



## Manipulative Aspects of Music

Prof, DrSc, Branislav R. Tanasic  

*University of the People, Sabac, Serbia; Faculty of Management, Sremski Karlovci, Serbia*

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### Abstract:

Every sensory stimulus, be it visual, audio, or some other, generates a brain response in the area of the cortex where such information is received, and processed, and gives full meaning or perception of the experience. The cerebral reaction can be monitored by measuring cortical activity through the synchronized response of a large number of neurons, ie. the formed electric wave. EEG scans show that the waves of the brain response in the alpha and beta bands are

synchronized around the carrier rhythm of the music track. The sinusoids of the brain waves move in phases so that the peak of the wave always occurs at a precisely defined interval at the point preceding the next beat in the rhythm of the drum. In this way, the rhythm actually synchronizes the brain waves. For centuries, people have used binaural rhythms at 4.5 beats per second and thus causing various mental states. Although unaware of binaural rhythms, shamans were unmistakably known to cause shamanic trance, playing the drum about 4 to 7 beats per second for 13 to 15 minutes. They knew how to recognize the power and positive effects of binaural stimuli. This paper is an attempt to shed light on some possibilities of the manipulative capacities of the phenomenon called music.

**Keywords:** *Music, rhythm, EEG, brain wave, cortex.*

### Introduction

Someone very nicely and wisely said that the history of music is actually the history of humanity. It can be argued, and there is probably a dilemma, whether man first started using his voice to create a melody, by simply clapping his hands, or did he do it by striking a resonant object, a hollow trunk for example. Music is usually explained as a way of expressing an emotional state. It is unlikely that primitive man had the need to express himself emotionally, it is more likely that a particular form of beating a kind of primitive drum was a signal for community members to gather and share important information, or even as an alarm, a sign of warning and impending danger. In the beginning, mainly a means of communication for immediate information, it gradually becomes an instrument able to provide a musical

background for a game, ritual, or game for fun, but always in the function of gathering the community. It didn't take long for intelligent people to realize that the seemingly innocent beat of a drum can be very useful in manipulating the masses and imposing certain ideas. For centuries, people have used binaural rhythms with 4.5 beats per second to induce various mental states. Although unaware of binaural rhythms, shamans were unmistakably known to induce a shamanic trance by playing the drum at about 4 to 7 beats per second for 13 to 15 minutes. They knew how to recognize the power and positive effects of binaural stimuli (Tanasic, 2018, p. 1-2). Manipulation of people is certainly not an invention of modern man.



## Development of music

It is difficult, in fact impossible, to locate the first creations produced by primitive man in time, and we can define it as the beginning of music. The official history operates with data indicating that the oldest cave paintings are around 60,000 years old. Those early painting works are an attempt at artistic expression and it is very likely that in a similar period man began to express himself through music. The human voice is articulated and in combination with the clapping of the hands, a kind of expression through rhythm and melody began to develop, that is, something that we could define as music. Any object that produces sound can be considered a musical instrument, especially if it is designed for that purpose. Archaeologists date the oldest musical instruments found to the Paleolithic period, and they are mostly simple wind instruments, primitive pipes, and various whistles. The instruments are made of animal bones and wood. In the cave of Divje Babe in Slovenia, the bone of a young bear was found, a fragment ten centimeters long, with several perforations. The bone is about 60,000 years old, and it is assumed that it is some form of block-flute. There are opinions that the holes were created as damage during a fight or some other aftershock. For the swan bone found in Germany, whose age has been determined to be around 40,000 years, there is no doubt that it is a musical instrument. There are holes in the bone, subsequently processed so that the fingers fit better and close the openings, which indicates the rich experience of the master in making this type of instrument (Montagu, 2017). The Tjurunga is an interesting instrument, estimated to be over 25,000 years old. The instrument is elliptical in shape, cut from wood or polished and ornamented stone. A piece of rope or animal gut is attached to one side. The Tjurunga is used so that a person holding the end of the rope rotates the instrument around himself, and it produces a sound similar to the roar of a bull. Similar devices are still used in ritual ceremonies today by the Australian Aborigines, they also call it Churinga. Interestingly, almost all wind instruments found were made according to a similar pattern. The first two holes are at a

