A Critical Review of Three Theories for Music’s Origin

A thesis presented to

the faculty of

the College of Arts and Sciences of Ohio University

In partial fulfillment

of the requirements for the degree

Master of Arts

Kevin W. Kondik

March 2010

© 2010 Kevin W. Kondik. All Rights Reserved.
This thesis titled
A Critical Review of Three Theories for Music’s Origin

by

KEVIN W. KONDIK

has been approved for
the Department of Philosophy
and the College of Arts and Sciences by

________________________________________

Arthur Zucker
Associate Professor of Philosophy

________________________________________

Benjamin M. Ogles
Dean, College of Arts and Sciences
ABSTRACT

KONDIK, KEVIN, W., M.A., March 2010, Philosophy

A Critical Review of Three Theories for Music’s Origin (82 pp.)

Director of Thesis: Arthur Zucker

This thesis compares three theories which debate whether or not the trait of music is constitutive of a biological adaptation. Steven Pinker advances a view that music cannot be an adaptation because making or responding to music utilizes faculties which evolved for other reasons. On the next view, Geoffrey Miller claims that music is a sexually selected trait which evolved primarily to seduce potential mates. Finally, Ian Cross argues that music can be seen as an extension of juvenile behaviors into adulthood and has efficacy in the consolidation of bonds within a group. I conclude that all three theories are insufficient as an explanation of why music evolved in the hominid lineage. The main reasons why these theories all fail is they all rely upon a speculative historical reconstructions and imprecise definitions of music. To conclude, I suggest that a modified version of Pinker’s non-adaptive hypothesis should be endorsed.

Approved: _____________________________________________________________

Arthur Zucker

Associate Professor of Philosophy
# Table of Contents

Abstract ............................................................................................................................... 3  
Précis ................................................................................................................................... 5  
Introduction: A Critical Review of Three Theories for Music’s Origin ......................... 10  
Chapter One: Steven Pinker’s Non-Adaptive View ......................................................... 18  
  Conclusion for Chapter One ......................................................................................... 37  
Chapter Two: Geoffrey Miller’s Sexual Selection View .................................................. 38  
  Conclusion for Chapter Two ......................................................................................... 56  
Chapter Three: Cross’s View ............................................................................................ 58  
  Chapter Three Conclusion ............................................................................................ 74  
  Conclusion .................................................................................................................... 75  
Works Cited ...................................................................................................................... 79
PRÉCIS

Prior to analyzing the three views, I discuss relevant terms which will be used throughout the exposition. I start with Elliot Sober’s etiological or strong view of adaptation. On this view, a trait’s genesis cannot be separated from the historical reasons for why that trait persists over evolutionary time. In contrast, a propensity view of adaptation claims that a trait’s efficacy in solving a current adaptive problem is enough to call a trait an adaptation. Since the question at hand is in regards to music’s origins, a propensity view is insufficient for this kind of analysis. The reason for this is because a trait’s current use may have nothing to do with the reasons that the trait was manifested.

Also, I review theories of selection e.g. natural, sexual, kin, group and gene-level selection, in order to further assess the theories at hand. I conclude that even if music is an adaptation a single level of selection may not be an exhaustive description of a trait such as music.

I also discuss the field of evolutionary psychology and how its’ methodological practices and constraints apply to each author. Evolutionary psychologists generally agree that an etiological view of adaptation and function should be adopted when trying to call a psychological trait a species-typical adaptation. Evolutionary psychologists endorse a thesis in which mental traits can be atomized and separable from other aspects of cognition. Once isolated, a researcher can give reasons why a certain trait evolved in the way that it did. These atomized mental organs can then be described as universal attributes possessed by all normal individuals. However, a declaration for why a trait exists relies upon a search for an environment of evolutionary adaptedness which is a
speculative statistical aggregate of the selection pressures along with the period in which a trait evolved. Since music is a psychological trait and only leaves very indirect fossil evidence, I conclude that this type of reconstruction is nearly impossible.

Steven Pinker is an evolutionary psychologist and language adaptationist. As a result Pinker concludes that musical abilities are primarily predicated upon a person’s ability to use language along with other capacities such as basic hearing or non-linguistic vocalizations. But most importantly, Music is a non-functional by-product of the architectural constraints which support humans’ ability to use language. I attack Pinker’s categorization of music as a pure pleasure technology with ethological and archeological evidence which suggests that music may have been a means of rudimentary communication before or concurrent with natural language. If this is correct, music’s efficacy in communication may have evolved for adaptive functions rather than to pursue a hedonic non-fitness promoting experience. So, my critique challenges the anachronistic conception Pinker holds about music being delivered by musicians to cause pleasure in a passive audience. Since there are no fossilized sounds we cannot know for certain if music or language had any evolutionary priority over each other or if either can properly be called adaptations. For these reasons, I claim that Pinker fails in his non-adaptive account of music.

Next, I describe Geoffrey Miller’s view which claims that music is a product of the process of sexual selection via mate choice. On this view music has the function of facilitating increased mating opportunities for those who excel at musical production. Miller claims that the possession of a hard to fake indicator such as the ability to vocally
or instrumentally produce music serves as an honest signal to potential mates. His analogy is that music is similar to the peacock’s tail. According to modern indicator theory, peahens assess potential mates based on the size and vibrancy of male tails. Once mating occurs, Fisher’s runaway sexual selection model shows why females who like vibrant tails will select for male offspring with vibrant tails and females who have an insatiable preference for those tails. I conclude that music for courtship comprises only a subset of the range of musical works and enhancing sexual desirability may not be music’s primary function or reason for music’s existence. Miller also relies on a propensity view of function along with an imprecise definition of music which stymies his entire analysis.

Finally, the third view I examine is Ian Cross’s view that music is an extension of infantile and subsequently juvenile behavior. Cross begins with a sustained critique of Pinker’s and Miller’s views by attacking their imprecise definition of music. The pursuit of a hedonic encounter through music may not have been how music was deployed in its relevant environment of evolutionary adaptedness. Instead, Cross insists that more attention must be paid to how hominids produced music in an ancestral environment. In contrast with Pinker and Miller, Cross describes a more egalitarian style of the production of music as something that would have been done with others. This is opposed to an individual listening to the radio which makes it seem like music is a commodity produced by experts for individual pleasure. Also, Cross is sensitive to the claims of ethnomusicology that the multiplicity of styles of music makes it unlikely that music is an adaptation. But, Cross identifies Infant Directed Speech (adults automatically adjusting
the way they speak to infants, ‘baby-talk’) as a possible developmental precursor to musicality which precedes any cultural influence which shapes music. Mothers speaking to infants do so in a stereotypical manner which cannot explicitly be described as entirely linguistic or musical. So, Cross suggests that as a methodological practice we should not artificially separate auditory actions as music or language. This allows for oration, poetry, vocal music and other hybrid forms to be put on a continuum as having more or less linguistic or musical character.

I conclude that Miller’s view is the least acceptable, while trying to fuse the conclusions of Cross and Pinker for a better view with less unverifiable assumptions. I endorse Pinker’s non-adaptive view of music as being a derivative of faculties evolved for entirely different purposes. But I reject Pinker’s assumption that language is the main adaptation which allows for musical construction and appreciation. This is because the same problems (lack of fossil record for sounds, speculative accounts of pre-cursors to language and music) which apply to reconstructing how music evolved apply to the evolution of language. In addition they both rely on an unverifiable reconstruction of an ancestral environment of evolutionary adaptedness. So instead of claiming that music or language evolved first, I endorse Cross’ continuum view of music and language as two means of communication which are artificially separated and I add that they each may rely on domain-neutral mental machinery. But, I reject Cross’s view that musicality is an extension of infantile and juvenile behaviors. I also conclude that for social traits such as music and language to be deemed candidates for adaptation, they must include some
multi-level view of selection. But overall, in agreement with Pinker I conclude that it is unlikely that music was selected for in the biological sense.
INTRODUCTION: A CRITICAL REVIEW OF THREE THEORIES FOR MUSIC’S ORIGIN

The concept adaptation can be defined as follows: “[c]haracteristic c is an adaptation for doing task t in a population if and only if members of the population now have c because, ancestrally, there was selection for having c and c conferred a fitness advantage because it performed task t (Sober 2000, 85).” I am using this definition to assess the views of three scholars who are discussing whether or not the trait of music has evolutionary origins and if music is constitutive of a biological adaptation. Before beginning the analysis more needs to be said about why Elliot Sober’s definition is appropriate for this type of inquiry as opposed to competing definitions of adaptation. The term adaptation can be deployed in reference to two different types of adapting. Phylogenetic adaptation is the process whereby the composition of a population is altered over many generations to produce a reliably developing characteristic (Sober 2000, 86). In contrast, ontogenetic adaptation describes how individual organisms adapt to an environment via conditioning (Sober 2000, 86). The definition Sober gives above is in reference to phylogenetic adaptation, not ontogenetic. This distinction will be important throughout the exposition since the various authors I examine will occasionally fail to acknowledge the difference. The reason I chose to utilize Sober’s view of adaptation is because it relies on an etiological view of function. On the etiological view, ancestral manifestations of a trait in question are to be privileged over current instances of a trait. In opposition, the causal role view privileges current functionality over ancestral function. Causal role theorists “want to decouple claims about function from
claims about evolutionary history because they have doubts about our ability to
reconstruct evolutionary histories accurately (Sterelny & Griffiths 1999, 223).” Causal
role theory is primarily used in medicine and related disciplines where evolutionary
history is mainly irrelevant to their tasks. However, propensity theorists have narrowed
the causal role theory by claiming that “[t]he functions of a trait are its adaptive effects,
rather than the effects for which it is an adaptation (Sterelny & Griffiths 1999, 222).”
The label of propensity theory is given to this view since “functions are effects that
increase an organism’s propensity to reproduce (Sterelny & Griffiths 1999, 222).”
Sober’s definition also describes how adaptations must confer a fitness advantage to
those who bear the trait. According to modern evolutionary theory, random chance
during genetic recombination will produce variations within a population. Some of these
variations will be heritable while others may be caused by changes incurred during the
lifespan of the organism (Brandon 1996, 5). As a result, the reproductive success of the
various organisms will be determined in part by which heritable variants are a better fit to
their environment. Those who are better adapted since they possess a certain trait will
(on the average) reproduce more often than those who do not have the trait and this is
called differential fitness (Brandon 1996, 6). Adaptations occur when a variant is so
successful that eventually the frequency of the alleles responsible for the trait will be
driven to fixation leaving an adaptation as a species typical trait which is possessed by all
members of the species.

But there is still a significant question remaining with Sober’s definition of
adaptation and that is what he means by selected. The process of random variation in
conjunction with heritability that produces differential fitness is commonly referred to as natural selection. In this mode of selection, the different traits possessed by individual organisms are selected for in virtue of their ability to confer a reproductive advantage to the individual possessing the trait. Those who have the trait tend survive better and breed more often leaving offspring which are better adapted to their environment. Darwin also described the process of sexual selection which produces weapons or ornaments due to mate choice. This mode of selection will be covered in detail during chapter two. However, in addition to the selection of traits which will benefit single individuals, it is hypothesized that selection can operate on the level of the group as well. For instance, “[m]any altruistic behaviors that would be selected against within a single population will evolve in a population divided into groups (Sterelny and Griffiths 1999, 332).” Group selection may occur even if the traits would lower individual fitness but on the average will allow for group benefits (Sober & Wilson, 1998). In general, most theorists deny that group selection ever occurs in nature since the pressures for individual selection will always be greater. A variant on group selection is kin selection. On this level of selection individuals help members of their own family (or group) because they are indirectly supporting the success of their own genes as well (Hamilton 1964; Smith 1964, 1145-1147). Altruistic traits evolve because by helping one’s close relatives it is hypothesized that you are actually helping yourself by them passing on similar genes. Additionally, kin selection can be cast in terms of reciprocal altruism, when I help you I expect you to reciprocate by helping me in the future. Kin selection is generally favored over pure group selection formulations since it is cast in nepotistic terms. In addition, it
is postulated that selection occurs on the level of the genes as well (Williams 1966; Dawkins 1976). This view claims that there are replicators (the genes) and vehicles (generally organisms) which according to phenotypic effects in an environment will increase or reduce a replicator’s chances of reproduction. Gene-centered selection theorists “contend that the single gene is the unit of selection because genes have a longevity that gene complexes, organisms, and phenotypes do not (Sober 2000, 105).” Gene selection theory also gives an answer to why some “genes are better than others at spreading copies of themselves throughout the genome (Sober 2000, 109),” which accounts for the existence of junk DNA which apparently does not code for any useful effects. Gene selection only comes up rarely in this exposition as opposed to natural, sexual, group and kin models of selection. Finally, recent accounts are trying to integrate all the competing accounts in something called multi-level selection which states that selection occurs at many or all of the levels simultaneously (Wilson & Wilson, 2008). The units of selection controversy along with the role of function and adaptation are all critical to assessing the various views which will be presented. But, since music is a psychological trait I must discuss some of the foundational concepts of evolutionary psychology.

