

# THE CO-EVOLUTION OF MUSIC AND LANGUAGE: EVIDENCE FROM THE ARCHAEOLOGICAL AND FOSSIL RECORDS

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Music and Language

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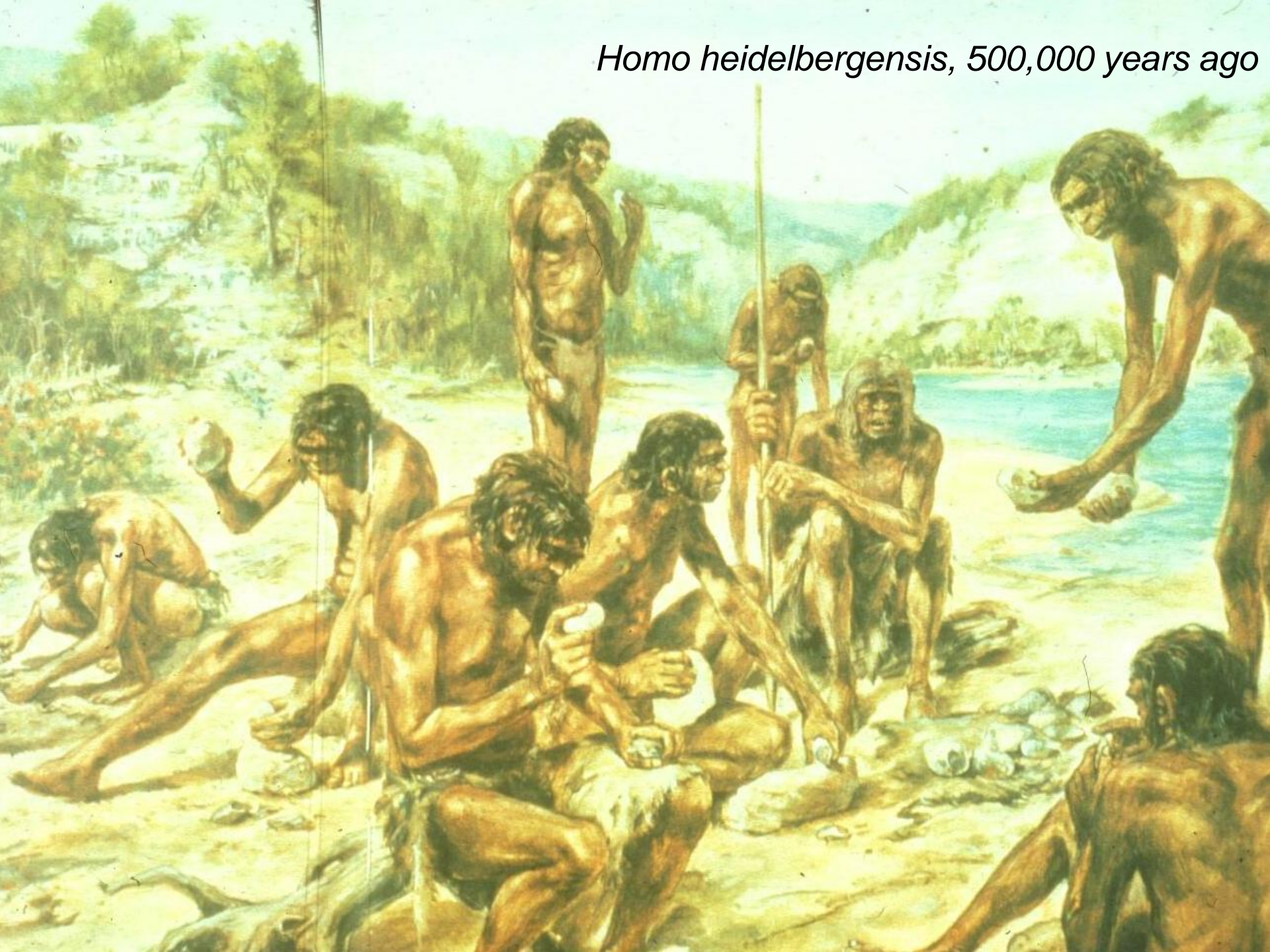
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# Why music?





*Homo heidelbergensis*, 500,000 years ago





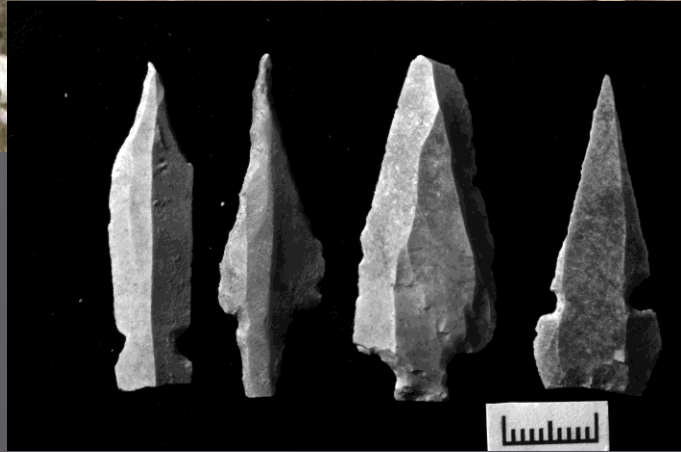
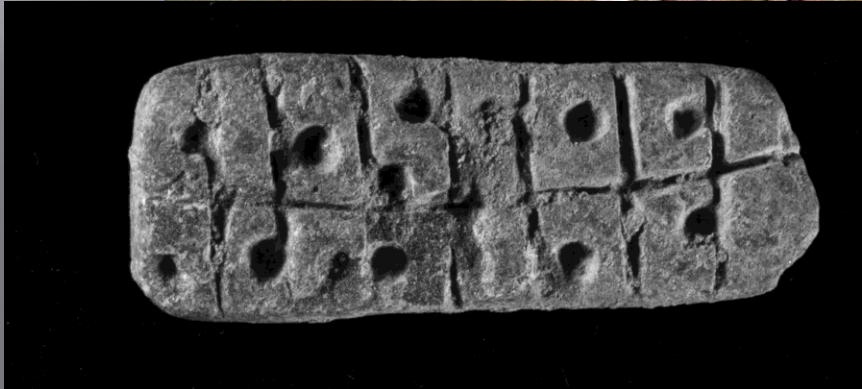
*Wadi Faynan, southern Jordan*







*The past  
is silent*





*Why should an archaeologist be concerned with music?*



# Colin Trevarthen :

We are “*born with a musical wisdom and appetite*”



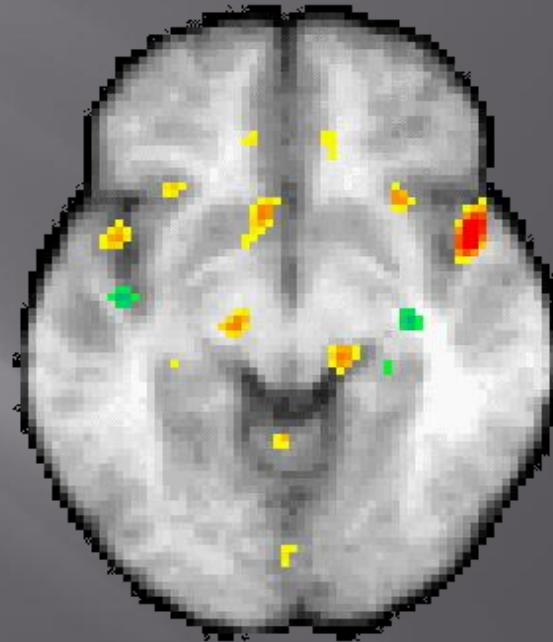
Babies prefer singing to speaking, and those who are sung to have enhanced development



We instinctively „talk to babies with a high degree of musicality – „motherese – and feel compelled to sing to them

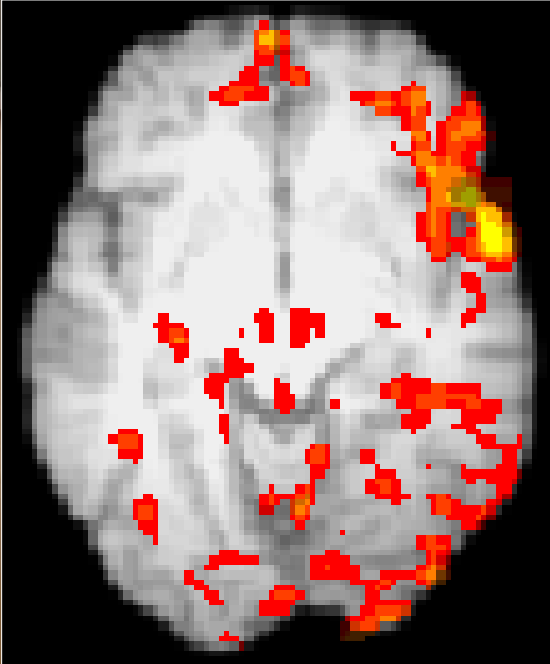
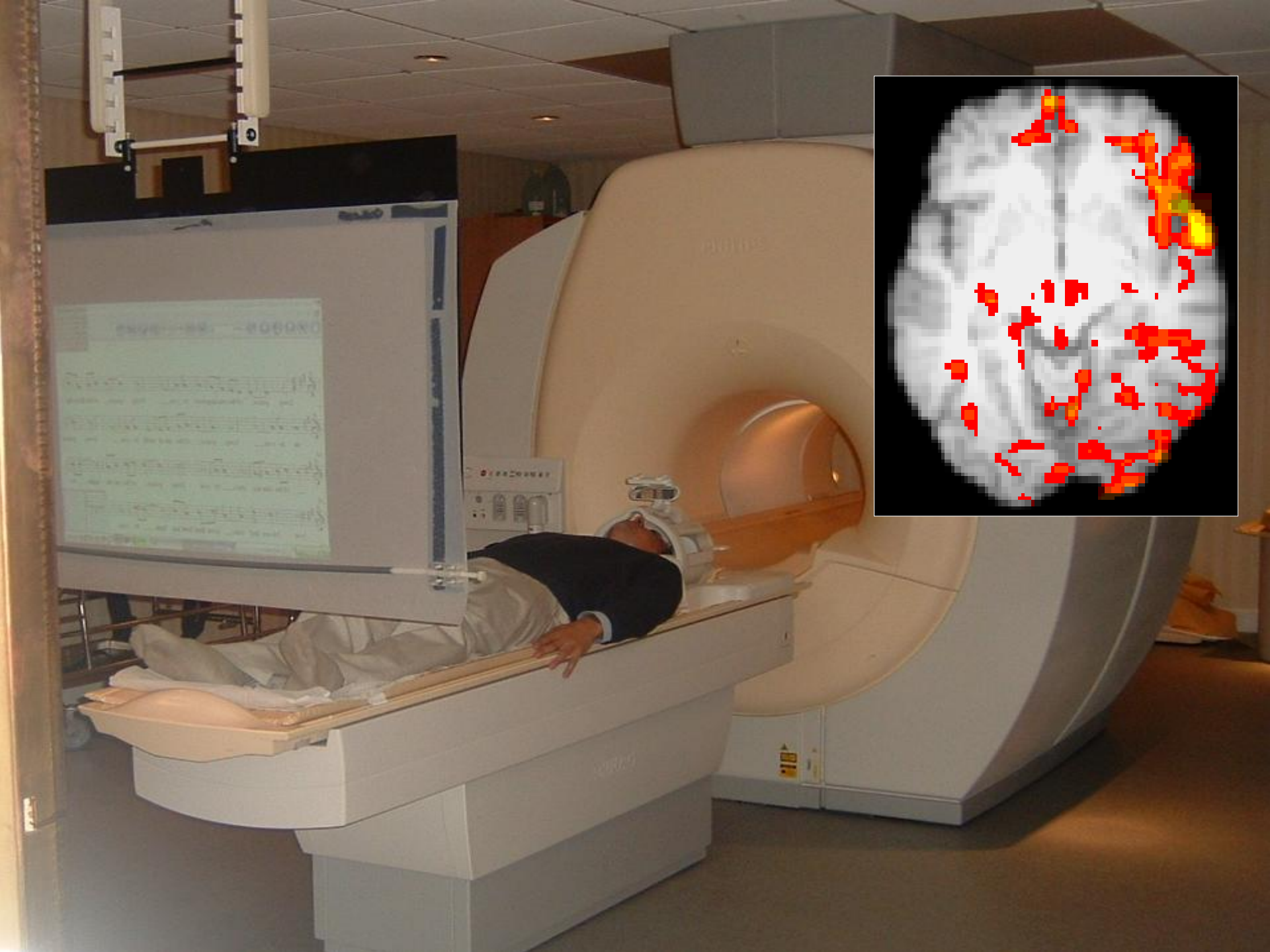


