

## FOOD FOR THE BRAIN

Music surrounds our everyday lives. No matter where you are or what you are doing, there is normally music playing somewhere in the vicinity. Growing up in Nashville, one of the music capitals of the country, music played a huge part of my life. As I grew older, I wanted to learn more and more about music. What happens in the brain when we listen to music? How does music affect people emotionally? What social impact does music have? While researching, I learned about: how active the brain becomes when we listen to music; how musical preference is determined in adolescence; and how musical preferences have a lot to do with social interaction.

This work shows how music affects me. A graphic score represents music without musical notation; it is a visual representation of a song or melody. In my representation of a graphic score, I represent twelve different musical genres. Not only did I listen to one song from each genre, I layered different songs to get an overall taste of the music. I used grey 12x12" boards as a background and used various materials—paint, oil pastels, ink, spray-paint—to capture what I heard. Song after song, more layers formed to depict twelve different genres of music.

Music and art are similar in so many ways; they are both a way for people to express themselves and impact each another. These paintings visually represent music and my experience in listening to it.

Grace

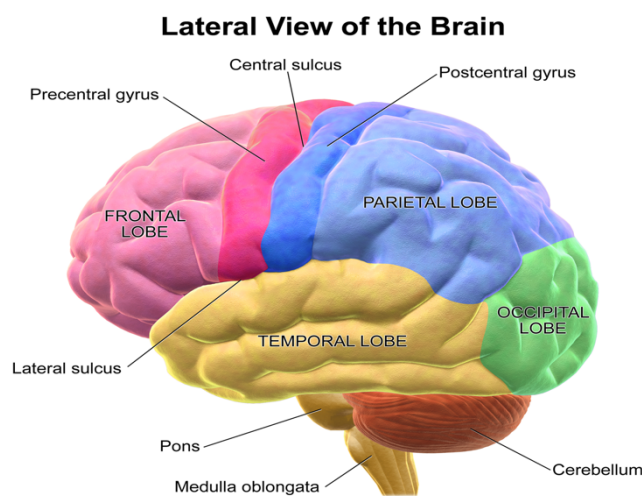
Bop, bing, ping, pop...sound after sound is strung together to make the perfect song. Notes, rhythms, melodies, and lyrics are used to make music that is ever-present in society today. Music is everywhere: in the car, in the house, on the street, now in everyone's pocket. From birth, I was raised to listen to music constantly; wherever I went music was always playing. Growing up in Nashville, Tennessee, one of the music capitals of the country, music was all around me. I was exposed to music at a young age in ways that some people will never experience in a lifetime. Music enveloped my life; I would either be listening to music, hanging out with someone who was in the music business, singing my favorite songs, or going to concerts starting as early as four years old. Technology had already been developed so that music was portable and I could take it with me wherever I went. On the playground, I remember taking my thick blue iPod nano and listening to music with my friends. We would sit on the top of the big green grassy hill at the edge of the playground comparing our favorite songs and who we liked to listen to. I was in first grade when one of my friends told me her mom was a big country music singer, Lee Ann Womack, and thought it was the coolest thing ever. As a child, I thought being surrounded by music was normal, I never realized that some people were not as influenced by music as I was from such a young age.

Music grabbed a hold of me from a young age, and still plays a major role in my life. As I grew older I started to sing and learn how to play instruments. I tried everything from the recorder, flute, double bass, guitar, piano, and ukulele; playing instruments always intrigued me, but I was never very good at playing them. I was so fascinated in so many different instruments but was never one to sit down and practice every day. School offered me some ways to get involved with learning more about music, but I also got to take voice, guitar, and piano lessons along with attending a singing program and camp. Sounds of instruments, combined with carefully worded lyrics, created a whole different world for me to live in. Music was, and is, a place for me to get lost and discover something new about music itself and other areas of life; it is another way for me to learn. Songs written about anything you could possibly think of brought lessons to my life I would not understand, if not for the catchy tunes and lyrics that stuck with me.

