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The Impact of Functional Ethno Music on the Psycho-Emotional State of Wrestlers

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Abstract.

The work considers identification of physiological mechanisms of music influence on the functional state of human body. The experience of Khomus therapy as a kind of receptive music therapy in sports training organizations is described as an effective way for wrestlers to get into an optimal pre-start condition. The research revealed the specific features of the functional music used in sports. The music should not be too well known. It should be free of specific content and lyrics (if any). It should be unknown to the listener, so that the psychological regulation effect could be achieved with the music rhythm, tempo and tone. The described experiment on the music perception proves that the cardiac rhythm varies considerably, depending on the character of the listened music, as well as physical reactions. Athlete's psycho-emotional state activation or calmness and mobilisation processes are affected by specified music type.

Keywords: training session, music therapy, ethno music, khomus, psycho-emotional state

1. INTRODUCTION

The contemporary training and competition processes do not only involve a high physical load with an increase in activity results. The psychological stress loads are also growing, which sometimes makes the athlete push performance to the limits of his/her capacity. In order to win, athletes should manage themselves, overcome stressful conditions, control emotions, accurately and quickly optimize their psycho-emotional state, and quickly restore their physical and mental performance. In this context the issue of optimization of psycho-emotional state and mental capacity, which are very important in the athletes' training, remain insufficiently studied. Therefore, the psychologists working with athletes intensively develop new methodological approaches, such as psycho-regulation training, auto-training, music therapy, art therapy, etc. and study the correlation between the athletes' ability to self-regulate their functional state and their personality traits.

The music affects the processes of human physical perfection. It is well known that it can have an impact on the vitality and cause changes in blood circulation, respiration and other body systems. People knew that it was possible to influence the human condition with music as early as in the Middle Ages. However, this method has only been systematically used for the last 15-20 years. The term of "music therapy" is of Greek and Latin origin and can be translated as "treatment with music". It is used to treat certain disorders, mostly psychological by nature, both in hospitals and outpatient clinics.

The music therapy theory and practice are now very diverse. The music therapy in European countries, especially in Germany, is highly developed but mostly concentrated on theoretical studies, while in the USA it acquired a steady clinical and empirical foundation. The music therapy was in the focus of research of not only Western specialists but also scientists from Central and Eastern Asia and Russia. First research papers dedicated to the mechanism of the music impact on people appeared in the end of the XIX century and in the XX century. The studies carried out in the last century contain data about the beneficial effect of music on the central nervous system, respiration, blood circulation and gaseous exchange, etc.

2. MATERIAL AND METHODS

Ch. Diserens [1, p. 74], in his book "Influence of Music on Behaviour", referring to a number of psycho-physiological studies carried out by other authors, comes to a conclusion that music positively influences the human psycho-physiological state, boosts bodily metabolisms, increases or decreases the muscular energy, accelerates respiration and decreases its regularity, produces marked but variable effects on volume, pulse and blood pressure, and provides the physical basis for the genesis of emotions.

Blum, Leiserson and Hofstedter [2, p. 110-135] consider that a special role in shaping perceptions and bodily reacting to listening music is played by the hypothalamus, being a bodily regulator of biological rhythms, which should not be underestimated when considering mechanisms of the influence the music and its rhythms have on the listener. According to the researchers, the hypothalamus reacts to the musical pulse in the same way as to any other incoming impulse. Therefore, it positively reacts to the music that complies with the

following requirements: 1) the music should consist of periodically repeating audio patterns. Frequencies of such periods should be different, i. e. simultaneous low-frequency periods and high-frequency periods. This characteristic makes the musical periods similar to the biorhythm periods. 2) The periodic musical structures should be mutually synchronous. When all biological rhythms are synchronized, a person feels great and almost ecstatic.

In the research focused on the music perception, Markhasin and Tsekhanovsky [3, p. 200-215] also commented on a special influence the musical rhythm has on the listener's body. As a result of psycho-physiological experiment, they found out that the cardiac rhythm varies considerably, depending on the character of the listened music. According to the practical findings, the effect was noticeable on the electrocardiogram reflecting the dynamic changes of cardiac function in response to the listened music.