# Music and the brain:











# Functional Activity Increases in non-Musical Adult After 1 Year Singing Lessons/Practice (After Lessons Minus Initial Singing)

Overall Combination of 12 Singing/Sightreading Tasks  
(Involving Song, Pitch, Tone, Timbre, Dynamics, Rhythm)  
fMRI (3 Tesla) ( $p < 0.005$ )

Enhanced motor  
control of vocal  
apparatus

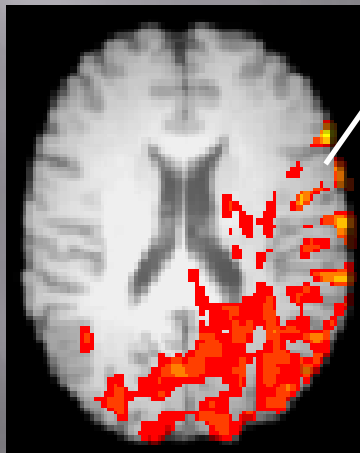
Enhanced processing  
of musical structure

Enhanced secondary  
auditory processing

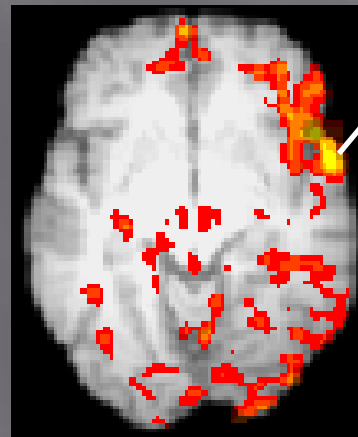
BA 45  
Inferior Frontal  
Gyrus

BA 38  
Superior  
Temporal  
Gyrus

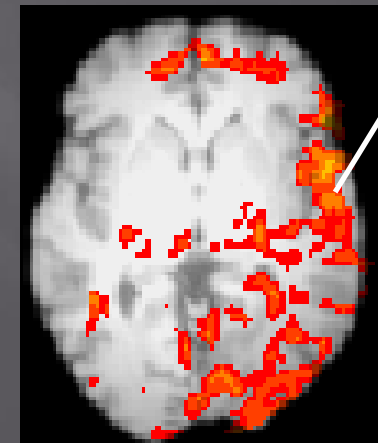
BA 22  
Superior  
Temporal  
Gyrus



$z = +18$



$z = -14$



$z = -6$

L ↔ R

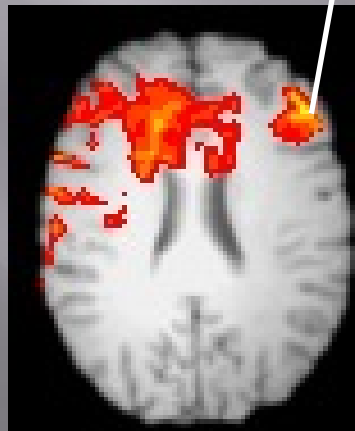
3.3 8.5

*Functional Activity Decreases in non-Musical Adult  
After 1 Year Singing Lessons/Practice  
(Initial Singing Minus After Lessons/Practice)*

*Overall Combination of 12 Singing/Sightreading Tasks  
(Involving Song, Pitch, Tone, Timbre, Dynamics, Rhythm)  
fMRI (3 Tesla) ( $p < 0.005$ )*

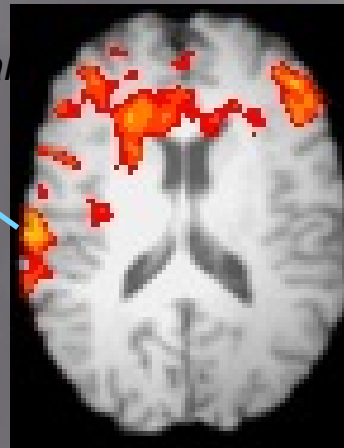
*Reduction in working memory: with skill  
acquisition now processing sounds as  
parts of musical contours and intervals  
rather than just as a sequence of sounds*

