

THE HUMAN MUSIC FASCINATION

By Thomas Jenkins

HUMANITIES AND ARTS COURSE SEQUENCE

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Especially since the advent of different communication mediums, namely radio, television, and the internet, we are not only exposed to, but also seek music constantly. There is no denying that music, especially live music, has become something of a fixation for many people. This is illustrated in the many music festivals across all cultures, many of which are reoccurring and draw enormous crowds. One of the first examples was the Pythian Games held at Delphi by the Greeks to honor the god Apollo, where music even predated athletic events.¹ Another, more recent, example is Woodstock, which drew a crowd of almost a half of a million people for the three day rock music festival.² Many recent festivals, notably Coachella in Indio, CA and Electric Daisy Carnival in Los Angeles, CA, draw 100,000+ people over a weekend. What, then, can be said about contemporary society's obsession with music? From the beginning of evolutionary studies, the existence and significance of music has been an incredibly controversial topic. Charles Darwin was one of the first to theorize that music held evolutionary significance, but others, notably Steven Pinker, refute this, calling music "auditory cheesecake." Because of the complex nature of the human brain there has been little scientific study of music's effect on the brain until recently, with today's researchers, like Daniel Levitin and David Huron, making more progress in this field than ever before. Much like the complex nature of brain development, music appreciation has too changed over time, but still continues to offer significant value to individuals on a variety of levels. While there is still much to be learned about how the brain works, it is clear the link between humans and music is significant,

¹ "Pythian Games." *Encyclopædia Britannica. Encyclopædia Britannica Online*. Encyclopædia Britannica, 2011. Web. 26 Feb. 2011.

² BBC News, . "On this Day: 1969: Woodstock Music Festival Ends." *BBC 8-18-1969 1969*. Web.

yet multifaceted, holding both physical and cultural evolutionary significance and cannot be held explicitly to either Darwin's or Pinker's theory.

The obvious first place to start in understanding the origins of music is physical, archeological evidence. An instrument or record of musicality that would support an evolutionary significance would have to be very old for this warranting merit. This is due to the fact that evolution does not work over a short period of time, but rather over seemingly countless generations.³ As it turns out, the first true musical evidence uncovered was a bone pipe found in Germany dated to around 34,000 BC.^{4 5} This pipe, along with other archeological evidence, asserts that human musicality is indeed very old. It is quite plausible that singing and even percussion instruments may have predated the bone pipe. Every culture, even those that have been isolated from other cultures, as Ian Cross, a neuroscientist and human musicality historian, states, "For most of the times and cultures that we know of, their mature musics overtly involve not just sound, but also action. Any attempt to find general attributes in music must acknowledge the embodied nature of music, the indivisibility of movement and sound in characterizing music across histories and societies."⁶ He goes on to say that this is not an isolated occurrence, "The fact that music appears about as early as possible in the traces of *Homo sapiens sapiens* in Europe, together with the fact that musicality is an attribute of both the peoples of the pre-Hispanic Americas and of the aboriginal people of pre-colonial Australia, provides good grounds for believing that music accompanied *Homo sapiens sapiens* out of

³ David Huron. "Is Music an Evolutionary Adaptation?" *Annals New York Academy of Sciences*. 2001. 48.

⁴ Ian Cross. *Music and Biocultural Evolution in Cultural Study of Music: A Critical Introduction* by Clayton. Trevor Herbert Martin, and Richard Middleton, eds. 2003. 26.

⁵ Daniel J. Levitin. *This is Your Brain on Music: The Science of a Human Obsession*. New York: First Plume Printing - Penguin Publishing, 2007. 256.

⁶ Cross 28-29.

Africa.”⁷ Levitin echoes, “One striking find is that in every society of which we’re aware, music and dance are inseparable.”⁸ Clearly, then, there is need for research into this linkage as it is truly cross-cultural and seemingly fundamental. While there is general consensus that music spans across all cultures, this is not enough evidence alone to conclude that music indeed holds any significance.

More promising evidence would be that of a physical gene that leads humans to express musicality. The discovery of a genetic predisposition to a particular behavior would categorically determine that it was the direct result of natural selection. Unfortunately there has been no such discovery in humans for any kind of behavioral gene.⁹ In fact, there is even the possibility for genes to piggyback on other, adaptive genes, thus not touched by natural selection. There has been, however, research leading to an understanding of a genetic hardwiring of our brains and ears to determine pitch, which may lead to further genetic discoveries linked to not only the sense of hearing but also cognition.^{10 11} This delves into another deep area of study that seeks to understand what parts of who we are come from genetics and culture and how these “adaptations” are passed on. Richard Dawkins, a respected evolutionary thinker, pioneered the idea that many characteristics we have today do not have a genetic origin, but rather are acquired through culture and interaction with others. David Huron, a researcher of music cognition, sums up this tricky area, “Music is now part of a Lamarckian system where acquired characteristics are transmitted in Dawkinsean “meme pool”

⁷ Cross 26.