Many of Charles Darwin’s ideas about natural and sexual selection for visible morphological adaptations are widely endorsed. But in addition, Darwin predicted that psychology will be based on a new foundation, “that of the necessary acquirement of each mental power and capacity by gradation (Darwin 1859, 449).” Over one hundred years later efforts are being made to identify and describe universal psychological
adaptations which are present in all normal humans. According to evolutionary psychologists, mental traits which show good design for solving an adaptive problem are likely to be produced via natural selection, the best known force for creating biological mechanisms which exhibit elements of design (Tooby & Cosmides 2005, 20-22).

Evolutionary psychologists reject the blank slate view of the mind originally endorsed by John Locke which has permeated throughout the social sciences (Tooby & Cosmides 2005, 5-6). Explicitly, this is the view that mental traits are contingent upon an organism’s environment with minimal input from a person’s brain or genes; this type of mental architecture is general-purpose and is also called domain-neutral. In contrast, for evolutionary psychologists mental traits are domain-specific which means that information is encapsulated within the trait to respond to specific stimuli (Sterelny and Griffiths 1999, 326). Traits of this character are also said to be opaque since they are not consciously accessible, and operate seamlessly. Mental mechanisms are also modular in that they are hypothetically able to be separated away from other aspects of cognition and exist as discrete objects of study. This is because neuroscientific evidence can be used to pinpoint a mental module’s activation within specific localized brain regions which are predictable and relatively invariant across a population (Tooby & Cosmides 2005, 23-36). Just to eliminate confusion, localization does not entail domain-specificity, a localized area of brain activity may be recruited by any number of domain-neutral stimuli (Peretz 2006, 19-20). Also, just like standard morphological adaptations, a proposed mental mechanism must appear (near) universally within a population. As an example, all neurologically normal human beings will at some point experience the emotion of fear
and this is due to common underlying mental machinery which makes this possible (Tooby & Cosmides 2005, 54-58). For instance, when a spider is seen the appropriate mental mechanism produces a feeling of fear in the observer since it conferred an adaptive benefit to do so in the past, and has a history of selection (Tooby & Cosmides 2005, 54-58). It should be noted that counterfeit stimuli such as plastic spiders can also cause the module to respond just as it would to the threat of a live spider. Also, seeing a rabbit will not cause the module to respond since the module is hypothetically domain-specific to spiders. While it may be the case that a domain-specific adaptation was created by natural selection for the discrete purpose of avoiding dangerous spiders, this type of explanation offered by evolutionary psychologists is not the only option. Alternatively, a fear of spiders may be the result of general-purpose mechanisms to avoid a wide array of potential threats, not just a domain-specific adaptation which operates exclusively to avoid spiders. The spider aversion example is controversial, yet it shows how there are multiple types of competing explanations which detail why spider aversion is a nearly universal characteristic in humans.

In order to advance hypotheses about a proposed mental trait’s genesis, evolutionary psychologists must rely on reverse engineering. First, a correlation must be identified between a stimulus and a reliably occurring behavior. Next, in order to isolate a proposed mental trait’s genesis, attention must be paid to the cumulative selection pressures present in the ancestral environment which shaped the module. This reconstruction is known as identifying a trait’s environment of evolutionary adaptedness which from now on I will call the EEA (Tooby & Cosmides 2005, 21-28). Every specific
mental trait will have a unique EEA which isolates a specific time frame based on a statistical aggregate of selection pressures which culminated to allow for a trait’s manifestation. Since evolution takes many millennia to produce reliably occurring design in species, we cannot just observe modern individuals reacting with modern environments. This is because a mental or physical structure’s function can change over time, and this process is what Stephen J. Gould calls exaptation (Gould 1998, 54-55). Exaptations “are fit for their current role, hence aptus; but they were not designed for it, and therefore not ad aptus, or pushed towards fitness (Gould 1998, 55).” This is why isolating a trait’s EEA is so important, and why an etiological view of function and adaptation are to be preferred as opposed to a view which privileges current function. So in order to isolate mental adaptations, as a methodological practice researchers will study societies which still rely upon hunting and gathering since they will hypothetically be the best match to a pre-historic EEA (Tooby and Cosmides 2005, 22-25). If successful, the reconstruction will discover the pre-historic selection pressure which responded to a specific stimulus to create a reliably occurring mental module which is universally distributed throughout the population. And it will avoid the problem of change in function since hunter-gatherer societies will more closely resemble pre-historic societies as compared to modern western society. Evolutionary psychologists are convinced that nearly all of human behavior can be attributed to mental modules, and their new synthesis of Sociobiology is what Jerry Fodor calls massive modularity. In opposition with the dominant view from evolutionary psychology some aspects of cognition may be domain-general like in the blank-slate view. Finally, “[o]ne must not confuse the fact that a
structure is used in some way with the primary evolutionary reason for its existence and conformation (Gould 1979, 584).” So an evolved mental module may have side effects which are unselected for but still caused by a mental module’s reason for origin. In Gould’s terminology the incidental by-products which occur along with adaptations are called spandrels (Gould 1979, 581-590). This is a problem for evolutionary psychologists since it is often difficult to disentangle which aspect of traits are legitimate adaptations as opposed to functional or non-functional by-products of adaptations.
CHAPTER ONE: STEVEN PINKER’S NON-ADAPTIVE VIEW

Natural language is thought to be a mental adaptation or suite of adaptations which evolved through natural selection to perform the function of enhanced communication (Pinker 1997, 534-535; Pinker 1994). Another related faculty is the human species’ specific ability to create and appreciate musical activity. This chapter discusses Steven Pinker’s view of music as a side-effect or consequence of other adaptive faculties, most notably language. On Pinker’s view, music is not a legitimate biological adaptation. For any proposed adaptation it is necessary that it is identifiable and clearly defined. In the case of music, this is an exceedingly difficult task (Molino 2000, 168-170; Cross 2001a, 29-33) and we will see how the lack of a precise definition causes problems in all the views. Pinker acknowledges that the term music encompasses a wide range of auditory activities which include: singing, instrumental music, poetry, oration and other hybrid forms. Many of these musical activities utilize linguistic elements as well as a grouping of pitches and sounds. This leads Pinker to conclude that the ability to produce music is at least partially substantiated by humans’ ability to use natural language. As a language adaptationist, Pinker has concluded that natural selection is responsible for the evolution of the language faculty (Pinker 1997, 534; Pinker 1994). Although in contrast, the following excerpt clearly shows how Pinker regards music.

As far as biological cause and effect are concerned, music is useless. It shows no signs of design for attaining a goal such as long life, grandchildren, or accurate perception and prediction of the world. Compared with language, vision, social reasoning, and physical know-how, music could vanish from our species and the rest of our lifestyle would be virtually unchanged. Music appears to be a pure pleasure technology, a cocktail of recreational drugs
that we ingest through the ear to stimulate a mass of pleasure
circuits at once. (Pinker 1997, 528)
Pinker’s view is in contrast with the view of Geoffrey Miller (which will be examined in
Chapter Two) who claims that musicality is an adaptation by being efficacious in terms
of increasing humans’ chances at reproductive success. Also, Pinker's view is at odds
with Ian Cross, (which will be examined in Chapter Three) and others who suggest that
music's efficacy lies in its’ ability to facilitate peaceful group interactions during
situations of social uncertainty. Instead of endorsing a view that music is an adaptation,
Pinker claims that musical works merely stimulate pleasure channels which were
designed for reasons other than musical effect. On this view, making music may have
adaptive uses, yet will still not qualify as a biological adaptation. Elliot Sober’s
distinction between traits which are adaptive as compared to legitimate biological
adaptations supports this point (Sober 2000, 85-86). For example, being a computer
programmer may have adaptive benefits in contemporary society, (it can increase a
human’s chances at survival and reproduction) however it would be improper reasoning
to conclude that computer programming skills constitute a biological adaptation (Sterelny
and Griffiths 1999, 218). This is because an adaptation must have a history of selection
at any one or more of the levels combined with many millennia of sustained selection
pressures. Computers are too new in human history for selection at the level of the
individual, the group, or the gene. For the trait of music, Pinker is claiming that there is
no reliably developing product or process that can qualify as an adaptation. Instead,
Pinker suspects “that music is auditory cheesecake, an exquisite confection crafted to
tickle the sensitive spots of at least six of our mental faculties (Pinker 1997, 534).” The
first faculty he describes is Auditory Scene Analysis along with the related faculty of what Pinker calls Habitat Selection. Next, music utilizes rhythmic functions which may be more appropriately described as being a concomitant by-product of the rise of bipedalism in the hominid lineage than for any specific musical efficacy.\(^1\) This is primarily due to the increase in brain size required for the coordination of hominids’ bodies due to bipedal locomotion. Also, music takes advantage of neural programming which encodes and decodes vocal expressions for the purposes of transmitting or receiving emotional content via sound, Pinker calls this faculty emotional calling. Finally, and most controversially, Pinker claims that music is a derivative or side effect of the processes which enabled natural language. In philosophy of biology, this type of derivative is called a spandrel and is described as a non-designed (by natural selection) secondary effect of an adaptation that subsequently is used for another function (Gould 1979, 581-590). In this case, language is the adaptation while music is a spandrel which utilizes components of the language faculty along with the others that Pinker has mentioned. He also notes that there is “something else … that explains how the whole is more than the sum of its parts (Pinker 1997, 538).” Pinker speculates the existence of “some kind of spandrel or crawl-space or short-circuit or coupling that came along as an accident of the way that auditory, emotional, language, and motor circuits are packed together in the brain (Pinker 1997, 538).” An initial concern for Pinker’s appraisal of musical activity is the lack of an explicit definition for the term music. Pinker notes that

\(^1\) Pinker does not explicitly say that bipedalism was the primary factor in enabling musical co-ordination, however he does claim that music “taps into the system of motor control (Pinker 1997, 535).” Current research by other scholars suggests that a human preference for rhythm in locomotion and sound have common evolutionary roots (Mithen 2005, 144-147; Fitch 2006, 194-195). I decided to augment Pinker’s section with more contemporary sources which are consistent with Pinker’s overall view.
music generally utilizes discrete target pitches which are stable as opposed to the sounds of wind, water, or even language which are continuously variable. To construct music, an artist assembles several discrete tones in a sequence which can elicit somewhat predictable emotional responses in the listener (Pinker 1997, 529-534). Pinker notes that several theorists including: Deryck Cooke, Leonard Bernstein, Ray Jackendoff & Keith Lerdahl, have attempted to try and correlate the shifts in pitch with law-like emotional connotations based on those shifts albeit none have been accepted as entirely successful (Pinker 1997, 529-534). In addition to the assemblage of notes placed together to elicit emotional responses in listeners, musicians can also utilize language concurrently with the pitches to provide semantic content. For Pinker, music is the art of arranging discrete or variable tones in an effort to evoke emotional responses in listeners. The current function of music is for entertainment and is created primarily in the pursuit of causing pleasure. Any efficacy music does have in transmitting or generating emotion in listeners is predicated on utilizing several faculties which came about via natural selection for reasons other than musical affect. So this is an inference predicated on a propensity view of function. Music has no efficacy in performing an adaptive task now so Pinker claims it did not in the distant past. We should note immediately that a propensity view is inconsistent with the tenets of evolutionary psychology, a research program in which Pinker is an integral contributor for his views on language as an adaptation. However, Pinker has much more to say about how music came about in the human lineage before we can fully assess this view.
Pinker discusses the faculty of Auditory Scene Analysis which is a set of phylogenetic adaptations that consists of the basic auditory processes of the ear. Auditory Scene Analysis allows organisms to determine the speed, distance, and direction of attention worthy objects in an environment via audition (Pinker 1997, 535-536). Auditory information is received through the ears and the brain constructs a “specification of the sound makers in the world that gave rise to it (Pinker 1997, 535).” The brain has an unconscious sorting process that occurs allowing the organism to discern the source of several auditory streams at once rather than apprehending all of the sounds as emanating from a single source. It is nearly certain that the ability to detect moving objects and infer their locations via audition confers clear adaptive benefits to its possessor. But the faculty of Auditory Scene Analysis can be stimulated artificially to recreate the sound of something moving. As an example, the brain has the ability to analyze the difference in the proportion of sound entering each ear and this is used to track moving objects (Pinker 1997, 535-536). This ability can be mimicked by stereo sound, which can be used to make it seem like something is moving from left to right. In addition, sounds which stand in harmonic relation towards each other (overtones) are grouped together as emanating from a single object (Pinker 1997, 535-536). This response likely evolved since natural resonators such as calling animals emit a stream of sound which is composed of harmonically related overtones. Pinker argues that melodies with stable tones can fool the brain into thinking that it is tracking attention worthy objects (Pinker 1997, 535-536). Pinker affirms that this is why melodies evoke a strong response, since the auditory system is stimulated in a way that mimics salient objects. It
is quite probable that audition came about by the process of natural selection to extend an organism’s ability to respond appropriately to the auditory world. However, the mechanism(s) responsible for basic audition can be utilized in ways that are different than identifying and tracking objects. So the native domain of the proposed mental module(s) of Auditory Scene Analysis can be stimulated for musical effect as a by-product of the design of humans’ specific auditory architecture. The next section on Habitat Selection is another faculty which Pinker claims is an adaptation but can be utilized for musical use.

