

**MUSIC AND HUMAN MOBILITY  
REDEFINING COMMUNITY IN INTERCULTURAL CONTEXT 2016**

Guest edited by Maria de São José Côrte-Real & Pedro Moreira

“Henri Coandă” Air Force Academy Publishing House

**MEMORY AND LEARNING: EXPERIMENT ON SONATA KV 331, IN A  
MAJOR BY W. A. MOZART**

**Stela DRĂGULIN\*, Claudia-Ligia ȘUTEU\***

\*Faculty of Music, Transilvania University, Brașov, Romania

***Abstract:** The brain is the most complex object studied. Musical research results showed that classical music could improve spatial-temporal abilities. Music written by great composers is used in order to cure disorders and develop the brain. My experiment presents the very well-known Sonata KV 331, in A Major, including the third part – Alla Turca in a minor, as a background for a thirty minutes logical test. There are two groups, each one containing 5 people. During this test, the first group will listen to the piano sonata while the second one will solve it in complete silence. As many studies showed, music helps the brain to function better. Music activity involves every part of the brain and improves it temporarily. Of course, if such a music therapy is constant, it can get to permanent improvements. This experiment involve a temporarily situation, in which classical music helps the individual to concentrate better and to focus on the final goal. It is surprising what a song can do, but the group that solved the test in complete silence was far more slowly that the one that was accompanied by music. Experiments like this one and the therapy with music play an important role in increasing the brain mobility but also in helping movement rehabilitation. Music can bring down blood pressure and this can lead to reliving the muscle tension. In what concerns listening to classical music and solve a logical test, the results were significantly better for the group that listened to Mozart, the written exam being finished earlier and exam’s grades being higher.*

***Keywords:** brain improvement, piano sonata, memory and learning higher skills*

## 1. INTRODUCTION

Rauscher, Shaw and Ky (1993) claimed that brain reacts to classical music, especially when it comes to young and middle-aged people. Performances of any kind are highly improved if the subjects were listening to this type of music. As many studies reveal the qualities classical music, this article would demonstrate the power of it, piano sonata KV 331, in A Major, written by W. A. Mozart being listen to, before a logical test. Classical music should not be used instead of learning and educational practice, but as a method of improving the brain functions and also a way to enhance the spatial-temporal reasoning.

IQ tests demonstrate that after listening to classical music, there is a temporary improvement of spatial-reasoning, highly bigger than sitting in silence, in the same period of time, or reading.

There are many studies that prove the benefits of classical music, one of the explanations being the aspect of music’s vibrations. “The secret is in the vibrations of music, which penetrate everything

– including the water, the sewage and the cells”. The present investigation tries to show the contributions of the great composers’ music and the differences between two groups of students, whom results are compared after a solving a logical test in a session of listening to a piano sonata by Mozart and an equalled period of time of resolve it in silence. The subjects rated their elicitation and mood and the test’s results showed the differences between the two groups.

## 2. METHODOLOGY

**2.1 Participants.** There were used 10 students (20 to 23 years of age). Participants came from Faculty of Music in Brașov and had almost the level in what concerns grades during the whole semester.

**2.2 Apparatus and Stimuli.** The entirely piano sonata KV 331, in A Major, including the well-known third part – Alla Turca, composed by Wolfgang Amadeus Mozart, was played by a laptop, with professional external speakers, in order not to affect the quality of music. The

recording was performed by a student at the Faculty of Music in Braşov. The control condition for the first group, formed by five students, consisted of listening to the entirely sonata, put on repeat, to cover 30 minutes for the logical test. The test had 15 logical problems, with graded levels. They listened to the first movement, in A Major. The opening movement is a theme and variation and the *tempo* marking is *Andante grazioso*. The second movement of this piano sonata is a minuet and a trio in A Major. The minuet is 40 measures long and the trio is 52. The third movement, Alla turca, is one of the most popular pieces of all times, being also known as *Turkish March*.

The second group had to solve the test in silence for the same period of time. There were used two separate rooms for each group, 10 chairs, one for each participant, the experiment being simultaneously developed. The chosen moment for the experiment was a short period of time – 30 minutes. Before this period of listening and resolving the problems or solving the test in silence, they were waiting another 5 minutes and after this, the examination papers were being given. All participants had the same subjects for this test and the maximum time for solving it was 30 minutes. There were 15 questions, from a lower level to an advanced one, including little puzzles and questions that require logical thinking. The logical exercises were the ones used in IQ tests (See Figure 1). The participants were being chosen in order to be nearly equally, in what concerns the level. The average medium of these students is between 9.50 and 9.75, during the last semester.

