

# Fundamentos de Neurociencia Cognitiva

*Language / introduction*

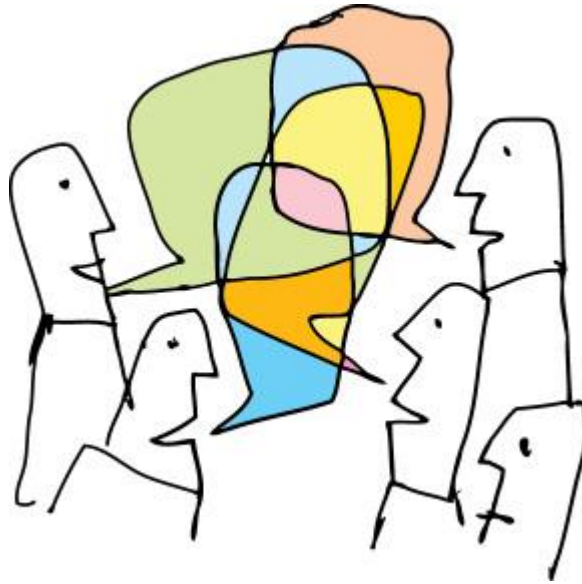
# Precursory remarks

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- Niels Janssen ([njanssen@ull.es](mailto:njanssen@ull.es))
- <http://njanssen.webs.ull.es/teach.html>

# What is language?

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# What is language?

what is language? - Google Search - Mozilla Firefox

what is language? - Google Sea... +

← [https://www.google.es/search?client=ubuntu&channel=fs&q=language&ie=utf-8&oe=utf-8&redir\\_esc=&ei=Y7NIUKyDMM](https://www.google.es/search?client=ubuntu&channel=fs&q=language&ie=utf-8&oe=utf-8&redir_esc=&ei=Y7NIUKyDMM)

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what is language?

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San Cristóbal de La Laguna

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Related searches: [definition of language](#) [why is language important](#)

**lan-guage** /'laNGgwi/

Noun:

1. The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way.
2. Any nonverbal method of expression or communication: "a language of gesture and facial expression".

Synonyms: tongue - speech - idiom - parlance - lingo

More info » [Wikipedia](#) - [Dictionary.com](#) - [Answers.com](#) - [Merriam-Webster](#)

[Language and Culture: What is Language?](#)  
[anthro.palomar.edu/language/language\\_2.htm](http://anthro.palomar.edu/language/language_2.htm)  
31 Aug 2006 – Their creole **language** is used on the street in dealing with poor Haitians. The Gullah speakers of Georgia and South Carolina speak **English** ...

[Language - Wikipedia, the free encyclopedia](#)  
[en.wikipedia.org/wiki/Language](http://en.wikipedia.org/wiki/Language)  
The **languages** that are most spoken in the world today belong to the Indo-European

# What is language?

The image is a screenshot of the Merriam-Webster website. At the top left is the Merriam-Webster logo and the URL 'm-w.com'. To the right are navigation links for 'Word Games', 'Word of the Day', 'New Words & Slang', 'Video', and 'My Favorites'. Below these are tabs for 'Dictionary', 'Thesaurus', 'Spanish-English', 'Medical', and 'Encyclo.'. A search bar contains the word 'language' with a magnifying glass icon. Below the search bar, there are links for 'Save' and 'Popularity'. The main content area shows '43 ENTRIES FOUND:' followed by a list of entries: 'language (noun)', 'language arts (noun plural)', and 'American language (noun)'. Below this is an advertisement for 'CLS Machine Translation' with a special offer. At the bottom, a detailed entry for 'lan·guage' is circled in red. It includes the word 'lan·guage' with a speaker icon, the part of speech 'noun', and the phonetic transcription '\lan-gwij, -wij\'. Below this is the 'Definition of LANGUAGE' and the first definition: '1 a : the words, their pronunciation, and the methods of combining them used and understood by a community'.

Merriam-Webster  
m-w.com

Word Games Word of the Day New Words & Slang Video My Favorites

Dictionary Thesaurus Spanish-English Medical Encyclo.

language

Save Popularity

43 ENTRIES FOUND:

- language (noun)
- language arts (noun plural)
- American language (noun)

