching methods for improving freestyle wrestlers' skills was based on reinforcement of correct behavioral choices in a simulated situation of decision making under the condition of multiple choice. Stimuli were video recordings of situations in free-style wrestling. Simultaneously, psychologists registered the oculomotor activity of the eye (the delay time of views, number of fixations and the number of repeated returns to the area of interest and registration of multichannel electroencephalogram (EEG) (Isaev et al.,2016). The effectiveness of the training based on this methodology was confirmed by qualitative and quantitative changes in the development of the ability to anticipate the opponent's moves.

MENTAL TRAINING IN ATHLETES

Mental training in athletes as a dimension of sports psychology is widespread in Russia at the national and local sport centers and is aimed at enhancing the athletic performance. Mental toughness is a characteristic feature that is frequently used to describe why certain athletes have become "the world's best performers" in their respective sports (Loehr, 1994; Goldberg, 1998; Connaughton, 2008; Gucciardi et al., 2015).

According to the definition of Jones, Hanton and Connaughton (2002), mental toughness is a natural or developed psychological edge that enables athletes to cope better than the opponents with the many sports demands. Specifically, mental toughness implies being more consistent and better than opponents in remaining determined, focused, confident, and in control under pressure.

Research on mental toughness in sport performance had been limited by lack of a valid measure for the construct in Russian until the questionnaire «Complex Assessment of Mental Toughness and Adaptation in Sport» (Russian acronym - «COMPAS») was developed and initially validated to assess mental toughness in athletes by Grushko & Kasatkin (Grushko, Kasatkin, 2017). The purpose of the study was to examine the factorial and construct validity of the nine-factor model of mental toughness.

A diverse sample of competitive Russian athletes (novice, intermediate and elite level) completed the questionnaire (N = 414; 60.6% male; 39.4% female; Mean age ± SD = 20.11±6.8 y.o.). The sample consisted of different sports: game sports (35.48%); martial arts & combat sports (28.15%); cyclic (16.72%) & complex coordination sports (16.72%); applied (12.32%), shooting (8.5%) & strength sports (3.52%). The first version of COMPAS consisted of 60 items in Likert Scale. The items were compiled according to the results of a) content analysis of mental toughness studies (including questionnaires) b) semi-structural qualitative interviews with the multiple Olympic champions (from Russia; N=8).

The factorial validity with confirmatory factor analysis was tested using EQS 6.3. Construct validity evidence was gathered by examining the relationship between the subscales of the COMPAS and the subscales of the Russian versions of questionnaires: State and Trait Anxiety Inventory - STAI, Sport Motivation Scale - SMS, Sport Imagery Questionnaire – SIQ (Veraksa et al., 2014), Multidimensional Perfectionism Scale. The final version of the COMPAS consists of 49 items that assess 9 subscales of mental toughness: «coping with negative emotions and rumination», «activation & relaxation skills», «imagery», «engagement & flow», «self-efficacy», «goal settings & time management», «handling pre-competitive

pressure», «relationships with the coach», «motivation». Fit indices from confirmatory factor analyses provided partial support for the hypothesized measurement model, with equal or better fit demonstrated than evident in initial validation. The comparative fit index values were close to acceptable guidelines for all subscales. Statistically significant bivariate correlations revealed that the subscales of the COMPAS were related to the subscales of STAI, SMS, SIQ, MPS. These findings suggest that the COMPAS is a valid measure of mental toughness in sport contexts, and can be used in future psychological research and applied practice with Russian speaking athletes (Grushko, Kasatkin, 2017).

MOTOR IMAGERY

Traditional definitions of mental imagery available in literature converge in referring to this concept as subjective quasi-perceptual experiences emerging in the mind when the corresponding real sensory stimulus is absent. Imagery is capable of recreating various senses of external (such as sight, hearing, touch, taste and smell) and internal origin (e.g., somatic sensations of balance, motion, pain, temperature, hunger, thirst as well as bodily sensations associated with emotional experiences such as stress or arousal) which are referred to as imagery modalities. Mental image is either multi- or monomodal. In light of recent research on combined application of observation and imagery in motor learning or just imagery at the time of tactile contact with the item imagined it appears that the absence of the real sensory input corresponding to the imagined experiences does not necessarily rule out the presence of a complementary real sensory stimulus of another modality.