certain distance, and the third hole is halfway between the first two. It can be concluded that they respected certain laws, similar to modern scales as if there is a half-tone between the second and third openings. Paleolithic people moved from Africa, and Asia to Europe and it is obvious that knowledge and experience in making instruments migrated with them. Using faithful reproductions and reconstructions of ancient musical instruments, it is possible to produce a tone, but nothing can be known about the playing technique and the type of music that prehistoric people performed. It was significantly noted that there is no archaeological evidence of the existence of stringed instruments or some types of drums with a leather membrane in the Paleolithic era. It was thought that early musical instruments were actually just modified objects found in nature, adapted to produce some sound. However, recently found flutes in China, dated to a period of 7000 years ago, have seven holes drilled, and an additional opening for pitch correction, if one of the holes produces the wrong tone. This proves the excellent sensitivity of the ancestors, it means that they correctly recognized the pitch of tones and that accordingly, they made musical instruments with clearly defined characteristics in advance (Grame & Westrup, 2022).

When it comes to the pitch and tuning of instruments, it should be noted that the mathematical basis for solving this problem is a very old question. There is still no perfect tone system. All the systems that were applied, as well as the internationally agreed official one of today - according to the London Convention from 1939. (The ISO standard defines A4 at 440 Hz), actually, involve a number of compromises. This is a fact that instrument builders have known and respected for centuries.

## Emergence of music notation and transmission

The performance of music as well as the construction and production of musical instruments was based on the subjective feeling of the player, that is, the builder. The music was performed and transmitted according to the

memory and personal experience of the interpreter. It was like that until the sixth century before Christ. With the appearance of Pythagoras and his mathematically based tonal scale, the theory of music was born. Legend has it that while walking by the forge, he heard the melodious ringing of hammers, got an idea, and began to calculate. He established a system so that two notes of the same name from adjacent octaves have a frequency ratio of 2:1, a ratio of 3:2 to a fifth (fifth tone of the scale), and a ratio of 4:3 to a fourth (fourth note of the scale). Thus he established the foundations of music theory. The ancient Greeks developed a system for recording music. On a carved tombstone from 100 AD, there is the oldest known record containing text and music – the Seikilos epitaph. The notes of the scale are marked with letters of the Greek alphabet, with special symbols above the letters. These symbols were auxiliary marks, while the text of the song was engraved below the letter notes. The Roman philosopher Boethius, based on Greek texts on the notation of music, transcribes the system into Latin. According to him, the lowest tone is A, while the highest tone is O. Boethius' work was used as a textbook for centuries. Interestingly, although they developed a system of notation of music, so far not a single notation of Roman musical expression has been found.

Still, this notation is far from the features of the notation system it is in use today. Church choirs perform their psalms using notes, but the melodies, tempo, and rhythm of the composition are transmitted by memory, memorized, and thus passed on. A notation known as a neumes is developed. In an attempt to record the pitch, various additional marks are written above the pitch marks, but there is still no standardized notation system.

The Benedictine priest Guido d'Arezzo, also known as Guido Aretinus, at the beginning of the eleventh century, presents an ingenious innovation, introducing at the beginning one line for writing the neumes. For years, he perfected the system so that in the final version there are four musical lines on which notes are entered, but now defined by pitch. Initially, round, the neumes takes on a square shape. Almost two

hundred years passed until the introduction of mensural notes, markings that mark not only the pitch but also its length (maxima, longa, and breve - short).

The 17th century brought turbulent changes and serious improvements in music. The notes get their present oval shape, the quarter and eighth tones, the fifth line of the musical notation system, and time signatures are introduced. The Baroque era perfects the notation system so that it takes on the appearance of today's musical scores. The notation system is standardized mainly on three basic clefs (G clef - treble, i.e. violin, F - bass clef, and C clef - alto and tenor). The printing of musical scores is widespread and musical works become available to a wide audience.

