

## Phonation Stimulation of Cognitive Processes as New Idea of Neuro-Pedagogical Innovation

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### ABSTRACT

The current work presents a new innovative technique of stimulation of cognitive processes for people who willing to be trained and increase reserves of healthy people who were in the intensive mental or physical regime or in the physical activities by means of phonation (voice) exercises. In the following article, the authors describe the basic principles of the technique. In this article, the authors describe the basic principles of the technique. In this article may be interested people, whose activities are connected with the necessity of assimilating and processing large amounts of information, experiencing high mental or physical activity. That can be scientists, students, teachers of higher educational institutions, etc.

**Keywords:** Cognitive technology; Innovation; Mental stimulation; Phonation exercises; Vocal exercises; Vocaloid; Educational technology

## INTRODUCTION

Phonation as a phenomenon that is specific to living beings carries with it the functionality at the level of instinct which is regulating the animal world and the human world in its many dimensions: Scream-protection against an attack, scream-the danger warning, scream-a call similar.

Phonation occurs right from the moment when baby is coming out to this world. A cry that a newborn baby does right from the moment of birth when born is already means a lot and carries a lot. The cry of an infant is one of the criteria included in the scale developed by the outstanding American physician-anesthesiologist, Virginia Apgar to assess breathing, and in conjunction with other criteria (such as muscle tone, heartbeat, skin color, reflex irritability), and general condition of the newborn [1-9]. This scale developed more than half a century ago, used worldwide by neonatologists, obstetricians and pediatricians every day in their practice. The cry of a newborn always sounds like music to the ears of the obstetrician-gynecologist who helps during the childbirth, as it suggests that the born child has successfully taken the first step on the way to adapt to completely new conditions of existence.

## MATERIALS AND METHODS

In uterus, the fetus is surrounded by fetal membranes and is found in amniotic fluid, whose role is also extremely important for the formation of the fetus. Since the fetus in the womb does not breathe, it gets the oxygen which is necessary for life, from the mother's bloodstream through the placenta and from the special qualities of their own blood (in particular, the presence of fetal hemoglobin having a much greater affinity to oxygen), is inherent only in the antenatal period of development. The lungs are found to be in collapsed condition, in case the air (oxygen) does not reach in the lungs of the fetus. By immersing in amniotic water, the fetus can swallow, aspirating them. This condition of the fetus is naturally, the presence of amniotic water in the respiratory tract of the fetus is normal and physiological [10].

But everything changes at the moment of birth, and the newborn no longer receives oxygen from the mother's blood and is forced to use the breath that he had not used previously by the lungs. So the first cry of a baby has important physiological functions the evacuation of fluid from the respiratory tract and smoothing the lungs for future respiration.

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Of course, the first cry of a newborn can definitely be considered as a reflex act, but beside it its purpose, is also to search mother and attract her, awakening her maternal instincts-the one who must provide food and care: Indeed, in a defenseless condition he cannot do that. So together they begin to act, first more on instinctive terms, physiological and socio-psychological functions of phonation.

Further the role of sound in the formation and development of the child only increases. The brain constantly receives information from different analyzers which are the organs of sight, taste and smell receptors, skin receptors, proprioceptors, but from the first minutes of life the child starts to make his own attempts to communicate by voice, first is the screaming, crying, and then goo goo, and after some individual words and small sentences. From birth until the last breath, man constantly uses voice in their lives.

Even in the animal world, phonation is of a purely utilitarian value, but also a way of expression. Even animals proclaim their emotional state by the sound of the voice. But man as part of nature uses this gift of nature much extensively. The voice is the basis of speech, language, development of culture and art; It becomes a musical instrument, the most important communication tool.