Based on the studies by Brusilovsky [4], Petrushin [5, p.15-18], the following psychological mechanisms of music's positive impacts on health were identified: a) catharsis (emotional release and regulation); b) facilitating self-awareness of personal experiences; c) confrontation with life's problems; d) increase in social activity; e) acquisition of new means of emotional expression; and f) facilitating the formation of new relationships and attitudes.

Medvedeva, Levchenko, Komissarova and Dobrovolskaya [6], Rudestam [7, p. 165-168] suggest the use of music therapy for correcting emotional abnormalities, fears, motor and speech disorders, psychosomatic disorders, deviant behaviour, communication difficulties, etc.

Inozemtseva studied the impact of the rhythm and tempo accompaniment of aerobics classes on the heart rate variability and electro-physiological characteristics of the neuromuscular systems in female students aged 17-20 [8, p. 153-155]. The adaptation mechanisms of the cardiovascular system were studied with the use of cardiointervalography. The state of the neuromuscular system was studied with the method of electromyography. The changes in the functional state of the body led to the improvement of certain cardiointervalography and electromyography indicators.

The studies on the classical music impact on the functional state of people in different occupations [9, p. 69-72] were held with musical pieces of different genres, such as classical music, hard rock and modern trance, techno and drum'n'bass music. Matokhina [9] identified the reduction of the heart rate on average by 5 bpm after 30 minutes of listening to fragments of classical music. Under conditions of the research, 33% of the subjects had the measured indicators of the apparent tension in the functional state of the body before the music perception, and after listening to the music, the tension was reduced. 75% of the research subjects demonstrated changes in the functional state of the central nervous system. It confirms that music can influence the physiological processes in the body, and the analysis of the research findings demonstrates that music has a positive impact on people.

Thus, the search for the data and study and analysis of the information sources identifying physiological mechanisms of music influence on the functional state of organism revealed that there are research papers on the issues related to the impact of various music genres on the functional state of organism among different groups of the population.

The researchers are well aware of such condition as the “muscular joy”: physical activity of a healthy person is always accompanied by the secretion of “hormones of joy” (endorphins) producing a feeling of euphoria.

In the context of our research, the musical accompaniment to athletes' training sessions reinforces positive emotions, which in their turn strengthen the immune system. The ethno music organization of athletes' training sessions with its metric structure helps to create a specific environment for learning, living and creative activities, while maintaining its internal consistency.

The term of “functional music” appeared in the 40-s of the XX century and has been used to denote music accompanying labor activities [10, p. 67-75]. The term of “functional music” (FM) combines two notions: music and function. In the context of music, a function is an activity carried out in a certain system, and its properties can be evaluated through objective evidence – the results of its impact on the practice and the human condition. The “*functional music”* term refers to works of various musical genres intended for a targeted stimulation of the physiological and mental processes in human mental and physical activity. The functional music has a comprehensive regulatory effect on the cardiovascular, respiratory, nervous, muscular and other systems of the body.

The music therapy used in sports has some specific features: the music is combined with specific forms of auto-training aimed at dealing with certain issues of athletes' training. With all that, the psychological regulation effect can only be achieved with the music rhythm, tempo and tone, but not its content that can cause undesirable associations; listening to the music, the athlete should constantly divide his/her attention between the music and the bodily sensations. There are certain requirements to the choice of music: the music should not be too well known, it should not have a specific content, and the text of the piece of music should be unknown to the listener.

