

# MUSIC THERAPY AND VIDEO TRAINING AS METHODS OF DEVELOPMENT OF INTELLECTUAL ABILITIES OF 5–7 YEARS CHILDREN

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## ABSTRACT

**1. Background.** Modern researches in the field of psychology of music show us that listening to the music influences on general child's development, on the processes of emotional sphere forming or intellectual sphere developing.

**2. Aims.** The main aim of our research was to figure out the influence of music therapy and video training on the development of intellectual abilities and intellectual operations of 5–7 years children. In the research took part 30 children (15 – correctional group and 15 – control groups). The research was conducted in 2001–2002, kindergarten < 5, Minsk, Belarus.

**3. Methods.** During the research *Edinburgh Pictures Test* was used to find out the level of development of intellectual abilities (before and after music therapy) and as therapeutic methods *films* “Baby Mozart” and “Baby Bach” were used. The statistical analysis was carried out in STATISTICA (Wilcoxon Test).

**4. Results.** As a result we find out that in correctional group intellectual abilities' levels were  $IQ_{med} = 113,2 \pm 2,6$  (*before therapy*) and  $IQ_{med} = 118,4 \pm 2,3$  (*after therapy*). So, among 15 children – 14 showed the growth of intellectual abilities. We found positive changes ( $T = 11, p = 0,005$ ). In the control group intellectual abilities' levels were  $IQ_{med} = 97,3 \pm 1,9$  (*first test*) and  $IQ_{med} = 99,9 \pm 2,4$  (*retest*). Among children in the control group the range of the results was wider, so we didn't find the positive change ( $T = 40, p = 0,25$ ).

**5. Conclusions.** Our data allow us to make a conclusion that music therapy and video training give positive results. So, they can be applied in the kindergartens for the development of intellectual abilities of children alongside with traditional developing exercises.

## 1. INTRODUCTION

At present, the research on the problems of the intellect, intellectual abilities and intellectual operations has been conducted by the two major schools of thought: testiological and experimental-psychological. These two trends are characterized by the tendency to explain the nature of intellect and intellectual operations “*outside*” intellect through various non-intellectual factors.

In our research we view *intellect* as a combination of cooperating components of its “*nucleus*”, defined as the system of intellectual operations (S.L. Rubinstein, 1946). We understand *the system of intellectual operations* as the order determined by a systematic arrangement of parts (separate intellectual operations: comparison,

the analysis, synthesis, classification, and generalization) in the system as a whole, determined by interrelations of these parts.

At the preschool age, when a child gains social experience, masters knowledge and various kinds of activities as well as the norms of moral behaviour, the initial formation of specific mental qualities occurs in his personality. These include logic, memory, creative imagination; the significant expansion and deepening of intellectual abilities content of a child is also observed. At the same time, particular undeveloped of intellectual abilities or intellectual operations do not allow the child to seize knowledge of certain depth and degree of complexity. The development of intellectual abilities and interests of a child is the main task of the psychologist's developing work.

Agreeing with L.S. Vygotsky's (2000) opinion that training of a child organized in a proper manner leads to the maturing of a child's intellect, we believe that the developing work aimed at the development of intellectual abilities of preschool children, can specifically influence the process of their intellectual activity development. Transfer to a real life of the positive experience received by a child during correctional training is only feasible under condition that the partners of the child in this practice are ready to accept and realize new ways of dialogue and interaction with him. Mobilization of driving force of a child's development occurs when he feels that the adult believes in him, trusts him, and includes him in the solution of more and more difficult tasks and challenges (T.V. Senko, 1998). Intellectual abilities formation is a very complicated process with specific peculiarities at each age stage. It is closely connected with the development of child's interests, self-estimation of his own success in this or that particular activity. Undeveloped abilities and interests lead to under-development of personality.

The essence of developing work methods devoted to the intellectual abilities development of 5–7 year-old children by means of combining video training with music therapy lies in formation of a harmoniously developed adoptive personality.

As demonstrated by numerous researches, listening to the music renders positive influence on the general child's development: it forms his emotional sphere and develops the intellectual sphere (N.N. Zaharova & V.M. Avdeev, 1982, S.V. Shushardzhan, 1998, O.P. Radynova, 2000, F.H. Rauscher & G.L. Shaw, 1998).

Thus, N.N. Zaharova & V.M. Avdeev (1982) studied functional changes in the central nervous system of those who perceived music, by recording examinees' electroen-cephalogram with simultaneous registration of their coetaneous-galvanic reactions. The results of the study testified to a change of an excitation stream in their cortical-thalamic and cortical-limbo circles.

Deeper positive emotions caused by listening to a certain piece of music were accompanied by more frequent heart contractions and breathing, changes in EEG, meaning the rise in the brain cortex activity.

