

# Is Music More Than Auditory Cheesecake?

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# 1 Introduction

In the 2007 film, *August Rush*, the Freddie Highmores character August Rush says, The music is all around you... all you have to do is listen. This young character proves a valid point: music is everywhere. Its in the grocery store, the elevator, in your iPod, in movies, on intros to the nightly newscast, and if there isnt music coming from speakers anywhere near you, music can be found within you — your heartbeat. So if music is everywhere, why do some consider music to be what cognitive psychologist and scientist Steven Pinker calls auditory cheesecake — there simply to tickle the palate and lacking any evolutionary value?

In our Group Investigation we chose to focus on Daniel Levitins chapter on *The Music Instinct* from *This is Your Brain on Music*. Within the chapter Levitin addresses several topics refuting Pinkers idea of musics relation to evolution and its importance in development. His thoughts provoke readers to ask several questions: What role music plays in sexual selection? Does it promote cognitive development? Do other species use it for developmental and reproductive purposes? Does music make society work? Is music simply a spandrel — if it isnt adaptive or beneficial, why does it still exist? Does music affect the cerebellum? And the main question of the chapter, where did music come from? We address and form answers to all these issues, discussed by chapter, in this Group Investigation and ultimately answer whether music is merely auditory cheesecake, or something more.

## 2 Origins of Music *Mary McKenna*

Music is the art of sound, including the incorporation of rhythm, pitch and timbre. But where did this phenomenon originate? Although there is not one precise answer to this question, many different individuals have their own theories about its origination. According to Daniel Levitin, the study of the evolutionary origins of music has a distinguished history, dating back to Darwin himself, who believed that it developed through natural selection as a part of humor or paleohuman mating rituals [Levitin, 2006]. The basis of Darwins theory of the

origination of music is natural selection, which is the process by which favorable traits tend to become more popular while unfavorable traits become less common. The preference of these traits is decided among a population of consecutive generations of reproducing organisms. In accordance with Darwins theory, music originated because of its developing popularity from generation to generation. Although Darwins theory is very realistic, there are many other ways by which music could have originated.

On the contrary, the origination of music has the potential of being an unintended creation in a sense that music may have been developed from unintentional repetition of sound, patterns and rhythm. Out of instinct, humans imitate these musical sounds through humming tunes, clapping hands and tapping objects. Using various objects in nature helped curious individuals to create props, another site of musical development. This led to the incorporation of musical instruments along with vocalized music. Human beings use music to represent their beliefs, ideas and passions. For example, in some cultural environments, instruments are used to imitate the sounds of nature [Liperote, 2006]. Without the outstanding origination of music, the various emotions that individuals feel would not be able to be expressed. Although the theory of unintentional development is completely different in comparison to Darwins beliefs, they are both equally realistic.

Whether the origination of music was the result of Darwins theory of natural selection, the process of unintentional repetition, or both, without this artistic creation, many individuals lives would be significantly different. Musical art is involved within numerous occasions, events and professions. The prime invention of music can be dated back to the cavemens utilization of stones, drums, and creativity. The cavemens first step of banging items upon various objects, ultimately signifying a drum, created rhythm. Humming and vocalizing created the melody, which led to the harmony. The origination of music would be impossible without the creativity of cavemen and any of these three elements. How music has evolved to from these origins will be discussed in the next section.

### 3 Musical Evolutions *Thomas Linsenmeyer*

Music has adapted to areas all over the world as culture changes and evolves. In many places, mostly poor or less developed regions, music is a way of life. It is how history is taught and stories get passed on through generations. These people are displaying emotion through the beats of a drum or the tone of their voice, whether it is soft and quiet or loud and controlling. Music expresses, at different moments, serenity or exuberance, regret or triumph, fury or delight. It expresses each of these moods, and many others, in a numberless variety of subtle shadings and differences. It may even express a state of meaning for which there exists no adequate word in any language. In that case, musicians often like to say that it has only a purely musical meaning. They sometimes go farther and say that all music has only a purely musical meaning. What they really mean is that no appropriate word can be found to express the music's meaning and that, even if it could, they do not feel the need of finding it. This is a quote from Chris Dobrian, explaining how musicians see and perceive the music that they play. The adaptation of music has allowed this practice to persist successfully for so long.