## Defining the reference tone A<sub>4</sub>

This short overview of the history of making musical instruments and recording music will be rounded off by the development of standards for tuning instruments, that is, defining the reference tone A<sub>4</sub>, as a basis for the other tones of the scale. Today, the reference tone with a frequency of 440 Hz is in official use. The old masters used a lower frequency, widely known Verdi's A is 432 Hz. On many websites, you can see a very lively discussion, musicians and music theorists discuss and give arguments for one or another frequency range. Dilemmas regarding the choice of frequency for instrument calibration go back to the distant past. References were usually church organs, and their tuning differed significantly depending on the manufacturer so the same musical works were performed with significant differences in pitch. The tuning fork was invented in 1711, but the invention of the fork did not help much, there was still no standard either for making the fork or for tuning the instruments. There is a great variety, the instruments are tuned in the range from 400 Hz to even 480 Hz. Only in 1830. Heinrich Hertz defined frequency as a cycle in one second, thus setting the basis and measure for standardization. The first step in the attempt to regulate this area was made by France in 1859. a law was passed that defines the A<sub>4</sub> standard at

435 Hz on the entire territory of the country. The Italian composer Giuseppe Verdi favors a reference tone of 432 Hz. In Great Britain, the A<sub>4</sub> tone was established at 439 Hz, although the French tuning was accepted in most of Europe. In 1885, the Music Commission of Italy defines the A<sub>4</sub> at 440 Hz, although in some parts of the country the basic tone of 450 Hz is used. In the United States, the Federation of Musicians sets the fundamental tone at 440 Hz. Finally, at an international conference held in London in 1939, a standard for A<sub>4</sub> at 440 Hz was recommended. Without considering the influence of the Nazis and the reason for their insistence that the frequency of 440 Hz is official, this standard was accepted and especially supported by the British BBC. Standardization brought certain advantages, orchestras and instruments around the world are now harmonized and the problem of different tuning was overcome regardless of the country or continent. The 440 Hz standard was globally accepted (Tanasic, 2022, p. 2).

### Manipulative aspects of music

The belief that certain instruments, or the music they produce, have magical power can be found in the cultures of many peoples. For example, the Jewish shofar, a wind instrument made from the horn of a bull or a ram, is still used today for ceremonial purposes for the New Year and the Yam Kippur holiday. The biblical story about the trumpet of Jericho, which destroys the walls, is actually a legend about the powerful shofar whose sound had such a devastating effect. Indian legend claims that when Krishna plays the flute the river stops, and the birds stop flying and listen to the music. A beautiful legend that ultimately celebrates the beauty and influence of music. It is indisputable that music produces certain effects, the question is to what extent and in which situation music can produce an effect on listeners with a predetermined result, that is, the question arises of the use, possibilities, and methods of misuse of music. For American Indians, the song is traditionally the main means of communication with supernatural forces. Music is rarely performed for fun or enjoyment,

certain results are expected from music, such as bringing rain, a victorious war campaign, or healing the sick. The unmistakably rhythmic Indian war drum, with four beats per second along with the warrior dance, puts the fighters into a trance. Next to the campfire, with the game of a tribal sorcerer who falcons young warriors, calls to battle, and prophecies success in the upcoming conflict, the Indians feel invincible. It is undeniable that music has the power to influence motivation and combat morale in general. Historically, many great military campaigns were accompanied by appropriate music. Therefore, General Suvorov is right when he says that music can triple the strength of the army, raise morale and unite the people for the fight. On the other hand, music can have the opposite effect. During the American Civil War, during the holidays, music and song could be heard from both sides, nostalgic melodies evoked memories of home and family, and most wished for an end to the conflict and a return home. A similar effect on the fighters occurred during the First World War during the armistice during the Christmas holidays in 1914. Members of the warring parties sang festive songs together, and a friendly football match was even played. A quick end to the conflict seemed possible, but in fact, it turned out to be just the grand opening of the cruel slaughterhouse of a great war. Military music raises morale, gathers the people around a common idea, raises self-confidence, and helps to bear more easily the hardships of war and grief for lost comrades who are being sent off to the eternal journey, again with suitable music.

### Music and hidden messages - backward masking

Advances in the first line of psychology and neuroscience have given a new dimension and unimagined possibilities for increasing the impact of music on listeners. The great scientist Tesla said that if you want to penetrate the secrets of the universe, you need to understand vibration, energy, and frequency. It's the same with music. When it comes to frequency, the already mentioned conference in London in



