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### THE MOZART EFFECT AND ACADEMIC ACHIEVEMENT

**Abstract.** The article is devoted to the analysis of studies of the application of music therapy methods in the training of future doctors. The basis of music therapy programs aimed at improving the students' academic achievement is the so-called "Mozart effect" (discovered by scientists at the University of California in 1993), the essence of which is to increase individual components of the IQ test after listening to Mozart's music. The experience of medical universities in the countries of the European Union, the US, and Canada shows that music therapy is effective in creating a mental state, thanks to which students learn new information much better. Music therapy programs based on managing the students' mental state during lectures and group practical training have demonstrated high effectiveness. Dynamic testing of mental balance and stress indicators during the academic year revealed significant improvement. The application of such programs made it possible to increase the students' academic achievement in the educational process by 20%. It was been established that students participating in collective music therapy programs spent less time on tasks (both at home and during exams) due to increased ability to concentrate. In addition, they missed classes significantly less often and had fewer academic debts. According to the control questionnaire, the program participants registered an improvement in the quality of sleep and a decrease in the manifestations of psychological stress. The results of students who trained according to individual programs of music psychotherapy were even better; the program was determined according to the psychological type of the student. The popularization and the widespread implementation of music therapy in the educational process of domestic medical universities will improve the quality in the training of the future doctor.

**Keywords:** music therapy, educational process, university, higher medical education



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## ЕФЕКТ МОЦАРТА ТА АКАДЕМІЧНА УСПІШНІСТЬ

**Анотація.** Стаття присвячена аналізу досліджень застосування різноманітних методик музичної терапії в підготовці майбутніх лікарів. В основі програм музичної терапії, спрямованих на підвищення академічної успішності студентів лежить так званий «ефект Моцарта», виявлений вченими Каліфорнійського університету у 1993 році: підвищення окремих складових IQ-тесту після прослуховування музики Моцарта. Досвід медичних університетів країн Європейського Союзу, США та Канади показує, що музична терапія ефективно використовуються для створення психологічного стану, що сприяє засвоєнню нової інформації. Програми, музичної терапії що засновані на управлінні психологічним станом студентів під час групових практичних та лекційних занять, а також у перервах між заняттями, виказали високу ефективність. Динамічне тестування психологічної рівноваги та показників стресу під час навчального року виявило достовірне покращення. Застосування таких програм дозволило підвищити академічну успішність студентів у різних розділах навчального процесу на 20%. Встановлено, що студенти, що приймали участь у програмі колективної музикальної терапії менше витрачали часу на виконання завдання як вдома, та й під час екзаменів завдяки підвищенню здібності до концентрування уваги. Крім того, вони значно рідше пропускали заняття й менше мали академічної заборгованості. Також за даними контрольного анкетування у учасників програми реєстровано покращення якості сну, зниження проявів психологічного напруження. Ще краще були результати у студентів, що скористалися індивідуальними програмами музикальної психотерапії, що визначалися за відповідністю психологічного типу студента. Популяризація та широке впровадження музикальної терапії в навчальний процес вітчизняних медичних університетів дозволить підвищити якість підготовки майбутніх с лікарів.

**Ключові слова:** музикальна терапія, навчальний процес, університет, вища медична освіта

**Introduction.** The modern educational process in higher education is characterized by high requirements. It is natural that students of higher educational institutions throughout their studies experience high emotional and intellectual stress, leading to chronic stress. Particularly high psychological stress falls on the period of