Storytelling is a very important part of life. It is not the only way music is present, it can also be very beneficial to many people in many ways. The musicians who create and play this music use it as a way to release feelings or pain to their audience. Justin London says that a musician's expression is the sadness, exuberance, etc. displayed by the performer. This is evident in recent songs by artists such as Tim Mcgraw or Shania Twain, as well as the hula music played in class earlier in the semester. Along with expressing emotion, music can be used to send a message through lyrics or just the presentation and context of the piece. One song that demonstrates the sending of a message is *The Drinking Gourd*, which was a popular song used in times of slavery to secretly inform slaves about how to escape to the North. Finally, music is fun. Although, there are many ways music displays emotion, tells stories, and sends messages, but it is also made to entertain and for people to have

something to enjoy in the car or in the village square.

Music has shown its evolution throughout time and through the passing of cultures by becoming what it is today. While simultaneously maintaining the main causes of the creation of music, expressing emotion, storytelling, and entertainment. The reason music is still around today is because it has never lost its meaning and still plays a large roll in countries and the lives and societies of humans around the world.

## 4 Music and Society *Greg Rollins*

No matter how hard it may be to pick out an exact reason for music, many theories have been created in order to share some thoughts on the matter. According to Daniel Levitin, One theory is social bonding and cohesion. Collective music making may encourage social cohesions humans are social animals, and music may have historically served to promote feelings of group togetherness and synchrony, and may have been an exercise for other social acts such as turn-taking behaviorsHumans need social linkages to make society work, and music is one of them [Levitin, 2006, 258].

Although it appears that there could be some truth to Levitins ideas, there is no way of knowing what the exact reason might be. Further, Levitins words bring up a new question to ponder: does music make society work? Many feel that music is simply for entertainment. While this is true in some respect, music is more than just words and melodies – it has a purpose. What that actual purpose might be, however, is widely open to interpretation, for music plays a different role in every persons own life.

One key area in which music may have an influence is individual skill development. Making music utilizes a number of skills and elicits a wide range of responses, more perhaps than any other human activity. Participating in making music requires the development of aural, intellectual, physical, emotional, communication and musical skills in addition to high levels of commitment, motivation and organization.

Another key area that music influences is human response. As stated by Susan Hallam, a writer for the International Society for Music Education, the responses of human beings to music go beyond sound. Music can be experienced physiologically (e.g. changes in heart rate); through movement; through mood and emotion; and cognitively (through knowledge and memories).

Music also has an important role to play in the functioning of society. No human culture appears to be without music. Singing, in particular, seems to be universal. Music is habitually expressed in relation to religion, celebrations and dance. It forms a part of all major occasions and celebrations, including weddings, funerals, pageants, rights of passage and festivals.

In most cultures, music serves to assist in the process of increasing communication and enabling people to function together more effectively. It provides a means of expressing a wide variety of human feelings, love, sadness and a sense of belonging which people sometimes find difficult to verbalize. Making music and sharing its meanings within a culture or particular environment leads to cohesion and the strengthening of social unity. Moreover, music can also allow the expression of an identity that is counter to many societal norms. In some cases, it can be a powerful tool for change. It can play an important role in unifying and exemplifying commonality in those who are challenging societal norms and practices.

In addition to the value of music as an art form, music has always played an important role in theatre, television, films and video. Many great cinematic moments appear meaningless without the accompanying music. This need for music has led to enormous booms in the music industry. Music is a substantial economic generator of income in most developed countries, employing thousands of people. It requires a supply of musicians, not only to perform, but to undertake all of the tasks behind the scenes.

Another key area in which music influences society is medicine. Music has been used to support health education, reduce anxiety and pain in medicine and dentistry, increase

relaxation, improve recovery rates, stimulate the immune system, support rehabilitation after brain damage, improve coordination and difficulties in movement, reduce the negative effects of Alzheimers disease, tend the complex physical and spiritual needs of the dying, and help people work through grief and depression.

Not only does music have an effect on a persons physical development, it also influences their personal and social development. There are verifiable positive effects of involvement with music on a childs personal and social development, particularly for low ability, disaffected pupils and those of low economic status. There is also some evidence that involvement in music can increase social inclusion.

Commerce and advertising even use music as a means of grabbing the consumers attention. Music is a major component of consumer marketing. It is effective in enhancing the appeal of products and in promoting memory for them. It has also been used to manipulate consumers shopping, eating and drinking habits. The type of music we listen to may also be able to predict consumer behavior.

Throughout the 20th century, the development of electronic media revolutionized access to and use of music. We can turn on the radio, play a CD or tape, or listen to music on video or television with very little effort. Prior to these developments, music was only accessible for most people if they made it themselves or attended particular religious or social events. It has become an integral part of our everyday lives in a way that would have been unthinkable 100 years ago. It would be nearly impossible to learn of a society without music, mainly because that society would not have survived for very long.