*BA 46  
Inferior  
Frontal  
Gyrus*



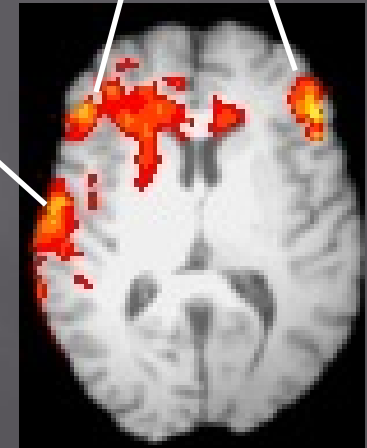
*z = +20*

*BA 40  
Inferior Parietal  
Gyrus*



*z = +14*

*BA 22  
Superior Temporal  
Gyrus*

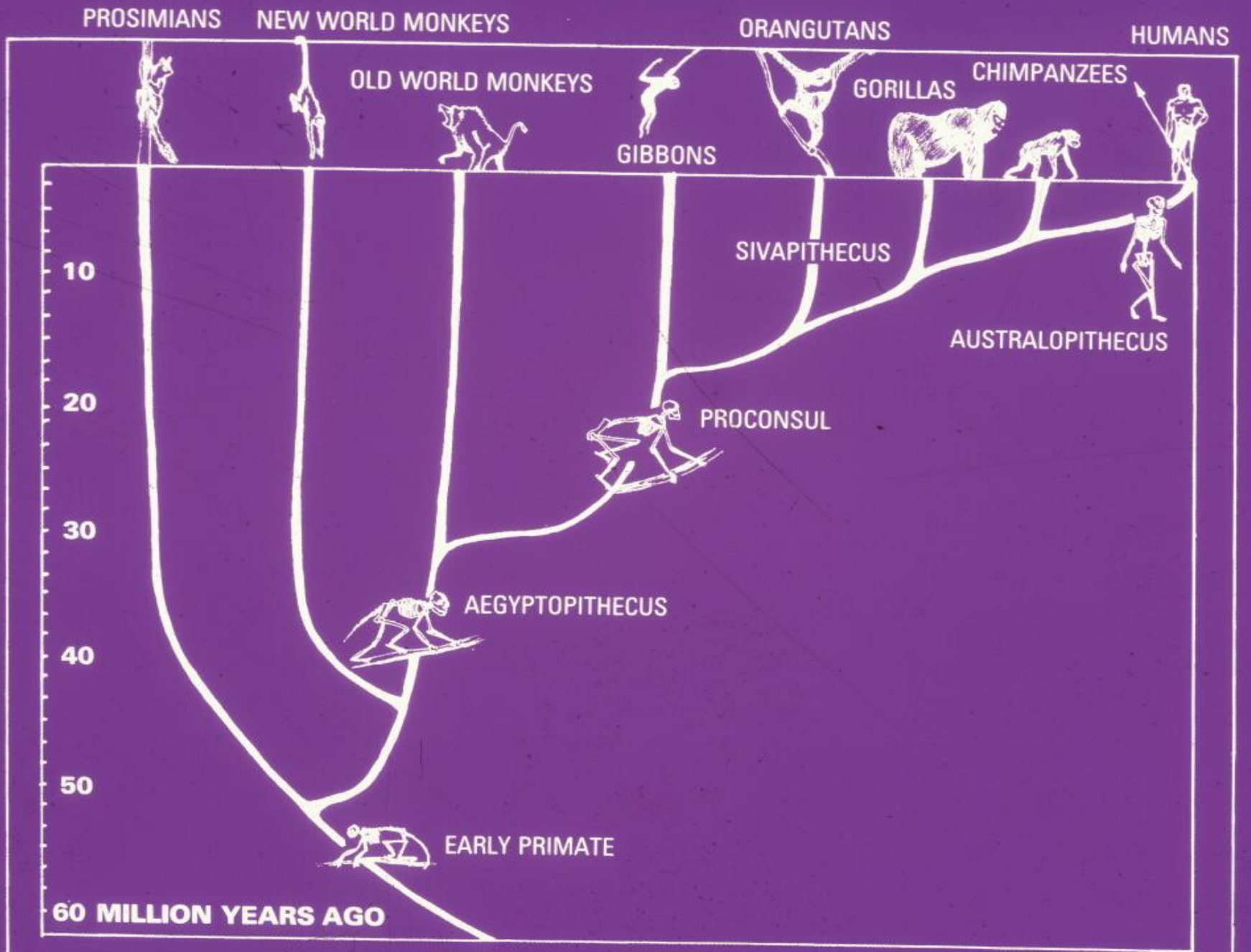


*z = +4*

*L ↔ R*





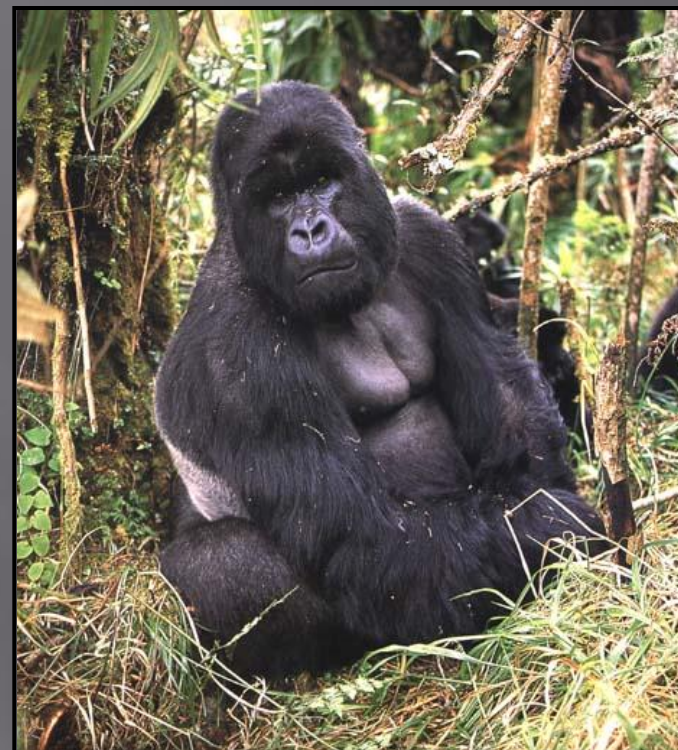




*Vervet alarm calls*



*Gelada chatterings*



*Grunts, barks, screams & hoots*

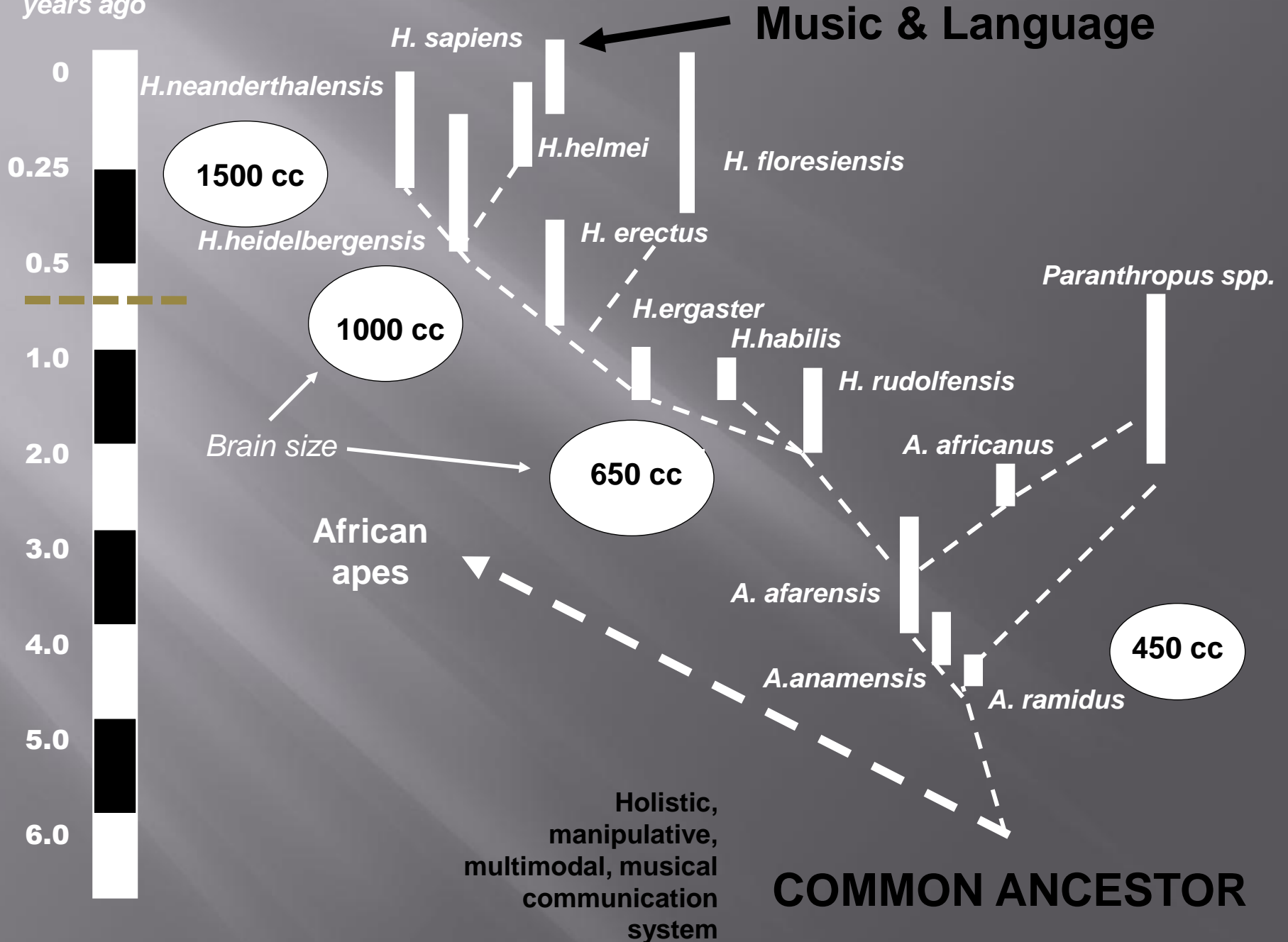


*Gibbon duets*





Millions of years ago



Music

Language



*Time*

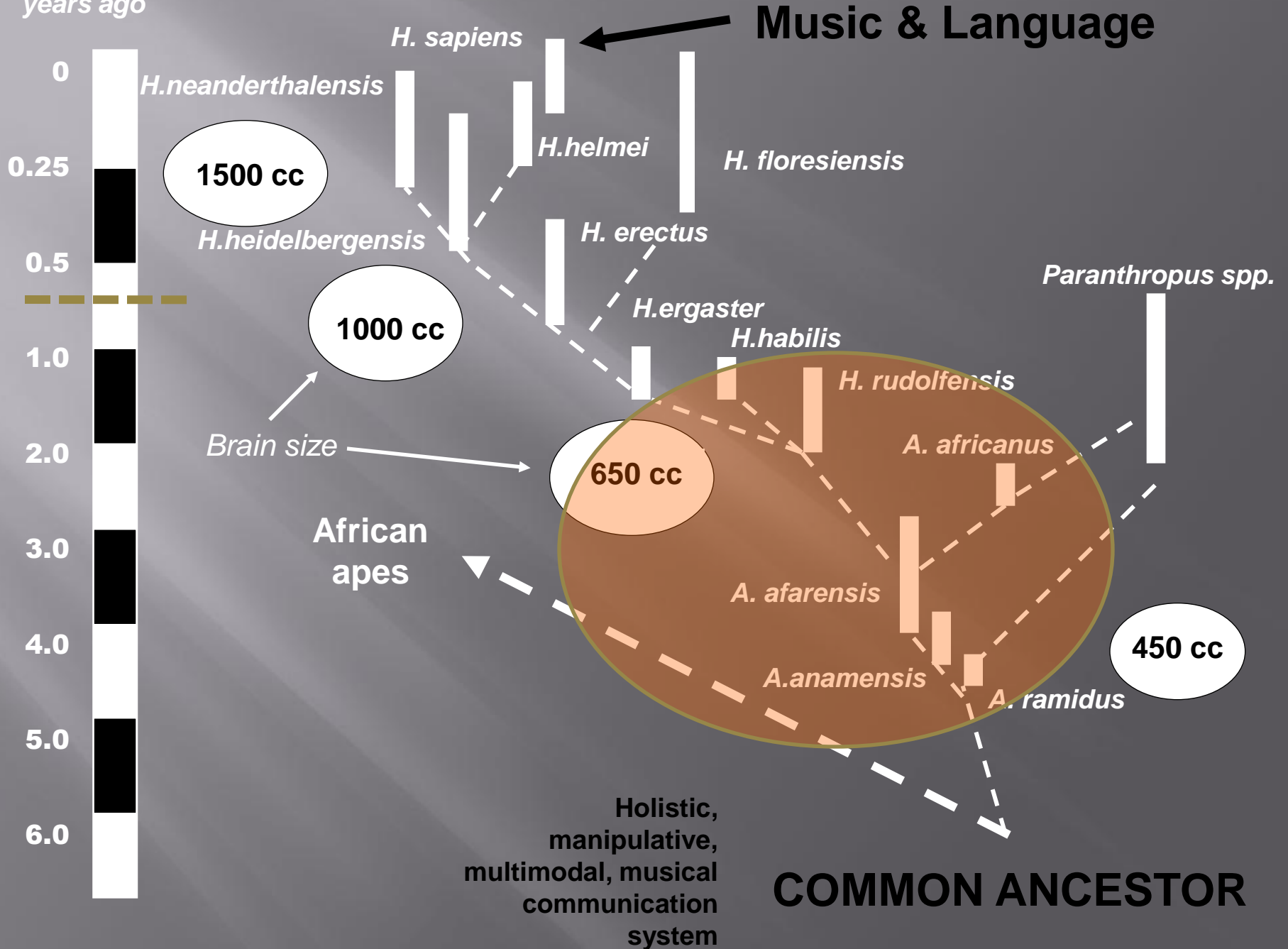


← 200,000-70,000  
years ago

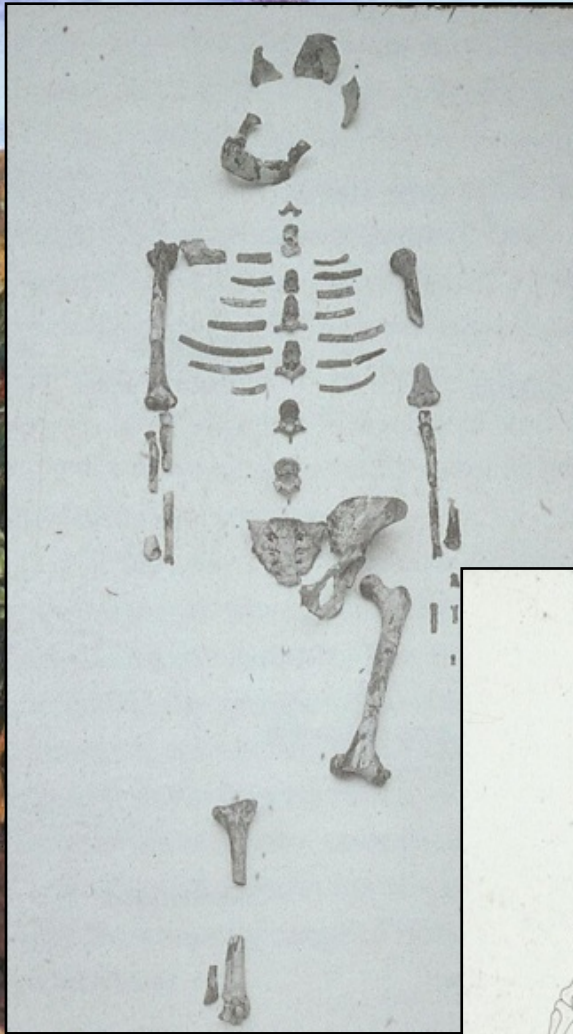
A pre-linguistic „musical  
mode of thought and action  
(Blacking)



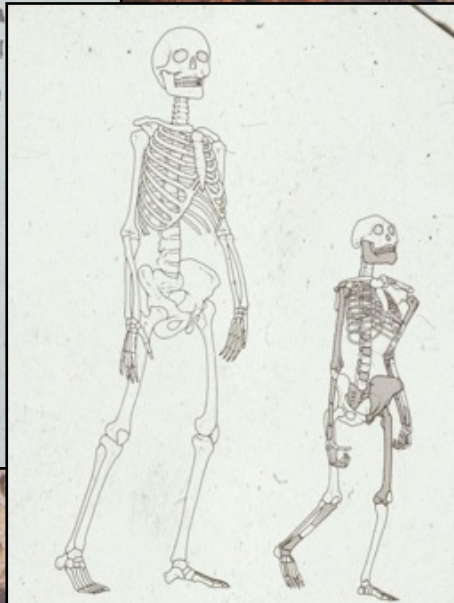
Millions of years ago



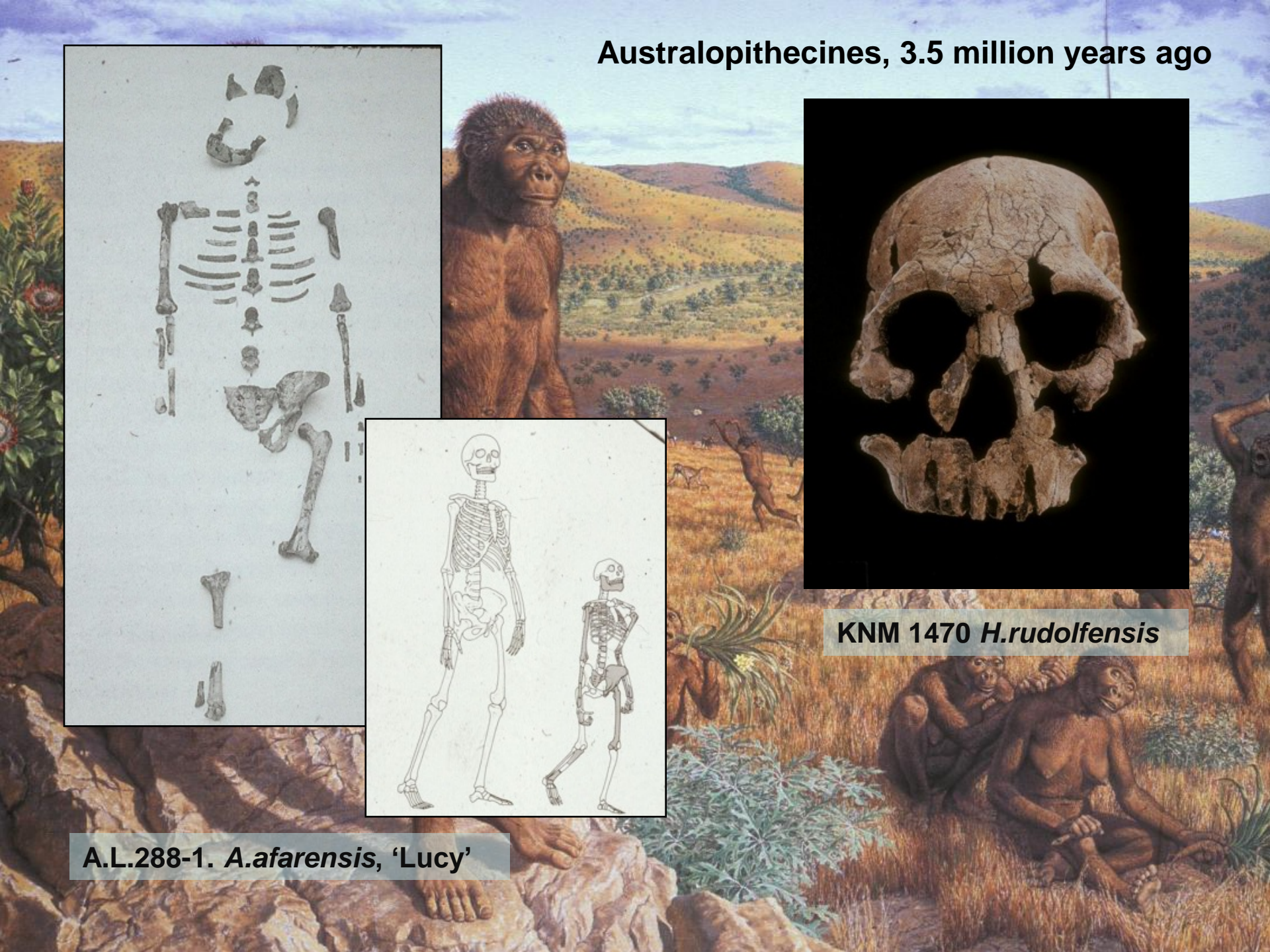
# Australopithecines, 3.5 million years ago