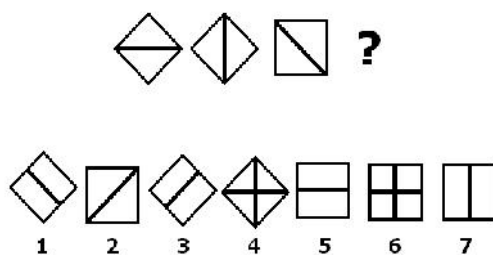


Fig.1 Example of one type of exercise used in the logical test, in this experiment, this being a very easy one.

The time in which every subject finished the test, was written on a paper, in order to be compared. The tests were quickly graded by a professor who didn't know the name of the students. Participants also provided a global rating of mood, elicitation and power of concentration, on a scale from 1 (weak) to 5 (strong).

At the end of this test, the grades, the speed and the participants' rating would be compared in order to present the results of this experiment.

**2.3 Procedure.** The procedure was controlled by a computer program created in order to replay music at a very high quality, exactly as it was recorded. Participants in the first group were listening to Mozart's piano sonata, during the whole test. The logical exam was from 11 A.M. to 11.30 A.M. The 10 participants were tested individually, in two classrooms, in complete silence, with no cell phones or computers opened. Sessions were conducted Saturday in the morning when the building of the Faculty of Music was quiet.

After the paper examinations were provided, students were given the opportunity to ask questions. In the examination period, there was a 10 seconds warning of the end of each 10 minutes period. After time elapsed, all participants were asked to rate their mood during the test and the power of concentration and the sheets were distributed. They had to grade with marks from 1 to 5, depending on their capability to focus, on their speed in solving the tasks and on their mood, after listening to Mozart's music or solving the test in complete silence.

### 3. RESULTS

Classical music had so much influence on the focus control in the first group. As musical perception is processed in the right hemisphere of the brain that involve spatial abilities and long-term sequencing operations, the second group, the one that solved the test in complete silence, had results that were less than expected. The differences between grades of the first group and the second one can be easily noticed (see Fig.2).

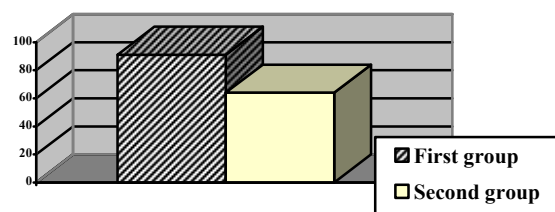


Fig.2 Grades in the logical exam, for each group.

The background of the 10 participants was slightly similar, so that we can't describe the results as unrighteous. As we saw the grades, the average for the first group was 91 points out of 100 and for the second one, 64 points out of hundred.

A more important measure is to asses changes at the level of individual. The global rating that was required is relevant for this experiment. Table 2 shows us how participants from the first group, evaluate their mood, on a scale from 1 to 5, their power to stay focused and their capability of

remaining calm in stressful situations such as exams (see Fig.3).

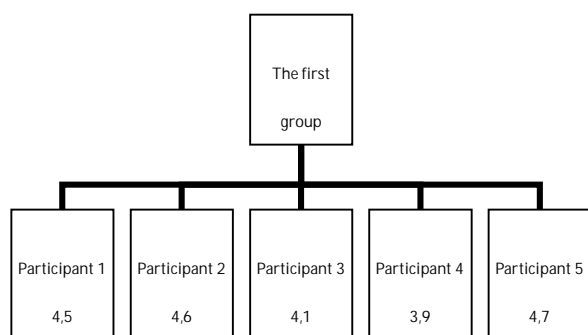


Fig.3 Self-evaluation realized by the participants in the first group

Table 3 describe the situation in the second group, concerning the capacity of self-control, the capability of staying focused during the entire exam and the self-control in a stressful task (see Fig.4).

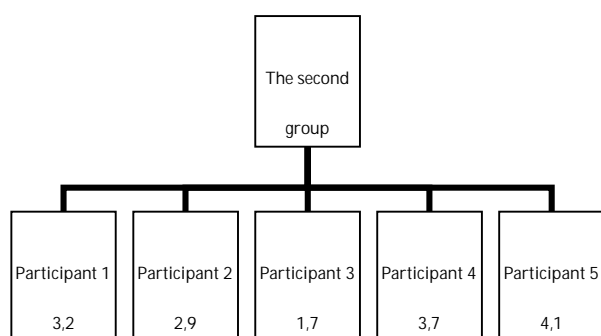


Fig.4 Self-evaluation realized by the participants in the second group.