It is clear that one, if not the main, purpose for music is to make society work. As we will discuss, though, music is not particular to humans, as it is found within many species other than our own.

## 5 Music and Other Species *Wyatt Warren*

Does music have the same effect on animals as it does humans? Some scientists seem to believe so. Most animals use and respond to musical tones only during the process of selecting a mate, and evidence suggests that many different species use forms of music as a way to determine which mate is the strongest and most suitable. In his book *This is Your Brain on Music*, Daniel Levitin describes the viewpoint of a cognitive psychologist by the name of Geoffery Miller. Miller parallels music to sexual selection mostly by using more relatable examples involving human situations. He does, however, bring to the readers attention the process of sexual selection in other species. He uses the relationship between the male peacocks tail and musical talent as a reference point for the readers. He then makes connections between how the peacocks tail becomes more elaborate and attractive when the male is healthy and strong and how that relates to a musician having the extra time and skill to attain a trait such as playing an instrument.

Certain species of animals have a direct relation to music insofar as they actually have a call or a tune unique to their respective species. Obviously one thinks of birds as the first and best example of a group of animals that have a call. Monkeys, frogs, dolphins, and whales also fall into this category. Scientists have studied the intricacies of mating calls of different species, with slim luck. However, ornithologists have made amazing breakthroughs in the classification and understanding of birdcalls. Experts in the field have found that birdsong is a way of communication either between two different types of birds or within the same species, between males and females [Catchpole, 1995, 2]. Birdsong can be used as a means of marking territory or as a way for a male bird to attract and mate, or vice versa.

Some researchers believe that musically and tonally advanced animals actually have the ability to differentiate tones and octaves. A study conducted by Melissa Shyan and Julie Nieworth of Butler University and Carleton College respectively found that rhesus monkeys seemed to be able to tell the difference between two different tunes. The study also showed

that the monkeys were not able to differentiate between single notes or even notes randomly put together. They were, however, able to understand and differentiate between childrens melodies. The authors of this study concluded that there is similar transduction, storage, processing, and relational memory of musical passages in monkeys and humans and has implications for nature-nurture origins of music perception.

Some whale mating calls have been studied on tape but it is extremely difficult to understand due to the fact that there is no common ground as far as communication is concerned. The main difference between humans and animals in the music aspect of things is that the animals use their tunes as a way to protect territory and mate. It doesnt seem that they create new, different tunes for enjoyment as humans do. This could be attributed to the fact that our brains are more developed therefore we need the stimulation of different music instead of the same tune all of the time. We have the means of creating new ways to make music through instruments other than our vocal chords, thus making it easier for one person to create a variety of tunes. Also, our brains have the capacity to understand how music works and is put together instead of simply singing a tune over and over. One musical similarity between animals and humans is that music can be a means of communication. Whether it is a small bird calling out for a mate, a whale singing a mating call, or a man with a guitar serenading a woman, music is used by many different species to communicate the same message. As in animals, musics affects are present in countless aspects of human life, including the cerebellum, sexual selection, and cognitive development.

## **6 Music and the Cerebellum** *Sara Rubenstein*

In order to address this issue, we must first consider the function and purpose of the cerebellum in humans. Latin for little brain, the cerebellum is one of the oldest parts of the brain, and it is the structure of the hindbrain that coordinates muscle movements. This is the part of the brain that is most affected by alcohol, and contains more neurons than all other parts

of the brain combined [Davis and Palladino, 2007]. The function of the cerebellum is crucial to music, as it deals with timing (Levitin, 2006), and is critical to maintaining our rhythm of life.

According to new research, there are several intriguing findings that point to how damage to the cerebellum affects verbal and musical abilities. For example, patients affected by this damage are more prone to error when performing verbal tasks, and are often less accurate than others in judging the difference of pitch between two musical tones. Because music is so old, and because the cerebellum is one of the oldest parts of the brain, it makes sense that one should directly affect the other.

In answering the broader question of whether or not music is an instinct, we can see that the evidence here clearly points to yes. The cerebellum, as the most primitive and developed part of the brain, is crucial to survival. When this part of the brain responds to music, it can only be assumed that this response is not accidental or unnecessary. Our abilities to understand and appreciate music directly correlate to the size of our cerebellum. People inflicted with Williams Syndrome (WS), for example, have a larger cerebellum than those with autism spectrum disorders (ASD) [Levitin, 2006]. As expected, those with WS are more receptive to sounds and rhythms, while those with ASD are not. Even in humans without mental disabilities, nonmusical people have smaller cerebellums than musical people.