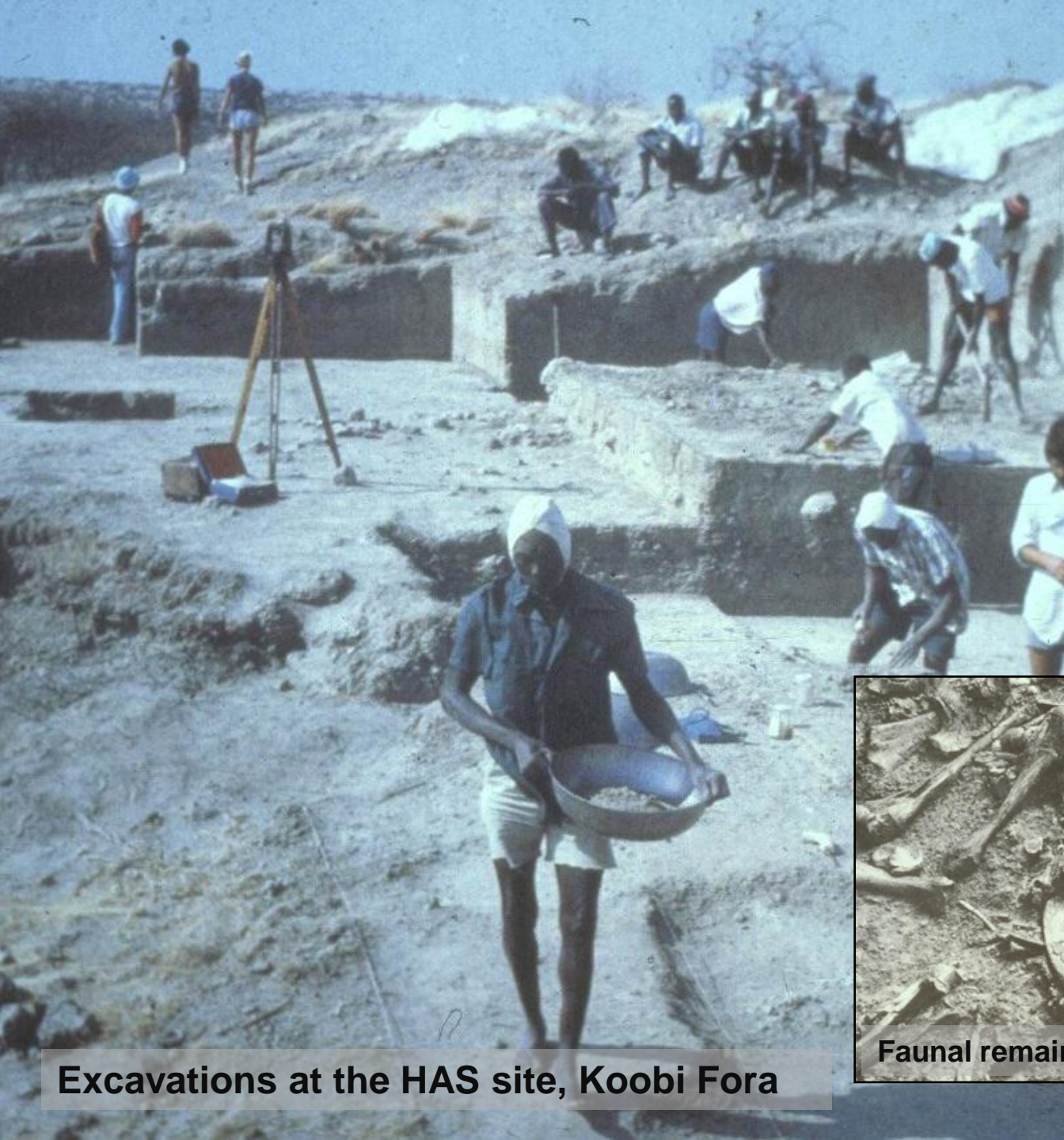
KNM 1470 *H.rudolfensis*



A.L.288-1. *A.afarensis*, 'Lucy'







**Excavations at the HAS site, Koobi Fora**

**Faunal remains at FLK 22, Olduvai Gorge**



***Homo habilis* 2.0 million years ago**

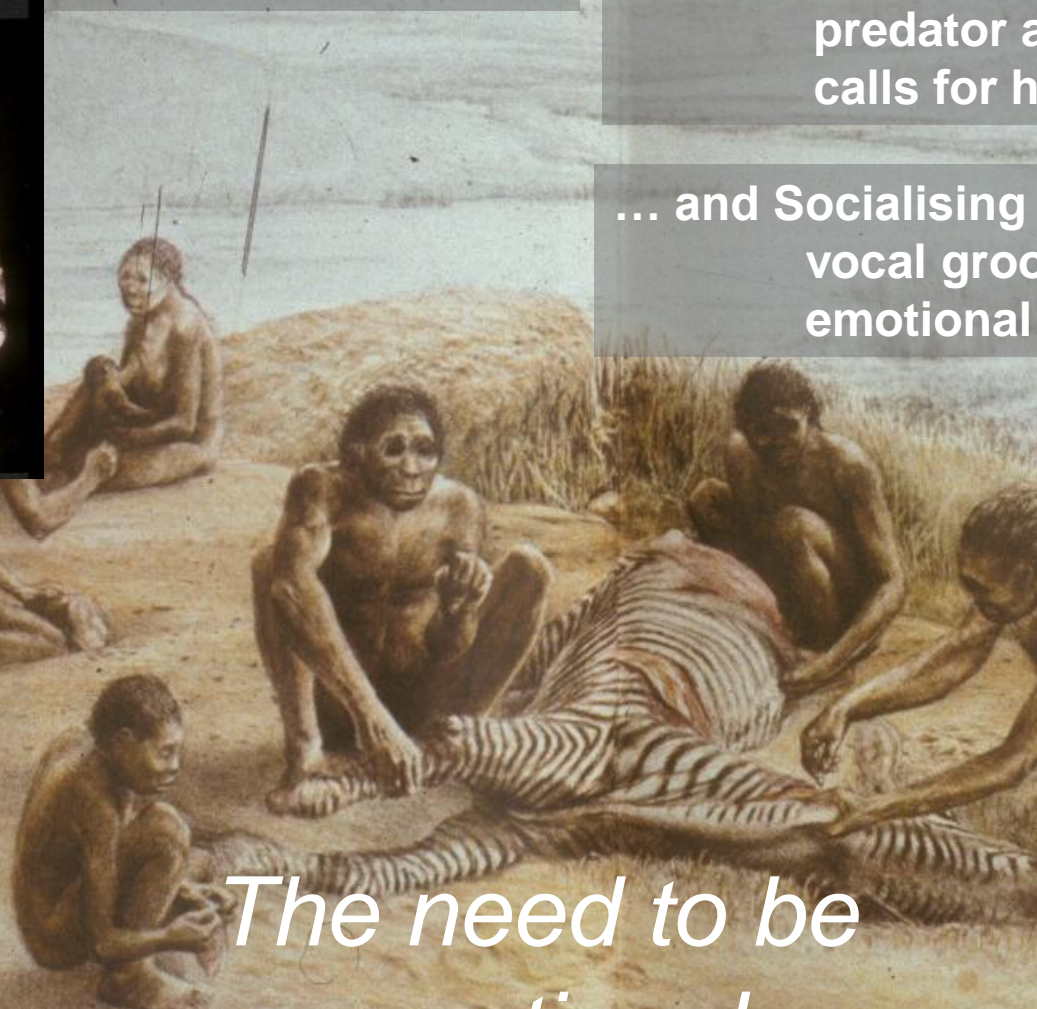
**Changes to the vocal tract arising from reduced dentition**



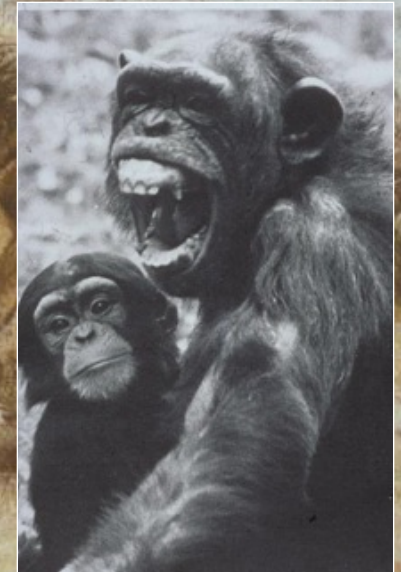
**Selective pressures arising from:  
Foraging:**

