

# Assessing the level of mental skills among young athletes at different stages of physical training in sports radio direction-finding

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## Abstract

**Objective of the study** is to develop mental skills at various stages of the long-term training of young athletes in sports radio direction-finding.

**Methods and structure of the study.** The research was conducted during training sessions involving 95 athletes from the Russian Federation's youth national team in sports radio direction-finding, competing in the young men's, young women's, junior men's and junior women's age groups, including 12 Masters of Sport, 31 athletes holding a first-class rank and the title of Candidate Master of Sport, 41 athletes holding third- and second-class ranks, and 11 athletes holding a youth rank. The athletes were asked to respond to 48 statements, which assessed the level of development of 12 different mental skills on a 7-point scale.

**Results and conclusions.** It has been established that, throughout the entire long-term training process for both young men and junior men, as well as young women and junior women, mental skills – specifically 'self-confidence' and 'anxiety management' – are of the utmost importance.

**Keywords:** athletes, sports radio direction-finding, physical training, mental development, development, level.

**Introduction.** Sport orienteering is a technically demanding sport in which athletes perform a significant amount of mental work whilst enduring considerable physical and emotional strain. In solving the problems that arise during the competition, the degree of development and refinement of mental processes – such as attention, memory, perception, thinking, imagination and the ability to analyse – plays a major role. The abundance of unpredictable situations during the race and the awareness of the significant role of chance in locating radio transmitters require the athlete to mobilise their full potential, above all their mental resources [2, 3].

It is precisely for this reason that the success of psychological preparation carried out during the training process depends on an understanding of the functioning of the psyche as a whole, as well as of mental processes, mental properties and mental state in particular; this ultimately affects the final outcome of

competitive performance in sports radio direction-finding [2].

Mental processes are categorised as cognitive, emotional and volitional. Cognitive processes include sensation, perception, memory, attention, thinking, etc. The manifestation of emotions and volition within mental processes lies in the specific characteristics of the subject's response. Whilst emotional response is a primary (unconscious) form of psychoregulation, volitional regulation is a form of active (conscious) control over purposeful activity [1].

A mental skill is understood as the ability to use cognitive processes to achieve set goals. It is an important element of psychological preparation, the development of which is determined by the ability to manage one's psychophysiological state and mental activity.

However, the current level of development of mental skills among athletes in sports radio direction-find-



ing has not been studied, which makes the topic of our research a pressing one.

**Objective of the study** is to develop mental skills at various stages of the long-term training of young athletes in sports radio direction-finding.

**Methods and structure of the study.** In order to comprehensively assess the level of psychological preparedness, mental skills were identified and an assessment was carried out using the Ottawa Mental Skills Assessment Test (OMSAT) to identify the athlete's strengths in mental preparation (K.A. Bochaev, D.V. Bondarev, L.M. Dovzhik, 2023) [4].

The structure of the test comprises twelve mental skills representing various aspects of an athlete's psychological readiness: determination; diligence; self-confidence; stress resilience; anxiety management; relaxation; mobilisation; concentration; resistance to interference; visualisation; ideomotor skills; planning.

In November 2024, during training camps held at federal sports training centres in Sochi, Kislovodsk and Alushta, athletes of various ages and skill levels took part, which made it possible to determine the level of psychological preparedness characteristic of the various stages of long-term training in sports radio direction finding.

A total of 95 athletes from the Russian Federation's youth national team in orienteering took part in the experiment, comprising the following age groups: junior men aged 17–19 (M19 – n=22), junior women

aged 17–19 (W19 – n=13), boys aged 15–16 (M16 – n=23), boys aged 13–14 (M14 – n=13), girls aged 15–16 (W16 – n=16), boys aged 13–14 (M14 – n=8), including 12 Masters of Sport, 31 athletes holding the Candidate Master of Sport and 1st class rankings, 41 athletes with 3rd and 2nd class rankings, and 11 athletes holding junior class rankings.

The athletes were asked to respond to 48 statements that assessed the level of development of 12 different mental skills on a 7-point scale.

**Results of the study and discussion.** The results obtained during the study using the Ottawa test [4] are presented in Table 1.

In order to clearly illustrate the trends in the development of mental skills at various stages of long-term training in sports radio direction-finding, the research results have been presented in pie charts, as shown in Figures 1 and 2. Analysis of the results showed that among 13–14-year-old boys, the highest scores were recorded for the following mental skills: self-confidence –  $5.4 \pm 1.0$ ; determination –  $5.0 \pm 0.9$ ; anxiety management –  $5.0 \pm 1.1$ . At this stage, mental skills such as visualisation ( $4.9 \pm 0.8$ ) and planning ( $4.9 \pm 1.1$ ) also show fairly high scores. At the same time, boys aged 13–14 do not yet possess sufficient skills to respond adequately to various stressors (stress resilience,  $4.2 \pm 0.7$ ), nor do they possess sufficient skills to maintain or restore concentration in the presence of distracting factors (noise immunity,  $4.1 \pm 0.6$ ) (Table 1, Fig. 1).