adaptation in the first year of study, when yesterday's school graduates are trying to adapt to completely new conditions of study and life for them. These loads are doubly higher at universities, where first-year students immediately encounter academic disciplines that are completely unfamiliar to them. Numerous studies show that it is in medical universities that from the first days of study, students are in a state of psycho-emotional stress, which leads to the formation of a "burnout syndrome" in 12-15% of cases [1]. Medical students experience no less stress in the II-III years, when they begin to master clinical disciplines. Chronic stress is accompanied in 70% of cases by sleep disorders, excessive anxiety (55.5%) and depression (5-10%) [2]. Disturbances in the emotional state create significant learning difficulties, which lead to a decrease in the academic performance of students. Such circumstances require effective psychotherapeutic support of the pedagogical process. The task of such support is to teach students the methods of self-regulation of their emotional state. The ability to manage one's emotional state underlies the preservation of the physical and mental health of students, and is also a necessary condition for the success of the educational process [3]. One of the most effective and affordable means of regulating the emotional state, which are in the arsenal of a modern psychotherapist, is music therapy. It is increasingly used in the psychological support of the educational process in both secondary and higher educational institutions.

**The purpose of the article:** evaluate the possibilities of using the method of music therapy methods in the training of future doctors to improve the efficiency of the educational process. In order to achieve this goal, an analysis was made of the scientific publications of the last 5 years on the use of the music therapy in the training of physicians. Search for literature was conducted in the scientific bases of Scopus, WebOfScience and PubMed, 111 publications relevant to the subject under study were identified, (19 of these were directly used in the review).

**The background of the subject.** The neurophysiological mechanisms of the emotional impact of music have been fairly well studied in the last decade. It is known that the sounds of music modulate activity in the cortical and subcortical systems, the functions of which are directly related to the generation and regulation of emotions [4]. Thus, the relevance of studying the issue of using music therapy as a means of psychological support for the educational process at universities is beyond doubt. An analysis of numerous studies of the influence of music on various types of intelligence and on academic performance will allow us to conclude that the practical application of certain methods of musical psychotherapy in higher educational institutions is effective.

**Music and cognitive functions in the educational process.** It should be recognized that listening to music during extracurricular training has become a common practice for most students. A study conducted by Malaysian scientists on 200 medical students showed that 60% of them have a higher concentration of attention





while listening to music. In the remaining 40% of students, the concentration of attention does not change significantly, but there are signs of stabilization of the state of the central and peripheral nervous system. Outside of class, most students listen to music in order to keep calm and relieve emotional stress. The same study found that only calm instrumental music (more often classical) has a positive effect on students' concentration, while the music of "aggressive" styles (hard rock) is distracting. It has also been found that students who regularly listen to music have higher academic performance than "non-music" students [5].

One of the most important motives for daily listening to music for students is to achieve the ability to self-regulate their emotional state. If a little more than half of the students listen to music to improve their mood before classes or to calm down before going to bed, then everyone needs relaxing music to relieve psycho-emotional stress. A study of the relationship between listening to music and psychobiological stress in everyday life by non-invasive measurement of salivary cortisol (a marker of the hypothalamic-pituitary-adrenal system) and salivary alpha-amylase (a marker of the autonomic nervous system) found a positive effect of music [6]. The ability to manage your mood gives you the ability to control many aspects of your life. Students who possess this ability not only have a more stable psyche, but also experience greater self-satisfaction with life, which allows them to achieve higher academic achievements. A study conducted on medical students showed that the ability to self-manage the effects of stress provides them with lower levels of anxiety and higher academic performance [7].

To analyze the effects of listening to relaxing music on cardiovascular recovery and anxiety after an episode of acute stress, a double-blind, randomized controlled trial was conducted in healthy adults. During experimental stress, all participants demonstrated stress responses in the form of tachycardia, increased blood pressure, and personal anxiety levels. The test subjects of the main group (listening to relaxing music) at the recovery stage showed a faster recovery of a stable state of the central and autonomic nervous system compared to the control group [8].

An Australian scientists from School of Psychology, The University of Queensland developed an experimental group music therapy program for university students called "*Tuned In*", aimed at teaching young people emotional awareness and the skills to regulate their emotional state through listening to music, has shown to be highly effective. By the end of the program, the participants had a decrease in anxiety and stress levels. In addition, students mastered the skills of regulating their psycho-emotional state by listening to music of the appropriate emotional content [9].