**predator alarm calls,  
calls for help & support ...**

**... and Socialising  
vocal grooming  
emotional manipulation**

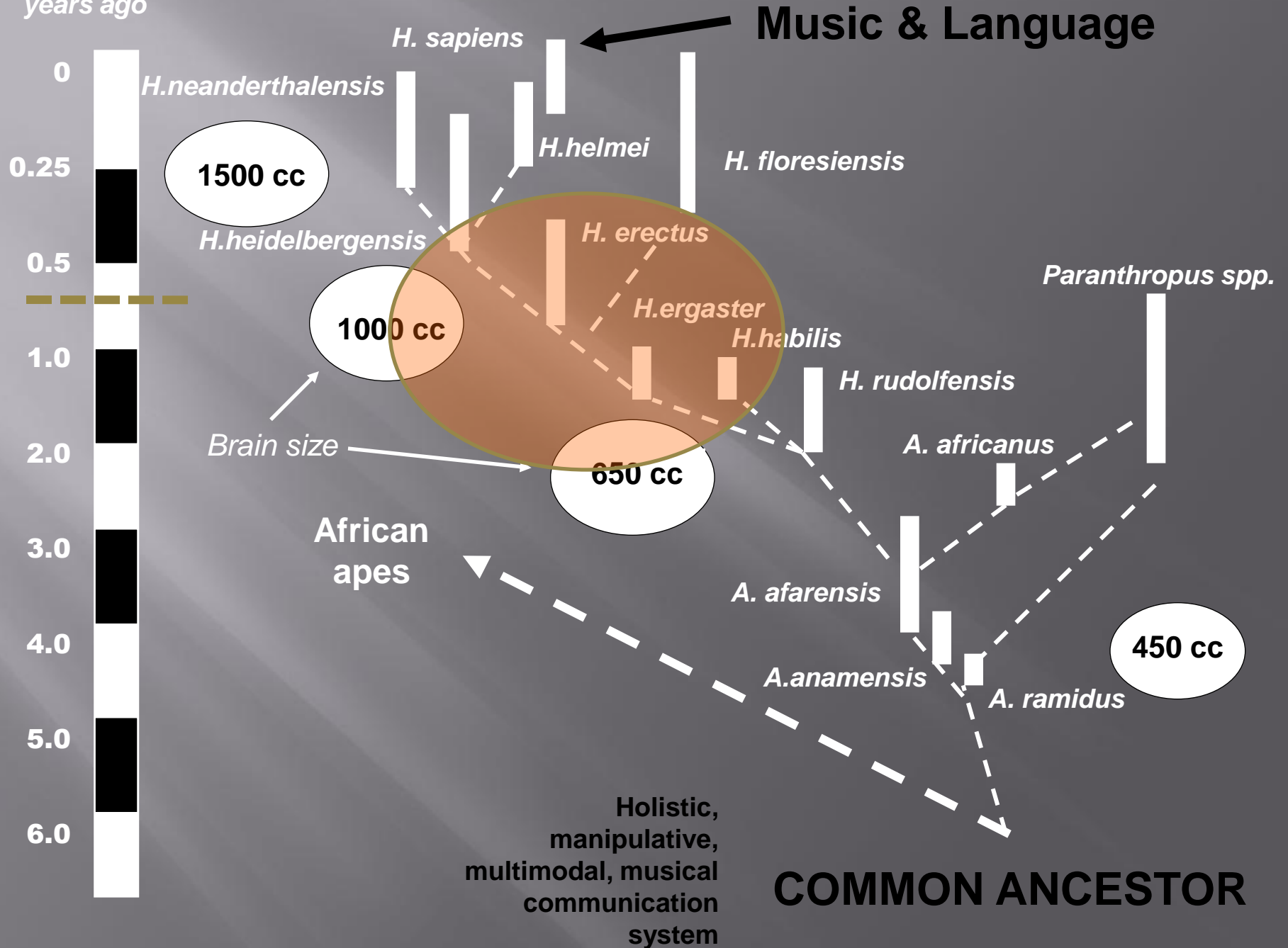


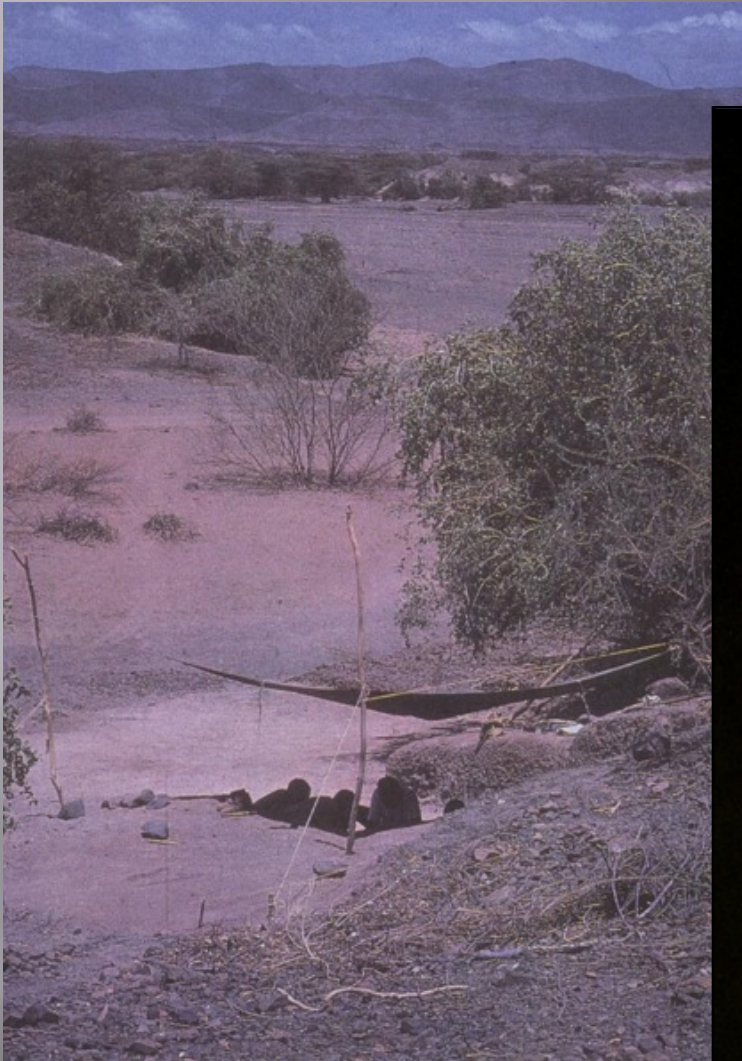
***The need to be  
emotional***





Millions of years ago



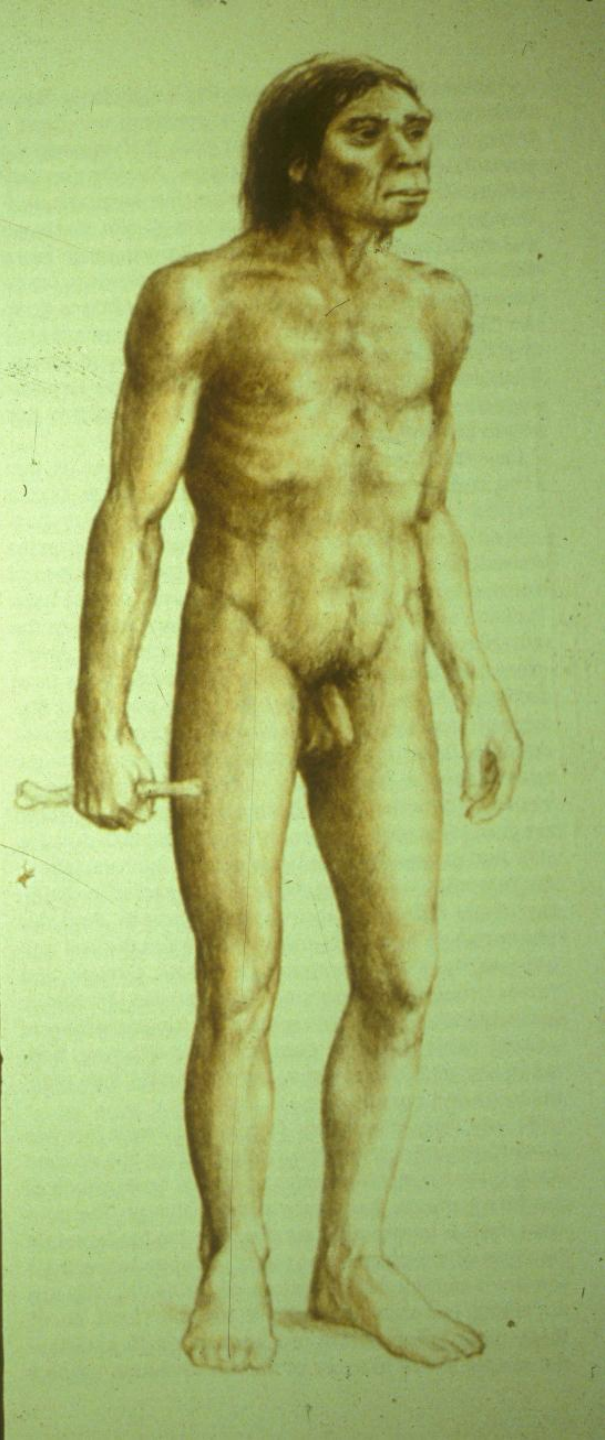


WT 15000 *H. ergaster*  
„The Nariokotome Boy



Full bipedalism  
required:  
Descended larynx  
Enhanced breathing  
control

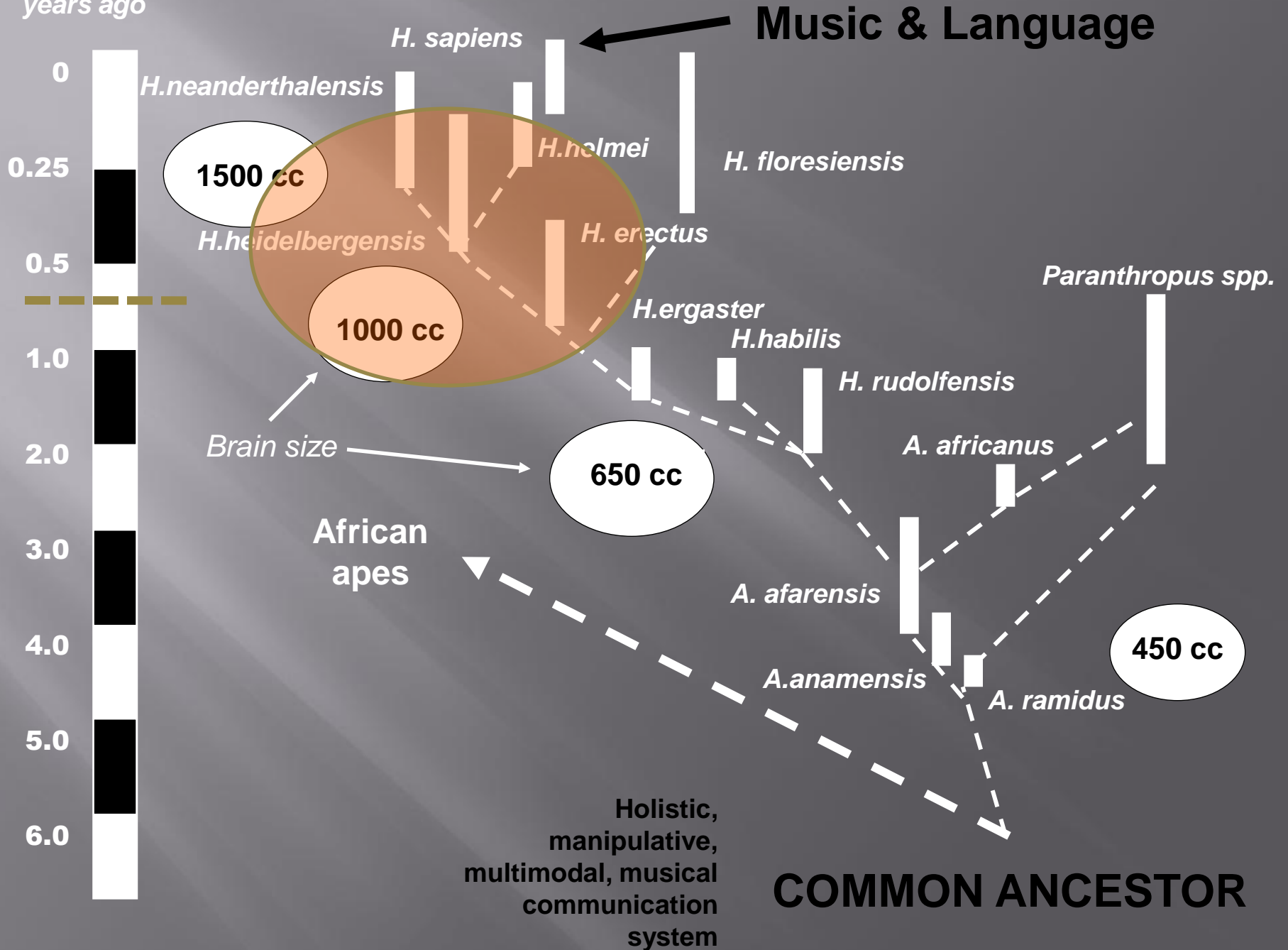




The muscular control required for bipedalism enhanced the potential for gesture and body language, and dance

Further consequences of bipedalism were enhanced rhythm and the phenomenon of bodily entrainment

Millions of years ago





# *Four evolutionary developments with consequences for the evolution of music & language*

## **1. The big helpless baby problem**



**Ellen Dissanayake**

*'coevolution in infants and mothers of rhythmically patterned, jointly maintained communications*

