

Music can be so much more than just a source of entertainment; it can transform, inspire, and enlighten. Specifically, music can be a tool for building our emotional understanding and maintaining a sense of self. This animation focuses on the relationship of music to memory, my own struggles with my unreliable memory, and how I use music as a tool to access seemingly lost recollections. In the course of my research, I discovered that music can be used to treat Alzheimer's disease, increases concentration in the classroom, and even helps when learning a foreign language.

This animation is comprised of four hundred and seventy-nine hand drawn pages. I attempted to illustrate music's ability to shape my thoughts and memories and effect deeper levels of being.

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This paper explores music's relationship to memory viewed through the lens of my own personal discoveries and observations. I set out to explore whether music can be used as a tool to access something even deeper than our memories and how this effect expresses itself. How is music linked to memory? Can music be used to access a "true self"? Does such a thing even exist? These questions guided my line of inquiry and allowed me to discover how music can be used in a variety of situations including the treatment of Alzheimer's disease and the improvement of language skills both inside and outside the classroom.

There is nothing quite as terrifying as not being able to remember something, whether it is a name of an old teacher home phone number or even an entire conversation the feeling that something becoming irretrievably lost is immensely disconcerting. I have always struggled with these types of memory lapses, but at first they were not noticeable. Since my parents took care of most of my schedule, I could be free to let my mind wander, living in my own small, safe world. Slowly as I got older, I was expected to remember things like my times tables, the names of classmates, and an acquaintance's face. The world became a place where at any moment I would be ridiculed for failing to produce some crucial piece of information. My mind no longer felt like a safe personal sanctuary where anything could happen, but a faulty and unreliable tool I was forced to work with because I had no other choice.

Slowly over the years I have mastered strategies to avoid situations in which I will be forced to reveal these memory gaps, but even if it is not apparent to others, I still have the nagging suspicion that something is "missing". However, there are things that I know I will never forget; golden hills in the dying evening, light the smell of briny salt air, her smile as she turns to me wind blowing her hair over her face. These moments don't give me anything tangible to hold on to. They have been re-embroidered and re-remembered so many times that any trace of the original memory is gone forever. What remains is the feeling that they carry with them; something so intangible that our language lacks the words to describe it. The closest explanation I can get is saying that it is sort of like a smell that lingers even after the source is gone, it is only possible to catch whiffs of it years later triggered by something unconnected.

I have found the only thing that can reliably bring back the feelings from these moments is music. Whether it is my father's rough voice singing me to sleep when I was around five or a distant line of a song heard in a shopping center, nothing can pull me back into a moment quite like a song. As strong as these affects are I have never given them much thought up until now. Music is something I have taken for granted, it is always there for me and yet I treat it so trivially. In the course of my research, I was struck with the realization that the memories that I have been trying to hold on to so desperately, assuming they were precious and untouchable, were actually so re-embroidered and clouded by my minds bias that the actual information they once held has been lost forever. The only thing that I believe remains in this feeling that I can't even name, is a feeling most easily accessed by music.

As it turns out, the idea of memory as unreliable and false at least in the way that we think of it, is one that scientists have been exploring for years. The assumption that there is a sort of "true" version of all our memories and experiences hidden away somewhere in our brains is false. Memory is not some mundane record of previously learned information, but an incredibly complex and ever changing amalgamation of personal perceptions. Memory is not linear, but for the most part creative, reinventing, and re-embroidering previous experiences the more they are thought about. Memories can be changed easily through perception and suggestion leaving little to no trace of the actual event or person behind (Memory and Forgetting).

In one study conducted by NYU neuroscientist Joe LeDoux, a team of scientists explored the idea that memories could actually be erased or permanently changed. In the recent study, a group of lab rats were played a musical tone and then given a mild electric shock through the bottom of their cage. The rats soon learned to expect the shock whenever the noise was played. Then, while the noise was being played and the rats were remembering the traumatic experience of being shocked they were injected with an experimental drug designed to erase their memories shockingly the drug worked. The next time the sound was played, the rats had no negative reaction proving that their memories of the traumatic experience of the shock had been erased.

LeDoux tested whether or not long term memories could be erased in the same way by performing a new experiment with a separate group of rats. They repeated the first steps, playing a musical tone and then giving the rats a mild shock. Once the rats were thoroughly conditioned, they stopped doing the experiments for almost a month, then again played the tone. The rats cowered and were injected with the drug, then the tone was played again and the rats reaction were normal and they had no memory of the traumatic experience ever occurring (Eternal Sunshine of the Spotless Rat).

This has huge potential in treating post-traumatic stress disorder and other mental conditions. The drug was also tested on a human subject; a woman who had suffered severe abuse and assault when she was young. She was interviewed about these experiences and while the experiences were fresh in her mind, was injected with the drug. Afterwards, her memories of her experience were not completely erased, but they were much less traumatic than they had been initially. She went from only being able to talk about her experience in front of a small group, to being able to discuss in in front of a large audience (Memory and Forgetting).