The ethno music is based on the genuine (authentic) sound of folk instruments and use of authentic records of folk instruments, such as sounds of khomus – Sakha jaw harp. A widespread tradition of the Sakha people is sampling of the khomus (a folk instrument), throat singing and drums. It is well known that the ceremonial, ritual music is the oldest layer of musical culture. The perception of music as a sacrament rather than pure entertainment lies in the basis of the most popular mass movement in ethnic music. Such music aims at creating a special emotional mood (ecstasy, trance) for communication, as only folk music can so masterfully influence people. The charming sounds of folk instruments, tracing their roots to earlier eras and synchronized with naturally occurring sounds at the inception, are able to influence the listener's psycho-

emotional state, or, as our ancestors said, redouble joy, calm and charm away sorrow, and cure diseases.

The music therapy (khomus therapy) is performed in two main forms: active and receptive. *The khomus is a bowed wrought-iron jaw harp of the Yakut people (Sakha).* The active music therapy (khomus therapy) encompasses active musical activities adapted to therapeutic goals: playing, fantasizing, improvisation on selected instruments in combination with throat singing (human voice). The receptive music therapy is a process of music listening for therapeutic goals. As a kind of the receptive music therapy, the khomus therapy can be performed in three different forms: communicative (joint listening to music aimed at maintaining mutual contacts, mutual understanding and trust), reactive (aimed at experiencing catharsis), and regulative (helping to relieve psychological tension).

The Yakut people were also interested in music therapy. The folk medicine used various psychotherapeutic treatment methods: shamanism, spells, taboos, talismans, self-hypnosis, etc. Nowadays, even the traditional medicine admits that, in the human body, nothing would somehow depend on the mental state. Shamans (a people's spiritual warrior who, after achieving the state of trance, is able to interact with spiritual entities and cure diseases) were very good in distinguishing between the physical and mental causes of the disease. In this context, it should be mentioned that, while healing the patients, a shaman imitated voices of different animals and birds by means of a shaman's drum and khomus play, which warded off evil spirits. Ill people deeply believed in the miraculous effects of those sounds. Khudyakov (Verkhoyansky District) stated that a young shaman girl Jereliÿer (Radiant), who arrived to Verkhoyansk from the Yakutsk District in 1807, performed shamanistic rituals and played khomus, which was beneficial for the emotional uplift among people who had already lost any hope and contributed to their healing and recovery [11, p. 363-364].

The inherent properties of the ethno music contribute to the development of intuitive interpretation of non-verbal signals (gestures, facial expressions, posture, etc.); a sensitive perception of emotions and their causes (empathy); an emotion-stimulated increase in efficiency of thinking (emotional doping); a flexible regulation of own emotions (especially negative ones); a deep understanding of own emotions and emotions of other people; an intuitive knowledge of when and how to express or restrain the emotions; a prediction of the consequences of a particular manifestation of emotions; a deep understanding of the causes of a specific emotion expressed by the conversation partner; a masterly control of the emotional state of the people around; and the ability to elicit sympathy and produce steady positive impression.

The aim of ethno music therapy is to form a positive psycho-emotional attitude after high training and competitive loads, to enhance the mobilization processes, and to get into an optimal pre-start condition. *The objective* of the research was to study the dynamics of psychophysical states in “mobilization” and “recovery” modes while listening to the functional ethno music with the use of national folk instruments – khomus and drums, and the functional ethno music optimization effect on the psycho-emotional state and mental capacity of freestyle wrestlers.

The study involved five 18-22 year old wrestlers, Masters of Sports, from the School of Higher Sports Mastership of the Republic of Sakha (Yakutia). During the experiment some functional ethno music compositions with drums, khomus and throat singing performed by Klavdia and German Khatylaevs (Honoured Artists of the Republic of Sakha (Yakutia), leaders of the proprietary “Törüt dorghoon” Centre of Ethno Music) were played. The music was aimed at mobilization, which is an increase in psycho-emotional tension. During training sessions, the Polar heart rate monitors were used to measure heart rate (HR), and participants were asked to assess their general physical and mental states, activity and attitudes.

Hypothesis: systematic listening to functional ethno music has a positive effect on psycho-emotional stability, increases effective capacity, and helps to relieve an excessive psychophysical stress during training sessions.