**Dean Falk**

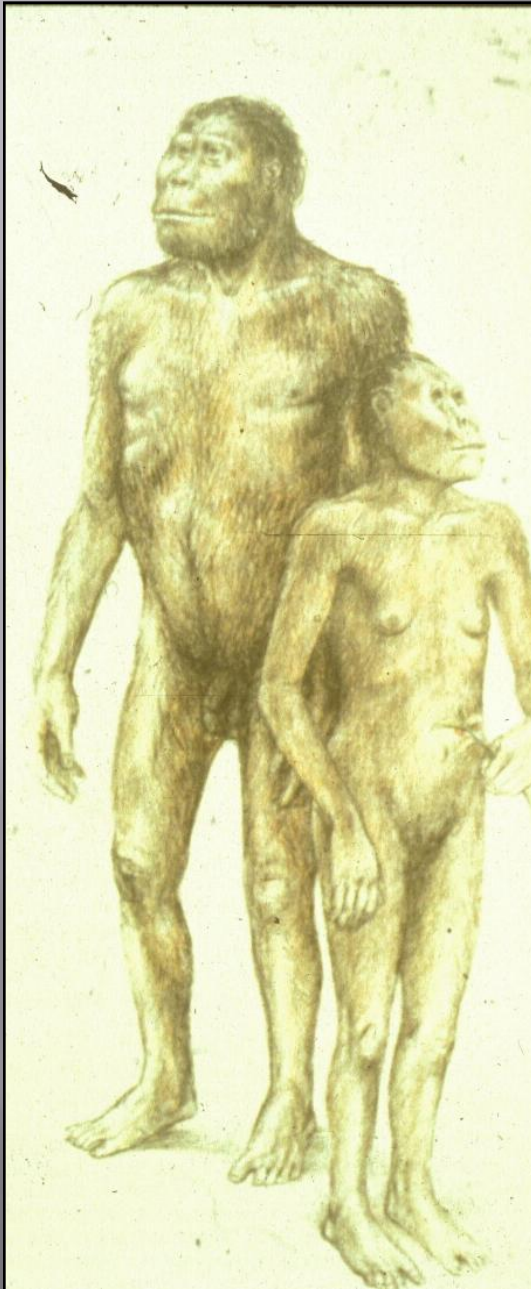
*Putting baby down*



*The importance and great antiquity of singing to baby*







## ***2. The reduction of sexual dimorphism***

c. 50% increase in male body size and 70% increase of female body size from *A.afarensis* to *H.ergaster*, change of size ratio from c. 1.4 to 1.2

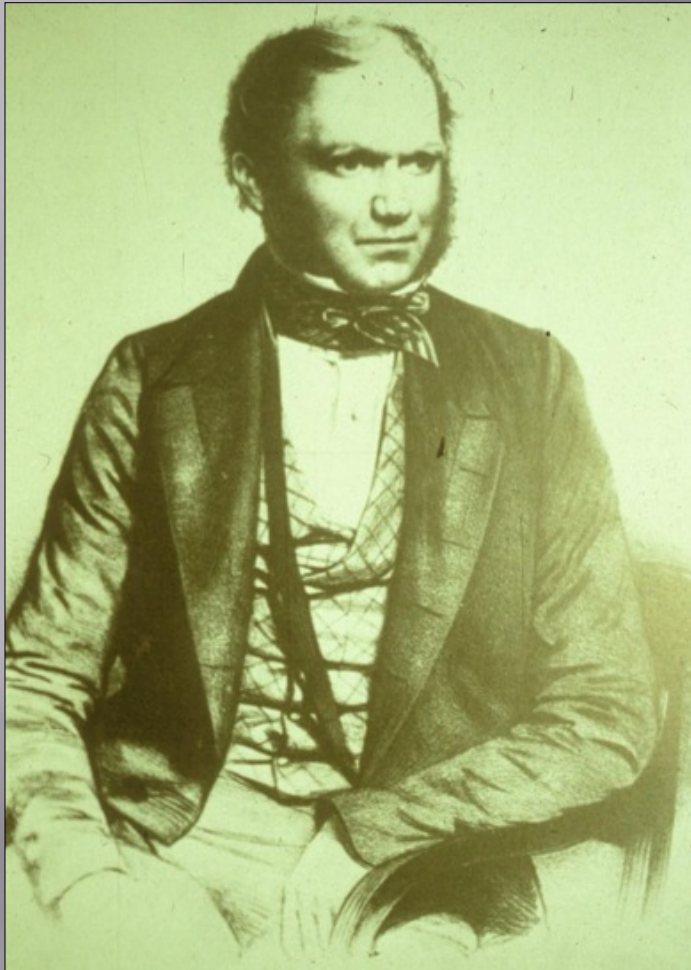
What would the consequences have been for social organisation and mating patterns?

Possibly:

Reduced male-male competition

Increased female choice

Pair bonding and male provisioning

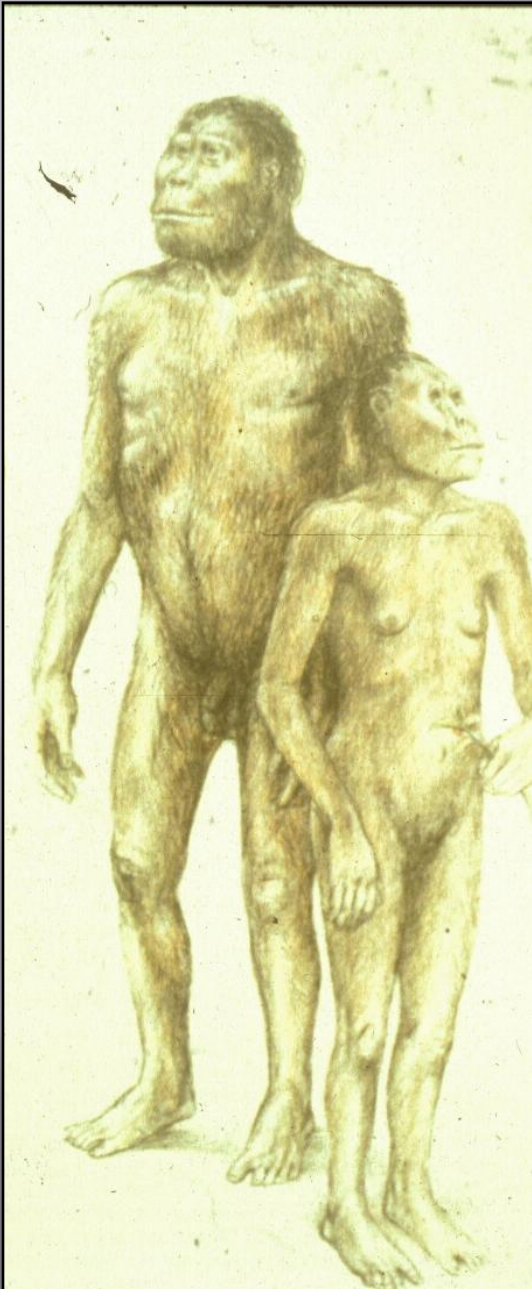


Charles Darwin 1871

*“... it is probable that the progenitors of man, either the males or females or both sexes, before acquiring the power of expressing mutual love in articulate language, endeavoured to charm each other with musical notes and rhythm”*