The S.V. Shushardzhan's (1998) study proves that emerging reactions of acoustical adaptation generate the certain associations, the aesthetic experiences that actively influence psycho-emotional state of the person. Emotions, which dynamics always bring certain hormonal and biochemical changes, indirectly influence metabolism rate, the tone of a brain, and blood circulation. The variety of physiological reactions caused by musical-therapeutic influences, can be explained primarily by the complex mechanism of acoustic reception. Music as the physical phenomenon represents a certain set of sound signals in each particular case. Perception of sound signals is relatively divided into acoustic and vibro-tactile components. The acoustic component of reception is realized by an acoustic analyser and provides perception of acoustic signal frequencies from 16 up to 20000 Hz. Thus, sounds of music are perceived and then pass through a very complicated processing in an acoustic analyser in brain cortex.

O.P. Radynova (2000) in her research states that music has the nature of intonation similar to speech. Music and speech have a lot in common. Musical sounds, as well as speech, are perceived by hearing. Intonation patterns in speech are conveyed with the help of tempo, timbre, dynamics, pitch height, stresses, and pauses. Therefore, expressiveness is always inherent in music. During correctional training with preschoolers the dynamics of their productive activity has been noticed. Through combined video training and music therapy self-comprehension occurred, feelings, emotions, and ideas have been developing. Listening to music, developing music ability, that is the ability to hear and reproduce a melody pitch, imply progress and are based on such intellectual operations, as comparison, the analysis, and generalization and, therefore, lead to the development of child's intellectual abilities. Newness of a situation while music is being played helps a child to cope with the developing material and also enhances group dynamics, develops empathy and positive emotions.

X. Leng & G.L. Shaw (1991) proposed that exposure to music might excite the cortical firing patterns used in spatial-temporal reasoning, thereby affecting cognitive ability in tasks that share the same neural code-spatial-temporal tasks. Tasks requiring spatial recognition, the researchers suggested, should not be affected by music exposure. The Mozart effect (lasting approximately 10 minutes) further supports the model, suggesting that listening to music helps to "organize" temporarily, the cortical firing patterns for spatial-temporal processes.

Further analysis of the data from F.H. Rauscher, G.L. Shaw, & K.N. Ky (1993) supports the argument that listening to music affects only spatial-temporal tasks. F.H. Rauscher & G.L. Shaw (1998) also marked that researchers, who are exploring the Mozart effect, should carefully consider questions of task validity and experimental design. Other factors such as the subjects' age, musical training, preference for the exposure condition, and aptitude for the task may also play a role.

## 2. METHODS OF INTELLECTUAL ABILITIES DEVELOPMENT

In our research *music therapy* and *video training* were used as methods of intellectual abilities development. During the research *Edinburgh Pictures Test* (1985). was used to find out the level of development of intellectual abilities (M.O. Aleksandrovich, 2001). As therapeutic methods *music* by V.A. Mozart and I.S. Bach and *films* "Baby Mozart" and "Baby Bach" (The Baby Einstein Company, 2000) were used. The statistical analysis was carried out in STATISTICA.

The purpose of the developing work in our research is the development of intellectual abilities and improvement of the level of intellectual operations, elimination of cognitive activity lack, overcoming failures in solving intellectual problems, and also the development of various logic thinking forms of the preschool children.

Through the analysis of psychological basis for the intellectual abilities development process of the preschool children, we have allocated the following methods as fundamental for correctional work: music therapy, video training. In setting the goals for the developing work we relied on the approaches of L.S. Vygotsky (2000), T.V. Senko (1998), F.H. Rauscher & G.L. Shaw (1997).

The developing work has been conducted *in four stages* presented as follows:

- defining the purposes, tasks, and tactics of the developing work on the basis of correctional group testing;
- determining the content of the developing work;
- setting up conditions for carrying out the developing work, counseling parents, informing tutors and administration about the intended developing work;
- developing work realization, conducting developing training with children, the check up of dynamic changes and evaluation of developing work efficiency, informing tutors and administration about the results of the developing work.

The following *tasks* have been set forward for the research:

- correctional tasks – to improve the level of the intellectual abilities and of separate intellectual operations, to overcome difficulties in solving intellectual problems;
- preventive tasks – to foresee and prevent the difficulties in solving intellectual problems;
- developing tasks – to optimise and stimulate the cognitive activity.

The developing work in our research has been organized and conducted leaning upon the *main principles of psychological*

correction (T.V. Senko, 1998), which suggest that personality is a complete structure. Among these principles are the following:

- the principle of systematic correctional, preventive and developing tasks;
- the principle of diagnostic and correctional unity;
- the principle of prioritised correction of causal type;
- the principle of active correction;
- the principle of integrated methods of psychological affect;
- the principle of involvement of the closest social circles.

The system of developing work with children has been based on a combination of music therapy and video training. The combination of video training and music therapy targeted the intellectual abilities development of preschool children, their internal conflict resolution and also intended to stir their creativity and mental potential.

The work was constructed on the basis of a combination of various activities like motion, drawing, music, improvisation, and stimulated personal growth of a child, his mental development and health improvement. The purpose of video training in our research was to prompt the cognitive activity, intellectual abilities and intellectual operations development of the preschool children. During the children's activities the music by W.A. Mozart [[First movement Sonata No 15.mp3](#)] and J.S. Bach [[Brandenburg concert 2.mid](#)] was being played. The choice of the childrens' activities and games was determined by the films "Baby Mozart" and "Baby Bach" themes. These films also contained particular pieces of music adapted for a young listener.