⁸ Levitin 257.

⁹ Huron 48.

¹⁰ Cross 63.

¹¹ Huron 48.

rather than in Mendelian “gene pool.””¹² What he is essentially saying is that there are behaviors or traits that one picks up through inherited culture and subsequently impresses that on his or her offspring through interaction. Because there has yet to be conclusive genetic evidence that would support musical ability being heritable, it could be in fact something that has arisen out of human interaction. While the physical evidence is inconclusive in telling the story of humanity’s relation to music, ethological evidence could potentially link music to an evolutionary function through analyzing behaviors. This type of evidence seeks to understand if music can influence gene survival. Music embodies a variety of types of perceived functions, but for this kind of research and reasoning to lead to evolutionary significance there has to be a positive effect on the survival of that person’s genes.

When one thinks of evolutionary theory, the term “survival of the fittest” is bound to come up. While succinctly illustrating the basic idea, the entire theory is more complicated. Natural selection suggests not simply that genes that are passed on represent those with an advantage. Daniel Levitin explains, “If one species develops a mechanism to keep away a particular predator, that predator’s species is then under evolutionary pressure either to develop a means to overcome that defense or to find another food source. Natural selection is an arms race of physical morphologies changing to catch up with one another.”¹³ At a high level, being successful means mating, reproducing, and ensuring that the offspring have the ability to do the same. One cannot start this exploration of the evolution of music without introducing Darwin’s studies, where he made the assumption that music may be one of these

¹² Huron 59.

¹³ Levitin 8.

adaptive traits in his *The Descent of Man and Selection in Relation to Sex*, exemplifying sexual and potentially biological fitness.

When we treat of sexual selection we shall see that primeval man, or rather some early progenitor of man, probably first used his voice in producing true musical cadences, that is in singing, as do some of the gibbon-apes at the present day; and we may conclude from a widely-spread analogy, that this power would have been especially exerted during the courtship of the sexes,--would have expressed various emotions, such as love, jealousy, triumph,--and would have served as a challenge to rivals. It is, therefore, probable that the imitation of musical cries by articulate sounds may have given rise to words expressive of various complex emotions.¹⁴

Naturally, there has been a lot of study into the origins and function of traits, such as language and music, especially by Darwin himself. The hypothesis is simply that music may serve as a behavior integral to finding a mate and procreating. Unfortunately, Darwin did not have the luxury of all of the technology we have today to study ourselves, so he had to rely on what was available. In much the same manner as he supported his overarching evolutionary theory as a whole, he studied other species and compared them to humans. His most notable of investigations was into the singing of birds, to which he asserted that song functions as a display to find a mate.¹⁵ Before this time, many had thought that bird song was something completely unnecessary or even that it was to signal the existence of a creator to humans.¹⁶ Darwin, however, saw that birds sang far more during breeding season. In addition, he observed that birds put a lot of energy into their song, thus sacrificing energy that could be used for other purposes. The greatest example of this is that some birds simply die from their

¹⁴ Charles Darwin. *The Descent of Man and Selection in Relation to Sex*. 1871/2004. Penguin Classics, New York. 87.

¹⁵ Darwin 370.

¹⁶ G. F. Miller. *Evolution of human music through sexual selection* in *The Origins of Music* by N. L. Wallin, B. Merker, & S. Brown Eds. 2000. MIT Press. 330.

singing efforts.¹⁷ It has since been biologically concluded by many researchers that Darwin's hypothesis was correct; bird song was evolutionary significant.¹⁸ As a result, it is not too farfetched that this could apply to human behavior.

If you were to frame natural selection in the strictest of terms, a fair bit of what we would consider normal life is completely extraneous. For example, there is no logical reason to live a long life beyond protecting and providing for offspring after reproducing. Darwin saw that there was more to this when he formulated his theory of "natural selection" to take into account sexual selection. He understood that there have to be some hard-coded attributes that help attract a mate, which we now know eventually made it into DNA. Traits, such as child nurturing, would then have spread throughout the population over time. There has been much inquiry into this idea and how these traits emerged either by genes or by cultural influence as mentioned previously. This, like most evolutionary theories, is heavily disputed, but should be considered and will be explored a little later. It is clear, however, that mate selection would be one of these characteristics.