3. Results and Discussions

In compliance with the research program, an introductory briefing was first of all held for the athletes and other participants of the psychological experiment. 15 minutes before the start of the experiment, the resting HR was measured in all athletes. The athletes were directed to take a relaxed initial position – lying flat on the back. During the first session, the athletes were asked to listen to the “mobilisation” ethno music, while staying in the initial position; their heart rates were measured after the 1st and 2nd minutes of listening and then measured 1 minute after the music was stopped. During the second, “recovery” session, the HR measurements were taken after the 1st and 2nd minutes of listening and 1 minute after the music was stopped.

Table 1. The research report on the psycho-emotional states of wrestlers during listening to ethno music of “mobilisation”, “recovery”

No.	Surname, name	Resting HR	Mobilization session 1			Restoration session 2		
			1	2	3	2	3	4
			HR, 1 min.	HR, 2 min.	HR after the session	HR 2 min.	HR 3 min.	HR after session 2
1	Ajaal Anisimov	66	60	68	54	49	48	52
2	Maksim Sivtsov	72	76	78	66	67	62	64
3	Diulustan Semenov	71	73	76	69	69	64	64
4	Aysen Gogolev	76	80	84	80	74	62	70
5	Egor Ponomarev	55	48	58	50	47	43	48

As seen in Table 1, the athletes' heart rate metrics in initial positions demonstrate their individual psycho-physiological states. The first session was aimed at “mobilisation” (stimulating music), the second session – at “recovery” (calm, gentle music). In the middle of the session the HR dynamics is obvious, which suggests a positive effect of music on the athletes' psycho-emotional states.

As we can see, slow minor-key music has no proven effect on the psychomotor system among people with strong nervous systems. As a result of the experiment, it was found out that the cardiac rhythm varies considerably, depending on the character of the listened music. Thus, we observed a specific impact of the musical rhythm on the listener's body.

As for the performed music, all experiment subjects, irrespective of their nervous system strength, demonstrated improvement in some of psychomotor measures and worsening of others, while listening to the same music. This implies that the impact of music on the psychomotor system depends on at least three factors: the affected psychomotor measure, nervous system strength and the music content.

As a training session organised in compliance with our methodology is mostly controlled by means of the music meter and rhythm, the physical activity was undulating periodized during the session, which contributed to decreasing the athletes' general fatigability, while maintaining a high motor density of the training session and high enough load intensity of physical activity.

The musical programme is usually compiled with gradual changes in mood, dynamics and tempo, taking into account the psycho-emotional loads. The first music piece is to create the atmosphere and the necessary mood, establish mutual contacts, introduce athletes to a training session, and to prepare them for further listening. The music in this case should be relaxing. The second piece, played on khomus, – dynamic, dramatic, intense – plays the main role. Its function is to stimulate intense emotions, own memories of every athlete, with more time allocated for the discussion of experiences, emerging memories and thoughts of the athletes. The third piece should relieve the strain, create a relaxing atmosphere and give the athletes a charge of vivacity and energy.

In our practical work during training sessions we use folktunes (“osouhaja rhythms”, “degereng rhythms”, “heeje”), as well as “a galloping horse” and “a singing lark” (“sounds of spring drops”, “babbling brooks”, “seagull squawking”, “chirping of birds”) and the “awakening” tunes (“summer rain”, “racing horses”, etc.). Owing to the music, all movements are especially precise, flexible and rhythmic. Moreover, the athletes' posture and coordination of arms and legs are improved, and the running airborne phase is especially prolonged.

The coach asks the athletes to line up, which is the official start of the training session. After some simple drill exercises, the coach or a sport psychologist puts on music to be listened to. In this paper, it is khomus playing (major triad). It musically, rhythmically and verbally sets the exercises to be performed, while moving around the training hall. It is what we name an ethno music organisation of the athletes' training session. An ethno music organisation of the training session is *the alignment of the process of mastering athletes' motor skills with the music meter and rhythm.* The control of individual and group activities in the training space is organized with the rhythmic sounds of drums, folk tunes and ethno music (khomus and throat-singing).

