

Last time

- What are the major theories regarding the last million years of human evolution and the origins of modern humans?
- What are the data that each use to support the theory?
- What are the relative impacts of gene flow and local selective forces in each theory?
- In each theory, how are archaic humans, Neanderthals, *Homo erectus*, and Flores regarded?

New news

- <http://www.nytimes.com/2011/05/10/science/10neanderthal.html?ref=science>
- What can we make of their conclusion?

Overview...

- The pattern of human evolution
- When did the major defining aspects of humans arise and in which populations?
 - bipedalism?
 - big brains?
 - modern anatomy?
 - modern behavior?

Becoming human...

- The Australopithecine adaptive radiation
- Early *Homo*
- *Homo erectus*
- Emergence of modern humans

Evolutionary trends in the human line

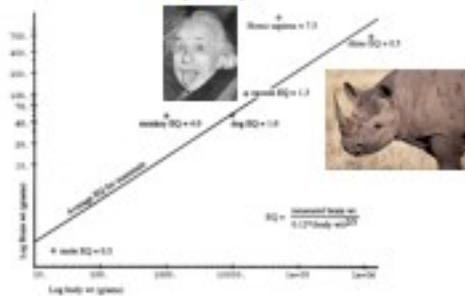
- Bipedalism came first...
- Then.....
 - Big brains
 - Culture
 - Language

Bipedalism

- When did our lineage become bipedal?
- What is the adaptive advantage of being bipedal?

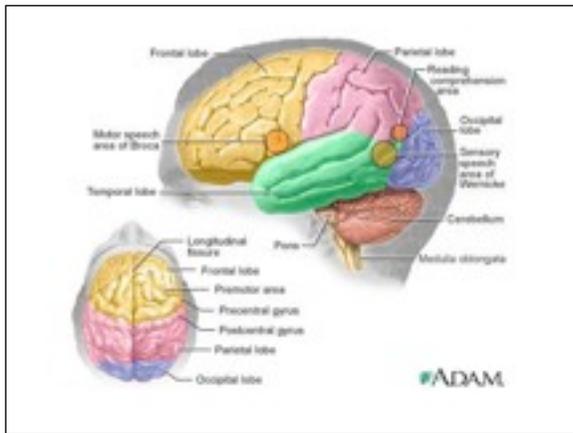


Encephalization quotient (EQ)



Big brains

- When did our lineage begin to increase brain size?
- What is the adaptive advantage of big brains?



Language

- When did our lineage begin to have language?
- What is the adaptive advantage of language?

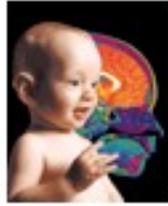
What is Language?

- Language is spoken
- Language is semantic
- Language is phonemic
- Language is grammatical



Language is spoken

- debatable
 - deaf babies babble with their hands
- BUT we are anatomically specialized to both produce language and produce language-oriented sounds



Language is semantic

- words have meanings linked to objects and ideas
- at an order of magnitude larger than any other animal
- these are learned through traditional transmission

Language is phonemic

- words are assembled from smaller sound units called phonemes
- no biological limit to the combination of phonemes into words
- association of words and objects or actions is arbitrary

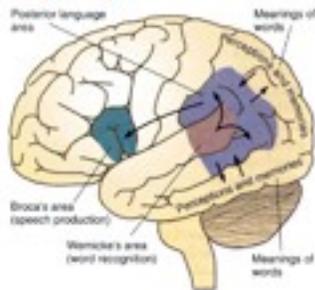
Language is grammatical

- a grammar is a system governing how word classes are defined and used and the rules of word order
- grammar is learned subconsciously

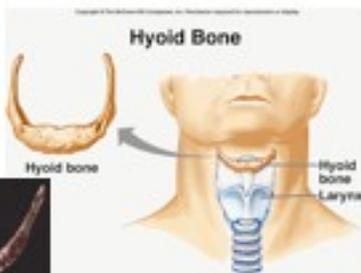
Evolution of language

- Look at Brain?
- Cranial anatomy
- Hyoid bone
- Genetics - FOXP2

Language in the brain



Hyoid bone



Adaptive advantage to language?

Language

- What is culture?
- When did our lineage begin to have culture?
- What is the adaptive advantage of culture?

Culture?

- from wikipedia:
 - generally refers to patterns of human activity and the symbolic structures that give such activities significance and importance. Cultures can be understood as systems of symbols and meanings that even their creators contest, that lack fixed boundaries, that are constantly in flux, and that interact and compete with one another.[2] Different definitions of "culture" reflect different theoretical bases for understanding, or criteria for evaluating, human activity
- ways of life
 - arts beliefs and institutions