Another perceived function of music is that of more general interpersonal interaction. While fairly broad, interpersonal interaction takes into account facets of group cohesion, effort, and conflict mediation. The basis for this thinking lies in the fact that music is communicable. Darwin expanded his research to further explore what he called "expression of emotion". This work still relied on comparing different species to humans but did not relate to just mate selection, but rather to communicate in general. Aside from significance in regard to mating,

¹⁷ Darwin 369.

¹⁸ Miller 331

Darwin saw that there was much importance to how we communicate to others and that there was much to be learned. Because of the many similarities between humans and other species, he concluded that humans were indeed a product of evolution. He was not able, however, to conclude where music fit into social dynamics and stated that there was much room for discovery. While Darwin was one of the early observers of communication and social dynamics in the evolutionary sense, he was certainly not the last.

As there are many facets to evolutionary musicality, there are too many facets to group dynamics. Initially, individual interaction poses a variety of challenges for a person; moving from recognition of that person, past memories, and eventually the value of interacting with that person.¹⁹ When this situation goes from a single person to a group of people, there are even more challenges. There are many individuals with different motivations, but somehow there is a common link between them. This link is simply that there is some value in being in the group as a result of collective similarities that then leads to cooperative action.²⁰ If an individual cannot earn the trust of another individual, how would there ever be group interaction? In Darwin's exploration into this idea of social cohesion, he explains that emotions are very important in a group. According to Darwin, emotions are what give character to the words, and can often speak more about the speaker's intentions than the content.²¹

Music, if nothing else, is communication. In this frame, it could represent a specific group and even signal an emotion to others. This could be useful in fostering unselfishness;

¹⁹ Martin Novak, Robert May, and Karl Sigmund, *The Arithmetics of Mutual Help* (1995) in *Darwin* by Appleman, Philip, eds. 2001. 407.

²⁰ Edward H. Hagen, and Gregory A. Bryant. "Music and Dance as a Coalition Signaling System." *Human Nature* 14.1. 2003. 25.

²¹ Darwin 611.

influencing individuals within a group to work toward a goal, thus increasing the group's effectiveness in other areas.²² This could pertain to work, for example, helping to coordinate rowing on a boat or moving something large. Music can signal anything from the synchronizing the rhythm of a task or providing encouragement others to join in the effort.²³ It is important to understand that music does not result in any sort of initial group cohesion as that was achieved by other interactions. That is to say, there were other factors in the interaction between individuals that led to the cohesion and music is a signal of that coherence. Because music is communicative of emotions, it is possible that it can even reduce conflict within a group. In much the same respect, music could also offer a safe way to pass time.²⁴ For example, a person would potentially increase the chance of suffering injury doing some other activity unless there is a safe form of entertainment such as music.

It is safe to assume that culture holds some answer to the evolutionary significance of many behaviors as a result of the group dynamic argument because humans acquire culture through interpersonal interaction and signal it to others through communicative behaviors like music. Much like Darwin, Edward Wilson analyzed human emotions, but elaborated on how humans form and express various emotions through the hypothalamus and limbic system of the brain, formed through natural selection. He affirms that any trait that has spread throughout the population through generations will characterize the species as a whole. He articulates this idea by stating "85% of variance composed of diversity within populations and 15% was due to

²² Huron 22-23.

²³ Hagan 42.

²⁴ Huron 47.

diversity between populations."²⁵ The spread of culture is due to interaction with other humans, yet is based on how we are hardwired at the same time. This links to music because music is present in every society, yet there are distinct and fundamental differences between different social groups despite the fact that genetically humans are extremely similar. Culture takes on a more of a heritable role in humans in determining behaviors, such as preference and aptitude to music. This doesn't leave a comfortable amount of certainty in the origins of music and how, if at all, it is significant evolutionarily as musicality is potentially not genetic, thus not strictly adhering to natural selection.

So far, all of the theories and types of evidence have alluded to various possibilities but have not been conclusive in understanding musicality. One theory that has arisen is that music does not hold *any* evolutionary significance. Steven Pinker, one of the more influential cognitive and evolutionary psychologists of our time, theorizes that music was a byproduct of other adaptations and as such, is not essential to natural selection. He supports this by explaining that music does not have a clear, scientific, or engineered evolutionary explanation, yet music affects an emotional response in the brain due to a hormone. This idea of a trait appearing for no clear adaptive reason was pioneered by Stephan Jay Gould, another notable evolutionary thinker. The trouble with such adaptations is that they take on or change function after time, hiding their origin. Gould calls these traits "spandrels", derived from the architectural term for the space between arches.²⁶ Essentially, when arches are constructed, there is gap that is formed between them. This gap was not part of the initial design, but rather came into existence as a result of the arches. Pinker says that language is the initial adaptation

²⁵ Wilson, Edward O.. *Sociobiology: The New Synthesis* (1975) in *Darwin* by Appleman, Philip, eds. 2001. 411.