Hominids implicitly made use of an Auditory Scene Analysis in order to accurately respond to possible threats in the environment, e.g., sounds of rushing water, snapping twigs, birdsong or low rumbles may indicate safe or unsafe potential habitats (Pinker 1997, 537). Pinker calls this type of assessment Habitat Selection and it can be seen as a utilization of an Auditory Scene Analysis for adaptive reasons. Over evolutionary time, organisms that could discern that loud noises generally meant that a predator was nearby would have a significant adaptive advantage over those who could not. The organism need not know that a loud noise was dangerous since it would be an opaque stimulus-response reaction. For the case of Habitat Selection, it is likely that a fear response to loud noises conferred an adaptive advantage which was tuned by natural selection as a phylogenetic adaptation. However, the faculty of Habitat Selection can also be seen as an ontogenetic adaptation rather than a phylogenetic one. A priori, without a domain specific propensity already in place, there is no reason that the sound of rushing water would be attention worthy for animals or even hominids. It is likely that an organism must go through a process of conditioning to learn to correlate the sound of
water with the desire to quench one’s thirst. So the difference is that the sound of water would be a learned or conditioned stimulus-response rather than loud noises activating a domain-specific opaque fear response during an Auditory Scene Analysis. Pinker does not clearly partition which aspects of environmental sounds would be domain-specific adaptations with phylogenetic as opposed to ontogenetic origins. While it seems like natural selection would select for an aversion to loud noises it is unclear whether sounds like rushing water would have a history of selection. While the ability to flee from predators and locate sources of water are each clearly adaptive (regardless of them being phylogenetic or ontogenetic adaptations), Pinker notes that evocative environmental sounds can be utilized as templates for manipulative musical motifs (Pinker 1997, 538). During television shows and movies musical artists “literally orchestrate the viewers’ emotions from beginning to end with quasi-musical arrangements (Pinker 1997, 537).” One of Pinker’s examples is the foreboding two note sequence, used in the film Jaws, to indicate that a large dangerous object is approaching and increasing speed. Initially, the shark is not shown, but an observer’s imagination is rife with reconstructions that correspond with the sound. The conjunction of the visual shots of open water along with a low quickening bass line is meant to convey rising tension and fear. For an explanation as to why the Jaws motif is functional, its effectiveness is determined by “the correlates of sound in the physical world produced by objects, organisms and events and derive from sensitivities to features of the sonic environment (Cross 2008, 7).” Whether or not responsiveness to quick, loud noises has ontogenetic or phylogenetic origins, or more likely some combination of the two, the predictable response generated in listeners make
motifs such as the Jaws example extremely effective. So, the matter of whether or not Habitat Selection (if it is a domain-specific faculty) is a phylogenetic adaptation or ontogenetic adaptation has not been settled. Pinker’s description and definition of this faculty is brief and imprecise so it is unclear if he means it is domain-specific or not. The next faculty which Pinker identifies as assisting in humans propensity to make and enjoy music is related to a preference for rhythmic sounds.

Pinker claims that the production of music relies upon another ability which has an adaptive function, namely rhythm and motor control. Musical synchronization is enabled in humans via a process of rhythmic interaction called entrainment.

“Entrainment describes a process whereby two rhythmic processes interact with each other in such a way that they adjust towards and eventually ‘lock in’ to a common phase and/or periodicity (Will et al. 2008, 3).” For example, when a pianist sets a metronome to a specific rhythmic pattern she will adjust her playing to synchronize with the beat provided by the metronome. At present, humans are the only species known to exhibit features of entrainment, but further studies on other primates may change this view (Fitch 2006, 194-195). Although the ability to entrain to external stimuli may have its foremost use in coordinating group musical activity, Steven Mithen claims that this was not the reason humans have a faculty or a preference for rhythm. Instead, researchers speculate that the timing mechanism responsible for musical entrainment is a by-product of the changes surrounding the move to bipedalism in the hominin lineage (Mithen 2005, 144-147). Numerous changes to the hominin body and brain occurred during the transition

---

2 Pinker’s treatment of the motor control section is brief and vague, so I tried to augment it with current information from Steven Mithen’s The Singing Neanderthals (Mithen 2005, 144-147) which is consistent and charitable to Pinker’s goals in the section.
from australopithecine to the fully bipedal *Homo Ergaster*. This transition requires a larger brain to accommodate the “new demands on sensorimotor control that bipedalism both required and enabled (Mithen 2005, 146).” Since two legs provide less of a stable base than four, the move to “bipedalism required the evolution of cognitive adaptations to maintain the rhythmic coordination of muscle groups (Mithen 2005, 150),” for the facilitation of dynamic balance. Insofar as the rhythm module stems from its use in regulating bipedal locomotion, it is unlikely that the rhythm module evolved to enable synchronic musical actions between others.3 Instead, Pinker claims that musical affect “taps into the system of motor control (Pinker 1997, 537)” by subsequently utilizing the time-keeping function associated with motor control for entrainment to an externally provided rhythmic pulse. As a related example, researchers have shown that subjects tapping along with a rhythmic pulse will match their finger tapping unconsciously if the pulse is slowed at a rate below the threshold of conscious perception (Patel 2008). It seems as if this type of study should be done with people on a treadmill changing their stride to match an unconscious change in rhythm to further substantiate the connection to bipedalism. Such a study to my knowledge has not been done. If the results were consistent with the interpretation that a timing mechanism is a concomitant by-product of bipedal locomotion, then Pinker’s non-adaptive view can be strengthened. This is because a preference for rhythmic sounds would not be designed for musical use, but rather persists as a by-product of the gradual emergence of bipedality in the hominid

---

3 William McNeill has a theory for music which claims that rhythmic actions are adaptive for the activities of group dance and military drill. I would contend that this function is derivative of rhythmic processes designed to aid in efficient bipedalism rather than designed for dance & drill. (McNeill, 1995)
lineage. The next adaptive faculty which humans utilize for musical effect is Emotional Calling.

Another faculty which is utilized for musical effect is what Pinker calls Emotional Calling. Charles Darwin’s hypothesis for a musical proto-language suggests “that human music grew out of our ancestor’s mating calls (Pinker 1997, 536).” This suggestion is marshaled to defend the view that the driving force responsible for human musicality was sexual selection, a claim which will be examined in Chapter Two. Instead of endorsing the view that music developed out of just mating calls (Darwin’s view); Pinker broadens the scope to include all emotional calls, such as whining, laughing, crying and so forth (Pinker 1997, 536). He speculates that melodies evoke strong emotions because they resemble digitized templates of our species’ emotional calls (Pinker 1997, 537). A more detailed version of this same theory appears a year earlier in Dan Sperber’s Explaining Culture where Sperber dismisses music as a “parasite (Sperber 1996, 141).” Sperber makes a distinction between a mental adaptation’s proper domain and its’ actual domain. A mental adaptation’s proper domain would be tuned to the ancestral input conditions which spurred the mental adaptation’s initial development during its’ relevant EEA (Sperber 1996, 141). In contrast, a mental adaptation’s actual domain would include the original input, as well as any other input which would satisfy the proper domain of the mental adaptation. Sperber provides us with an analogy to clarify his point. Humans have a propensity to enjoy foods which are laden with sugars and fats, since in ancient times those foods were rare but also contained dense amounts of energy. During pre-

\footnote{Pinker’s view is partially borrowed from Herbert Spencer without attribution, who argued that music is derived from not only mating calls. Instead “the whole body of these vocal manifestations of emotion form the root of music (Spencer 1857 ‘Postscript’ p1’).”}
historic times in the mental adaptation’s *proper* domain, sugars and fats were exceptionally rare. The relative rarity of sugars and fats in conjunction with its dense energy profile may have shaped a mental adaptation which causes an organism’s preference for foods containing those tastes. Thus, according to Evolutionary Psychologists, an evolved mental adaptation is the reason why sugars and fats taste good (Sperber 1996, 141). It is not the case that ‘tasting good’ had anything to do with precipitating the evolution itself, but instead fats and sugars taste good due to the evolution. In modern times the ‘fat and sugar’ mental adaptation(s) *actual* domain contains an abundance of foods which contain concentrated amounts of sugars and fats to levels which are far beyond the original input conditions in ancient times. By analogy there are sounds which can be apprehended by organisms which are sensitive to auditory stimulus. Evolutionary processes acting over many generations would likely tune an organism’s hearing to respond adversely to dangerous stimuli such as predators and positively to species specific sounds. If species specific sounds are pleasurable to the listener, a musical artist could create sounds with the intention of causing pleasure in other con-specifics. By analogy, music is so effective at causing pleasurable responses in listeners because artists concentrate sound patterns in a way which stimulates the module to cause more pleasure than the sounds it was originally tuned to. Sound patterns that are pleasing to a hominid’s ears would be addictive in highly concentrated amounts just like how cheesecake is addictive due to the dense concentration of fats and sugars. The mental adaptation that Sperber proposes to fulfill the initial adaptive functionality would be the pre-linguistic utterances made by hominids. Sperber claims that hominids may
have relied on “rhythm and pitch for the production of vocal signals, (Sperber 1996, 140)” as opposed to words which have specific semantic propositional content. If this is true, a module that helps to discern another hominid’s intentions (in a pre-linguistic situation) would have adaptive relevance. A hedonic response tuned via natural selection is the likely cause for hominids to pay close attention to a con-specific’s vocalizations rather than ignore them. So, according to Sperber, a mental adaptation for processing and creating vocal expressions evolved in the hominid lineage. There are two distinct possibilities for the character of the proposed mental module for vocal expression, one vestigial and another still functional. Sperber speculates that the module may be vestigial since the modern vocal tract affords an increase in the range of vocalizations available to hominids. Then, due to the evolution of the modern vocal tract linguistic communication supplants the functionality afforded by the pre-linguistic system with a propositional system. Alternatively, “the relevant acoustic properties still play a role in modern human speech (in tonal languages in particular), so the module is still functional (Sperber 1996, 142).” Whether a vestige or still a functioning system, musical affect utilizes the pleasure producing mechanism of a module designed for early hominid emotionally based communication (as rudimentary as it may have been) rather than a pleasure mechanism designed for music.

Pinker begins the next portion of his argument with the premise that language is an adaptation. He starts by claiming that from a young age, all “neurologically normal children spontaneously speak and understand complex language (Pinker 1997, 529; Pinker 1994).” In contrast, most people enjoy listening to music, but far fewer can sing
in key or play a musical instrument, and those who can require “explicit training and extensive practice (Pinker 1997, 529).” While language has clear benefits in facilitating communication and is at least currently adaptive, music fails to have explicit benefits other than for a transient hedonic encounter. However, Pinker does describe some of the parallels between linguistic and musical activity. Pinker notes that hierarchical grouping, recursion (embedding phrases within phrases), and the contour of sound work similarly in both language and music. Pinker focuses on the contour claim by saying that the rise and fall in pitch which occurs during a spoken sentence is native to language and should be properly understood as partially facilitating linguistic interactions. This is an important and controversial claim which will be examined in depth later in the exposition. The correlation between contour in music and language “may account for the gut feeling that a musical piece conveys a complex message (Pinker 1997, 535).” So Pinker concludes that music borrows a portion of its mental machinery from language, specifically from prosody (Pinker 1997, 534-535). For Pinker, musical abilities and appreciation are predicated upon the faculties of: Auditory Scene Analysis, Habitat Selection, Rhythm from the move to bipedalism, emotional calling and most importantly language. Pinker claims there was no selection pressure for hominids to produce musical activity or to enhance their reception of music. The selection pressures which produced the aforementioned faculties allowed for sensitivity to musical stimulus. This proclivity was then discovered and utilized by crafty humans to generate pleasure in other listeners.