But what effect does music have on the cerebellum? According to studies done by Daniel Levitin, strong activations in the cerebellum were found when people were asked to listen to music. It also responded more when people listened to music they liked, which suggests that the cerebellum is for far more than just motor skills: it may also be involved in emotion [Levitin, 2006]. The cerebellum has a strong connection to the amygdala and the frontal lobe of the brain, which deal with emotions and planning, respectively. The cerebellum not only helps us understand music, but it is necessary for performing music, as hand movements and rhythm (both of which are controlled by the cerebellum) are needed

for musical performance, especially that of an instrument. When studying the effects of harmony, melody, and rhythm on the brain, Lawrence M. Parsons found that the cerebellum responded to all three, specifically rhythm [Parsons, 2001].

Because such an old, developed part of our brain responds to music so easily, there must be more than just an accidental connection. The cerebellum not only responds to music, but it helps us to understand it, by helping us identify the rhythms within a piece, and even linking our emotions to it. Because we have developed such an understanding for music, and because this understanding stems from the oldest and most advanced part of our brain, it is clear that, in this case, music is much more than simply a hedonic random mutation. Music also has influence over sexual selection.

## 7 Music and Sexual Selection *Ashley Korn*

The Beatles, Elvis, Jimi Hendrix, Mick Jagger, and \*NSYNC all have something in common aside from being musicians—they have all been fawned over by women. What makes these musicians more appealing than the average person? Cognitive psychologist Geoffrey Miller revealed in Levitin's book that Jimi Hendrix had sexual liaisons with hundreds of groupies, maintained parallel long-term relationships with at least two women, and fathered at least three children in the United States, Germany, and Sweden [Levitin, 2006]. Why because they can sing a tune, strum a guitar, or beat a drum are musicians more appealing than a businessman?

Levitin claims that, in seeking mates, our innate drive is to find either consciously or unconsciously someone who is biologically and sexually fit, someone who will provide us with children who are likely to be healthy and able to attract mates of their own. Music may indicate biological and sexual fitness, serving to attract mates [Levitin, 2006]. In essence, sexual selection is all about finding someone who is sexually fit enough for you. Darwin believed that certain features emerge not because they serve any part of survival but be-

cause they make one more appealing to others. In his book *The Descent of Man*, he writes, I conclude that musical notes and Rhythm were first acquired by the male and female progenitors of mankind for the sake of charming the opposite sex. Thus musical tones became firmly associated with some of the strongest passions an animal is capable of feeling and are consequently used instinctively. This means that because our man Jimi adopted the ability to play the guitar, he became more sexually fit and a better mate.

Living in a college environment, one can see that the hunt for a fit mate is on. Students do their best to show off their best selves similar to the peacocks tail analogy; the bigger and more colorful the peacocks tail, the more appealing he will be to a mate; or to relate it to music, the bigger the hair was in the 1980s, the more attractive that musician was to the listener. “During sexual courtship, animals often advertise the quality of their genes, bodies, and minds, in order to attract the best possible mate. Many human-specific behaviors (such as conversation, music production, artistic ability, and humor) may have evolved principally to advertise intelligence during courtship.” So when a man reveals to a woman that he can play the guitar or that he can sing, he instantly becomes more attractive even if he isn't physically. Levitin states that the number of sexual partners for rock stars grows exponentially over what a normal male has and for the top stars, like Mick Jagger, appearance doesn't seem to matter [Levitin, 2006].

Another interesting aspect in the relationship between music and sexual selection is how sex roles almost seem to be reversed. Davis and Palladino in their book *Psychology*, cite research saying that the predicted pattern is that men make sexual advances and women are supposed to accept or reject. But in the world of music, it appears that typically when a male reveals his extra skill of musical talent that the woman is more apt to make a sexual advance (picture the great mass of women flocking after the Beatles, just trying to get a piece of one of the members). What is interesting is that you don't typically see men chasing after Beyoncé or even really see them in attendance at her concerts. Her skill has evolved just

as Elvis had, yet it is the fact that she will reproduce children that makes her more likely to be the one searching to find a mate with similar qualities (i.e. her new husband Jay-Z) so that her child may be equally as attractive.

In an article published in 2003 by the New York Times, author Nicholas Wade sums up Levitin's idea on the relationship between music and sexual selection by saying, "Since music draws on so many of the brain's faculties, it vouches for the health of the organ as a whole. And since music in ancient cultures seems often to have been linked with dancing, a good fitness indicator for the rest of the body, anyone who could sing and dance well was advertising the general excellence of their mental and physical genes to a potential mate. Despite cognitive psychologists Steven Pinker's idea that music is simply auditory cheesecake, Levitin gives valid explanations as to how music affects sexual selection by development of features appealing to future mates."

