

The Mind, Music, and Behavior abstract

The main purpose of the paper is to investigate and present the relationship between the mind, music, and human behavior. For this purpose, research is presented on previous works and studies that link music with the mind. Based on this research, music increases neurotransmitter levels. Soft or mellow music has a tendency to promote tranquillity, while music with tempo sometimes distracts. Human memories can be cued by music, and music can promote improved learning.

The brain is a two and a quarter pound piece of living organic tissue that controls the human nervous system. Music is a collection of sound waves that propagate through the air, and has varying frequencies and tones following a discernible order. Yet we all recognize the significance of the brain beyond its physical function. Our minds are the essence of what we are. The brain enigmatically stores memories, and lets people experience such things as emotion, sensations, and thoughts. In the same sense, music is more than just a collection of vibrations. This leads to the question of how does music affect the mind, and in addition, how does music affect human behavior? The reader might ask why such a question should be relevant. If more is known about the psychological and neurophysiological effects of music on the human mind, then the possibilities of this knowledge are unbounded. Music can be used to treat social and behavioral problems in people with disabilities. The use of music in the classroom might enhance or weaken a student's work characteristics. Therefore, whether the influence of music is positive or negative, much needs to be explored about the link between the mind and music.

Physiologically, the brain receives information about sound waves from the ear through the auditory nerve. This information is then processed by the brain and analyzed for the juxtaposition of melody and rhythm. The mixture of melody and rhythm is what we commonly refer to as music. However, our minds interpret this auditory information as more than just sound signals; somehow, we are able to differentiate between certain types of music, and develop preferences for these different types. Yet, what are the ways in which the effects of music manifest themselves?

First, there are particular biochemical responses in the human body to music. Research shows that college students, when listening to music, have more galvanic skin response peaks, as opposed to when they were not listening to music. This research also indicates a significant decrease of norepinephrine levels in students while they listen to "preferred" music. Norepinephrine is a neurotransmitter that arbitrates chemical communication in the sympathetic nervous system of the human body. The release of this neurotransmitter, as a consequence of a function of the brain, results in an increased heart rate and heightened blood pressure. Therefore, the decrease of norepinephrine in these college students results in a more "relaxed" state. This could suggest that favored or pleasant music somehow affects the mind, resulting in the relaxing of the body. Another research project, undertaken at the Tokyo Institute of Psychiatry, focuses on the effects of music on the mind using electroencephalograms (EEG). An electroencephalograph is a medical instrument that is capable of showing the electrical activity of the brain by measuring electrical potentials on the scalp. In this experiment, volunteers were exposed to silence, music, white noise (simulated hiss), and then silence. The result of this experiment coincides with the previous findings. The volunteers all reported feeling a calming sensation. However, the researchers did not attribute the lowered tension to reduced neurotransmitter levels. While listening to music, "many of the subjects reported that they felt pleasantly relaxed or comfortable... Music may evoke more organized mental activities which result in subjectively comfortable feelings." The white noise in the experiment produced an even greater effect; the

volunteers were so relaxed that many felt drowsy and soporific. This sleepy effect can be explained by the monotonous characteristics of white noise, in contrast to the variations in tone and melody of normal music. Furthermore, the researchers found, based on the EEGs, that while listening to music, the volunteers maintained a higher consciousness than when they were exposed to silence or white noise. What this experiment shows is that there is a change in the mental state of people while listening to music; that is, music has certain psychophysiological effects on humans.

Along with these psychophysiological effects, music has an impact on memory as well. In one experiment, words were presented to test subjects, while either classical music, jazz music, or no music played in the background. When the test subjects were asked to repeat the words a few days later, either the same music or a different background was present. The researcher noticed a "facilitative effect of providing the same [musical] context." Similar research has been done on CDM. CDM stands for context-dependent memory, which is the principle that "changing the context or environment in which material was originally learned causes some of that material to be forgotten." A group of scientists tested college undergraduates by asking the students to rate the pleasantness of a sequence of words, while they listened to a certain type of music. Afterwards, they were asked to recall these words. The results indicate that the students were able to recall the sequence more successfully if the same musical piece was playing. Furthermore, the researchers found that if the music played during the recall had a different tempo than the original music, then there was a lowered ability to recall the words. These results are also supported by a supplementary investigation, where it was shown that a musical piece can facilitate learning and recall. Perhaps a common manifestation of this phenomenon is when you remember the jingles in commercials. A test conducted at the University of Washington demonstrated that brand names were more easily recalled when they were presented in the form of a musical tune, instead of just spoken. Hence, this is a consistent example of one relationship between music and memory.

Now that there is a quasi-established link between the human mind and music, what are some of the ways that music affects human behavior? Fortunately, there is a considerable amount of research available that indicates how humans function while being subjected to music. A group of specialists at the University of Connecticut studied how people communicate with each other while background music was present. A hundred and four students were paired off and put into rooms with either different types of background music playing, or no music playing. In the rooms, these students were asked to perform some problem solving tasks that required conversation between them. After five minutes, the subjects were asked to rate their conversations. Of the students who heard background music, almost all reported "significantly higher satisfaction [with communication] than those in the no-music condition." The different types of music also affected the students. The researchers noted that the students who listened to fast music had differently paced conversations than those who listened to slow music. The volunteers who listened to major mode music performed notably better than those who listened to music of minor mode. Thus, not only does music affect the way humans converse, but different classes of music influence people in different ways. A further way in which music has an impact on our behavior can be witnessed in something as conventional as walking! A recent investigation into the effects of music on walking distance was performed at Ursinus College. Volunteers were asked to walk for ninety seconds. The study showed that, "music significantly influenced distance walked." The conclusion reached by the scientists in this instance contradicts the previous results. Instead of "raising the consciousness" of the mind, the researchers hypothesized that the music interfered with or distracted the minds of the test subjects. A related study concurs with this finding. In this case, college students were asked to complete two hundred and twenty hand-eye coordination problems while listening to different types of music. It was found that the rhythm

and loudness of the background music interfered with the attention span of the students. These last two studies seem to refute the findings of the other research; but in a sense, all the studies correlate a modification of behavior caused by the presence of music.

The next reasonable step is to ask how this modification of behavior or affect of music on the mind can be harnessed. One major field that may benefit from music's affect on the mind is education. As a matter of fact, it has been shown that by exposing students in a classroom to music, the musical exposure enhances class achievement. A research performed at Glassboro State College indicated that when music was played in a certain psychology class for twenty minutes each day, the music "stimulated the human alpha and beta brain waves," resulting in the attainment of "significantly higher mean scores on examinations than those who were not exposed to the music." In addition, music can also be used to aid in the education of mentally handicapped students. In a school district in Prescott, Arizona, music was added to the academic environment of special education students. This resulted in an increase in performance, especially in the area of mathematics.

Thus, it has been established that there is a link between music and the mind or human behavior. There still, however, remains a great deal of research that needs to be done in order for us to comprehend the why and how. This is a substantial challenge, considering that not much is known about the mysteries of the brain itself, let alone how it is affected by auditory impulse. It should also be noted that although the studies presented show certain effects of music, in each study there are exceptions. Some people show no signs of altered behavior or any other effects of music. There are even some studies where a majority of the subjects show no known measurable effects of music. Nonetheless there is a great potential for this topic of the music and the mind. If we understand how human beings are effected by music, we can alter how human beings learn and behave, as simply as by turning on the radio.

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