1939 set the internationally adopted reference tone standard A<sub>4</sub>, at a frequency of 440 Hz. The representatives of Nazi Germany especially insisted on this frequency. The great master of propaganda Goebbels, like a colorful musician from a fairy tale, found models to win over the German people to the goals of the Reich. Leading German psychologists, the Würzburg School of Psychology, as it was later called, advocate the opinion that music interpreted on instruments tuned to the frequency of the tuning fork at 440 Hz provokes in people an elevated level of aggression, but also suggestibility and persuasiveness. Fascinated by war and conquest, the leaders of the Reich saw the potential of music as an instrument for indoctrination and the propagation of their insane ideas. The colorful scenography and marches in honor of the Führer and the Aryan race proved to be a weak attempt compared to the techniques that followed. Music, as a universal language, knows no boundaries or barriers of any kind. This universality is a lure, and music is often chosen as a means of communication and marketing all kinds of ideas. Fans of The Beatles probably won't like to read it, but the tufted guys from Liverpool were among the first, back in the early 1960s, to use masked messages in their songs. Numerous searchers for hidden messages often highlight the sequence at the end of the famous track Strawberry Fields Forever, where John Lennon inserts a masked message: I buried Paul. Before that, in the song Revolution 9, you could hear the statement: Paul is dead! How did it all begin? Namely, in February 1967, news broke that Paul McCartney had died in a car accident. The alleged event took place at the beginning of the big American tour, as well as the promotion of the band's new album. Rumors soon started that the dead Pole had been replaced by the winner of the competition for his doppelgänger. The interest in the concerts was incredible, as were the accompanying financial results. The fantastic success of the Liverpool foursome is such that the British queen excitedly declared that if Britain has an unfavorable financial balance with any country, she will send them the Beatles and settle the accounts easily. Almost as popular as the Beatles, the rock group Led Zeppelin in their famous track, *Stairway to*

*Heaven*, inserts hidden lyrics glorifying Satan. A masking technique (backward masking) was used, and the real message can be clearly heard by listening to the song backward. In the second stanza of the poem, the normal reproduction seems to announce the hidden meaning:

*There's a sign on the wall*

*But she wants to be sure*

*'Cause you know,*

*Sometimes words have two meanings.*

Playing the video backward reveals a terrifying text and a message in praise of Satan. A random coincidence, a similar sonic image of words with a satanic message when the song is listened to backward, or a carefully planned and rehearsed effect, will probably remain a secret. Regardless of the motive and the applied technique of recording the original melody, when listening to the song backward, you can clearly and distinctly hear, among other things: "Oh here's to my sweet Satan."

Was it all just a skillful marketing trick by The Beatles, or did the group have to push the grief for the lost member into the background and continue the tour professionally? Second, the question of why masked messages are in the first place, and how many listeners have the equipment to listen to the composition backward? There is no evidence, but the possible scenario of the whole project could be as follows. The group finishes recording of new album, airs the story of the hidden messages on certain channels, and the mystery begins its marketing life. Speculations, alleged evidence, analysis of recordings, etc. are just adding fuel to the whole project. Of course, the result of everything is an extraordinary increase in record sales and sold-out concerts. There are numerous examples of masked messages, but they are quite an innocent game compared to the content and messages that were created at the end of the twentieth and the beginning of the twenty-first century. Allegedly as a result of the subliminal influence of Judas Priest's song *Better by You, Better than Me*, two guys in America committed suicide. The rather gloomy text of the song, but also the inserted message, do it - do it, motivated

the young men to take a suicidal step. This is just one of the examples, recorded mainly because of the initiated court process, many cases remained just unrecorded accidents. The group Suicidal Tendencies, probably in the absence of serious artistic inspiration, in the desire to shock and manipulate fear in the song *Suicide is an alternative*, openly admits: "I'm sick of death - it sucks me in, I'm sick and tired, I'm sick of myself to myself - I don't want to live, I'm sick of life - I'm going to die, suicide is an alternative." In fact, sweet pop songs that usually deal with love themes and the woes of unlucky lovers evolve in the sixties into an anti-war protest, the flower children stand for peace in their songs. The famous maxim of that time "we make love not war" was replaced by the interest of hard-rock bands in otherworldly, mystical, occult, and often related to Satanism. As a product of this interest, but also an additional search for artistic inspiration - often aided by hallucinogenic drugs, works full of violence, blood, and butchery with messages that this is completely correct are created. The so-called artists claim that everything is in the spirit of Aleister Crowley's principle, you can do whatever you want and that is the only law! Following this credo, some authors have gone too far. Thus, the group Slayer, in the track *Hell Awaits*, calls for action: "With no apparent motive. Just kill, kill again. Survive my brutal butchery. I will hunt you to the end." The mass murderer, satanist, Richard Ramirez, who killed 30 people, declares at the trial that he was directly inspired by the AC/DC song *Night prowler*. "No one will warn you, no one will scream: "Attack!", and you will not feel the steel until it digs into your back. I am your night watcher."