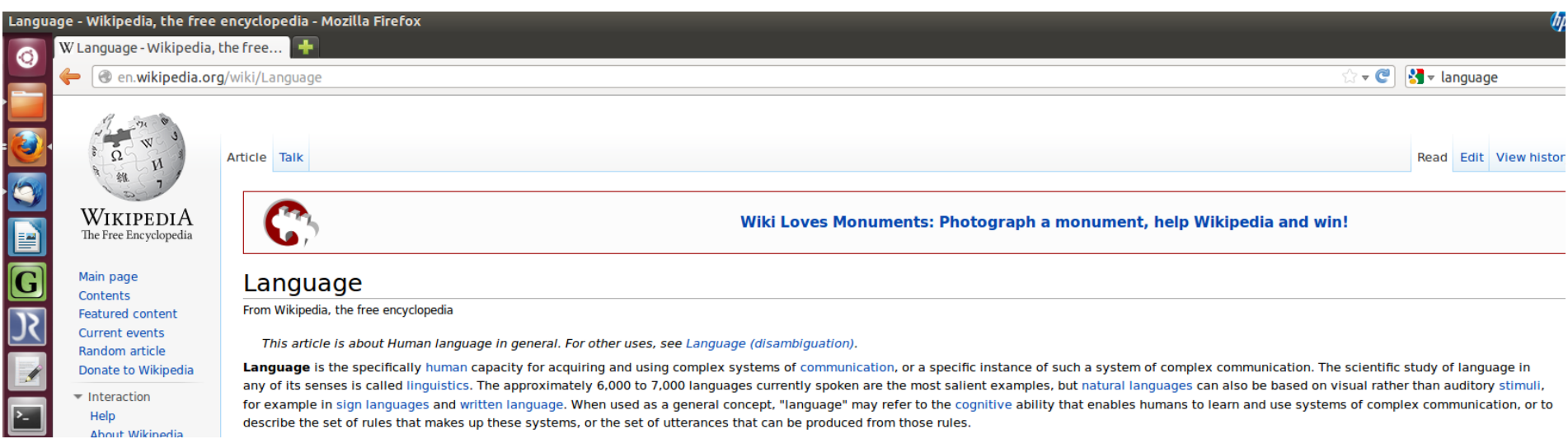
Ads by Google

CLS Machine Translation  
Special offer: free access to our Machine Translation for 4 weeks.  
[www.cls-communication.com/](http://www.cls-communication.com/)

lan·guage *noun* \lan-gwij, -wij\  
Definition of LANGUAGE  
1 a : the words, their pronunciation, and the methods of combining them used and understood by a community

"the words, their pronunciation, and the methods of combining them used and understood by a community"

# What is language?



The screenshot shows a Mozilla Firefox browser window displaying the Wikipedia article for "Language". The browser's address bar shows "en.wikipedia.org/wiki/Language". The page features the Wikipedia logo, a navigation menu on the left, and a main content area. A banner for "Wiki Loves Monuments" is visible above the article title. The article text defines language as a human capacity for communication and mentions linguistics.