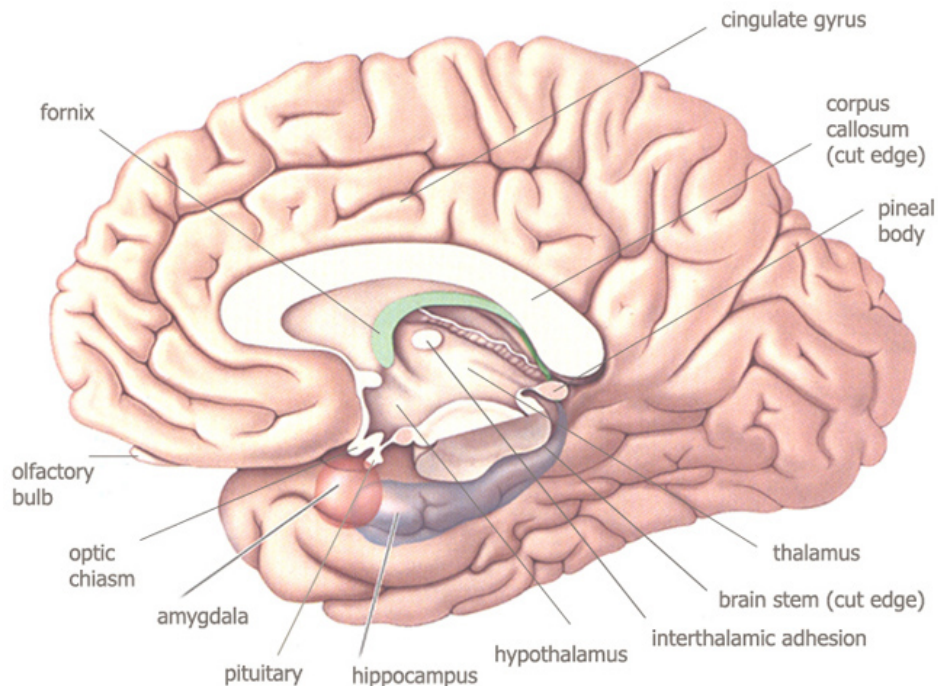
Getting older I asked more questions about music--the music industry, how music is created, why I like it so much, why I enjoy going to concerts, how listening to music can change an experience, and how our brains process music. One question leads to another. There are so many different genres of music, different devices for listening to music, and a variety of ways to experience music. Everyone has a different opinion on what kind of music they like to listen to and how they like to listen to that music; why is this the case? Music has a power and influence over people that is unlike any other experience or activity, which I hope to learn more about.

Wherever you are right now, there is probably music around you. Whether you are listening to music through headphones, the person next to you is, or music is playing over a speaker for everyone to hear, it seems as if music is always in the background of our lives. In today's world, music has a strong hold over everyone's lives, surrounding people nonstop. Some people take notice and enjoy it all, but others are oblivious to how much music they encounter. Our society thrives on big musicians who make catchy songs that get stuck in our heads. Millions of dollars are made every year in the music industry, because music has become something we can't live without. Everyone always wants another new song or another new artist to listen to. Most people do not stop to really think about the music, but it is always something that is in the background of their life. I wanted to take the time to stop and explore what happens in our brains when we listen to music and how it is so powerful.

Our brains are constantly working to process what is going on around us. Sometimes we do not stop to think about what is going on in our heads. Why did that thought just pop in my head? How can I remember that memory from so long ago? Specific sections of our brain are trained to process specific information received. Most functions that happen in our mind and body, involve just one section of the brain. Music is an exception. The entire brain comes alive when listening to music. Not just one section is used to process the song we are listening to, but almost every section of the brain that has been studied comes to life. What seems like such a simple action, sitting and listening to music, is one of the most complex actions happening in our brain. Scientists have studied long and hard how music is received in the brain, but some things are still unexplainable. Experiments have been conducted to try and understand why music is so powerful, but there is no exact answer. Between our brain, society, and the environment around us, listening to music has become an act of pleasure that our world would not be the same without music.



When listening to music, so many things happen in the brain that we are unaware of. The brain is divided into four lobes--the frontal, temporal, parietal, and occipital--along with the cerebellum. Each lobe is used for a specific function (Levitin 85). The frontal lobe is used for planning and self-control; the posterior part of the frontal lobe controls motor movements and spatial awareness. The temporal lobe controls hearing and memory, while the occipital lobe controls vision. Lastly, the cerebellum controls emotions and planning movements. While each of these functions uses one part of the brain, music involves every section of the brain that scientists know about. Listening to music, which seems so simple, is very complex when looking at what happens in the brain while listening. When we listen to music, molecules vibrating at specific frequencies bombard the eardrum causing it to move in and out. The brain then extracts features of the music using neural networks to break them down. In the brain, the process starts with the subcortical structures that participate in all behavioral reactions and moves up to auditory cortices which are involved when hearing sound; familiar music also evokes memory which involves the hippocampus (our memory center) and sections of the frontal lobe (Levitin).



Music, which involves lyrics, invokes language centers, which include Broca's and Wernicke's area (two speech centers in the brain). Since there can be great emotion in music, we use the cerebellar vermis and amygdala (main area for emotional processing in the cortex). Just like there is no single language center, there is not a single music center in our brains. This opens up so much about how music has such a huge impact on people's emotions and memories related to music. Rather than our brain using one specific place to process a song, our whole brain becomes active with new information. This allows us to use those other parts of the brain to feel greater emotion, memory, and connection to a song or artist, which explains how music is so influential (Levitin).