Pinker characterizes music as being for pleasure and having its’ primary current function as entertainment. Pinker is not concerned about ancestral function which we
have seen from the introduction is a crucial component of adaptationist thinking in the field of evolutionary psychology. There is a problem with Pinker’s insistence on using music’s current function (or non-function is his view) since two of music’s component faculties Auditory Scene Analysis and Habitat Selection are predicated primarily on the avoidance of pain (via a fear response to certain stimuli) rather than the pursuit of pleasure. A neurological study written after Pinker’s book indicates that works of music can activate the amygdala, a brain structure that has evolutionary lineage dating back to reptiles as well as being present in all mammals (Peretz 2006, 23). Coincidently neurological analysis indicates that language use activates this area far less readily than music does (Peretz 2006, 23). This extremely old structure is part of the brain’s fear system, when dangerous stimuli are encountered the amygdala is activated. When necessary, the amygdala is responsible for activating the limbic (motivational) system along with increasing the state of arousal of the organism. This is why the musical motif in the film Jaws is so effective at generating a sense of foreboding and fear in those who are watching. However, the utilization of these faculties could also have clear adaptive functionality in pre-historic times, and may have been subject to selection pressures. The first musicians, whom from now on I will call Homo Musican, may have communicated with each other by way of fear inducing musical acts. The ancestral functionality would be similar to other primates’ use of specific calls made when encountering snakes or birds of prey (Mithen 2005, 107-109; Sterelny and Griffiths 1999, 153). For instance, Vervet monkeys “use acoustically distinctive alarm calls for different types of predators (Mithen 2005, 108).” Specifically upon seeing a snake a Vervet will issue a ‘chutter’ which
incites the other Vervets to cluster together to mob the snake to drive it away (Mithen 2005, 108). Researchers are unconvinced that these emitted sounds are words, but they may serve to function in an analogous manner. Here is a place where the units of selection controversy and Pinker’s views on it are integral to the discussion. Pinker claims that “[s]election among groups is possible on paper, but most biologists doubt that the special circumstances that let it happen are ever found in the real world (Pinker 1997, 397-398).” Instead the more powerful forces of natural selection will swamp those which are selected for the benefits of the group. Although he is not explicit I assume that Pinker feels that any altruistic actions which are observed can be more appropriately re-described as natural selection or perhaps kin selection. Let us assume momentarily that the Vervet’s calls are present due to a history of selection, rather than an entirely learned response. It is possible that the call was selected for individual benefits since the various calls may have deterred predators. In this case, the function of being a warning to other monkeys may be a fortuitous side effect for a nepotistic call. However, if these monkeys traveled in groups (over many generations), then the possibility remains that the call did develop as a specific warning call for the purpose of alerting con-specifics. In this case, the ‘chutter’ of the Vervets could be seen as a group selected domain-specific adaptation for the purposes of warning other Vervets. Steven Mithen suggests that the calls of the Vervets by analogy can be extended to hominids where warning calls and rudimentary vocal signaling may have been used to facilitate the evasion or pursuit of larger prey before natural language had evolved (Mithen 2005, 132-137, 166-169). We can observe the Vervets and make empirical claims about the efficacy and purpose of their calls,
however Mithen’s analogy for hominids remains speculative. But it does introduce an important possibility that Pinker may have missed with his exclusive reliance on individual level selection.

Another related possibility which highlights a possible group function for music is if *Homo Musican* used music-like displays in story telling (Mithen 2005, 166-169).

Steven Mithen makes the argument that music’s original functionality was to describe the natural world via a sort of musical presentation done by men in the evening to inform their kin about the successes or the perils of a recent expedition. A journey to a foreign territory filled with predators could be re-described after the fact via a musical display conjoined with gestures all while not necessitating (and likely predating) the use of natural language (Mithen 2005, 166-169). An appropriate fear inducing music-like act could be used to scare youths or the weak from entering dangerous territory and thus have adaptive functionality in pre-historic times. Additionally, a musical activity which causes pleasure may have been associated with the discovery of a new food or water source. Without natural language there would be selection pressures to find a way to encourage or discourage members of the group to undertake an expedition to a foreign territory. Even if this behavior is recast in nepotistic terms (as in kin selection) the inference that hominids were highly social animals thousands or even millions of years ago is supported by the archeological record. As a brief example at the Boxgrove excavation site there is significant evidence that hominids were big game hunters (Mithen 2005, 163-164, 208-220). Even if Pinker is correct about group selection being insignificant, kin selection would likely be a driving force. This is because the fossil
remains or large prey such as, mammoths, tigers, and hyenas have been found in conjunction with hominid tools and skeletal remains (Mithen 2005, 237-239). These large kills would have been impossible to accomplish by a single individual, some level of cooperation must have occurred for any individual to thrive. There are also clear signs of tool use and other manipulation of the bones that have survived the archeological record (Mithen 2005, 163-164). So the evidence is strong that hominids hunted, foraged and co-existed peacefully, thus opening the possibility of kin or even group selection.

Again most of these stories from Mithen are based on indirect archeological evidence and he admits the speculative nature of his project (Mithen 2005, 220). But, these stories uncover a larger problem with Pinker’s insistence on using a contemporary definition of music in his evolutionary argument. As we have seen, it is quite likely that Pinker’s conception of music which is derived from modern examples diverges from how music was first manifested and experienced by hominids. If any of these speculative functions of pre-historic musicality are accurate, it seems as if music (or some pre-cursor) may have performed analogous functions that natural language performs in current times. If so, Pinker’s claim that musicality is built upon neural networks designed via natural selection exclusively for language is questioned. If music transmits or generates emotional content in other listeners, then this faculty would have clear adaptive benefits. This argument is bolstered if the capacity for spoken language had not yet developed. Instead, emotional calling may have served as a proto-language, but as we will see it is extremely difficult to reconstruct how that faculty may have been constituted.
At present, it is unclear whether vocal expression of emotions initially was constitutive of a linguistic act, a musical act, neither or both. Darwin’s musical proto-language hypothesis claims a music-like communication system for courtship evolved first and then propositional content was added later to form natural language. In contrast, Pinker follows Herbert Spencer’s claims that language developed first which allowed for emotional speech which then precipitated vocal and instrumental music (Spencer 1857). Either theory may be true however when adjudicating between theories there needs to be an assessment of what kind of evidence can be marshaled to support either one. Elliott Sober claims that our knowledge “of the past depends on whether the physical processes linking past to present are information preserving or information destroying (Sober 1988, 5).” Confirmation of a language-first or music-first scenario can be obtained “only if empirical facts specific to the processes governing each are favorable (Sober 1988, 5).” I claim that the processes which created music or language are information destroying since we do not have fossilized sounds that have survived the archeological record. And even if we did, what kind of metric could we apply to the sound itself without observing the process of interaction between live hominids first hand? In contrast, hominid fossil remains give an accurate representation of the skeletal structure of pre-historic hominids and this process can be called information preserving (Sober 1988, 3-5). This being said, the final state of apparently two separate means of communication, one linguistic and one musical might have been obtained from either a music-first or language-first scenario or even some unknown pre-cursor to both. The analysis is stymied since current “neuropsychological research indicates that melodic contours in speech and music may
be processed in an overlapping way in the brain (Patel 2008, 238).” Since Pinker is an evolutionary psychologist and a language adaptationist, it is a more parsimonious fit with his other theories to conclude that language was the reason that the neural pathways developed as they did, with music subsequently utilizing those pathways. However, Pinker does not draw a clear partition between the traits of music and language. If Pinker is to give a full account of music being a derivative of language then he must clearly define both traits. While he acknowledges the overlap, what is the crucial distinction between oration, poetry, and spoken words? When Pinker is talking about language I must assume that he is talking about spoken words since written language is a recent human invention in evolutionary terms. So, “we can be confident that specific brain areas have not been shaped by natural selection for reading printed script (Patel 2008, 357).” It appears that Pinker is only referring to spoken language but even this characterization may be incomplete since some accounts indicate “that 65 percent of human communication occurs through body rather than spoken language (Mithen 2005, 155). Gestures and the intonation of speech can indicate whether a person is lying, speaking sarcastically or otherwise changing the propositional content of the utterance to go beyond the conventional use of a set of words. The musical aspects of speech may have predated natural language or were developed after to further expand the emotional content of language. Neuropsychological studies “suggest that musical and spoken melody are in fact more closely related than has generally been believed (Patel 2008, 238).” From the comparative perspective, many other species have something similar to what Pinker calls emotional calling, but lack language use. This highlights another
possibility, that hominids used prosodic utterances (emotional calls) before language or music developed in the hominid lineage. While these are just a few of the nuanced possibilities that music and language evolution can take, it is important to ascertain all the options rather than the most convenient one for Pinker. Pinker argues that prosody is meant to aid in communication since that is the current function it obviously performs in language use. However, it seems likely that there were hominids that lacked language but may not have lacked prosodic emotional communication which did not have semantic propositional content.

Conclusion for Chapter One

Pinker does a good job of detailing the separate faculties which are stimulated for musical affect. Music can cause pleasure (and pain) by way of the specific configuration of several traits which were adapted for reasons other than to make and respond to music. However, Pinker’s theory succumbs to critiques of anachronism since he uses a contemporary definition of music, as being only for pleasure, which is likely to be orthogonal to how music was deployed in its relevant EEA. Pinker claims music has no adaptive function (current or ancestral) due to these anachronistic views. His analysis is clouded by the imprecise partitioning between the traits of music and language. This makes his main argument that music is a derivative of language along with other faculties unverifiable. This problem stems from the fact that certain aspects of music and language evolution are forever lost due to an information destroying process which has forever buried the sounds uttered by pre-historic hominids. Therefore there is no way to confirm a language-first or music-first evolutionary scenario.
CHAPTER TWO: GEOFFREY MILLER’S SEXUAL SELECTION VIEW

Researchers studying the origins of music have presented a wide variety of theories which attempt to explain music’s persistence. We have seen in Chapter One that music’s longevity in the human lineage may be simply a result of contingent processes and not subject to direct selection pressures. But, there were selection pressures which created the ear, vocal cords and concomitant neurological pathways to support the ability(s) to create music starting sometime in the hominid lineage. However, music subsists as a by-product of those faculties rather than the target of any significant selection natural or otherwise (Pinker 1997, 528, 534). In opposition, dating back to Darwin there has been lively debate of music being a biological adaptation rather than merely an enjoyable exploitation of pleasure channels. To isolate music as an adaptation, there must be adaptive benefits afforded to organisms which have the trait of musicality. As far as survival is concerned, the task of isolating a clearly defined fitness advantage for Homo Musican has historically been elusive. Most of these attempts have focused on a survival advantage for individuals or groups possessing the attribute of musicality, but none have gained widespread acceptance. Darwin observes that “neither the enjoyment nor the capacity of producing musical notes are faculties of the least use to man in reference to his daily habits of life, [so] they must be ranked amongst the most mysterious with which he is endowed (Darwin 1871, 874).” From comparative studies in many other species such as song birds or Tungara frogs, vocalizations are utilized as a simple call or as a charm to the opposite sex (Fitch 2006, 181-183). Darwin claims “these facts with respect to music and impassioned speech become intelligible to a certain
extent, if we may assume that musical tones and rhythm were used by our half-human ancestors, during the season of courtship (Darwin 1871, 875).” Along with natural selection for traits which give its’ bearer a fitness advantage for survival. Darwin described another means of selection, sexual selection for elaborate traits meant to attract potential mates (Darwin 1871, 880). The presence of seemingly unnecessary structures such as the peacock’s tail and song birds’ chirping at a glance seem to be orthogonal to promoting overall fitness for the organism. Darwin’s explanation for birdsong as a sexually selected courtship display is widely endorsed by modern research (Miller 2000a, 329-333). However, Darwin’s analogous explanation for human musicality as a sexually selected courtship display has been generally dismissed. Geoffrey Miller, an evolutionary psychologist, recapitulates Darwin’s idea with some updates from contemporary sexual selection theory. But first more needs to be said about how sexual selection is thought to proceed before we can fully examine Miller’s theory about music being a sexually selected courtship display.

Sexual selection theory has been used to explain traits in organisms which are not thought to be produced via the process of natural selection. In most cases of natural selection, it is fairly obvious why an organism possesses certain traits since they clearly assist the organism in survival. But with sexual selection, elaborate traits can be displayed by organisms which seem to have a detrimental impact on the trait’s bearer. These elaborate structures can be maintained and reinforced by a process of sexual selection for weapons (e.g. an Irish elk’s antlers) and for ornaments (e.g. a Peacock’s tail). Weapons are utilized to deter and defeat competitors for mates while ornaments are
produced via mate choice. Miller’s theory focuses on music as being analogous to an ornament, rather than a weapon. The most ubiquitous example of a sexually selected ornament is the peacock’s tail. According to sexual selection theory, peacocks which are substantially fit will have excess resources to allow for the production and maintenance of ornate tails. Peacocks which are malnourished or otherwise unfit will fail to produce a vibrantly colored tail (Miller 2000a, 338-339; Cronin 1991, 225-226). The flashy tail serves as an indicator to peahens that a vibrantly colored peacock is especially fit. According to modern sexual selection theory, for a trait to become a genuine indicator to the opposite sex, there must be a legitimate handicap which is imposed by the trait upon its bearer (Miller 2000a, 338-341). The reason for this is that the burden of an ornate tail will cause a severe handicap to an unfit peacock and less of a burden to a peacock which is physically fit. However, if a peacock carries a large colorful tail (concomitant with a higher predation rate due to flaunting its’ colors) and survives nonetheless, its’ survival serves as an honest signal to potential mates that the peacock is exceptionally fit since it survived with such a large handicap. This view can be summarized as the truth in advertising model; since a metabolically expensive tail cannot be simulated it serves as an honest signal of its bearer’s fitness (Miller 2000a, 338-339). However, an ornate tail’s efficacy in enhancing reproductive success (and the success of the genes) can be re-described as a relatively inexpensive means of utilizing metabolic resources. In relation...