The film "Baby Mozart" contained: Fanfare themes from The Magic Flute; Piano Sonata in C, K 545; Piano Sonata in C, K 330; Variations, K 265/300e; Concerto for Flute and Harp in C, K 299; Piano Sonata in A, K 331; Piano Sonata in C, K 545; Sonata in D for Two Pianos, K 448; Divertimento No. 17 in D; Piano Sonata in B flat, K 570; Piano Sonata in F, K 533; The Magic Flute, K 620, Papageno Arias; Symphony No. 41 in C, K 551.

The film "Baby Bach" contained: Fanfare based on theme from Toccata in D; Minuet in G from Anna Magdalena; Brandenburg Concerto No. 5, BWV 1050; Jesu, Joy of Man's Desiring, BWV 140; Brandenburg Concerto No. 4, BWV 1049; Toccata in D; Cantata No. 140, BWV 140; Brandenburg Concerto No. 2, BWV 1047; Flute Sonata in Eb, BWV 1031; Minuet in G from Anna Magdalena; Orchestral Suite No. 3, Air, BWV 1068; Goldberg Variation No. 1 BWV 988; Goldberg Variation No. 4 BWV 988; Goldberg Variation No. 30, BWV 988; Goldberg Variation canon.

## 2.1. Results of Developmental Work

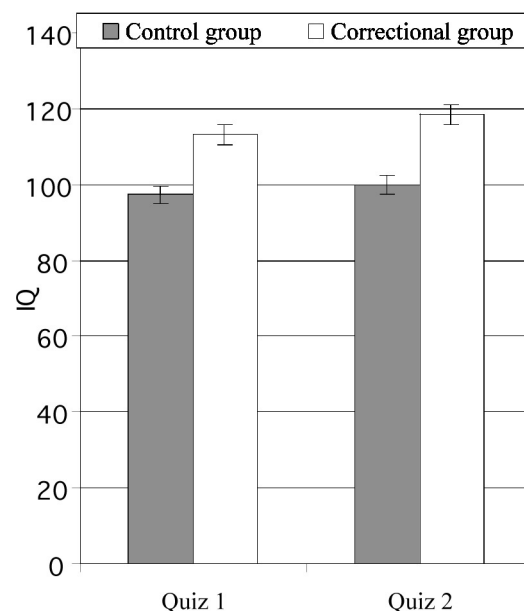
After the first quiz aimed to evaluate the development level of intellectual abilities in the correctional and the control groups

the following results have been obtained. In both the control ( $IQ_{med} = 97,3 \pm 1,9$ ) and the correctional ( $IQ_{med} = 113,2 \pm 2,6$ ) group the general development level of intellectual abilities came to average.

The repeated quiz after the completion of the developing work revealed, that the average development level of the intellectual abilities in the correctional group has made up  $IQ_{med} = 118,4 \pm 2,3$ . Fourteen out of fifteen preschoolers showed development of the certain intellectual operations.

After the repeated quiz in the control group the following results have been obtained  $IQ_{med} = 99,9 \pm 2,4$ . Preschoolers showed large individual diapason of the development of the certain intellectual operations.

The comparison of the development level results of the intellectual abilities of both control and correctional groups are demonstrated at the figure 1.



**Figure 1:** The development level of the intellectual abilities in the control and the correctional groups "before" and "after" the developing work.

Then, the Wilcoxon's *-criterion* has been calculated for the correctional group. It clearly demonstrates a significant natural shift in the development level of intellectual abilities as well as of the level of separate intellectual operations. The results speak of a positive change in the correctional group, hence, proving the developing work productive (table 1).

Variables	Sample volume	Wilcoxon, <i>T</i>	<i>Z</i>	<i>p</i> -level
$IQ_1$ & $IQ_2$	15	11.0	2.78	0.005

**Table 1:** The parameter of Wilcoxon's *p*-criterion for comparison of the development level of the intellectual abilities of children in the correctional group.

The correctional group showed positive changes in the development level of intellectual abilities and intellectual operations. In the control group a positive shift was also visible. However, in this group the individual estimates vary considerably and changes in the development level of some intellectual operations take both upward and downward turns. Nevertheless, the productive component in the model structure of the developing work indicates that the goal has been reached, and confirms efficiency of the program for further use in preschool establishments.

### 3. SUMMARY

The results of psychological developing work indicate that combined video training and music therapy can be used as the principle methods for intellectual abilities and intellectual operations development of the preschool children.

The results analysis of the developing work aimed at both the intellectual abilities and intellectual operations development and overcoming failures in solving intellectual problems has shown a positive natural shift in parameters of the development level of separate intellectual operations (Wilcoxon Test,  $T = 11$ ,  $p = 0,005$ ) and in the intellectual abilities level (before the training  $-IQ_{med} = 113,2 \pm 2,6$ , after the training  $-IQ_{med} = 118,4 \pm 2,3$ ).

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