Under the impact of the played music pieces, the people with strong nervous systems demonstrate unidirectional improvements mainly in spatial parameters (though not all of them are significant enough),while the people with weak nervous systems demonstrate changes only in the temporal psychomotoric parameters (again, not all of them are significant). When the fast major-key music is played, the following indicators are meaningfully improved: tempo and rhythmic activity by 5-22%; self-assessment of the general physical and mental state, activity and attitudes by 13-32%.

DISCUSSIONS

Within this study, the indirectly similar studies from another field however were found out about the influence of music on the psyche. These are the studies of the French scientist and physician-otolaryngologist Alfred Tomatis on the discovery of a direct relation between the range of human auditory perception, the range of human voice vibrations, and the level of human health. A.Tomatis developed a special sound recording process called "electronic ear". In this process, the high-frequency then low-frequency components are alternately cut out of the usual sound. When a person listens to such a record, the muscles of his ear are trained by alternating tension and relaxation. Thus, the range of auditory perception is widened and, as a result, many health disorders disappear. A.Tomatis is convinced that if to train the auditory sense by the sound (i. e., the entire apparatus for perceiving and processing the auditory sense), then the person will necessarily expand the range of audible frequencies. This means that it will perceive more sound vibrations from the surrounding world and improve its general health (its "auditory perception" of the world will change; the person itself will change). New external sound vibrations will adjust the health of a person (including its spiritual sphere) on a more subtle level.

Next, for comparison, the work by the Bulgarian psychologist Georgy Lozanov, who invented a method for treating patients by means of musical fragments (fragments from musical works) lasting only 4 seconds, is summarized. In particular, he drew attention to the fact that string music, used in the rhythm of 64-quarter notes per second (rhythm close to human heart rate), is of best help for patients.

According to the estimates of the majority of specialists, it is the rhythm of the musical work that has the strongest impact on the human body. Rhythms of music lie in the range from 0.6 to 1.5 Hz, which is a biologically perceptible frequency, close to the frequency of breathing and palpitation.

Arthur U. Harvey, a professor of music and a therapeutist at the Eastern University of Kentucky (USA),

believes that the classical baroque music possesses the most curative property (by the way, his opinion is shared by many specialists in the field of music therapy). Human heart rate is on the average 68–72 beats per minute, and the rhythm of baroque music (the works by Bach, Handel, Vivaldi, Boccherini, Telemann, Corelli) is close to this value—64 quarters ("beats") per minute. When listening to music created in the Baroque style, human brain and heart adjust to this rhythm, and people involuntarily relax (heart rate decreases). Some researchers argue that the music of this style stimulates alpha waves in the cerebral cortex (i. e., rhythms associated with wakefulness and a sense of tranquility). According to a number of French scientists, Handel's music "stabilizes" the behavior of patients with schizophrenia.

Thus, the influence of music or its frequencies under the guise of vibrations acts on the human psyche. In this work, this is the application of ethnic music with the use of folk musical instruments (drum and khomus).

4. CONCLUSIONS

Summarizing the analysis above, we may come to the following conclusions:

First, our approach is based on the principle of developing the emotional and motor responsiveness to music as a condition of a normal psycho-physiological maturation and rehabilitation of an athlete. Our research and practical work are based on the use of the meter and rhythm structure as a tool of physical training. Actually, the rhythm itself (in combination with the athlete's musical sensitivity) promotes physical and mental development, as well as behavior correction and socialization of the athlete. The pace of the music encourages the athlete to change the speed and amplitude of his movements. The change of music pieces and melodic lines organizes the change in directions. Restructuring of movements contributes to the willingness of changes in psychological flexibility.