*Such ideas led to the theory of sexual selection*



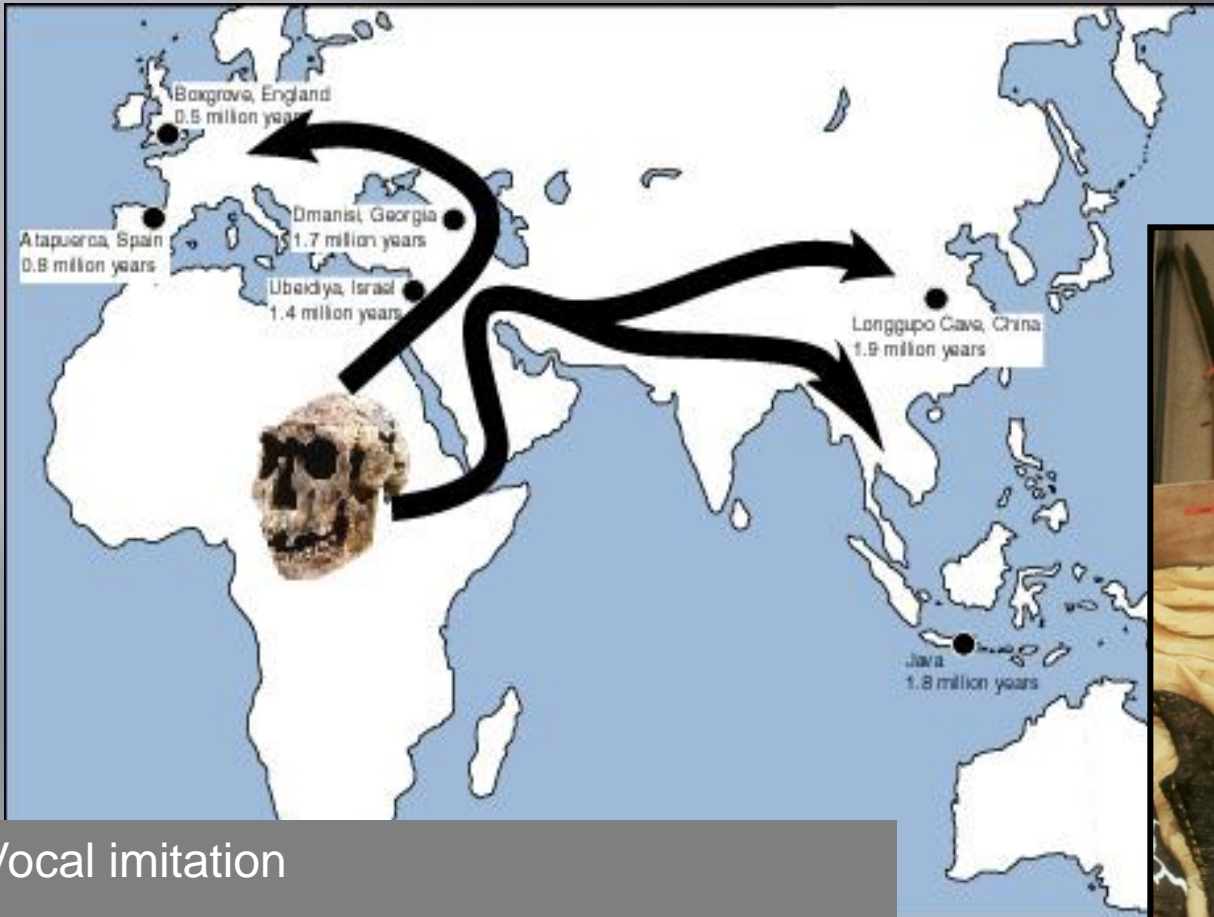


*Music and  
sexual  
display*



### 3. Dispersal & big game hunting

Selective pressures to enhance communication about the natural world



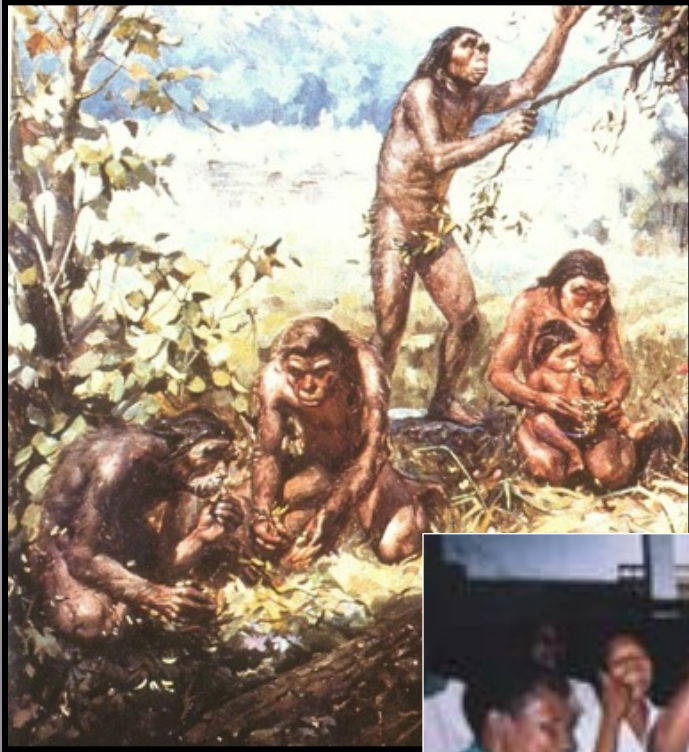
Vocal imitation

Mimesis – Donald 1991 „Mimetic culture

Sound synaesthesia – Brent Berlin



## 4. Significance of cooperation and group bonding



Group hunting of big game depended upon cooperation and trust



Group singing and dancing are the primary means to build such trust

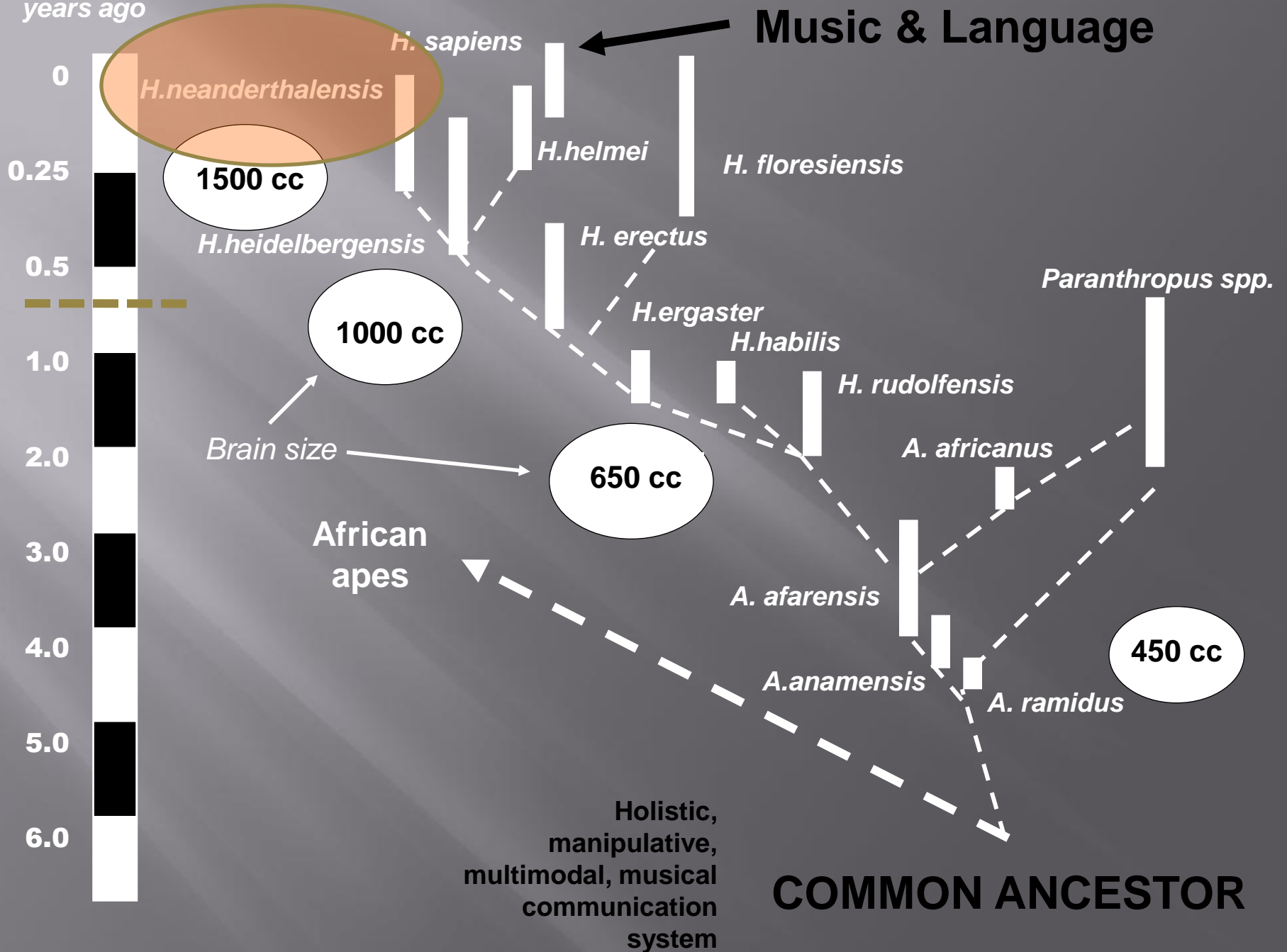


***Bilzingsleben, Germany, 300,000 years ago***





Millions of years ago



*Homo  
neanderthalensis*

## Arguments for language

Large Brains

Modern-like vocal tracts

Technological sophistication

Big game hunting

Ecological success

## Arguments against language

Absence of symbolic artefacts

Cultural stasis





# ***Neanderthal Communication***

**H**OLISTIC

**M**ANIPULATIVE

**M**ULTI-

**M**ODAL

**M**MUSICALITY

**M**MIMETIC

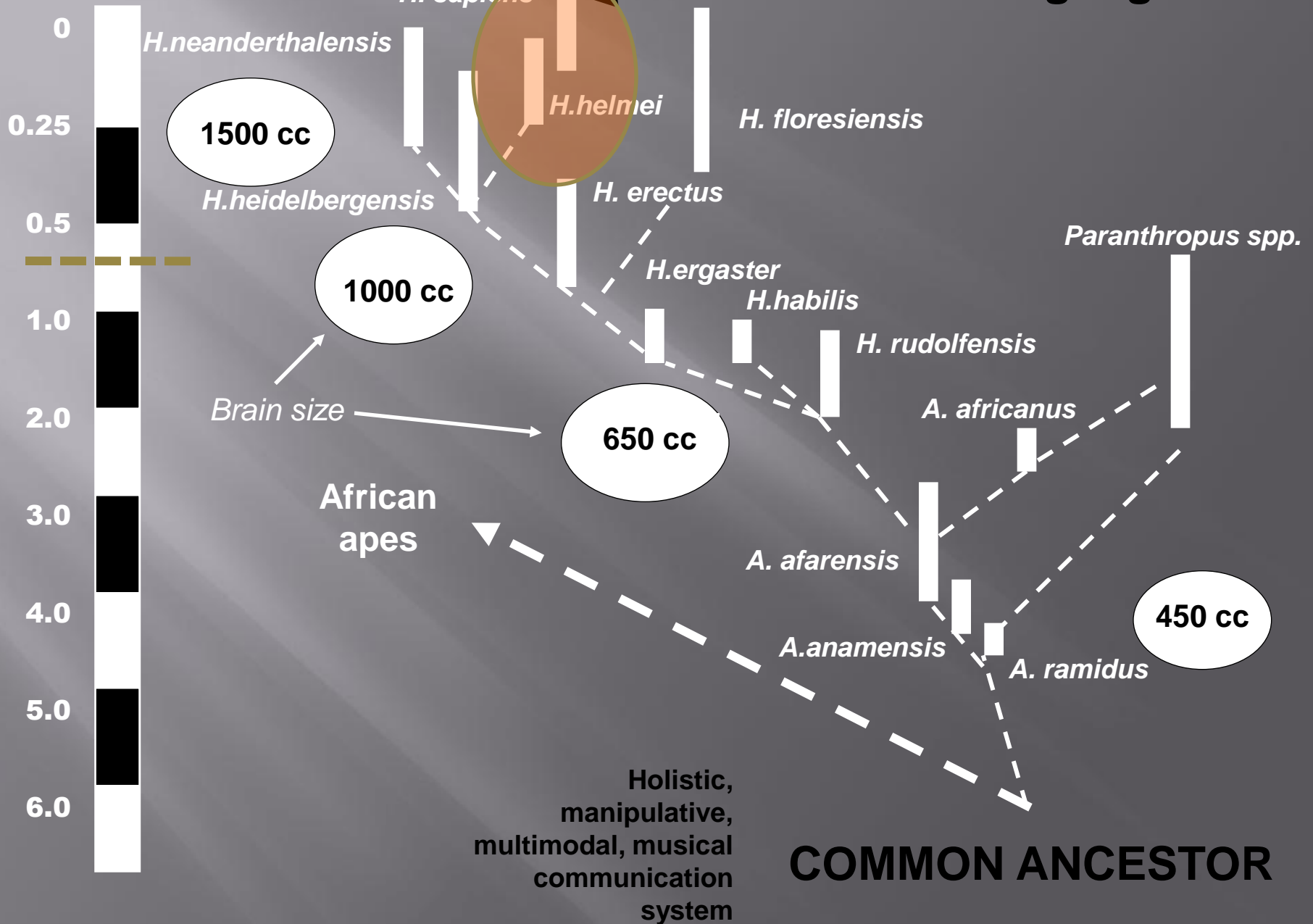
*A relatively fixed set of formulaic utterances with complex semantic meanings, used for recurrent situations and events, used in conjunction with body language and moderated by variations in pitch, melody and rhythm to nuance their meaning and emotional content*