The cornerstone in research on mental, and in particular motor imagery in Russia was laid in the works of B. Ananiev, S. Kravkov, A. Leontiev, S. Rubenstein, A. Smirnov and B. Teplov and was predetermined by the core principles of the psychological activity theory postulating that the mind acts to reflect environment (Rubinstein,2000).

From this perspective, mental image is secondary to perception, which, in turn, is considered in line with the following fundamental principles. First, perception is an image of the world around produced by means of sensory organs' response to environment and appears as a source of knowledge. Second, perception is subjective representation of objectively existing phenomena and its accuracy manifests itself in performance.

Motor imagery is a special case of mental imagery and, similarly, is defined as mental execution of an action or a movement without overtly doing it. Classic literature in the field uses the terms "motor imagery" and "kinesthetic imagery" interchangeably, emphasizing modality as the defining feature of the concept. Hence, the imagined "feeling of movement", or proprioception, is considered to be the main and essential content of a motor image.

There are two noteworthy points to consider. On the one hand, movements are in a sense an inherent ability. Conversely, and especially in the context of sports, they constitute complex motor skills that have to be acquired and continuously perfected. At the first stages of skill formation the experience with the movements to be learned is usually very limited. According to Bernstein (1990), before a certain amount of experience with the rehearsed movement can be gained, exteroceptive data are the only option available for motor control to be performed with. Thus, novice performers rely mainly on vision when reproducing and assessing technical actions and hence, they are limited in motor imagery use. Second, an action becomes successful only by taking into account and counterbalancing external forces of the environment (Bernstein, 1990).

Therefore, some motor activities may benefit from vision as an additional sensory input providing more comprehensive information about the environment. It allows for planning actions in advance, as in the case of a ski racer who can analyze his course while viewing terrain ahead. Some activities such as movements aimed at hitting a visible target (e.g., dart throwing), may become meaningless without a visual component. Even movements taking place in a stationary environment (so called "closed skills", e.g., hammer throwing), which could be performed without visual support, often require vision to provide a final assessment of a movement result. Consequently, vision plays an important role in movement planning and execution in that definition of motor imagery as "internal generation of *visual and kinesthetic* aspects of movement".

Association of motor imagery with first person imagery perspective is also stressed. This association originally comes from Jeannerod (1994) who referred to Mahoney and Avener's (1977) paper known as a pioneering work on imagery perspective in the field of sport psychology. Kinesthesia is a bodily feeling and therefore the conclusion that kinesthetic imagery is impossible to adopt with a third person perspective or at least harder to adopt with a third person perspective than with a first person perspective seems intuitively appealing and is readily taken for granted (Kaminskiy, 2015; Kaminskiy et al., 2018). However some of the subsequent studies yielded alternative results and questioned the validity of Mahoney and Avener's (1977) methodology.

According to Jeannerod (1994), motor imagery is, by nature, a product of conscious access to a motor representation preceding the real movement. In a case of overt action, corresponding afferentation inactivates the representation before the subject becomes consciously aware of it. But, when the overt execution is inhibited (as in the case with motor imagery) or impaired, the representation can exist long enough to enter consciousness. From this point of view, depending on the intended characteristics of an imagined task both first and third person imagery can correspond to the underlying motor representation and so carry the features of motor imagery.

Taking into account all these points, for the purposes of this paper it is reasonable to broadly define motor imagery as a type of mental imagery that specifically focuses on body movements of

the subject (regardless of imagery perspective) and contains useful information on spatial, temporal, strength and other meaningful characteristics for movement performance.

There are 3 functions of motor imagery/motor representations. Programming function involves the formation of commands to be executed by movable body parts. Regulating function provides a picture of the ideal movement performance that a real movement is to be compared with. This comparison allows for a movement assessment to be conducted and required motor corrections to be dynamically computed and applied. Training function consists in possibility of using imagery as a technique facilitating motor skills acquisition.