Second, the recovery processes are faster if the training session is held against the general positive emotional background and the session itself is organized with the use of metric and rhythmic structures, as well as an undulating system of tasks with transition stages between them. The traditional three-part structure of the athletes' training session **(**preparation, body (content) and conclusion) is kept but changes its form. The session duration according to our methodology varies from 40 minutes to 1.5 hours and depends on the program material and the group preparedness. Usually we start with 40-minute sessions in the first month of training and increase the duration to 1.5 hours by the end of the academic year. The training sessions are held 2-3 times per week in the evening, and the young athletes attend the training sessions after classes.

Third, the research findings reveal that the music therapy is accompanied by changes in a number of the measured parameter sand optimization of psycho-emotional state and mental capacity of athletes during training sessions. The athletes get less tired and perform more efficiently when listening to music during training sessions rather than training without musical accompaniment.

Hence, selecting music pieces of a certain mode, harmony, meter and rhythm, one can cause certain physical reactions and activate or calm activity of the athlete. This study has allowed determining what role the method of music therapy (khomus therapy) can play in the structure of sports activities; test the method with a group of wrestlers; and to identify possible ways for further development of this trend in sports psychology. It is believed that physical exercises are well combined with the *music therapy*, which helps to cope with the stress and negative experiences, causes distraction and promotes a positive mood for the upcoming competition, because the folk music and folklore are those foundations that connect any person with the native people, history and culture and the entire spiritual world of the personality.

REFERENCES

[1] Diserens, C. (1983). *Influence of Music on Behavior*, Moscow: Moskovskaya Konservatoriya;

[2] Blum, F., Leiserson, A., & Hofstedter, L. (1988). *Brain, Mind & Behavior, (Ye. Godina, Trans.)*, Moscow: Mir

[3] Markhasin, V.S. and Tsekhanovsky, V.M. (1987). *Eksperimenty po vospriyatiyu muzyki v aspekte fiziologii. Tvorcheskiy process i hudozhestvennoe vospriyatie* [Experiments on Music Perception in Terms of Physiology: Creative Process and Art Perception]. Moscow: Nauka

[4] Brusilovsky, L.S. (1988). *Muzykoterapiya*: Rukovodstvo po psihoterapii, *Music Therapy Guidelines for Psychotherapy*, Moscow: Pedagogy

[5] Petrushin, V.I. (1999). Muzykalnaya psihoterapiya [Music Psychotherapy], Moscow: Vlados.

[6] Medvedeva, E.A., Levchenko, I.Yu, Komissarova, L.N. and Dobrovolskaya,T.A. (2001). Artpedagogika i artterapiya v muzykalnom obrazovanii: ucheb. dlya stud. sred. i vyssh. ped. ucheb. zavedeniy [Art Education and Art Therapy in Music Education: Textbook for Students of Pedagogical Colleges and Higher Education Institutions], Moscow: Academy

[7] Rudestam, K. (2006). Experiential groups in theory and practice. (2nd ed.), St. Petersburg: Piter Kom

[8] Inozemtseva, Ye.S. (2012). Vliyanie ritmo-tempovoy struktury zanyatiya po aerobike na pokazateli variabelnosti serdechnogo ritma i elektrofiziologicheskie harakteristiki nervno-myshechnoy sistemy studentok [Impact of Aerobics Rhythm and Tempo Structure on Parameters of Heart Rate Variability and Electrophysiological Characteristics of the Neuromuscular System in Female Students]. *Psychology and pedagogy*, 5, 153-155.

[9] Matokhina, A.A. (2013). Issledovanie vliyaniya klassicheskoy muzyki na funkcionalnoe sostoyanie lyudey razlichnyh professiy [Studies on Classical Music Impact on the Functional State of People in Different Occupations]. *Grani poznaniya*, VGSPU, 2 (22), 69-72.

[10] Goldvarg, I.A. (1971). Muzyka na proizvodstve, *Music in Industrial Environment*, Perm: Knizhnoe izdatelstvo

[11] Khudyakov, I.A. (1969). *Kratkoe opisanie Verhoyanskogo okruga* [Short Description of Vekhoyansky District]. Leningrad: Nauka.