²⁶ Levitin 248.

and music resulted from it. He asserts that music continues to be passed on as a result of Dawkins' "meme" theory. Pinker states, "Music is auditory cheesecake, an exquisite confection crafted to tickle the sensitive spots of at least six of our mental faculties."²⁷ He goes on to say that much like our taste buds' pleasurable reaction to sugar, music elicits a similar pleasurable experience. He does not say that music has not been used in a variety of ways, but rather that it was an accidental by-product of language and thus is not essential to survival. He even goes so far to say that if we were to remove music from culture, it would have no affect on our lifestyles at all. Others have come to this same conclusion, namely Dan Sperber and John Barrow, who assert that music exists simply for pleasure.

Other actions elicit a pleasurable response, especially sex, which are integral to success of a species. Naturally, our brains seek out pleasurable activities to tap into reward systems while not having an adaptive function. Pinker's theory hinges on the existence of non-adaptive pleasure seeking (NAPS) behaviors.²⁸ The example he gives of cheesecake relates back to early human history, where sugar and fat were a very small and rare part of a person's diet. They were, however, important nutritionally in the small levels available.²⁹ Our taste buds then progressed to reward a person for ingesting sugar and fats. This was then derailed by technological advances that resulted in today's diet where there are high levels of sugars and fats in many foods, essentially short-circuiting our brains to obsessively seek out the pleasurable response. An even better example of this can be seen with drug use. Many drugs directly influence the pleasure centers of the brain, especially heroin and cocaine, yet do not

²⁷ Pinker, Steven. *How the Mind Works*. W. W. Norton & Company, 2009. 534.

²⁸ Huron 45.

²⁹ Huron 45.

have a clear function for survival. Huron says, “Heroin users tend to neglect their health and are known to have high mortality rates. Furthermore heroin users make poor parents- they tend to neglect their offspring.”³⁰ This neglecting of health does not help your chances of fostering future generations. Following this reasoning, if music is not adaptive, then it would disadvantage us. Thus it would not have been around a long time because it is counterproductive.

Clearly music continues to be extremely popular with no sign of disappearing, and its history provides a compelling case refuting the argument that it is pleasurable only. This is where modern understanding of how the brain works is seeking to make progress. It is generally accepted that the brain is an extremely complex system, grouping various pieces to perform functions such as interpreting and producing music.^{31 32} There are a variety of factors that go into grouping. For example, a person perceives an object based on physical attributes of it, such as the dimensions, but also on a psychological level, such as a memory associated with that object. This goes a bit further, however, as Levitin points out, “At a deeper level, the emotions we experience in response to music involve structures deep in the primitive, reptilian regions of the cerebellar vermis, and the amygdale- the heart of emotional processing in the cortex.”³³ He goes on to say that there is no specific music center, but that the different functions are distributed in the brain have to coordinate.

³⁰ Huron 45.

³¹ Levitin 78.

³² Tanner, Nancy *On Becoming Human* (1981) in *Darwin* by Appleman, Philip, eds. 2001. 430.

³³ Levitin 87.

Because the perception and production of music utilizes a variety of faculties, it is more than plausible that making music serves as a clear sign of health. Proficiency, perhaps, then would also show material wealth as it takes time and energy to hone a skill and coordination that would otherwise be used to fend for oneself. This idea of biological fitness has changed, with many in today's modern society flaunting expensive clothing, cars, and homes.³⁴ Evolutionarily speaking, luxury items like those clearly show resource wealth.³⁵ The message is that clearly a person with these excessive things has more than enough to survive, thus would be a good mate. Making music could even demonstrate the originality and flexibility of a person, thus also showing fitness to reproduce. A recent study conducted by Martie Haselton, a researcher at UCLA, with women during various stages of menstruation supports this possibility.³⁶ Women were asked about the attractiveness of potential mates based on a written passage describing them. The questions the researchers asked the women stressed the fact that creativity was because of genetics and that wealth was largely based on luck. Most women preferred the poor artist to the rich, but not creative man. Age is another aspect to consider, especially as men are most sexually active in teenage years. Today's society supports the idea that musical interest seems to coincide with sexual peak. As Miller sums up, "Music evolved and continues to function as a courtship display, mostly broadcast by young males to attract females."³⁷ While it is evident that larger numbers of younger males in society are going to concerts, learning instruments, and starting bands than older males, the idea that this relates to courtship does not immediately make logical sense. The older men have lived longer, thus

³⁴ Hagen 51.