*Limited degree of compositionality & some words*

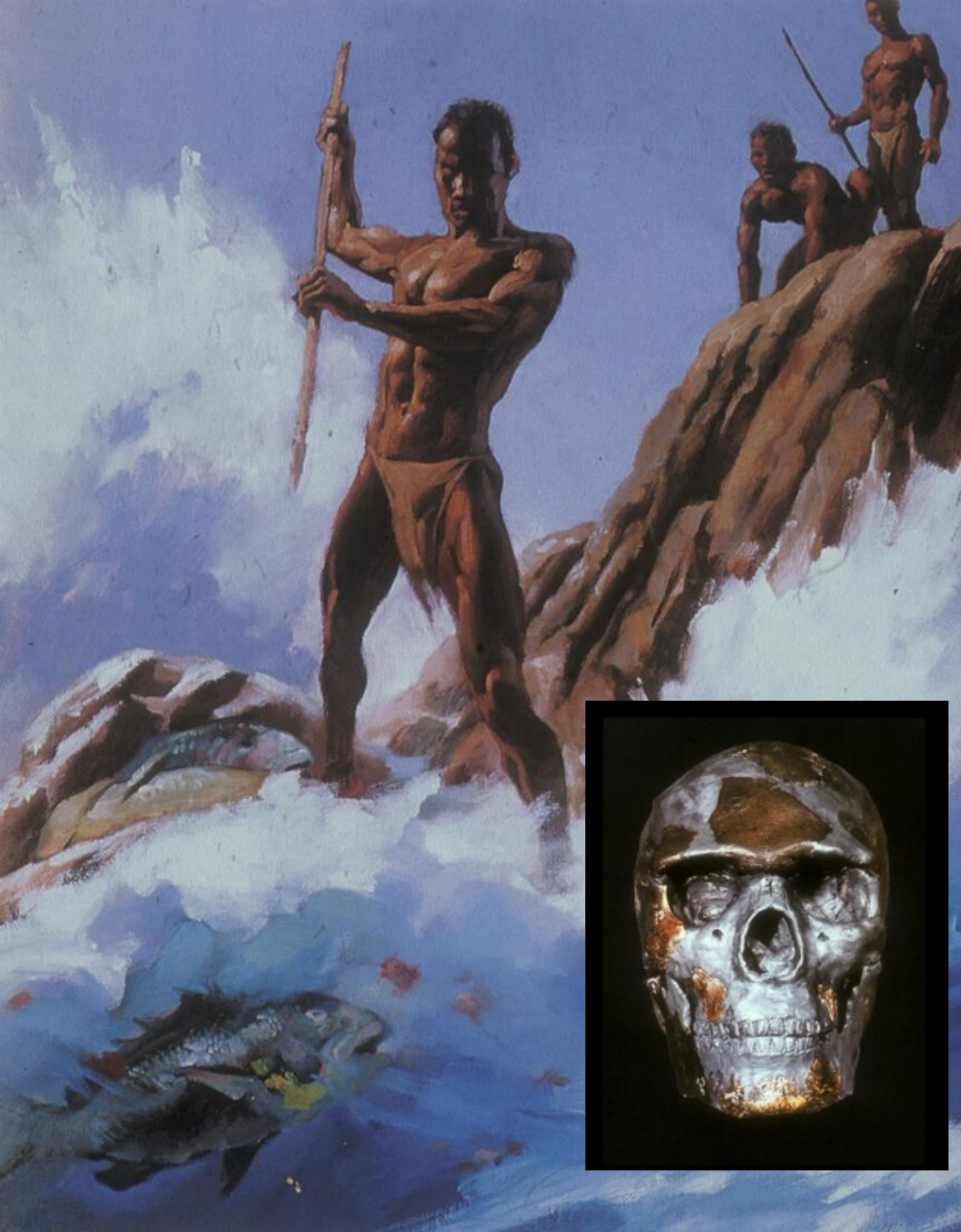


Millions of years ago

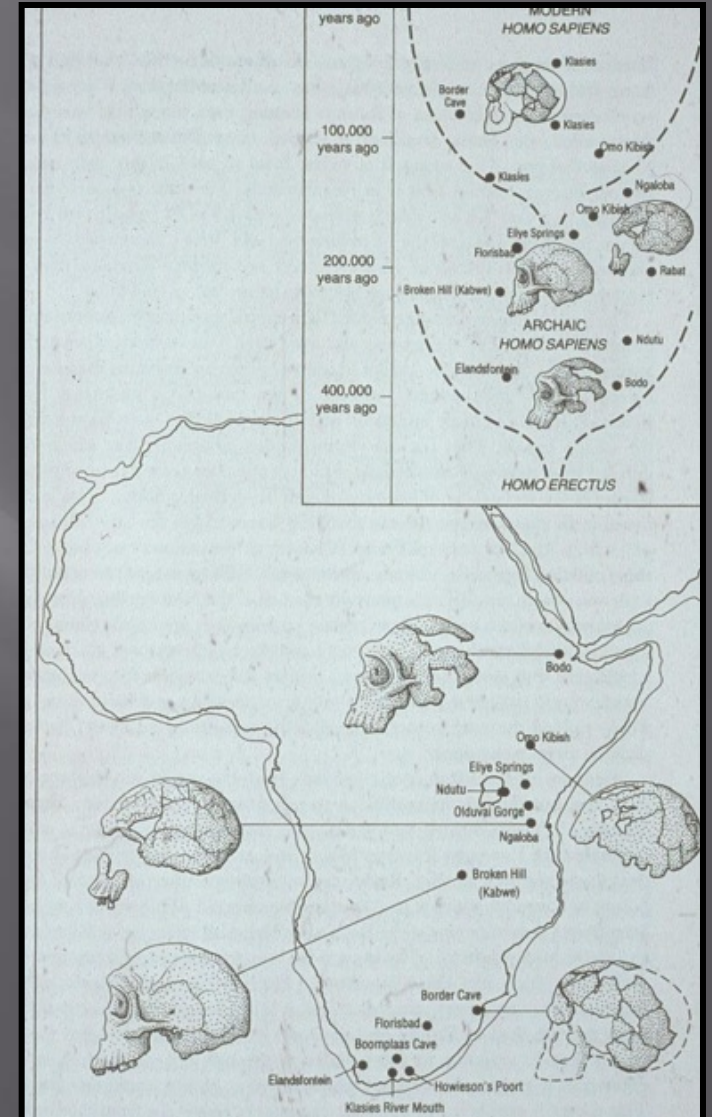
# Music & Language







Our species. *Homo sapiens*, evolved in Africa at c. 200,000 years ago

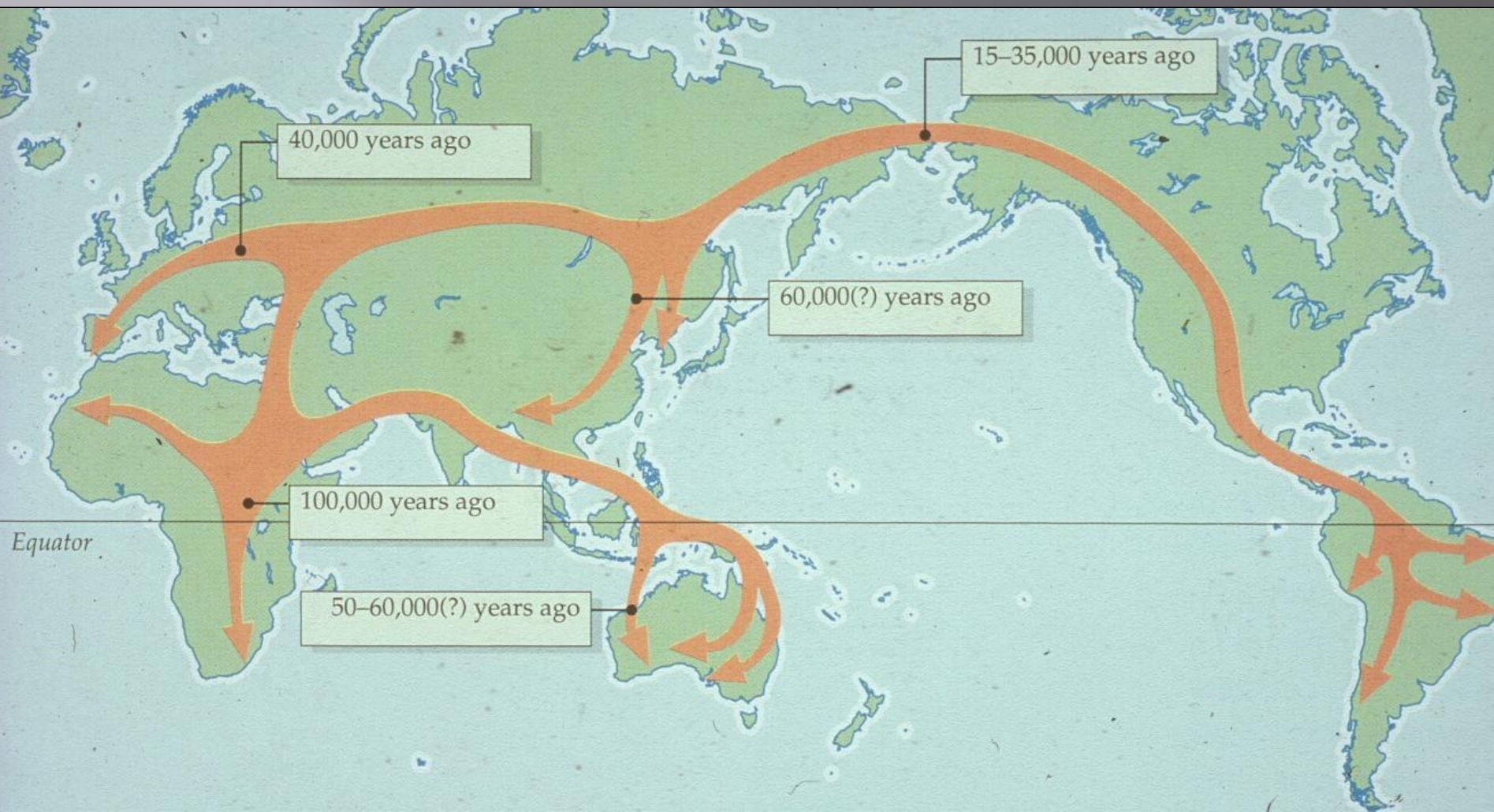




**Blombos Cave,  
South Africa,  
Middle Stone Age,**







Music becomes a communication system specialising in the transmission of emotion and facilitating social bonding

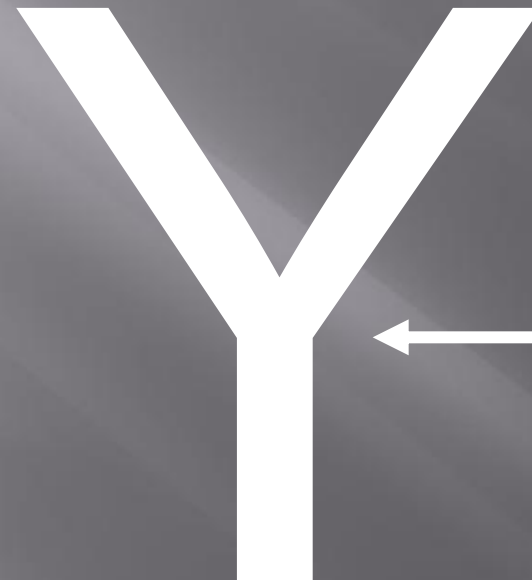
Language becomes a communication system specialising in the transmission of information and dominates communication

Music

Language



*Time*

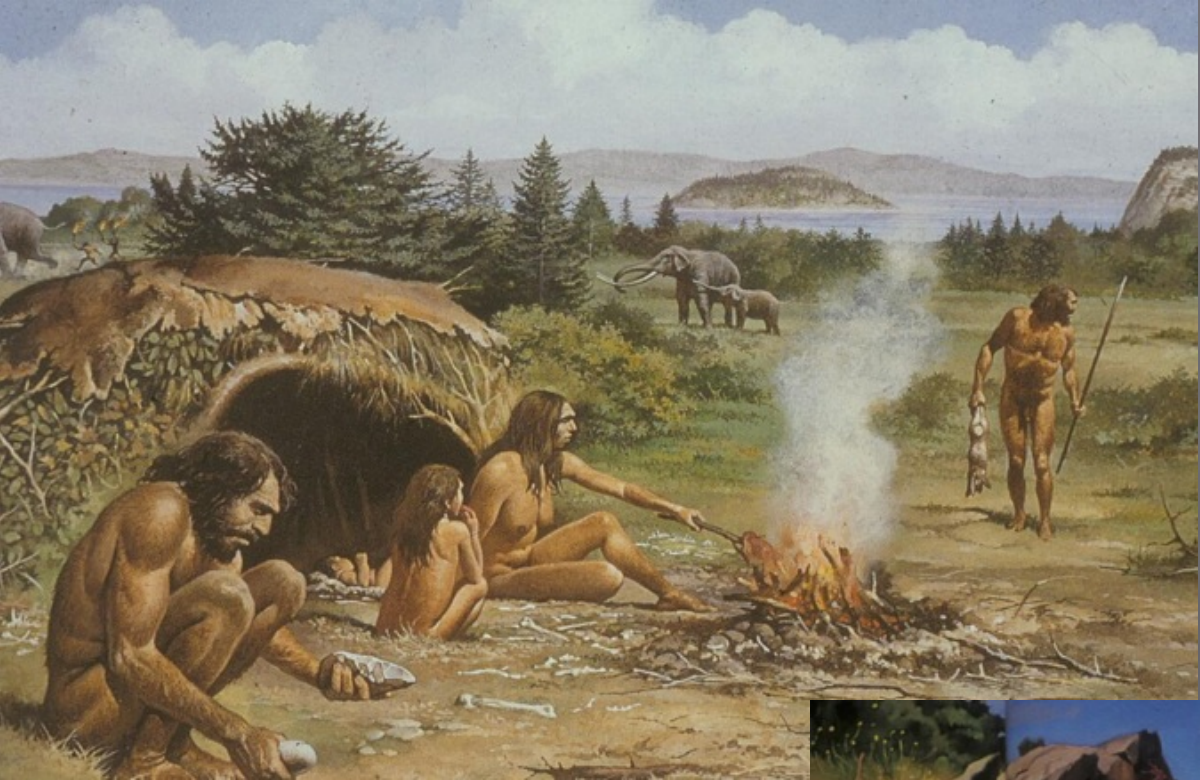


c. 200,000 –  
70,000 years  
ago

**Hmmmmm**

A pre-linguistic „musical mode of thought and action (Blacking)





*Hmmmmm using  
Neanderthals ....*

*...were outcompeted by  
language using modern  
humans*









# Why music?

*Because we are the beneficiaries of a pre-linguistic but musical stone age past*