This study raises a lot of questions about whether or not tampering with someone's memory means tampering with their "true self". In my opinion, our memories do not make us who we are. They may shape our opinions and world views, but they do not define our beings. Surely something that can be so easily manipulated does not define our sense of self. In many ways, I think I believe this because the alternative is terrifying to me. If the whole of who I am is based off of memories that I have trouble even calling to mind, then what do I have left? There must be something more-something so intangible that it can only be felt in the moments after the last notes of a song have faded, leaving a lingering sense of true being so strong that it transcends everything else. German philosopher Arthur Schopenhauer eloquently describes this connection to music by stating that, "The inexpressible depth of music, so easy to understand and yet so inexplicable, is due to the fact that it reproduces all the emotions or our innermost being, but entirely without reality and remote from its pain.... Music expresses only the quintessence of life and of its events, never these themselves." (Schopenhauer xi). I believe Schopenhauer is saying that music transcends the limitations of reality and is capable of expressing feelings and perceptions far beyond the limitations of memory and the conscious mind (Sacks xi).

My experience with music activating memory is not unique. Music has the power to activate more areas of the brain than almost anything else. Not only does it awaken the auditory areas of the mind, but it also stimulates the motor and limbic sections. These effects vary depending upon whether the music has lyrics, but the profound effect is still the same. Because of these effects, music is being tested as a way to treat severe brain injury in patients with memory loss caused by traumatic injuries. The patients are played popular songs from their youth to help them regain memories and awareness, rediscovering powerful feelings or memories associated with these lyrics and tunes (Music and Memory).

Music has also been used in the treatment of Alzheimer's disease and dementia. In the documentary "Alive Inside", filmmaker Michael Rossato-Bennett explores the work of Don Cohen, founder of a nonprofit organization called "Music and Memory". The goal of this organization is to help patients in nursing homes regain precious memories through the healing power of the music they once knew. Each patient was given an i-pod with music that had been significant to them when they were younger. When the headphones were placed over their ears, the transformation was incredible. One man went from being slumped in his chair completely unresponsive for hours on end to singing loud and clear, discoursing at length on the joys and sorrows of his youth. Another woman who was bedridden and completely unresponsive for

months began to move her feet and shake her head. The transformation in many of these patients was almost magical. One woman who had been using a walker for years leapt to her feet and with the help of Don Cohen, danced shakily around the room (Alive Inside).

During the documentary, Cohen speaks extensively on the challenges of administering this seemingly simple treatment to large number of people. While our healthcare system is willing to spend thousands of dollars on pharmaceutical drugs, it is unwilling to support something like distributing music to patients. For many elderly people, life in a nursing home is devoid of joy, passion, and human interaction. Even though these are necessities outside of the basic needs of food, water, and shelter, they are no less important. For these people, their music provides context for the people they once were. It allows them to be something more than a hospital bed medical diagnosis and a number on a nondescript door. This music not only allows these people to gather together the scattered fragments of their lives., it also gives them access to something deeper- a delicate sense of pure being that is difficult to maintain in everyday life let alone the stark harshly lit walls of a nursing home. These are people who have lost almost everything. The least that our healthcare system should do is provide them with some fragile sense of self. Cohen has tried again and again to get government funding for his program but has been told reputedly that “unconventional treatment tools like music are not accepted”. It was not until a video clip of a patient with advanced Alzheimer’s disease reacting to the treatment went viral that Cohen was able to obtain sufficient funding to continue his program (Alive Inside).

As I watched Alive Inside I could not help but imagine myself in the same position as a patient in one of these nursing homes. If my mind seems unreliable now I can only imagine the state I would be in while grappling with a condition like Alzheimer’s. I am haunted by the image of myself crippled, unresponsive, slumped in a motorized wheelchair, connected to tubes, and under the influence of unfamiliar medications I have no control over. I am unable to cry out to the people I love because I no longer remember their names, I am washed up, done, finished, then a flash of something new and unfamiliar man places headphones over my ears. In seconds I am transported back to a skinny shy person with scraggly bleached hair, wearing an oversized sweater. I am pulled back into her hopes, fears, dreams, and sorrow. In a moment, the thread of music that runs through my life is given a strong tug and I surface gasping from my stupor.

Just as music has the power to transform the lives of the elderly, it also has the power to transform the lives of the young. At an early age I was introduced to the classics my parents listened to when they were young. Music can be used in many aspects of young life. It is much more than just a source of entertainment, it can be used in the classroom to set the mood and boost concentration (Brewer, Chris Boyd). Too often we trivialize music’s true power by taking it for granted and reducing it to something that is merely used to pass time. We use it in advertisements, ringtones, and theme songs. It is so intrinsically a part of our life that its potential as a tool of learning is forgotten. Something so inherently expressive of the human consciousness and spirit must be respected and treasured, not as a cheap gimmick, but as a powerful weapon used against apathy and ignorance. We are doing our youth a disservice by not using its power to present information in an empowering and interesting way.