Table 1. Indicators of the level of development of throwing skills among boys and girls of various age groups in sports radio direction-finding, standardised scores ( $\bar{X} \pm \sigma$ )

Mental skill	Age group, age					
	young men, juniors			young women, juniors		
	13-14 years	15-16 years	17-19 years	13-14 years	15-16 years	17-19 years
Determination	5,0±0,9	5,1±1,1	4,9±0,9	5,2±0,9	5,1±1,2	5,0±1,0
Hard work	4,7±1,1	4,4±1,2	3,9±1,1	4,3±1,6	4,8±1,2	3,6±0,9
Self-confidence	5,4±0,8	5,6±0,7	5,9±0,3	5,3±1,0	5,2±1,1	5,3±0,9
Stress resilience	4,2±0,7	4,4±1,3	5,0±1,0	3,9±0,5	4,1±0,7	4,5±0,4
Anxiety management	5,0±1,1	5,1±1,3	5,8±0,9	5,1±1,2	5,1±0,8	5,3±1,2
Relaxation	4,6±0,6	4,6±1,1	4,7±1,3	3,8±0,4	4,0±0,8	4,6±0,9
Mobilisation	4,7±0,8	4,9±1,0	5,1±0,9	4,7±0,8	4,7±0,9	4,8±0,8
Concentration	4,4±1,0	5,1±1,3	5,2±1,2	4,5±0,4	4,6±0,5	5,0±0,7
Distraction resistance	4,1±0,6	4,5±1,0	4,6±0,8	3,7±0,9	4,1±0,9	4,0±1,3
Imagination	4,9±0,8	5,1±1,2	4,9±1,1	4,3±0,7	4,7±0,7	4,9±0,5
Ideomotor skills	4,6±1,0	4,5±1,1	4,2±1,3	3,9±1,2	4,3±1,0	4,4±0,6
Planning	4,9±1,1	4,5±1,3	4,4±1,2	4,1±0,9	4,6±1,1	4,6±1,1



Figure 1. The development of mental skills in juniors and young athletes at various stages of long-term training in sports radio direction-finding

Among 15–16-year-old young men, as with 13–14-year-olds, the highest scores for mental skills were recorded for self-confidence (5.6±1.0), determination (5.1±1.1) and anxiety management (5.1±1.3). In addition, there is an increase in the ability to direct and sustain attention on goals and processes critical to achieving results (concentration, 5.1±1.3) and the ability to creatively form and utilise specific motor imagery and images of victory (imagery, 5.1±1.2).

When analysing the data for the strongest juniors aged 17–19, it should be noted that the highest values for both young men and young women are achieved in the mental skills of self-confidence (5.9±0.3) and anxiety management (5.8±0.9). At this stage of training, high scores are also observed for the mental skills



Figure 2. The development of mental skills in junior and young women at various stages of long-term training in sports radio direction-finding

of concentration (5.2±1.2), mobilisation (5.1±0.9) and stress resistance (5.0±1.0).

It should be noted that in the male age groups, a negative trend is observed in the development of mental skills such as diligence (M14 – 4.7±1.1; M19 – 3.9±1.1), ideomotor skills (M14 – 4.6±1.1; M19 – 4.2±1.3), and planning (M14 – 4.9±1.1; M19 – 4.4±1.2).

An analysis of the maximum scores for mental skills in female age groups indicates that these values are significantly lower than in male age groups (Table 1).

The highest scores among young women aged 13–14, as well as among young men of the same age, were recorded for mental skills: self-confidence – 5.3±1.0; determination – 5.2±0.9; anxiety management – 5.1±1.2. Significant scores at this stage for mental skills are mobilisation (4.7±0.8) and concentration (4.5±0.4). Young women of this age do not yet possess the ability to maintain or restore concentration in the presence of distractions (distraction resistance, 3.7±0.9) (Table 1, Fig. 2).

For young women aged 15–16, as in the previous stage of long-term training, the highest scores for mental skills are self-confidence (5.2±1.1), determination (5.1±1.2) and anxiety management (5.1±0.8).

Analysing the indicators for junior athletes aged 17–19, it can be noted that the highest scores are achieved in the mental skills of self-confidence (5.3±0.8), anxiety management (5.3±1.2), determination (5.0±1.0) and concentration (5.0±0.7).

As in the male age groups, a negative trend in the development of the mental skill of diligence is observed in the female groups (F14 – 4.3±1.6; F19 – 3.6±0.9).

**Conclusions.** Throughout the entire process of long-term training, both males and junior male athletes, as well as for female athletes and junior female athletes, are the mental skills that characterise an athlete’s confidence in achieving their goals and the presence of an inner belief in their own abilities (self-confidence), as well as the ability to adapt to situations that cause emotional arousal (anxiety management).

In young male athletes, mental skills characterised by confidence in achieving one’s goals (self-confidence); the ability to cope with stress (stress resilience); the ability to adapt to situations causing deep feelings of excitement, fear and anxiety (anxiety management); the ability to focus attention (concentration); maintaining or restoring concentration in the presence of numerous distractions (distraction resist-



ance) differ significantly ( $p < 0.01 - 0.05$ ) depending on sporting ability. Among girls and junior athletes, depending on their level of sporting proficiency, there are statistically significant ( $p < 0.05$ ) differences in indicators of mental skills: the ability to cope with stress (stress resilience); the ability to purposefully reduce the level of psychophysiological arousal (relaxation); the ability to focus attention (concentration) and to form mental images of sporting victory based on previously acquired experience (imagery). The development of the remaining mental skills does not show a significant correlation ( $p > 0.05$ ) with the stage of athletic training or the athlete's level of proficiency.

The results of the study showed that the development of mental skills is an important element of psychological preparation in sports radio direction-finding, and the assessment of their development is an effective mechanism for managing this process.

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