---

5 Wallace, a contemporary of Darwin claims that sexually selected weapons can be seen as an extension of natural selection and I agree. That said, weapons may be produced by natural selection although there are cases where the exaggeration eventually becomes maladaptive, as in the case of Irish elk.

6 Military march and drill could be seen as a musical weapon. William McNeil in his book proposes this as an adaptive function for music via group selection. On this view, groups possessing the trait of musicality would have an advantage in combat leading to the proliferation of their group over others. (McNeill 1995)
to gene selection, while the vehicle (the peacock) may incur a higher predation rate, the replicators (the genes) have a greater chance of proliferation based on the phenotypic effects of a colorful tail. Insofar as a trait is a sexually selected ornament, it may not assist the peacock directly in regards to survival, but will be adaptive by promoting the success of the peacock’s genes via increased reproductive success (Miller 2000a, 341).

So this is where sexual selection and gene selection overlap. In peacocks, choosy females prefer males with colorful tails since they implicitly know that those who bear the trait also have a strong set of genes.

For peacocks, an ornate tail serves to indicate that as a statistical average, those with colorful, flashy tails are more genetically fit and thus attractive to peahens. However, Miller describes another process which he calls sexually selected aesthetic displays. A preference in peahens for a con-specific to have bright red plumage or a long tail “may originate as side effects of perceptual adaptations evolved for other functions (Miller 2000a, 341).” For instance, a bird which feasts on red berries may evolve an eye which is especially sensitive to the color red. As a result, the bird may seek other birds with primarily red plumage as opposed to other colors due to that perceptual sensitivity (Miller 2000a, 341). If mating occurs, then the offspring of the cross will more likely have red plumage and an enhanced sensitivity to the color red. This is contingent on there being a heritable preference for the trait and heritable genes which code for red plumage. So, sexually selected aesthetic displays can be the result of a preference that develops as a side effect of other adaptive processes. In the case of the peacock’s tail, at some ancestral time a mutation occurred, which augmented the coloration of the tail.
Whenever the initial mutation was deemed attractive by a potential mate, the tail did not function as an indicator but rather as an aesthetic display. Only after reinforcement of the color through sexual selection can an aesthetic display become a viable indicator. To explain how a trait like the peacock’s tail can become more pronounced over evolutionary time, Miller recruits R.A. Fisher’s theory called runaway sexual selection (Miller 2000a, 341-343; Fisher 1930). With the assumption that the trait and the preference for the trait are heritable, a peahen obsessed with colorful tails will tend to mate with peacock’s which bear that characteristic. The male offspring of this cross would on the average inherit genes which produce colorful tails, while the female offspring will likely inherit a preference for mates with colorful tails. As time progresses, a positive feedback loop will be established in which females with extreme preferences will generally choose to breed with males which display exaggerated traits. Due to the process described above, it is common for sexually selected traits to exhibit a high degree of dimorphism (Miller 2000a, 332-333,351). Peacocks have flashy tails but no preference for flashy peahen tails. Peahens have a preference for flashy tails but have no impetus to grow flashy tails of their own. The sexually selected traits that have been discussed so far all have easily identifiable physical correlates. Though from his training in evolutionary psychology, Miller claims that complex psychological adaptations can be sexually selected indicators which function in a manner analogous to how tails function in peacocks (Miller 2000b, 7-15; Miller et al 2006, 145-146). According to aesthetic display theory “any acoustic preference that our ancestors had could have been exploited, attracted, and entertained by the appropriate musical display (Miller 2000a, 342).” So in
summary, music can be an indicator of overall fitness (like visual art, literature, and humor in Miller’s larger theory) just like the peacock’s tail (Miller 2000b, 10). Also, music may have first begun as an exploitation of sensitivities to pleasurable sounds, a theory which looks somewhat similar to Pinker’s. However, the difference is that in Miller’s theory, sexual selection is responsible for precipitating the increased musical ability along with increasing the desirability of musical stimuli. In contrast, enhanced musical ability for Pinker is merely the result of extensive training and practice. The next section details problems with describing music as an aesthetic display.

The term aesthetic display is misleading since with the birds and red berries example there is no overt intention to seek redness or to display red. Instead, those organisms with a perceptual preference for red things will be unconsciously attracted to things that are red. Miller claims that “music has many features that can be interpreted as aesthetic displays that fulfill preexisting perceptual and cognitive preferences (Miller 2000a, 343).” In turn, humans figured out what kinds of sounds were pleasing through experimentation with sound producing devices or simply voices. Then, they could manipulate receivers by reiterating or creating musical sounds which exploit those preferences. In the other example, the birds just happen to display the characteristic red that is preferred due to a perceptual sensitivity. Red birds do not have to do anything special in order to attract a female who has an insatiable preference for the color red. On the contrary, a musician has to intentionally manufacture sounds which are in accord with an acoustic preference. If the ability to make music requires intentionality, it opens up the possibility that music is not an adaptation designed by natural selection, but rather an
invention contingent on whatever process enabled intentional representation. An argument against Miller might go as follows: If an organism has certain perceptual preferences for certain sounds and has the ability to intentionally manufacture them (by voice or by instruments) then they can create music. But the ability for intentionality as currently used requires that a language is already present. Thus, musical ability would be contingent on being able to use language, a theory which mirrors Pinker’s conclusion in chapter one. But if there is a form or proto-intentionality using signs or gestures in combination with vocalizations, natural language as currently used would not be required for music. Whether music or language came first in human’s development is a question which is unlikely to be answered. However, the claim that each requires intentionality in even a mitigated form seems probable. But, if intentionality is required the analogy that music consists of a passive aesthetic display is weak. The next section discusses general problems with sexually selected indicator theory and how these problems apply to Miller’s argument.

Zahavi’s formulation of the handicap principle is potentially flawed according to A Kodric-Brown and J. H. Brown. Instead of focusing exclusively on the reproductive benefits associated with sexually selected traits, Kodric-Brown and Brown imply that most researchers overlook other positive contributions that the sexually selected trait may have for overall fitness (Kodric-Brown & Brown 1984, 312-315). Specifically, “many male traits such as large body size and weapons, may confer an advantage in intraspecific competition for resources as well as for mates, and hence may enhance both survivorship and reproductive success” (Kodric-Brown & Brown 1984, 314). Also, the genes
responsible for creating the tail may produce other beneficial characteristics as a side or even primary effect. For instance, better hearing or better sight may be bound to the genes which code for the tail. In this case the tail may be confounding the analysis since it is the most obvious trait that needs to be explained by sexual selection. Also, the tail may not hinder survival, but may actually assist if predators don’t like the tail since it displays the warning colors (generally red) present on other prey or it may even taste bad to the predator (A. Zucker pers. comment). While the possession of an ornate tail may have the deleterious effect of attracting predators, those effects might be counteracted by any of the positive benefits detailed above. Kodric-Brown and Brown also offer a caveat about the efficacy of sexually selected ornaments in providing its bearer with clear advantages in mating scenarios. Instead, they offer the alternative that the elaborate plumage is probably one of many traits that females assess in males. The plumage may account for the initial attraction however this is not the sole determinant of mating success. Other factors such as large size may override a peahen’s preference for colorful plumage. The same can be said about human females assessing males on a potentially large range of desirable traits which occur coextensively with the ability to create music. For these reasons I think that sexual selection is just a special case of natural selection since we cannot say a specific trait is used exclusively to promote reproductive success. In addition, if the genes which code for the tail are attached to other traits which increase its’ bearers’ chances of survival the tail may become elaborate as a side effect of adaptive processes. The main point is that it may be impossible to isolate the trait as being for a
specific purpose, which we will see is a problem for when Miller claims that music is a trait which functions analogously to a peacock’s vibrant tail.

According to Miller, music for humans is a medium for protean, unpredictable behavior which is generally sought by females (Miller 2000a, 345-346). For Miller, musicality performs the same current function as birdsong does for birds: it is primarily an aid to mating (Darwin 1871, 880).7 Birdsong serves as an indicator to other birds of their availability and fitness. Miller, observes that “almost all complex acoustic signals produced by other species are courtship displays,” (Miller 2000a, 329) and this characterization should include human music as well. Analogously, in accord with Darwin, Miller claims that pre-historic human music performed the same ancestral function of being a courtship display. There are additional critiques that can be levied upon Miller which focus on challenging the common notion that musicians are exceedingly attractive as potential mates. Miller uses examples like Jimi Hendrix and Jim Morrison as examples of sexual success stories (although not survival stories). While this may be an intuitively attractive claim, there is no comparative data to support this, only anecdotal evidence. Even if musicians do enjoy an enhanced reproductive benefit in contemporary society there is no substantial evidence that the same type of success was enjoyed by musicians in cultures without birth control (Fitch 2006, 201). The advent of reliable birth control may make it seem like musicians are inherently attractive but women may have had a different decision process if that male were to be a father. A woman may be attracted by a male’s genes for creativity but repulsed by his lack of

7 Males also sing to protect their territory, and while some females will engage in ‘duets’ with the males the most likely cause of female song is to emulate male song as territorial defense (Fitch 2006, 201)
survival skills. Although Miller claims that data from traditional cultures may help to elucidate this claim, the fact remains that such a comparison may not be indicative of how things were in the distant past. Annirudah Patel notes that “[c]ourtship is one of music’s many functions, and there is no evidence that music is either necessary or sufficient for successful courtship across human cultures (Patel 2008, 369).” Also, the use of music for courtship may be a recent change in function which has nothing to do with music’s original manifestation. In addition, the vast amount of resources which can be allocated to successful musicians in contemporary society seems unwarranted in a traditional hunting and gathering society. So while males or females who are successful musicians in modern times may have access to large amounts of wealth and subsequently mates, this is contingent upon a cultural framework which has excess resources to spare for musicians which cause pleasure in listeners. Also, there is no guarantee that the male’s act of creating music determines why the female is attracted to them (Mithen 2005, 179-180). The problem is the same as trying to isolate why peacocks with bright tails are more successful in mating. It may be due to the tail exclusively or it could have to do with the enhanced confidence a peacock has when they have the tail. Since we cannot be certain as to why a colorful tail or a good singing voice promotes reproductive success it remains difficult to endorse Miller’s music as a product of sexual selection theory.

Since Miller is committed to Zahavi’s formulation of sexual selection, the possession of a sexually selected augmented musical ability must impose substantial problems for that organism’s survival. In order to further evaluate Miller’s analogy I will
momentarily assume the veracity of Zahavi’s handicap concept, which states that sexually selected indicators are detrimental to survival but helpful in seducing a mate. In contrast with colorful tails, musicality in humans does not consist of an easily identifiable physical object, but rather a behavior which can be used for a variety of reasons. As such, when an individual or group is making music, what kind of responses should be expected from other hominids and predators? Provided Miller can show that creating music had high costs for our ancestors, the possibility of music serving as a sexually selected indicator in Zahavi’s sense is augmented. Miller claims that music conforms to Zahavi’s model by listing a number of possible ways that music can be used as an indicator of overall fitness. Virtuosic musical performance reveals motor coordination, and also indicates having time to practice which also implies that the performer has excess food and limited parenting responsibilities (Miller 2000a, 340). Also, Miller claims that music making is loud and could inadvertently attract rivals and predators (Miller 2000a, 348). But, when Miller claims that music making is loud he still gives a very limited characterization of how music making occurred in the past. While music making may have been loud, it cannot be loud in the same sense that a rock band or 110-piece orchestra is loud in modern times. It remains possible that the loudness created by musical activity may have instead served as a deterrent to unwanted predators or rivals rather than attracting predators as Miller claims (Huron 2001, 47-48, 50-51). In order to adjudicate between Miller’s and other competing claims, it is required to specify the

---

8 David Huron cites ethological evidence which describes the Mekranoti Indians’ ritualized vocal expressions performed in the middle of the night. This defensive vigil may have functioned to deter predators with the noises made by the men in addition to keeping the men alert and active to defend against predators or other groups who may attack them at night. In this case it would be costly not to make music.
appropriate environment of evolutionary adaptedness (EEA). Surprisingly, Miller claims that “it is just not very important whether music evolved 200,000 years ago or 2 million years ago (Miller 2000a, 337).” Although when trying to isolate a relevant EEA, this comment is detrimental to Miller’s view since “society was structured very differently at those dates in human history (Mithen 2005, 180).” The comment that it is unimportant to specifically address when music first occurred and developed misses a crucial component of adaptationist analysis for psychological as well as morphological traits, namely isolation of the relevant EEA. Furthermore, Miller argues that in order for music to count as an adaptation that we must “play by very strict rules (Miller 2000a, 333).” However, according to Miller, “it is not so important to worry about how to define music, exactly when it evolved, or what sequence of modifications occurred to transform non-musical apes into musical humans (Miller 2000a, 333).” So, humming, whistling, tapping two sticks together, or synchronized coughing could all very well count as musical activity for Miller since he fails to adequately define the trait. Miller also makes no delineation between musical appreciation and musical production. Is the sexually selected adaptation for producing pleasurable sounds or for appreciating them? Also does an infant’s babbling or a pre-pubescent child mimicking other adults count as musical activity or should we just count adult practices? Also it is worth quoting the following passage since it reveals more background assumptions Miller has about the process of identifying a psychological adaptation.