Analyzing the problem of the influence of music on the academic performance of students, one cannot ignore the "*Mozart effect*" – an improvement in spatial thinking test scores discovered in 1993 by F. Rauscher and G. Shaw after listening to Mozart's sonata [10]. Despite the fact that numerous attempts to repeat the success of Rauscher



and G. Shaw were unsuccessful, the “*Mozart effect*” still haunts scientists. In 2014, the results accumulated over 20 years of research rejected the possibility of developing intelligence with passive listening to classical music and confirmed it with the active development of musical abilities [11]. In sum, although listening to music composed by Mozart might contribute to improved performance on a subsequently presented spatial-temporal task, numerous and differential results provide no evidence that the improvement differs from that observed with other engaging auditory stimuli that are equally pleasing to participants. Indeed, numerous studies have shown that musical training has a very positive effect on intellectual abilities. A study conducted with the participation of 237 young people with different levels of musical education and different duration of music education confirmed this position. It was found that “*non-musical*” intellectual abilities of a general order (lexical, logical, mathematical) correlate with musical training [12]. It would seem that the debate was summed up by the publication under the heading “*Non, l’effet Mozart n’existe pas!*” (*The Mozart effect does not exist!*, from French) [13]. However, in the same year, a work appeared that put everything in its place: “*Mozart, gör mig smartare!: En alternativ aspekt kring Mozarteffekten*” (*Mozart makes me smarter: an alternative aspect of the Mozart effect*, from German) [14, p. 2]. While acknowledging the lack of credible evidence of the direct impact of Mozart's music on intelligence, the study provides overwhelming evidence for the emotional impact of classical music, which creates indirect conditions for increased intellectual performance. The “*Mozart effect*” was the impetus for research on the cognitive effects of classical music, showing its effectiveness in creating an emotional state that ensures high concentration on the performance of intellectual tasks [15]. Mood management for generating ideas is well developed through music. In a study of the influence of classical music of various emotional content on the effectiveness of brainstorming, it was found that the productivity of generating ideas increases against the background of moderate emotional stimulation (when listening to Fredric Chopin's neutral waltzes). Against the background of strong positive emotional stimulation (“*Spring*” by A. Vivaldi), as well as against the background of negative one (György Ligeti's “*Requiem*”), idea generation was low [16]. Psychologists from Freie Universität Berlin, (Berlin, Germany) found in the course of studying the influence of musical emotions on attitudes to decision-making that against the background of sad or neutral music, the decision when choosing a lottery is more balanced and deliberate, while against the background of cheerful music, risky and rash decisions are more often made [17]. Scientists from Department of Applied Psychology, Cardiff Metropolitan University (Cardiff, UK) determined that unfamiliar positive music provided higher intellectual performance than familiar and beloved [18]. The positive effect of background classical music to increase the concentration of attention and the associated memorization of new knowledge by students during the educational process has been proven not only by theoretical



calculations, but also by successful practical application at universities. A randomized controlled trial was performed in study by Graduate Institute of Basic Medicine, College of Medicine, Fu Jen Catholic University (Taipei, Taiwan), which consisted of six steps and the use of the standard attention test and emotion questionnaire. Background music with lyrics adversely impacts attention performance more than that without lyrics. Study demonstrate that background music in the workplace should focus mainly on creating an environment in which listeners feel loved or taken care and avoiding music that causes individuals to feel stressed or sad [19].

**Conclusions.** Thus, the methods of individual and group musical psychotherapy can and should definitely be widely used in the psychological support of the educational process at medical universities. They can be successfully implemented on the basis of already existing experience (the already mentioned “*Tuned In*” program) by university staff psychologists. Group music therapy at the university looks even more attractive. Literature data indicate that its principles are being actively developed and in the near future there will be effective methods adapted for the educational process.

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