Indeed, motor imagery is considered one of the crucial tools for improving athletic performance. At the very beginning of the XX century, P.F. Lesgaft conceptualized imagery as a means for visual and logical representation of a motor task being learned. Also, Lesgaft considered imagery a useful practice allowing a learner to fully comprehend a planned motor action and foresee its results. As rehearsal activities in today's elite sports often appear to be limited in time, there have been numerous attempts worldwide to optimize the effectiveness of such interventions by developing various methodological frameworks modifying practical approaches to mental imagery use.

Here we propose that such frameworks may be classified according to the sequence they have to be applied in at the stage of development and implementation of intervention program based on mental imagery. This idea is illustrated further by considering that stage as a three-step process including determination of required functional type of imagery (1), environment and individual psychophysiological state (2) and, finally, specific content and features of images (3). The three-step approach is supposed to be a universal algorithm for imagery interventions development in sports, however in the current paper it will be described only as an example for motor imagery use.

The first necessary step is to select a functional type of imagery in accordance with the goals that are pursued as a desired result of a mental training procedure. According to Paivio (1985), imagery training may focus on self-regulation, motivation enhancement, performance strategies planning and motor skills development.

As pointed out by Kaminskiy and Veraksa (2016), practitioners should clearly distinguish when the goal of engaging in mental practice consists in improving the motor skills. In this case a certain type of imagery should be used, which is specifically focused on movement as a subject of imagination and known as motor imagery. In this regard, Olsson (2011) emphasized that during motor imagery, as opposed to exclusively visual representation of movements, corresponding motor programs should be activated. The implication being, that previous actual performance experience of a particular motor skill rehearsed is an essential condition to utilize motor imagery. However, it should be clarified that this is not a spur to recommend engaging in mental practice only to experienced athletes. On the contrary, mental rehearsal may be equally beneficial for both novice and skilled performers but in each case it would involve different psychological and neurophysiological mechanisms to influence the overt behavior.

To better distinguish between motor and other functional types of imagery (e.g., motivational or performance strategies) it would be helpful for practitioners to be aware of one important point. It seems reasonable that, when engaging in mental practice for improving motor performance, attention should be concentrated on motor actions and related environmental cues and by no means is desirable to be diffused across the imagined scene. Hence, we speculate, that motor imagery appropriately works when it is interpreted only as a mental reconstruction of *actions*. Other types of imagery (that can be mixed with motor imagery but have no direct effect on motor skills performance) may be described as a mental reconstruction either of *actions or* of *events* (Kaminskiy, Veraksa, 2016).

After establishing the correspondence between a goal of an intervention and a certain type of imagery, one has to determine the most beneficial conditions for mental practice in terms of the environment and the state of an individual engaged (see Cumming, Williams, 2013; Mizuguchi et al., 2011; Munroe et al., 2000). Although this issue was acknowledged long ago, it is currently considered debatable. The traditional approach involved relaxation as an introductory step to prepare an individual for mental rehearsal. One of working assumptions that could be elaborated to provide a rationale for such a practice is a parallel with hypnosis where relaxation is believed to produce more vivid mental experience. Similarly, it is well-known that the more vivid imagery is, the more effective mental rehearsal will be. Still, a PETTLEP imagery model proposed by Holmes and Collins (2001) is regarded to be the most influential. They argued that the most favorable conditions for mental practice are the closest to the real ones for corresponding sports activity. Thus, it is believed that athletes should reach some degree of physical and emotional arousal and consequently they are advised to imagine while being in contact with a specific item related to an action imagined (e.g., a ball, a dart, ski poles, etc) (Mizuguchi et al., 2011).

Finally, specific content and features of mental image should be considered. This approach involves identification of mental image variables, which may be consciously changed by an individual thereby producing one or another kind or degree of effect on performance. Overall, these variables include image timing, modality and perspective.

In Russia, this area was specifically examined in a study by Kaminskiy et al. (2017) who particularly addressed a problem of imagery perspective use at various skill levels. The study involved 54 cross-country skiers (N=54; 40 males, 14 females, Mean age - from 11 to 31 years) with skiing experience from 1 to 24 years. To determine athletes' technical skills level dual-task methodology followed by video analysis and expert technique assessment was implemented. By using cluster analysis, the participants (n = 46) were divided into 4 groups according to

their expertise. The national Olympic-team members (n = 8) were assigned to the fifth group as best-skilled performers. Based on imagery perspective for 11 ski technical elements, groups with predominant use of first-person, third-person or switching perspective were formed by means of cluster analysis. Then cross-tabulation revealed a gradual increase in the frequency of the third-person imagery use along with mastering motor skills, with a subsequent increase in the frequency of the use of first person images among the most skilled performers.