## 8 Music and Cognitive Development *David Ervolina*

When a child is born, over time cognitive traits are developed that is a clear model for evolutionary purpose. Some of those mechanisms may include memory, attention, judgment, decision making, and reasoning. Besides common attributes, such as the ones previously listed, we come across some that seems to have no apparent evolutionary principle. With the common popularity and the frequent occurrence of playing and listening to music, many researchers question if the concept of music helps promote cognitive development.

The very intelligent and well-respected scientist Steven Pinker was quoted saying, "language is an adaptation and music is its spandrel. This quote can be interpreted that by analyzing all of the cognitive abilities that human beings execute, music may be found as one of the least attractive operations to study merely because it is just a branch off the study of language [Levitin, 2006]. Pinker goes on to say that music is really just a behavior that is sought out solely for pleasure that was an evolutionary trait developed to support linguistics."

Unlike other common cognitive attributes that will help us later on in life, Pinker says that music is relatively useless and does not even brush upon aiding us towards any goals in the future. In comparison to our reliant attributes that make up for a lot of our senses such as language, vision, and physical activity, music could be taken out of our lives and it really wouldnt affect our lifestyle with a significant impact.

Many other researchers and scientists believe that Pinkers comments are very controversial, but may also be true. Other research has been performed that show that the listening to music and/or the participation in music lessons may have an affect on intelligence. Music listening and music lessons can lead to short-term and long-term cognitive enhancements. The listening to music is found to show short-term affects that may last between 10 -15 minutes while the listeners provocation level and frame of mind rise and fall with the time and experience [Schellenberg, 2005]. On the contrary, the practice of music lessons can show some long-term affects on intelligence in four different ways: they are a school-like learning activity that children may enjoy; they train multiple skills; they improve abstract reasoning; and the acquiring of music knowledge is similar to acquiring a secondary language. Something that should be kept in mind, though, is that music is not the solution to any quick fix for intelligence. Even though music lessons may be proven to have some long term benefits, the time that it consumes to acquire such a skill is proven to only jump someones IQ a couple of points and would not be worth the effort if one is pursuing to raise their IQ. Activities such as drama lessons are also to be a popular option with the difference being an improvement in social skills [Schellenberg, 2005].

The listening and practice of music does seem to show some aid to cognitive development. The Mozart Effect, the practice of playing Mozart composed music to an infant when the brain plasticity is the greatest, shows signs that may have a long-term impact. Most of the other affects show short-term intelligent boosts.

## 9 Conclusion

In conclusion, what our Group Investigation discovered is that music is, in fact, more than merely auditory cheesecake. Music most likely originated as a trait that developed in our earliest ancestors. Even if this mannerism of expression and communication was unintentional, the fact remains that music has remained a very prevalent part of our lives. Music is critical for our survival, since, if it were unnecessary, the desire and need for it would have died out long ago. Music in its earliest stages was used for communication, emotional expression, and storytelling. It has since developed into forms of entertainment that our society appreciates above almost any other art form. Music is imperative to our culture, as it is involved in skill development, human response, societal function, art, medicine, commerce, and countless other aspects of our lives. Even in the lives of animals, music plays a large role, which pays tribute to the idea that it is more than a simple evolutionary mishap. Animals use music not only as mating calls, but also as forms of communication. Some animals even undergo processes of distinguishing different kinds of music in ways similar to that of humans. The oldest part of our brain (the cerebellum) responds to music, and the size of this part and our ability to appreciate and understand music directly correlate. We as humans respond to musical abilities as attractive features in potential mates. Being musically fluent is instantly attractive and gives the appearance of sexual fitness. Music even assists in increasing our intelligence, as studying and listening to it can lead to short and long term cognitive enhancements. All this evidence supports the idea that music is more than just a part of our lives it is part of our survival.

The books *This Is Your Brain on Music* and *Psychology* helped us greatly in our research. Not only did the books provide multitudes of background information, but they also gave us definitions and explanations for some of the phenomena discussed in the investigation. We were able to rely on both sources for dependable information and accurate supporting evidence. By focusing specifically on one of Daniel Levitins chapters, his writing was a great

help in supporting our claims. Because we had to relate music to psychology, Davis and Palladinos book was perfect for making explicit connections between music and psychological factors.

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