For most psychological adaptations that leave no fossil record, it is not even possible to reconstruct phylogeny in this sense. Nor is it necessary. Adaptationist analysis does not worry very much about origins, precursors, or stages of evolutionary development; it worries much more
about current design features of a biological trait, its fitness costs and benefits and its manifest biological function. (Miller 2000a, 337)

If we adopt Sober’s definition for adaptation along with an etiological view of function, we find a glaring discontinuity since Miller discounts the importance of ancestral stages and functions. On Miller’s view, current design features and functions take precedence making his view consistent with the propensity view of function, yet he does not cite an authority on the topic. This is important because it highlights a discontinuity between Miller’s approach and the standard approach used in evolutionary psychology which is concerned with origins and precursors (Tooby & Cosmides 2005, 22-27). Miller claims that the primary motivation for musicians to create music is to increase their sexual desirability. But it will be extremely difficult to ascribe a primary function to music, even without regards to past functionality since it is currently involved in many activities going far beyond functions related to enhancing courtship. Miller provides no compelling evidence that increasing reproductive success is music’s predominant current or past function. Miller misses the point that evolutionary psychologists attempting to describe adaptations along with a relevant EEA must regard ancestral function as more important than current function since functions can change over time. In Gould’s terminology this is called exaptation and a common example is how birds’ feathers evolved to keep birds warm and subsequently the function was altered by natural selection for flight (Gould 1998, 54-55, 57-58). So it seems that Miller’s claim is not really about music’s origins but rather is an explanation for how a seemingly frivolous and costly activity is present in the population. Sexual selection is one of the types of evolutionary processes that could have reinforced the trait. But if Miller is not concerned
about ancestral conditions, then how can he be able to make claims about how music was in ancient times, let alone how music could qualify as a sexually selected trait (Mithen 2005, 178-180)? All of Miller’s discussion must presuppose some reconstruction of past hominid environments. This is because even if he could prove that music’s current function is for courtship this may be due to a change in function, not because it is a sexually selected trait for musical ability.

Miller’s failure to fully define the trait of musicality as being for production or appreciation, or both is a large problem for his sexual selection hypothesis. Although Darwin agreed that male choice as well as female choice could occur while evaluating sexually selected traits, we should expect female choice to be the most prevalent (Miller et al 2006, 130-131; Miller 2000b, 42-46). This stems from psychological reasons that women should be more selective with whom they mate due to the increased cost for reproduction in females as opposed to males (Miller et al 2006, 130-131). Miller attempts to bolster his claim that a propensity to produce music is similar to sexually selected displays in other species, with males overwhelmingly producing ornaments or weapons while females evaluate them. As evidence, Miller cited sources which have collated statistical databases from over 1,800 jazz albums, 1,500 rock albums, and 3,800 classical works (Miller 2000a, 354). Miller concluded that men created about ten times as much music as opposed to women in the jazz, rock, and classical genres listed above. This is a claim about the dimorphism present in the trait; men are more prolific as musicians than women. However this result, while compatible with sexual selection, could be the result of contingent processes. It is possible that the sample is biased since
males had more control of the society, thus influencing the amount of musical works made by either sex (Mithen 2005, 180; Fitch 2006, 201). Given that sexual selection shaped music producers with augmented musical capacities and con-specifics with a more discerning appreciation for music then it should be expected that males produce the majority of music while females predominantly listen (Fitch 2006, 201). There is no available evidence that men are better musicians than women. Also, evidence is lacking to prove that women are more discriminating listeners than men. The lack of demonstrated dimorphism present for the trait of musical production ability is a major difficulty for Miller’s sexual selection hypothesis.

Evolutionary psychologists try to identify psychological traits which are domain-specific, and universal. But according to Miller, “many intriguing psychological phenomena show the opposite properties; high cost, low modularity, large individual differences and high heritability (Miller 2006, 129).” So, sexually selected mental adaptations may not look universal across a population due to the large differences common in sexually selected traits. As such, the project of evolutionary psychology misses the possibility that sexual selection may be involved in the production of mental traits. Miller claims that music making for hominids in ancient times requires hours of practice and a significant expenditure of energy (Miller 2000a, 349-350). If true, this would bolster Miller’s claim that music was a costly indicator designed through sexual selection to improve reproductive success. But one could question Miller’s definition of what counts as musical practice. In western manifestations of music it is expected that a musician has undergone extensive training and endured years of practice (Pinker 1997,
However, we should not expect the same rigorous standards to be set by early hominids. Instead, musical activities produced by *Homo Musican* are likely to be informal and egalitarian rather than planned proscribed events which are similar to those which occur in concert halls (Cross 2003c, 107-108). Therefore, Miller’s account of music making seems anachronistic since practice is not a necessary element of musical production and certainly not appreciation (while each may be in some modern contexts). Additionally, in western music, musical skills for production are supposedly only present in a small subset of expert musicians and performers. If this is true, Miller’s theory is bolstered since extreme variation should be expected in sexually selected traits. But Miller’s characterization of music results from an anachronistic view of musical production rooted in the twentieth century’s musical paradigm (Cross 2003c, 107-108). The fact that musical producers currently hone their skills via schooling and practice may account for the apparent disparity in musical ability. In this case, comparative data from other cultures could help to clarify the problem (Fitch 2006, 201). Traditional cultures, which have undergone minimal technological change, may participate in musical activity in small egalitarian groups (Cross 2005, 3-5; Cross 2001b, 5). But this claim requires circumspection since “most of the obvious music in these cultures is social, but there also may be a great deal of covert music (Patel 2008, 371),” made for the artists themselves. In sum, the picture is still clouded since we are not sure if music made in traditional societies looks similar to what may have occurred in music’s relevant EEA. The problem could stem from the methodological process of looking to hunter-gatherer societies which are closer to the relevant EEA of a proposed adaptation. Of course modern rock concerts
are further in a sense from anything which may have occurred in music’s EEA. But it is possible that changes in other cultures have drastically altered the function of music just as it has been done in the west.

Whether by Fisher’s feedback loop or by Zahavi’s handicap concept, if either is to be used to explain why music is a sexually selected trait, the trait must have heritable components for both receivership and production. That is, males should display a higher level of production capability while females should be more discriminating listeners. However, if Miller cannot define the trait of music adequately, researchers will have difficulty isolating the psychological mechanisms which are responsible for producing or appreciating music. But the problem may be something that Miller cannot address using the framework provided by evolutionary psychology which claims that there are mental adaptations which are localized, domain-specific, and universal. In opposition with the tenets of Evolutionary Psychology, others (Sterelny & Griffiths 1999, 328-322; Gould 2006, 453-466) argue that “the human mind is in fact a complex functional system in which most individual mental mechanisms play a role in the production of multiple behaviors (Driscoll 2004, 17-18).” For musical production, if we reject the modular theory of mind taken for granted by evolutionary psychologists the protean unpredictability that Miller claims is responsible for musical production may be a general purpose mechanism for artistic creativity. While one of that psychological mechanism’s uses will be to aid in the production of musical works, it may also be used for painting, theatrical performance, or other art. Again the lack of research data makes it difficult, but the mechanisms responsible for inducing hominids to make music may not be domain-
specific for the purposes of musical activity. If the mechanism (when found) is utilized for other functions such as visual art, or mimicry, then Miller has a narrow case for music to qualify as a domain-specific adaptation. If the arguments against evolutionary psychology are correct the claim that natural or other means of selection can operate exclusively upon unitary psychological traits and produce domain-specific mental modules is also challenged.

One last set of comments needs to be made about Miller’s sexual selection view. Earlier in the discussion I downplayed the difference between natural and sexual selection claiming that the later can be seen as an extension of the former. This seems correct for sexually selected weapons and for ornaments as it has been shown how the positive benefits to mating may overlook other positive contributions an ornament may have for fitness. However, Miller’s theory seems to focus on the individual advantages of music making as opposed to benefits for the group. Like Pinker, Miller claims that “[a]daptations must be explained either through natural selection for (individual) survival benefits or sexual selection for courtship and reproductive benefits (Miller 2000a, 329).” He claims these are the only options mainly because he has not found proof that group selection exists. According to Miller, no “biologist ever made a good case for … altruistic [traits] evolving in any vertebrate species (Miller 2000a, 352).” Even though music is made primarily in groups and may have been in the past, Miller does not see this as a problem for his hypothesis. In his estimation it “is crucial to distinguish between behaviors done in groups and those done for groups (Miller 2000a, 351).” If music is done in groups for individual benefit then it seems as if this variety of his theory is
compatible with kin selection models. But he misunderstands what kin selection is during the following quote. “[T]o posit that music evolved under kin selection for some kind of kin-bonding function seems implausible, because no other species with cooperation between kin requires a special bonding ritual (Miller 2000a, 352).” First of all kin selection is not about bonding per say, it is a nepotistic theory about why individuals will help their immediate relatives since in a sense they are helping themselves. Kin selection is a special case of group selection and may be relevant for why musicians will form groups so that they can be more effective at finding a mate than they would have been otherwise.

Conclusion for Chapter Two

Music’s current functionality in courtship occurs in modern day society but only as a marginal subset of all musical activity. Also the claim that music is a sexually selected indicator or an aesthetic display is not strong. Music may have functioned primarily for courtship in the past, however Miller can say little about the past due to his philosophical commitment to a propensity view of function which does not consider past functionality. Miller’s argument that music was a costly and dangerous activity is not strong due to his reluctance to acknowledge music’s possible uses in the relevant EEA. Also, Miller does not conclusively show that music is or was exhibited in a dimorphic manner, even though modern society may display this characteristic due to contingent processes. Anachronism also disrupts Miller’s claim that there is a large variation in musical ability, this claim stems from the western conception that there are musical experts. Additionally, Miller’s reluctance to endorse or create a suitable definition of
music makes it impossible to isolate a genetic mechanism that is heritable. Even if a genetic mechanism is found, evolutionary psychologists endorse a mental modularity thesis which is unlikely to be productive for traits such as music and language which are intertwined with each other and owe their genesis to other adaptive faculties. And finally Miller’s denial of group selection and his misreading of kin selection obscure a possible way for him to strengthen his hypothesis with a plausible additional level of selection.
CHAPTER THREE: CROSS’S VIEW

The task of defining the trait of music has been a disputed topic over several millennia. The question of whether a certain set of sounds consists of music as opposed to noise cannot easily be established. From comparative studies of different varieties of world music many ethnomusicologists claim music “is not a unified and homogeneous reality, [and] there is no reason to think that it emerged one day wholly made by evolution (Molino 2000, 169).” In contrast researchers such as Deryck Cooke insist that there are wide-spread universals and deep structure which are common throughout the multiplicity of musical manifestations (Pinker 1997, 534).9 Ian Cross is a researcher studying music’s early manifestation and origins. Cross attempts to take aspects of both types of definitions in an effort to properly define the trait of music for adaptationist analysis. To begin, Cross claims that researchers in the sciences (as opposed to ethnomusicology) generally use a definition of music “as a consumable commodity constituted of complexly patterned sound that is produced by a class of specialists and engaged with through listening for primarily hedonic reasons (Cross 2007a, 12).” In Chapter One Steven Pinker uses this type of definition to conclude that music is a pleasure technology, while in Chapter Two Miller claims that hedonic musical encounters serve to facilitate mating opportunities. According to Cross, the first problem with the definition of music in the sciences concerns music’s status in contemporary cultures as a tradable and consumable commodity. The invention of the phonograph and other recording devices have allowed for music to be experienced in a context disembodied

