



Prof. Daniel Everett



music's benefits were primarily reproductive and best explained by the same sexual selection processes that shaped birdsong.

wordless courtship songs predated our linguistic abilities, and that such singing provided the scaffolding upon which language itself evolved

**DARWIN - 1871**



human musicality as a fortuitous  
byproduct of how our minds work

a “mere incidental peculiarity of the  
nervous system... of no  
teleological\* significance.”

**James - 1871**

\*teleology = study of ends and purposes



I suspect music is  
auditory cheesecake,  
an exquisite  
confection crafted to  
tickle the sensitive  
spots of... our mental  
faculties.

As far as biological  
cause and effect are  
concerned, music is  
useless

Steven Pinker (1997)

“music takes advantage of pre-evolved faculties for language, pattern recognition, and emotion, but that it is an evolutionary byproduct—a happy accident”



music constitutes a medium that is well suited to demonstrate the “protean,” unpredictable and creative, properties of an individual, properties that are selectively advantageous and hence desirable in the determination of mate-choice

Miller (1997)



# Adaptationist theories

- the function of music was to attract sexual mates (Darwin)
  - However, unlike other sexually selected traits, music is not sexually dimorphic, meaning that there are no differences between the musical abilities of men and women
  - Signalling more general fitness?



# Adaptationist theories (2)

- Music fosters group cohesion, cooperation and social bonding
  - In other primates, social bonds are formed and maintained through grooming, but around the emergence of *Homo erectus* social groups became too large for grooming to be viable
  - ➔ Language and music (or a common precursor of the two) evolved to perform this function (Dunbar, 1996; Huron, 2001)

# Adaptationist theories



sexual selection



motherese  
“baby talk”



group cohesion  
“social glue”

# Adaptationist theories



“sharing emotional states/intentionality”  
“song and dance - release of endorphins and promote social bonding”

Patel, A (2010). Music, biological evolution, and the brain  
Levander & C. Henry (Eds.), Emerging Disciplines, Rice University Press

# Exceptions?



*Tsimane (Bolivian tribe)* - *little to no collective music-making*  
- singing by shamans or other older adults whose songs  
conveyed traditional knowledge, reinforced cultural norms, and  
propitiated ancestors and the guardian spirits of forest animals

Patel, Rudden (2021). Where they sing solo: Accounting for cross-cultural variation in collective music-making in theories of music evolution

# Exceptions?



- researchers played certain notes of different frequencies and asked them to match this to the same note in a different octave.

“One of the tasks they got was to sing back an interval an octave lower, for example. Whereas people who have been exposed to octave-based music could do this quite easily, it was much harder for the Tsimane.”

Jacob et al., (2019).Universal and Non-universal Features of Musical Pitch Perception Revealed by Singing. *Current Biology*

# Exceptions?

youtube: Universal and Non-universal Features of Musical Pitch Perception Revealed by Singing

<https://www.youtube.com/watch?v=8SKa2cIVq3g&t=1s>

# Non-adaptationist view

“a human invention that can have lasting effects on such nonmusical brain functions as language, attention, and executive function, and is concerned with explaining the biological mechanisms underlying these effects”

“music resembles *control of fire* in being an ancient invention that has become universal because it provides things that are universally valued by humans”

“the valued things it provides are mental rather than physical: namely emotional power, ritual efficacy, and mnemonic efficacy ”

- Aniruddh Patel (2010)

# Non-adaptationist view



**8605399670**



# Music, biological evolution, and the brain

“rather than a by-product of evolution,  
music or more precisely musicality is  
likely to be a characteristic that survived  
natural selection in order to stimulate  
and develop our mental faculties”

— Honing (2013)

# Musical Aptitude/Ability or Musicality?

- biologically based spontaneously developing skill (like language) constrained by our biological and cognitive systems
- need not be related to special musical talent
- widely shared human capability
- a multifaceted cognitive skill that encompasses aspects of implicit learning, temporal processing, sensorimotor synchronization, and the role of expectation in music perception

— Honing (2020)

# Musical Aptitude/Ability - a biological trait

Genes affecting inner ear development, dopaminergic systems, learning, and memory were found as candidate genes for musical aptitude, listening to and performing music

MOZART'S GENES



Mozart is a typical example of a talented composer whose family was musical. There are a lot of families in our days that have several professional musicians, so part of the musical talent is explained by the genes but of course also to exposure to music.

**It's like an allergy; the risk for an allergy is only expressed when the pollen is coming, so you need this environmental trigger.** And music is an excellent environmental trigger. Children who have an ability for music have to be exposed to music, otherwise we don't know whether they can become musicians. So a rich musical environment is of course needed.

# Musical Aptitude/Ability - a biological trait

- new born babies have brain responses similar to adults if you omit the note on the down beat
- results strongly support the view that beat perception is innate
- infants (5-24 months) engage in significantly more rhythmic movement to music and other rhythmically regular sounds than to speech
- infants exhibit tempo flexibility to some extent (e.g., faster auditory tempo is associated with faster movement tempo)

# Musical Aptitude/Ability - a biological trait

rhythm processing more natural  
than pitch processing?