From the theoretical point of view, this can be explained by referring to several concepts of general significance (Bernstein, 1990) or theories developed beyond sport settings (Libby, Eibach, 2011; Vallacher, Wegner, 1987).Summing up all of these, Kaminskiy et al. (2017) came to the assumption that first-person imagery predisposes to adopt a narrow attentional focus, which allows for deeper analysis of an imagined movement. Thus, the beginner athletes might use predominantly first person imagery as an adaptation strategy allowing to focus on the problematic details of imagined actions and selectively improve their execution. After a movement has become automated, there is no need to thoroughly control its elements and athletes more frequently adopt a broad attentional focus, which is believed to be associated with third-person imagery. Secondary rise of first person imagery use is presumed to be attributed to one or more of the following factors: demand to profoundly practice acquired skills, conscious emphasis on strength and speed of imagined movement (all national team members were sprinters), pronounced emotional load and link of imagery with somatic reactions (Kaminskiy et al., 2017).

The authors suggest using first-person imagery at stages of intense motor learning and third-person imagery to facilitate further progress in cases when it is detained by conscious examination of movement structure.

In conclusion, the three-step approach to mental practice described above is an algorithm that can take into account overall research experience in the field of motor imagery use and seems to be universal and easy-to-use both in the practical and theoretical context. The approach has the form of conceptual framework that describes the sequential steps to be made when mental imagery intervention program is designed by a practitioner in the field of sport psychology. Importantly, the framework is supposed to easily absorb further knowledge without changing its basic structure which allows it to serve as a solid connection between research and applied settings. Also, the approach can be implemented in the methodological domain for standardization of mental imagery research in sports by systematically controlling all variables that can influence study results.

A lot of studies (Veraksa et al., 2012, 2016) were conducted with young athletes, aged 5–6 years. The main focus of these works was the usage of iconic and symbolic tools by young athletes in the development of certain motor skills. The formation of a movement can be productive not only in the course of physical activity itself (including those kinds of physical activity that imply active use of attention, memory, etc.), but also in the course of the psychological means acquisition by which this activity is organized. In that case implicit learning approach turned out to be more effective than an explicit one. Results showed effectiveness of the metaphor implementation when working with preschool aged soccer players.

Young soccer players who were taught in an implicit approach (using metaphor) generally exhibited more positive trends than those who learned in an explicit way (using scheme). These results endorse the idea originating in Vygotsky's works that symbolic tools usage is more effective in the case of metaphor learning because a subject needs to split space of symbolic representation from the current situation, which makes the skill more stable afterwords, and is unlikely in the scheme that he or she can implement directly.

CONCLUSION

Challenging the achieved results in sports today requires outstanding training of athletes. Their physical resources are already close to genetically conditioned restrictions. For these reasons, the use of psychological and psychophysiological resources in sports should have significant prospects, with a special emphasis on the diagnostics and development of athlete's cognitive and psychophysiological abilities.

Thus, we see that in Russian psychological science the field of research in sports psychology is diverse. This article represents only some of the segments in sports psychology such as psychological diagnostics and training including perceptual-cognitive expertise and mental skills in athletes (attention and memory, time perception, anticipation and decision making, sensorimotor coordination etc.). Relevant methods of research of sports activities should take into consideration not only the type of sport, but also special professional characteristics of athletes such as position in the team, skill level, status etc. Fast development of innovative approaches and methods in sports psychology (Eye Tracker, EEG, Biofeedback and Neurofeedback) is combined with subjective methods such as mental training.

One of the primary tasks of sports psychology in Russia is to effectively transfer the practice and development of professionally important athletic qualities from the laboratory, to their practical application during real play. This allows us to observe the development of an integrated approach in sports psychology, which is based on the use of objective and subjective methods depending on the professionally significant athletic qualities of a particular sport.

CONFLICT OF INTERESTS

There is not conflict of interests

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