A study in the journal of neuroscience found that young people who took music lessons for two years were better able to process language. This study focused on a small group of kids in a low income community located in Los Angeles. The team of scientists were able to utilize powerful new technology, capable of breaking brain waves down into their component parts. This allowed the scientists to observe exactly how the children’s brains were being effected. Kids coming from lives of poverty often know fewer words by the age of five than children in

higher income areas. This is because they are spoken to and read to less. In the absence of words, the brain will fill the gaps with things like static or background noise. Although learning a musical instrument cannot fill these gaps, it can help a child's brain better process language, helping them to sound out tricky vowels, making them easier to decipher. The program also allowed children a respite from their home lives. Music became a tool that could be used when dealing with issues both in and out of the classroom. Tenth grader Monica Miranda, who was part of the program for three years, described how she used music as a tool in her studies; "When I do my homework or I'm studying for something and I feel overwhelmed, I usually go to my violin, to start playing it, I feel like it relaxes my mind. And coming here to play with an orchestra, it's just amazing. I love it." It is clear that music has done much more for Monica than just improving her speech and language skills (This Is Your Brain. This Is Your Brain On Music).

Monica's account sounds startlingly familiar to me. Music has long been a tool that I have utilized in my own studies. As a child I was introduced to the classics my parents listened to. I have vague memories of snoozing in my car seat while Fleetwood Mac or Cat Stevens played softly in the background. Slowly these melodies seeped imperceptibly into my soul as our car wound up the bumpy loops of our long dirt driveway. As I got older I began to have favorite songs and artists or my own, but there was a problem: I owned no music of my own. I had taken to carrying around a battered portable CD player and a jumbled collection of CD's. Unfortunately this system was both inconvenient and unwieldy. This all changed when I turned thirteen and received an i-pod for my birthday. Suddenly all the music in the world was available at my fingertips. This new music expanded my consciousness, provided a distraction, and allowed me to focus and refine my scattered thoughts.

Some of my strongest memories are from long car trips winding up the California coast. The drive was breathtakingly beautiful and I would occupy my time gazing out the window at the rolling hills dropping in harsh rocky cliffs straight down into the cold Pacific Ocean spray hundreds of feet below. As I gazed at this beauty lost in my thoughts my music provided a constant soundtrack. Each unique moment of my childhood was associated with a different album or song. My first month of community college printmaking class was marked by the indigo girl's album "all that we let in" I used it as a tool to get through long studio hours and remain productive. The heartfelt lyrics and upbeat tempo helped me keep my focus and remain motivated even when mastering difficult new techniques.

The song American Pie, by Don McLean unfailingly brings back memories of my father and the rusty white Toyota truck he used to drive. He would come home at the end of the day, his steps slow and weary but his voice raised in song "A long long time ago, I can still remember how that music used to make me smile, and I knew if I had my chance that I could make those people dance and maybe they'd be happy for a while" he would sing, lifting me into his arms despite how exhausted he was.

One of the first steps in my research process was to compile all of the songs that have strong childhood memories connected to them. This process was tedious and difficult, listening to each song brought back a host of faces and situations that I have not thought of in years. I found myself swallowed by a flood of old fears and insecurities. Many of the memories have a beautiful yet melancholy felling to them, this makes sense considering that I often used music as a tool to pull myself out a bad mood or deal with a hard day. I often personally identify with the song lyrics even if they don't directly associate with my situation. This list includes something from every phase of my musical history and each song has a story or feeling connected to it.

1. American Pie, Don MacLean
2. Fill It Up Again, Indigo Girls
3. La Noyee, Yann Tiersen
4. Stairway to Heaven, Led Zeppelin
5. Wednesday, Tori Amos
6. Mykonos, Fleet Foxes
7. The High Road, Broken Bells
8. The width of a Circle, David Bowie
9. Moon Shadow, Cat Stevens
10. Court and Spark, Joni Michell

These songs range from old classics to new Indi hits but each of them has left a footprint on the beach of my memory. Each one a stamp on my mind with a unique set of feelings to go along with it.

As I delved deeper into music's connection to memory and how this relates to what I refer to as the "true self" I found that I had more questions than answers. There is no doubt that music is an exceptional tool with the power shape the human mind in incredible and often unexpected ways. It can bring back buried memories, help children learn, and access unexplored layers of perception. It can inspire, enlighten, motivate, and awaken us. Yet I remain confounded, if our memories do not define us than what does? I feel like I am reaching for something that in many ways is unprovable. The only evidence I have to support my claim that music is a key to something deeper is my own experience. An outpouring of pure emotion so powerful that it makes my heart ache and my bones shake, as if my body is struggling to contain the melody shaking me to my very core. Throat tight and eyes wet I know only one thing, this is real and it is far more powerful than the surface layers of my consciousness. This feeling cannot be captured or reproduced at will, statistics and studies lack the power to describe it. All I can do is stumble blindly around attempting to capture its transcendent quality. Whether this is an expression of the fickle "true self" I keep mentioning is beside the point, if this is not true I do not know what is. Music has an unbreakable bond with my memory but this is just the beginning of its power.

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