Starting in the womb, our musical preference begins to develop. Twenty weeks after conception, a fetus's auditory system is fully functional (Levitin). A fetus hears sounds when in a mother's stomach, and becomes accustomed to those sounds. In Levitin's book he shares that "Alexandra Lamont from Keele University in the UK found at one years old babies prefer music that they heard while in the womb" (Levitin 223). At the age of two, children tend to lean towards listening to music that comes from their country or culture. In the beginning, babies like easy songs that are predictable, but as they grow older they like to listen to more challenging songs that they will not be able to predict. Around the age of 10 is when children tend to take on more of an interest in music (LaFata). Up until we are 18 to 20, our musical preferences are changing and solidifying; "researchers estimate that by this age, we've become less open-minded, and our neural circuits become almost fully structured based around our experiences, leaving little wiggle room for new associations" (LaFata). After those teenage years, the kind of music we listen to tends to stay the same. It is possible to venture out and listen to new music, but there is almost always a return to the music listened to during childhood. One of the reasons music from our teenage years stays with us is because it is a time of self-discovery and being very emotionally charged. Levitin explains, "we tend to remember things that have an emotional component because our amygdala and neurotransmitters act in concert to 'tag' the memories as something important" (Levitin 231). What kind of music a person likes comes from past experiences with that specific kind of music. If just listening to one artist, Levitin says, "they

become apart of us on a neural level” (Levitin 241). The brain remembers their voice specifically and if heard later on, it would be easily recognizable no matter what they are saying. Levitin explains “Our brain develops circuitry so we can then pick out their voice from thousands of voices” (Levitin 241-242). Artists can really affect the listener on an emotional level and make listeners get emotional, based on how much they open up.

When an artist opens up, people then feel connected with the artist and even other people who listen to that same artist. There is a huge social component associated with music. It helps us relate to others and connect with people we might not have the chance to connect with without music. In society today, musical preferences have become something related to personal and group identity (Levitin 232). There is a theory that personality characteristics are related to musical preferences (Chamorro), but Levitin believes “it is determined by more or less chance factors: where you went to school, who you hung out with, what music they happened to be listening to” (Levitin 232). I totally agree with Levitin because your personality and musical taste are mostly developed in your teenage years based on factors surrounding a person. Society plays a huge role in music and what it has become.

Music envelopes us in the world today, but little do people stop and think about when and why music started. There are many theories on when music first began and why. It is very difficult to give an exact answer because documentation has been recorded for many different formations of music. There are references in many different religious texts that include singing and making music. Cave paintings reveal people dancing which strongly reveals the presence of music (When). Also, what is believed to be the first instrument was found; it is thought to be a bone with holes cut into it that produces sound when the holes are blown into. We tend to believe that music started around the time these artifacts were created, when musical activity is recorded and evident, but it is impossible to know if music was created far before any recordings or artifacts archeologists have found. Many psychologists today believe that music exists purely for pleasure; but Robert Jourdain in his book *Music, the Brain and Ecstasy* says, “in prehistoric societies everything served in survival one way or another” (Jourdain 307). This leads to one of the most developed and most referenced ideas that came from Charles Darwin. He believed that music came about to attract the opposite sex, which Levitin goes on to say is why “it became associated with some of our strongest emotions” (Levitin 251). Another theory suggests it was a way to show you are in good health and have extra resources because you have extra time to develop a skill that is unnecessary (Levitin). Other theories suspect music was a way of social bonding and cohesion; music was a social linkage. Many of these theories seem to relate to how music is used today. Famous musical artists seem to definitely get attention from the opposite sex while getting money and staying healthy; and music is still a way that connects people together. There are so many hidden mysteries behind music that we are slowly learning more about, but we might never have an exact answer we know for a fact is completely true.

Meaning in music is one of those hidden mysteries. “Meaning” is a very unclear concept, whether it is relating to music or another notion. It keeps philosophers busy because there really is no end to studying what meaning is. There is not a simple definition or explanation that satisfies the majority. Just like there are theories behind musical preference and how music was created, there are theories about meaning and, more specifically, the meaning of music. In *Music, The Brain and Ecstasy*, Jourdain explains that in older theories, “something has meaning when it somehow represents our experience of the world or of ourselves” (Jourdain 272). In this case, meaning seems to mostly be about communication. Going along with verbal meaning is intonation. Jourdain relates verbal and intonation meaning by saying, “every statement has at

least two meanings: a verbal meaning that in some sense describes the speaker's experience, and an intonational meaning that reflects the speaker's feelings about that experience" (Jourdain 273). There is meaning in what we say and how we say it. It is possible to find meaning in music that has nothing to do with the notes, but is found in the lyrics. There is meaning in listening, performing, and sharing music; it all affects us in one way or another. Even if you do not notice the meaning in music, almost all music has meaning to the brain (Jourdain).

From when music was first created until today, music has been a huge part of human life and an amazing medium of expression. Singing and small instruments made out of natural objects, have turned into recordings and packed shows of hundreds of thousands of people. The human brain has even evolved to understand and create even more complex sounds. Human connection has turned music into more than just some notes and chords strung together. Music is now something to connect people, help mend pain, improve emotions, and expand the brain and so much more. There is so much science behind how music is created, where it is now, and what is happening in our brains the information I studied barely skims the surface on how much more there is to learn. Through all the research I have done, I believe it is evident our world would not be the same without music. As neurologist Oliver Sacks puts it, "Music is part of being human" (Sacks). It has been around as long as we can remember, and taking it away would leave a gap in society that would be too big to fill.

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