There is no need to waste words on the artistic level and the message that this achievement carries. One must seriously wonder what effects the mentioned text can produce in a teenage soul, which approaches music innocently in the desire to have fun, unprepared for the shock caused by the insane lyrics of untalented lyricists, who glorify satanic ideas, murders, and bloodshed.

## Music and brain reactions

It is believed that music is the most powerful sensory stimulant, it triggers emotions, and it can change the mood of listeners, either in a positive or negative sense. Electroencephalographic scans (EEG recordings) show that waves of brain activity (alpha and beta) are synchronized around the rhythm of the music. Oscillations of brain waves are shifted in phase so that the peak of the wave always occurs at a precisely determined point in relation to the next beat in the rhythm of the drum. Rhythmic sound synchronizes the brain's response. Each sensory stimulus generates a short brain wave, in the area of the cortex where a certain type of stimulus is processed. For example, the reaction in the occipital region to a sensory-evoked brain wave shown by a photograph is expressed through some level of spectral density expressed in microvolts, but when the image is combined with appropriate music, a significantly stronger brain response is registered. This means that visual perception is significantly influenced by music, especially rhythm as an audio component of the experienced stimulus and that in a very short period of time, after only a few bars the brain waves are synchronized with the rhythm.

In recent times, there is an increasingly pronounced tendency to listen to techno music, with overemphasized rhythm and the absence of melody and harmony. We have already talked about the influence of the monotonous rhythm and its hypnotic effect on the listeners. Such music in combination with gloomy lyrics leads the listeners into a depressed state. A typical example is the appearance of the Emo movement, mostly emotionally immature and unstable teenagers, whose members are involved in numerous suicide incidents. EEG monitoring during listening to music based on a tantric repeating rhythm records the mental image of the rhythm, spontaneous induction of beats from the rhythmic pattern as well as sensorimotor synchronization with the music (Fields, 2012). It has been noticed that when the stimulus, in this case, a musical rhythm, is repeated at a fixed speed - with a fixed period, it generates a periodic change in the voltage of cortical activity, synchronized with the stimulus,

that is, the rhythmic pattern of the emitted music (Regan, 1996, p. 238-248). From what has been said, it follows that the periodic time structure of the beats facilitates the synchronization of the listener's movements with the musical rhythm, that is, the perception of the beat through neural networks and dynamic cognitive processing, harmonizes the movement of the body parts - for example, tapping the foot in time with the music, or playing (McAuley, 2010, p. 165-200). This effect is especially pronounced if the listener likes a musical track, then almost the whole body begins to vibrate in time so that the perception of music is equated with motor activity (Madison, 2006, p. 201-208).

## Conclusion

*Music gives a soul to the universe, wings to the mind, flight to the imagination, and life to everything.*  
Plato

Music is the most complex and perhaps the most beautiful sensory stimulus that we can experience. It is also a universal language that knows no borders. It is enough to know the notes, and the musical score is understandable to everyone. The written piece of music remains forever available to everyone, clear and precise just as the author imagined. Unfortunately, in addition to the noble messages and positive effects that musical works usually cause, there are also realizations of such dark content, with the aim of awakening heavy emotions, hatred, and resentment in the listeners and driving them to evil deeds. This paper mentioned only a small part of the techniques in the abuse of music, that is, the listeners. Let's say, in recent times, you can buy music content called numerical narcotics on the Internet. We are talking about binaural stimuli, and it is necessary to use headphones to achieve the binaural effect. Depending on the user's wishes, it is possible to download a musical dose of audio narcotics that will put the listener in a state as if they had sex, consumed alcohol, or some synthetic drug. They address evil, they invoke it and it responds, it comes in different forms. The universality of music is also

reflected in the various techniques of its abuse. Manipulation of music is not a local headache; it is simply a global problem of humanity. In the end, one can only ask the question in which direction these techniques will evolve, and what devastating effects they will cause on the listeners and parents must seriously pay attention - what are their children listening to?

## Conflict of interests

No conflict of interest.

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