---

9 These approaches mirror the strategy employed by psycholinguist Noam Chomsky in the middle of the 20’Th century concerning invariant universals present in all the world’s languages.
from those who create it. Cross maintains that this manner of musical enjoyment (merely listening) is incongruent with how music was likely experienced in ancient cultures. Cross claims the view in the sciences is anachronistic by utilizing a characterization of music which is incongruent with how music was likely to have occurred in its’ EEA. Instead, Cross argues that it is more likely that music making was a communal activity which solicited active participation from those who were present, a claim which I will analyze in detail later in the exposition. Cross furthers his critique of the standard view in the sciences which claims that music is “wholly aural and being efficacious only in the hedonic responses it evokes (Cross 2003a, 23).” Pinker’s theory that music is ‘auditory cheesecake’ and a pleasure technology directed at personal hedonism adopts this type of definition for music (Pinker 1997, 528-529, 534). However, the primary reason that musicality was developed may have had nothing to do with individual hedonism. And as we saw at the conclusion of Chapter One, the faculties of Auditory Scene Analysis and Habitat Selection probably evolved to avoid pain rather than to pursue pleasure. Cross is claiming that researchers must look outside of the modern western cultural paradigm if we are to give an accurate appraisal of the origins of musicality. Cross gives yet another critique of the view of music in the sciences and this is the lack of attention allotted to studying the physical action which must occur to produce music. The standard definition utilized in the sciences is concerned only with the receiver hearing sound and not with the associated movement which must occur to create music. In the western tradition music is generally experienced in a context which confines musical appreciation to a concert hall filled with seated listeners. In this format, Cross claims that the activities which normally
accompany music are squelched by the cultural expectation to sit still and quietly enjoy the music (Cross 2001a, 29-31). Explicitly, clapping, foot tapping, and humming or singing in synchronization with the performance is generally not accepted in the western format. For Cross, music in its’ relevant EEA is not merely “heard and consumed, it is something that is done with others (Cross 2008, 5 his emphasis).” Concurrent with this critique is that the contemporary definition used in the sciences artificially delineates musical practice into discrete roles of performer and consumer. Cross maintains that viewing musical participants in terms of active performers and passive listeners is unrepresentative of how music was and is produced in more traditional cultures (Cross 2007b, 147-148). The performer/consumer dichotomy is predicated upon the notion that there exists a class of musical experts which are qualified to create musical works due to extensive musical training (Pinker 1997, 529). If it is true that there are musical experts from a genetic predisposition then the claim that musical production is constitutive of an adaptation is potentially augmented, especially from the sexual selection angle. The view in the sciences is accurate for describing the bulk of musical practices in the west e.g. listening to the radio, concert halls, or a personal headset. However the view is insufficient as an evolutionary account since Cross is attempting to provide insights into questions about music’s origins and early manifestations. As such, an accurate reconstruction of how music was produced in pre-historic times should not rely on a contemporary definition of music (Cross 2001a 29-31). This is because Cross realizes that current manifestations of music, especially in western formats are not likely to resemble musical activities done by hominids in the distant past.
Cross’s claims that anachronism clouds the non-adaptive view for music endorsed by Pinker as well as the adaptive sexual selection view endorsed by Miller. Even though Cross does not explicitly adhere to the tenets of evolutionary psychology he does insist that attention must be given to how music was produced in pre-historic times by *Homo Musican*. In more cooperative musical contexts, such as singing around a fire, the distinction between what scientists call producer and consumer is blurred. If ten people are sitting around a fire making music, with a similar level of participation from all members it seems incorrect to call one of them exclusively a performer or consumer. Cross cites archeological and ethological evidence which suggest that music making in prehistoric times was likely a group activity which solicited contributions from all who were present (Mithen 2005, 240-242). The evidence given is in the form of performance spaces which were used presumably as a forum for entertainment. However, even though we find hominid fossil remains and tools congregated near these hypothetical performance spaces, the character of the interactions at these spaces remains a mystery (Mithen 2005, 240-242). Elliot Sober’s discussion of information preserving as opposed to information destroying processes will again assist in this discussion (Sober 1988, 3-5). The fossil remains preserve the fact that hominids had ten fingers and ten toes, and may even show that they had a vocal tract. However, other information which would be critical to assessing those hominids’ musical capabilities would be destroyed. In the words of Steven J. Gould, “claims about an EEA usually cannot be tested in principle but [can only be] subjected to speculation (Gould 2006, 460-461).” As a response, evolutionary psychologists insist that hunting and gathering societies which have
undergone minimal technological change should be studied. Cross follows this line of reasoning by claiming that folk music does not have the anachronistic elements present in the western conception of musical activity. As such, we can be confident that folk music is more similar to how music was experienced in its’ relevant EEA. The problem is that folk music may succumb to the same problems of anachronism that Cross associates with modern musical activity. While music may have been an activity done in groups, studies of modern day hunting and gathering societies claim that covert music done by the musician themselves may be more common than Cross claims (Patel 2008, 371). Again the methodological concern looms; how do we know that hunter-gatherer environments of the late 20’th and early 21’st century are similar to those persistent in music’s EEA? The following quote from, Gould’s article *More Things in Heaven and Earth* shows how difficult a search for the EEA is.

But how can we possibly know in detail what small bands of hunter-gatherers did in Africa two million years ago? These ancestors left some tools and bones and paleoanthropologists can make some ingenious inferences from such evidence. But how can we possibly obtain the key information that would be required to show the validity of adaptive tales about an EEA: relations of kinship, social structures and sizes of groups, different activities of males and females, the roles of religion, symbolizing, storytelling, and a hundred other aspects of human life that cannot be traced in fossils? (Gould 2006, p461)

The musical practices of *Homo Musican* are unverifiable since we do not have access to the sounds of the past. Cross claims that Pinker and Miller subscribe to anachronistic notions about how music was deployed in its relevant EEA. But, his own reconstruction by saying that music was experienced in groups as a cooperative event may be
anachronistic as well. So, Cross’s attacks of Pinker and Miller may be intuitively correct, but there is no way to verify his assertions based on the speculative nature of isolating an EEA. Next, Cross describes the definition from the field of Ethnomusicology in an effort to improve upon the definition he attacks in the sciences.

The generally received consensus from the field of ethnomusicology is that musicality is merely a cultural activity rather than a biologically grounded universal attribute. As such, “[n]othing guarantees that all the forms of human music contain a nucleus of common properties that would be invariant since the origination of music (Molino 2000, 169).” However, the ethnomusicologist John Blacking asserts that “every known human society has what trained musicologists would recognize as ‘music’ (Blacking 1995, 224).” Music on this view is a cluster concept or family resemblance relation that ties together music-like activities under the term music. So, it seems as if contemporary musicologists have a troublesome definition, music is a universal yet individual manifestations of music are potentially irreconcilable with each other. This is a problem for an evolutionary account of music because an activity that counts as music in one culture may not be admitted as music in another. A necessary condition for a trait to be considered an adaptation is that it must have some degree of universality within the composition of a population (Brandon 1996, 6). If there is nothing which can satisfy this universality requirement the question as to whether music constitutes an adaptation must be answered in the negative. The search for the original musical event along with a description of it may be impossible without knowing what culture it originated in since any specific musical event is likely to be culturally contingent. Thus, if the position from
ethnomusicology is adopted, little can be said about music’s status as a biological adaptation, it is not one. However, there is reason to believe that the definition of music in ethnomusicology is flawed because it does not acknowledge universal physical attributes present in all normal humans. The ear, vocal tract, and potentially corresponding neural structures (Peretz & Coltheart 2003, 688-690; Peretz 2006, 1-26; Patel 2008, 360-361) all qualify as adaptations and are species typical universal attributes for humans. Therefore, the ethnomusicologist’s position is challenged because music is a biologically grounded practice based at minimum on the characteristics of how sound is received by the ears and processed by the brain. Pinker’s view does a good job of describing some of the faculties which are sensitive to musical stimuli. But music being grounded in biological hardware used for audition may not be a sufficient condition for musicality since some cultural input may be required as well. This is still the case even if particular manifestations of music are culturally contingent and perhaps mutually irreconcilable (Blacking 1995, 220-224; Molino 2000, 166-170). Cross’s positive project is to isolate a universal manifestation or characteristic of music which can serve as a candidate for the original musical event which can then be assessed as a possible adaptation. In addition, Cross will attempt to provide an ancestral musical event which does not succumb to the problems of anachronism associated with the definition of music in the sciences. We have already seen that avoiding the concerns of anachronism may be impossible. The music-like practice Cross will examine is Infant Directed Speech.

As noted above, Ethnomusicologists deny that there are any universal attributes present in music since it is a culturally contingent activity. But Cross insists that human
infants are responsive to several musically relevant characteristics early in life before they have any clear utility (Trehub 2000, 1-7). These include: relational processing of pitch patterns, a preference for consonant musical intervals over dissonant ones, along with affective responses to melodic contour whether spoken or instrumental10 (Trehub 2000, 1-7; Trehub 2003a, 402-403). These musically relevant predispositions present in all normal infants provide suggestive evidence that musical perception is an adaptation. But the burden of proof falls on Cross who must detail how these characteristics are adaptations for music rather than by-products of other faculties. While infants cannot produce music themselves, they are disposed to pay more attention to maternal (as opposed to paternal) singing or speaking towards the infant (Trehub 2000, 7-11). This manner of communication is called Infant Directed Speech (IDS) and is claimed to be a universal human behavior which also shows cross-cultural similarities in production (Trehub 2000, 7-11; Mithen 2005, 70). This is significant because cross-cultural similarity is a necessary condition for a trait to be an adaptation, however it is not sufficient. Recent research suggests that adults will automatically adjust the way in which they vocalize while speaking to infants. For instance, maternal song directed at infants is performed in a “distinctive manner marked by high pitch, slow tempo, and emotional expressiveness (Trehub 2000, 1).” The responsiveness to contour, relational pitch sequences, and change in tempo can influence the mood of infants just as affective states of adult listeners can be modulated by music. The early degree of apprehension

10 Some are convinced that a preference for consonance and certain musical intervals (the perfect fifth) are innate perceptual preferences designed for music, however mere exposure even in the womb may be driving the preference. (Patel 2007, 380) So a preference for consonance may be better explained by early conditioning rather than an inborn perceptual preference. This debate is ongoing and has not been settled.
that infants possess for musical or music-like stimuli serves as a counterpoint to the received view in musicology that the perception of music is merely a culturally grounded activity. Evidence from developmental research on Infant Directed Speech suggests that music originally was and still is adaptive for the regulation of infant moods. The variable contours (with an emphasis on rising and falling pitch) and slower tempo utilized during IDS are thought to maintain the infant’s attention while also providing a calming effect (Trehub 2000, 11). The relevant evolutionary question becomes why did singing develop in the hominid lineage as a means to regulate infant arousal? Cross recruits Dean Falk’s corroborating theory about the evolution of song, which can be described as the ‘putting down the baby hypothesis.’ One of the effects of the gradual emergence of bipedality in our ancestors is that infants were born relatively more premature on the average than they were prior to bipedalism (Mithen 2005, 196-199). The reason for this is that women’s hips were becoming narrower on the average as a consequence of the evolutionary shift towards bipedalism (Mithen 2005, 196-199). Thus, on the average babies were born premature with less capabilities then they otherwise would have had if they matured in the womb longer. In contrast, while chimpanzees are able to cling to their mother at a relatively early age, human infants take far longer to develop that capacity (Mithen 2005, 198). This becomes a problem since babies who are born premature do not have the capacity to grapple onto their mother while she is engaged in other activities such as foraging. Falk claims that helpless babies are a problem since they could cry if left completely unattended while the mother forages for food. If left alone, a crying baby would be an easy target for predators. But if held, the baby would hinder the mother’s
foraging responsibilities. The question of what to do with babies while foraging constitutes an adaptive problem which is solved by maternal song directed at the infant. Falk speculates that mothers placed their babies in close range and were still able to regulate the babies’ arousal via gesture, eye contact and most importantly song. Infant Directed Speech could pacify an infant from a distance without the need for physical contact thus allowing a mother to focus on her foraging duties. Falk reinforces this claim with evidence that human babies who are left alone for a longer period will cry more than babies who are accompanied by a parent (Mithen 2005, 196-199). So even though physical contact would be limited, the use of song would be adaptive for the safety of the child, since a baby hidden from predators may still cry and reveal itself. Falk believes that Infant Directed Speech would bridge the gap between early bipedal hominids (who have larger more helpless babies) and the invention of the sling. Falk’s hypothesis is reinforced by a recent experiment conducted in which mothers are forbidden to touch their babies, but allowed to speak or sing to them (Trehub 2000, 9) The mothers universally dealt with the problem by talking in a more exaggerated prosodic manner using utterances with more variable contours than they would if touching was permitted (Trehub 2000, 7-11).