However, despite the fact that the need for the voice of the representatives of the musical genre has been positioned mostly as a purely aesthetic attractiveness of the singing and of phonation in General has, including the Foundation of applied, functional properties. People used music and singing for different purposes since ancient times. About the functionality of singing were written first time in the Old Testament-the Book of Samuel. Young David lives in unexplained bouts of rage of King Saul by singing and playing the cithara. Even in the mythology of the ancient Greeks, wasn't by chance that Asclepius, the patron of healing, was the son of Apollo-the patron of the arts. Thus, starting from the myths of ancient Greece the symbolic connection between art and medicine emphasized.

Plato's ideas associated with music therapy also were known. In his opinion, the rhythms and modes influence on idea making it consistent to itself. After Plato and Pythagoras's ideas about the influence of art on human, Aristotle developed the same idea in his doctrine of catharsis-the concept of purification of the human soul in the process of perception of art. He indicated the meaning of purification (catharsis), it's like the elimination of the unbridled pathos, subjective violence, and it is a tool that updates, moral attitudes, when individual isolated in his pain from life of society rises apart from his private oneness to universality, identifiers with the life and aspirations of the society [1].

Music therapy was used in ancient China as well. In the "book of changes" you can find a specific music tone that matching to one of the human organs. Music harmony in Chinese music is called the pentatonic scale and is based on five tones corresponding to five elements of nature (earth, metal, wood, fire, water), which in its place correspond to five human organs (spleen, lungs, liver, heart, kidneys). Music and vocal

creativity were used from people all over the world from old times for the purposes of healing [4]. Traditional shamanism of the peoples from the North, Russian folk music and folklore, aimed at the expulsion of diseases.

## RESULTS AND DISCUSSION

In Russia under the initiative of V. M. Bekhterev in, was founded the Committee for the researches of music therapy effects, which included a number of prominent doctors and representatives of music world. B. M. Bekhterev et al. made special researches which showed a positive effect of music on various systems of the human body: Cardiovascular, musculoskeletal, respiratory, central nervous [8].

Nowadays that direction of medicine called music therapy and vocal therapy accepted and successfully developing worldwide. Basic research on vocal therapy belongs to Shushardzhan SV, et al. He developed methods of treatment of various pathological conditions of the body by means of vocal therapy. According to his research, only 20% of the vibration and sound energy vote falls into outer space. 80% of the energy is "voiced" our body. According to the researches of Shushardzhan SV, et al. this vibrational energy is able to normalize functional disorders of various organs and systems of the body [7]. In our article we do not mean a pathological condition or sick people. We are interested in increasing reserves of healthy people, but in the mode of intense mental or physical activity. Phonation in its physiological basis contains the mechanisms to mobilize additional reserves. Consider one of the many anatomical and physiological mechanisms improving the body's reserves and State of health of the singing person. It deals with gas exchange as the alveolar and plexus. While singing in the chest cavity occur pulse air pressure increase that fills the lungs. That helps to optimize gas exchange in the alveoli and the capillaries in combination with the sound vibration. Blood gets oxygen from the alveoli faster and more efficient. In this way in the blood forms a reserve portion of oxygen. In further way enriched with oxygenated blood comes in tissues and organs, undergoing oxidation processes. At this stage sound vibration wave spreading along the whole body, improves circulation, and at the most important level: At the level of capillaries in tissues and organs. The vibration waves, shaking the walls of the capillaries, prevent the formation of conglomerates of red blood cells, which can be formed place by place. Thus there is normalization of blood microcirculation, metabolic processes, but in the tissues and organs.

It should be noted that in a number of these bodies there is also the human brain. But if the person is a student who carries a lot of information in the brain in this case we can talk about phonation stimulation of mental activity as an innovative technology in the field of education.

Athletes also use phonation at the peak of exercise. Also it's not accidental that soldier's on the march are relaxing by singing combatant songs. The applied purpose of vocal music can express not only medicine, but also psychology and sociology, botany and zoology, sports, trade and marketing, organization and optimization of work. But we are interested in the

possibility of its application in education as well. In Table 1, it was given the classification (Levi) relating to the use of music and singing at different levels and with different goals.