As it can see in the results, the participants evaluated themselves objectively. The participants in the first group claimed that the piano sonata that they listened to, relaxed them and helped also for a better focus. They managed to remain calm and focused for the entire period. They also finished sooner that they have expected, in less than 25 minutes. The subjects in the second group got exhausted easier and they finished in 30 minutes. Grades were relevant and the quantity and quality for the first group were far better than in the second one.

#### 4. DISCUSSION

This study analyses the effects of exposure to classical music on a specific spatial-temporal activity. In this experiment, performance was significantly better after participants in the first group listened to music during a logical exam than after participants in the second group sat in silence.

Classical music is physically accessible to the general audience. The participants were chosen from a faculty that apparently doesn't have an obvious connection to mathematical thinking. They may be keen on logical and puzzling tests but the experiment proves that every person can be helped by classical music. As I claimed in this article, his music is not a substitute for any kind of activities but it is an extraordinary way to improve brain's activity, aspects that concern memory, on short or long-term.

Scientists agree that there are neurological foundations for music's effects on cognitive ability. Theory of sensory stimulation is another explanation that should be considered when it comes to this experiment. When listening to classical music, the brain is excited by stimulation and finally there would be improved conduits of brain function. Also, it is very important to specify that music similar to classical music, concerning tempo, structure, melodic and harmonic consonance and predictability has also the same results as classical music. There are also opinions that see the negative side of this more important aspect but as John Hughes says, "Skeptics could criticize the IQ studies but this is on paper: you can count discharges and watch them decrease during the classical music". Also, Rauscher and Shaw presented their studies and results in many articles. The "neural resonance" theory of Rauscher is about stimulation which is the confounding variable that mediates the relationship between spatial ability and music that defines this amazing effect on listeners. When Rauscher claimed that, after listening to classical music for 10 minutes, normal subjects would show better response to tasks than after a period of silence designed to lower blood, there were lots of studies that would agree or contradict those statements.

This very studied aspect of music, the classical music's effect on people, is so popular due to its claim to be a quickly way to improve short and long-term condition, due to its capability of enhancing the mood and its power to keep one individual focused longer on advanced tasks. The results of this experiment prove that classical music is far better than complete silence, especially when it comes to activities such as logic problems and challenging situations such as tests, exams or public performances. The brain has a certain plasticity, it's able to change and music can be one element that influences its activity. The injured brain can be reeducated and a normal brain can be highly improved, when it comes to a link between it and the classical music.

Techniques such as functional magnetic resonance, imaging and electroncephalography, are combined to

music and the results are amazing. Even though, studies regarding this network that present this amazing connection between art and health are not being known among people. In my opinion, there should be a culture in this direction, because it is a very accessible therapy for every person and it isn't a complicated manner to boost the brain and its activity. Listening to classical music increases the neurotransmitter dopamine, which plays a very important role in motivation. It also boosts spatial intelligence and this is one of the reason this experiment used classical music for a logical test.

The experiment tried to prove the existence of classical music benefits when it comes to multiple tasks. Even if the subject is well-prepared is very important to use stimulation that excites the brain in different situations, so that it can be created a relaxing and enhancing atmosphere that help the individual to perform better and think faster than usual.

#### BIBLIOGRAPHY

1. Andre, J.C. & Means, J.R. (1986). Rate of imagery in mental practice: An experimental investigation. *Journal of Sport Psychology* 8, 124-128.
2. Benson, H. (1975). *The relaxation response*. New York: Avon Books.
3. Clark, L.V. (1960). Effect of mental practice on the development of a certain motor skill. *Research Quarterly* 30, 560-69.
4. Martin, K. & Hall, C. (1995). Using mental imagery to enhance intrinsic motivation. *Journal of Sport and Exercise Psychology* 17, 54-69.
5. Morasky, R. L., Reynolds, C., & Sowell, L. E. (1983). Generalization of lowered EMG levels during musical performance following biofeedback training. *Biofeedback and Self-Regulation* 8, 207-16.
6. Vandell, R. A., Davis, R. A., & Clugston, H. A. (1943). The function of mental practice in the acquisition of motor skills. *Journal of General Psychology* 29, 243-50.
7. Wolpe, J. (1958). *Psychotherapy by reciprocal inhibition*. Stanford, CA: Stanford University Press.