³⁵ Levitin 253.

³⁶ G. F. Miller and M. G. Haselton. *Women's Fertility Across the Cycle Increases the Short-Term Attractiveness of Creative Intelligence in Human Nature*. Vol. 17, No. 1. Transaction Publishers. 2006. 50-73.

³⁷ Miller 21.

being exposed to music over a longer period of time, than younger men. This should result in the older members of society having more advanced musicality, yet that is not what is seen.³⁸ While reproduction may not be the primary motive when it comes to music, it seems difficult to completely detach it.

Recent studies have taken this idea of showing fitness and looked at it from a different perspective, in the process stumbling upon a discovery in this field. Daniel Levitin and Ursula Bellugi have been studying individuals with mental disorders, especially Williams syndrome (WS) and autism spectrum disorders (ASD). WS is genetic in origin with those affected being particularly good at music and very social. ASD may or may not be genetic, but people with ASD often cannot read emotions in others. Some are good at music, but are not moved by music at all. Those with ASD are completely unable to appreciate many aspects of art and music as a result of their inability to understand communication of emotion, which as was discussed before is key to most interpersonal and group interaction. The link between sociability and musicality is strongly suggested by this case and others like it. The hypothesis is that there may be genes responsible for sociability and musical ability; supported by observations of deviations like those displayed by persons with WS and ASD.³⁹ Further study into these diseases has shown that these differences or deviations with regard to musicality and sociability are complementary. There is a strong link between the physical and behavioral differences in those with these diseases that allude to the presence of genes responsible, perhaps only in part, for musicality and sociability. Studies by other researchers have shown persons with these diseases have differences in brain size compared to the other disease and those without either

³⁸ Levitin 259.

³⁹ Levitin 259.

disease. The nuerocellebelum, the area of the brain found to play a large part in musical cognition, has been found to be larger in individuals with WS.⁴⁰ While many aspects of these diseases are yet understood, this linkage between observations of physical pieces of the brain to musicality continues to be strengthened. Levitin's continued research has shown that those with WS use more and different parts of the brain when they are listening to music. Additionally, he discovered that the areas of the brain responsible for emotion were more active than those without Williams.

Much like how our paradigm of fitness has developed over time, so too has the way we appreciate music. Early hunter-gatherer humanoids would probably have utilized instruments such as drums or early flutes in a group setting. We see this in the cultures that have been isolated, essentially living as our ancestors did thousands of years ago.⁴¹ Today, however, there is a changing paradigm of music. Recently, evolutionarily speaking, music has transformed from an interactive, group activity to that of the performance of a musician for an attentive audience.^{42 43} The emotional aspects intrinsic to a specific group eventually characterize the music of that culture and the response to that music.⁴⁴ For example, a rock concert featuring The Who would include great outward expression from the audience while conversely an audience for a classical orchestra would be reserved, inwardly feeling emotion. There has been recent study that showed pleasurable responses as a result of listening to music as a result of increased hormone levels.⁴⁵ The study concluded that group cohesiveness increased as a result

⁴⁰ Levitin 259.

⁴¹ Levitin 256.

⁴² Cross 66.

⁴³ Levitin 257.

⁴⁴ Levitin 258.

⁴⁵ Huron 57.

of the pleasurable release of hormones, which supports not only the group cohesion theory, but also furthers the pleasure seeking argument.

While the origins of music continue to be unknown, evidence strongly suggests that there is indeed evolutionary significance with regard to human musicality. It is clear that musical appreciation and ability are not extraneous to our survival, yet aspects of music have changed as time has gone on. These new studies are furthering the understanding of how our brains work and how we as humans have gotten to this point today. It seems as though the current evidence is suggesting a mix between Darwin's theories and those of Pinker. We may be short circuiting our brains for pleasure, but that is not the primary reason music has maintained a place in culture. Much like early speculation on heredity before the discovery of DNA, cognitive study is still in early stages, but offers immense potential to understand very fundamental aspects of every human. There is also little reason to believe that music does not have at least some place in sexual selection. For confirmation of this, look at rock stars like Keith Richards or Jimi Hendrix, who have no trouble finding multiple mates. Whether musicality has genetic roots or if it was the result of other adaptations and culture is not as important as the fact that it is incredibly powerful and serves a variety of positive functions toward successful human flourishing. The scores of people gathering all over the world to make and appreciate music in every culture are simply exemplifying what it is to be human in today's world.

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