The level of impact	Purpose of use
Biological	Mitigation of physical discomfort, decrease of pain; Influence on various physiological processes (circulation, respiration, internal secretion, immunity, etc.) Disease therapy, enhancing the effectiveness of different treatments for complex use
Psycho-physiological	Overcoming the monotony of the stimulation organs of senses. Increase physical performance. Improving the functions of perception, attention, memory, sensorimotor reactions, increased wakefulness, overcoming drowsiness, relaxation, acceleration of falling asleep.
Psychological	Improvement of mood, creation of positive emotions (timogen function) Anxiety reduction, distraction from unpleasant thoughts (anksiolitical function), getting rid of boredom or satiety of any activity Identification and abreaction-external expression of the accumulated emotions (catharsis), the change of state of consciousness, creating a sensation of immersion in "another reality"
Value-sense	Excitement of implementing any activity, the ability to summon enthusiasm, etc Formation of ideology, values, personality orientation, the development of moral qualities
Socio-psychological	Improving communication ability, enhancing sociability, overcoming symptoms of autism, cohesion, combining collective people, improving their relationship, influence on the behavior of large and small groups.

**Table 1:** The possibility of using music and singing in the fields, not directly related to art.

If we delete everything that is not connected with education or student activity in this Table 2, then the table of phonation stimulating opportunities in the field of education will look this way-

The level of impact	Purpose of use
Biological	Influence on various physiological processes (circulation, respiration, internal secretion, immunity, etc.)
Psycho-physiological	Overcoming the monotony of the stimulation organs of senses Increase physical performance Improving the functions of perception, attention, memory, sensorimotor reactions, Increased wakefulness, overcoming drowsiness
Psychological	Improvement of mood, creation of positive emotions (timogen function) Anxiety reduction, distraction from unpleasant thoughts (anksiolitical function), getting rid of boredom or satiety of any activity. The change of state of consciousness, creating a sensation of immersion in "another reality"
Value-sense	Excitement of implementing any activity, the ability to summon enthusiasm, etc The development of moral qualities
Socio-psychological	Improving communication ability, enhancing sociability, overcoming symptoms of autism

**Table 2:** The possibility of applying musical phonation stimulation in education.

If we continue talking about education, then surely phonation stimulation of mental activities could find their place in high school and in its educational process, in the state associated with the development of large scope of educational information, accompanied by physical and mental exhaustion. Forms of such stimulation may be different. The first and most attractive form is the systematic training of students in vocal or choral student associations or in the form of individual lessons. That time the healing power of phonation and art will unite and reinforce each other the, ennobling both the soul and body.

The subject is about to increase the number of choirs. That would diversify creatively and would enrich student life emotionally. Here would be worth to bring the positive experience of National Research Nuclear University (MEPhI) Russia, where gorgeous male choir has existed almost from the very beginning. Singing won't be bad for Physicists. It is shown that the choir students have good educational quality in school as well, and the university itself is one of the few national universities that have achieved a worthy place in the international academic rankings.

Every university, college, school could have its own choir. They must be prepared purposefully [5]. The thing is that vocal lessons only then bring stimulating effect, when the singing is complete

organic and physiologically, the work of the larynx is not accompanied by painful sensations, ("free" the larynx), the breathing is performed with the active regulatory functions of the diaphragm. The methodology of such formulation of voice own only vocal-choral conductors professional which not every university can prepare [3].

## CONCLUSION

Another possibility is a specialized phonation complexes, adapted for use in educational process of educational organizations that implement programs of various educational levels (CCA, SSE). Education as a cognitive system is able to perceive and assimilate innovations flexibly. Such systems need to be developed and actively implemented in the educational process. Phonation mental stimulation is also possible in the form of stage readings, rhetoric. Vocal installation of stage professional theatrical recitation similar to singing, which brings not less effective results for the relief of mental and physical stress, exhaustion of activation for educational activity. Phonation stimulation for mental activity is also possible in the form of games workshop with the use of different phonemes in different pitch.

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