Even if Falk’s rationale for the development of song is endorsed, the question still remains as to why infants respond to song. Experimental studies have shown that infants pay more attention to their mother while singing as opposed to when they are speaking
This evidence is used to claim that babies are primed for music, since they respond to song more so than speech at an early age. However, this interpretation is contested. Aniruddah Patel author of the comprehensive *Music Language and the Brain* offers two alternative interpretations. Since babies are probably exposed to more speech (adults talking to each other) than song it is possible that musical affect is more salient since it occurs rarely in the infant’s daily course of events. Hence, on this interpretation the novelty of singing is sculpting the preference, rather than an inborn perceptual predisposition (Patel 2008, 381). A more carefully controlled experiment which monitors the amount of time infants are exposed to speech vs. song would help to vindicate or vilify this claim. Another possibility is that infants prefer emotionally laden speech to affectively neutral speech. This idea has been reinforced by a recent study (Patel 2008, 382). Emotionally laden speech contains more pitch variation and a sustainment of effort than the speech of perhaps a boring lecturer who is putting very little effort into their vocal delivery. While the interpretations for the evidence may differ, there is still no generally accepted explanation for why babies like musical sounds. Sandra Trehub attempts to give an explanation to why babies like musical sounds by claiming that it would be adaptively relevant for a mother and infant to be able to call and respond to each other’s utterances (Trehub 2000, 11). The idea that there was a selection pressure for females to develop a means of hands free vocal grooming for infants may be accurate. However, the evolutionary scenario as it pertains

---

11 The infant preference for song over speech is suggestive of innate preferences for musical rather than linguistic acts. Thus, musicality may have a developmental priority over speech, challenging Pinker’s music as a by-product of language hypothesis. (Mithen 2005, 69-70)

12 Patel is convinced (like Pinker) that language is an adaptation but remains skeptical for music.
to musical ability remains incomplete, since a refined adaptation for maternal singing can only explain a small subset of musical works. The problem remains that vocal music in the form of singing is not a comprehensive characterization of what comprises musical activity. Instrumental music, along with a preference for rhythmic sounds such as drums or two sticks hitting against each other are unexplained by this theory. Although IDS utilizes musically relevant characteristics, do we really want to call IDS music? While Infant Directed Singing has musically relevant traits it seems as if this activity is not a paradigmatic instantiation of music. Another problem is that IDS and an infants’ subsequent babbling can be seen as being a pre-cursor to linguistic interactions rather than music. At present, researchers have been unable to determine if IDS is a pre-cursor to music, language or both.

In an effort to tie infant music-like behavior to adult musical behavior, Cross introduces a notion about how music is a form of play by being similar to, and an extension of, the ritualized mother/infant vocal exchange in the form of IDS. As hominid babies are born earlier on the average as a consequence of bipedalism, they experience a longer juvenile period of thought and behavior (Mithen 2005, 69). A more lengthily juvenile period in primates is directly correlated to a higher degree of social organization and interaction (Cross 2007a, 30-32). Cross makes a claim that music can be seen as a way of integrating infantile and subsequently juvenile behavior into the adult repertoire (Cross 2001b 98-102). Cross argues that music “can be both a consequence-free means of exploring social interaction and a play space for rehearsing processes necessary to achieve cognitive flexibility (Cross 2001c, 99).” So, something like the universal activity
of IDS is being extended into juvenile behavior (play) as music. For Cross this is the phylogenetic reason why musicality persists in the hominid lineage. Hypothetically musicality was naturally selected for use in the infant-mother exchange and then the trait acquires the additional (nearly the same) function of facilitating social interactions in young adults. So Cross agrees with the position in the sciences that there are biologically based mechanisms which are supporting the ability to make and respond to human music. But, Cross’s characterization also acknowledges the position from ethnomusicology that musical meaning is not universal but instead is culturally contingent and socially constructed. This will be important for Cross’s final description of musical activity and how it may have had an ancestral adaptive function. Cross claims that, “music accumulates its identities… from the ways in which it participates in other activities (Cross 2007b, 152).” This is because a pattern of pitches produced in one context, may yield different interpretations by different individuals. Explicitly, “[m]usic is a medium that rests on semantic indeterminacy (Cross 2009, 8),” which gives music advantages over language in group contexts, especially in cases of social uncertainty. The sustainment of variable interpretations that can co-exist within this play space is called floating intentionality by Cross (Cross 2007a, 16-17). In language when a word or sentence is uttered there is usually a consensus about what the specific arrangement of the words mean. However, with music there may be a predictable range of responses, but the associations to the music will be dependent on the observer. Cross argues that in the same way proto-musical behaviors exhibited by infants allow for exploratory behavior,

13 Those familiar with Susanne Langer’s (1942) theory of music as a ‘dynamic form’ will notice the parallel between her theory and Cross’s characterization of the multiple interpretations that can be given to music.
14 Wittgenstein and later Quine both point out that meaning is not fixed but instead are socially constructed.
music produced by adults operates in nearly the same manner. The lack of a specific referent in musical interactions allows for several participants with possibly contradictory interpretations to perform the action simultaneously without a detrimental incident (Cross 2007a, 30-31). While linguistic interaction may incite discontent over a particular interpretation, music allows for risk-free interactions since a single individual’s interpretations are not likely to come into conflict with any other individual’s interpretation of the musical event. The faculty of music would be adaptive for situations which require that meanings be under-specified as to not result in conflict. So, music is adaptive for the regulation of situations of social uncertainty in virtue of music possessing the characteristic of floating intentionality (Cross 2007a, 30-31). Cross claims that “music became part of the repertoire of modern human behavior as an exaptive consequence of processes of progressive altricialisation in the hominin lineage (Cross 2008, 1).” So, infant-mother relations in the form of IDS were selected for via natural selection to pacify infants at a distance. Subsequently over the course of development the trait is used for another function, to regulate situations of social uncertainty. So while infants’ moods can be regulated by maternal song, the collective state of groups can be modulated in a similar manner.

Cross’s claim about there not being a fixed reference (or shared convention) in music is interesting since it highlights an important difference between language and music. Cross claims language does have meanings which are determined by a consensus of language users. As a public check, other language users can point out when an utterance is being used incongruently with the rules or social conventions of the
language. But with music, there is no way to adjudicate between competing interpretations of a musical work. If music has what Cross claims is floating intentionality or plasticity in meaning which is relative to a listener at a specific time, then it seems as if anyone can react in whatever way they want to the musical event. However, Cross anticipates that claim by describing what he calls the motivational-structural dimension which underlies any auditory experience (Cross 2008, 4). This can be seen as a reformulation of Pinker’s (and others’) ideas that music is built in part from primitive auditory experience derived from an Auditory Scene Analysis. Also this experience is constrained by the physiological construction of the ear and supporting neural pathways. In order to solidify his definition of music all while acknowledging that it is related to language, Cross advances a characterization of human communication in general. Cross denies that language and music should be seen as distinct entities. This statement is consistent with the neurologist Patel’s claim that “[a]s cognitive and neural systems, music and language are closely related (Patel 2008, 417).” Cross proposes that “language and music should properly be distinguished as tending towards opposite poles on a continuum of capacity for specificity of meaning (Cross 2009, 8-9).” On this view, instrumental music occupies an extreme position on one side of the continuum which has unspecified meaning. In opposition, formal languages would occupy the opposite end in which meanings are exactly specified. Natural language is close to a formal language, while poetry, oration and vocal music would all occupy positions towards the center of the continuum. This definition acknowledges that there may be no way of deciding whether oratory for example should be classified as language or music. Instead the
definition is responsive to the fact that oratory is a blend of music and language which he claims are artificially separated by the views of Pinker and Miller. So while language can incite conflict over particular interpretations of shared events, music’s under-determination of meaning makes it ideal to function as a social lubricant.
Conclusion for Chapter Three

So in summation, Cross’s view is unlike Pinker’s or Miller’s since it does not artificially separate language and music. This is important because Cross does not have to make a claim about whether music or language evolved first in the hominid lineage. Instead, he can claim that general purpose mechanisms for experiencing and reacting to the auditory world are likely to be responsible for the activities of language and music. Also since I am arguing that traits like music and language should be seen as domain-neutral in origin rather than domain-specific, Cross’s view fits this ideal better. But Cross goes further by suggesting that IDS is the evolutionary reason which allows for *Homo Musican* to create music. Again, this may be an inference that is not confirmable since we must study live infants rather than infants which were present in music’s relevant EEA. While IDS may be music like, it does not seem to exhaust the faculties which may be relevant to music’s genesis. We have also seen that while Cross’s conclusion that Pinker and Miller are using anachronistic definitions of music, his own theory about music being used in situations of social uncertainty falls to his own critique. This is because it may have taken many millennia along with cultural reinforcement for music to be employed in ancestral functions of religion, life transitions and in situations of social uncertainty. However an important conclusion which Cross does reach which I think should be endorsed is his continuum definition of language and music. While Pinker claims that language is clearly adaptive this belies the fact that music and language may have had similar evolutionary origins as adaptations, or unselected by-products of adaptations.
CONCLUSION

After analysis of all three competing views it seems as if all of them will fail to capture the initial musical event(s) associated with *Homo Musican*. Explicitly, the question of whether or not music is an adaptation in Sober’s etiological sense will be impossible to answer. This is because in all three cases the reconstruction required relies on a search for an EEA which will be impossible to isolate without rampant speculation. However, according to evolutionary psychology the search for an EEA is vital to describing any trait’s genesis and this is consistent with morphological adaptations as well. Pinker fails in his reconstruction since music may have not originally been used for the function of pleasure. Since Pinker does not search for the relevant EEA he misses the point that a structure’s function may change over time. In addition, a lack of current functionality does not preclude the possibility that the trait had a function at one time, e.g. the human appendix, but now lacks an adaptive function. Miller also fails for the same reason since he is unconcerned with music’s EEA but instead relies on a propensity view of function which only is concerned with current functionality. While Miller’s intuition that the phylogeny of mental traits cannot be reconstructed leads him to a propensity view of function I am startled by how he can still claim to be an evolutionary psychologist. Both Pinker and Miller also fail to acknowledge the possibility of group selection which for social traits like music and to a greater extent, language, seem integral to their genesis. Contrary to Pinker, language could not have been adaptive until there were at least two people who could tell what each other meant. For these reasons and the others in the bulk of the paper I disagree with the project of evolutionary psychology which
attempts to find adaptive explanations for extremely complex traits such as music and language. However, Pinker’s non-adaptive characterization of music as subsisting upon other adaptations seems to be the most comprehensive evolutionary view that has been studied here. But I cannot endorse his insistence that natural language is an adaptation which allows for music as a consequence or by-product. This is because Pinker characterizes music as being a derivative of natural language yet he does not offer clear definitions which show how music is a subsidiary consequence of language. As a result Pinker advances a conclusion which is parsimonious with his adaptationist view of language but he fails to acknowledge logically possible competing options. Although neither I nor anyone else can prove conclusively that music came before language, Pinker has no evidence that language was a predecessor of music. His only evidence is due to music’s apparent lack of current functionality while language has obvious current functionality. As we have seen current functions may not be relevant in an ancestral EEA. The lack of a comprehensive definition of music, and a failure to partition the traits of language and music make the possibility of locating a relevant EEA for either impossible. Cross attempts to solve this definitional problem with a continuum view of music and language that does not artificially separate behaviors as either musical or linguistic but instead acknowledges that many practices involve characteristics associated with each. I think Cross’s attempted definition is clearly the best since it makes no claim about whether to privilege language, music or some rudimentary pre-cursor to both. So, the prospect of finding the initial manifestation of music along with the question of whether it was adaptive is unlikely to be solved by any of the three approaches.
Also, more attention needs to be devoted to the levels of selection controversy. Pinker and Miller deny the possibility of group selection while Cross mentions it but does not elaborate. If music was the target of selection it is unlikely to have been from one level exclusively. Pinker denies that natural selection was a force in shaping humans’ musical abilities which I think is mostly correct. However, Pinker overlooks any group, kin or multi-level views of selection which may have contributed to the development of music and potentially language. Miller also denies that natural selection was a factor in musical abilities but he also discounts the importance of kin, group and multi-level selection. These plausible additional levels of selection may serve to strengthen his sexual selection hypothesis.

Instead I suggest that Pinker’s multi-component view be endorsed with a few caveats. It is extremely unlikely that the trait of music can be described as a unitary trait which selection has acted upon. Pinker’s view acknowledges this but more attention needs to be paid to when each component faculty came into existence. Pinker is clever by listing language use as the first faculty that music is a derivative of, yet it is virtually impossible that speech developed prior to having ears. Language use and Auditory Scene Analysis are separated by millions of years, plus all the other faculties are somewhere in between. Pinker gives no time frames in his argument. This is why I needed to augment his argument from several more detailed sources. As a result, language should not be given a position of primacy in the analysis. Instead Cross’s continuum view about the relation between music and language should be endorsed. This allows for researchers to study music and language without having methodological dispositions as to which one
evolved first. This is consistent with current research that has shown that “the neural substrate for music processing might overlap with that used for processing other complex [auditory] patterns, such as speech sounds (Peretz & Coltheart 2003, 688).”
WORKS CITED