Language - Wikipedia, the free encyclopedia - Mozilla Firefox

W Language - Wikipedia, the free... +

en.wikipedia.org/wiki/Language

language

Article Talk

Read Edit View history

**Wiki Loves Monuments: Photograph a monument, help Wikipedia and win!**

## Language

From Wikipedia, the free encyclopedia

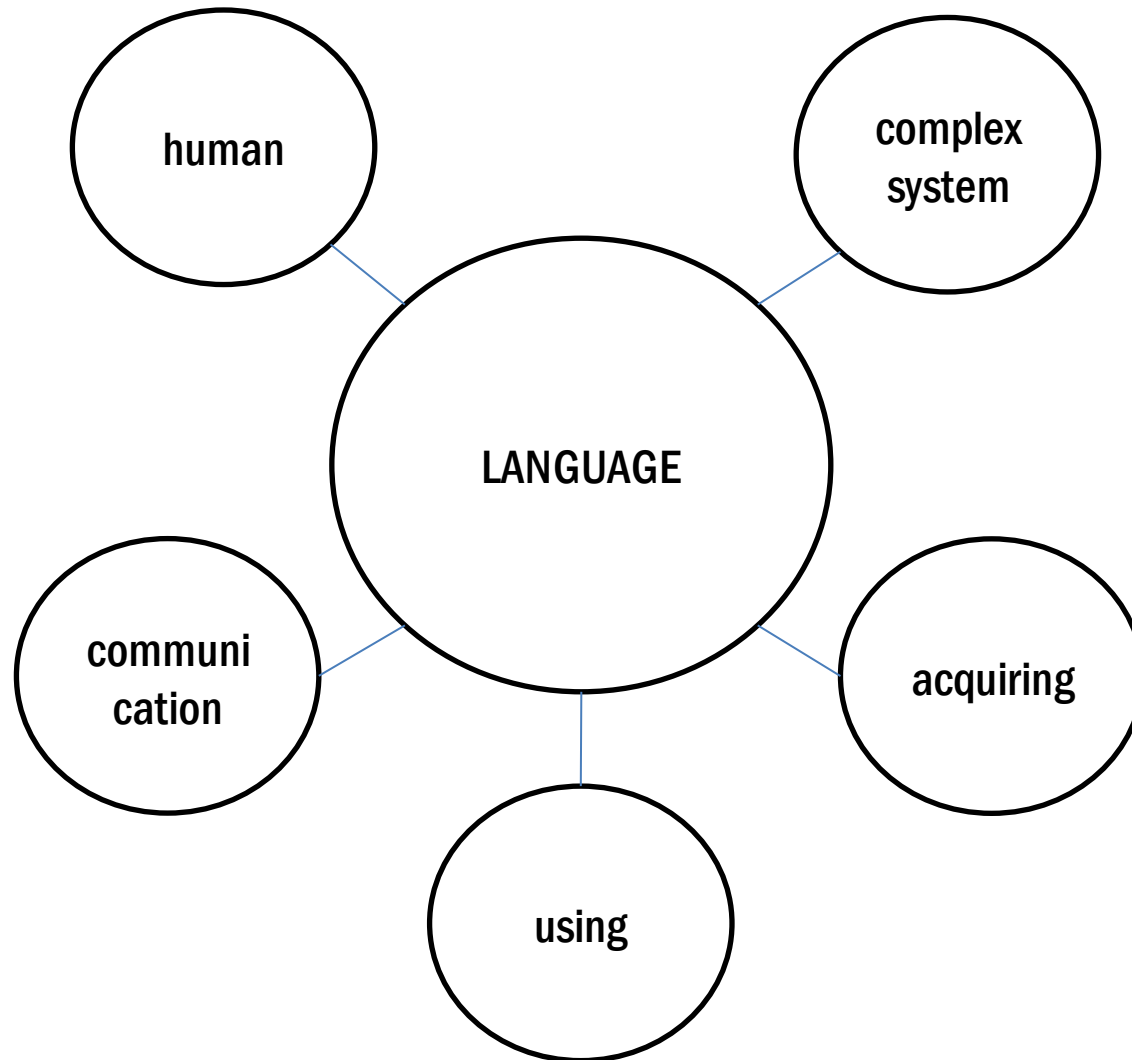
*This article is about Human language in general. For other uses, see [Language \(disambiguation\)](#).*

**Language** is the specifically [human](#) capacity for acquiring and using complex systems of [communication](#), or a specific instance of such a system of complex communication. The scientific study of language in any of its senses is called [linguistics](#). The approximately 6,000 to 7,000 languages currently spoken are the most salient examples, but [natural languages](#) can also be based on visual rather than auditory [stimuli](#), for example in [sign languages](#) and [written language](#). When used as a general concept, "language" may refer to the [cognitive](#) ability that enables humans to learn and use systems of complex communication, or to describe the set of rules that makes up these systems, or the set of utterances that can be produced from those rules.

"Language is the specifically human capacity for acquiring and using complex systems of communication, or a specific instance of such a system of complex communication."

# What is language?

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# What is language?

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- **Human**
  - What about other animals?
- **Communication**
  - Social aspects?
- **Complex system**
  - What is this?
- **Acquiring**
  - How?
- **Using**
  - How?



# What is language?

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- **Focus on "complex system"**
- **Compare with non-human animals**
- **Identify characteristics of this "complex system"**

# What is language?

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- **Other animals have language?**
- **Birds?**
  - Communication
  - Using
  - Acquiring(?)
  
  - Complex system?

# What is language?

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- **Black capped Chickadee**



# What is language?

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- **Characteristics of Chickadee Birdsong:**

- Individuals always produce four notes: A, B, C ,D
- Most common are AD, and BCD
- There is repetition: AADD, BCCDD
- Some patterns do not occur, D always at end.

# What is language?

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- **Properties of bird "language":**
  1. There are units of sounds (notes)
  2. There are constraints on their order and appearance
- **Is that the same as human language?**

# What is language?

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- Just like human language!



El coche verde

💣 El verde coche 💣

# What is language?

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- Yes, but...
- **Complexity**
  - Four notes in birdsong
  - More in human language...but how many?
- **~50,000!**

# What is language?

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- **Meaning**

- Words have meaning, and different orders of words can mean different things



"dog bites man"



"man bites dog"



# What is language?

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- **Also true in birdsong?**
  - AADD means something else than AAD?
- **How would we know?**

# What is language?

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- **Is birdsong language?**
- **Yes, words with constraints on order**
- **No, less complex and not clear if word and order variation have meaning**



# What is language?

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- Look at (non-human) primates
- Live in social groups



# What is language?

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- **Capuchin Monkeys**

Capuchin1

Capuchin2

# What is language?

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- **Capuchin Monkeys**
- **Communication is socially based**
  - Calls for contact seeking - avoiding, aggressive - submissive
- **Compound calls – combine other calls**
  - Combine, two, three or four sounds
  - Indicate compound situations [grooming+aggression]

# What is language?

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- **Still not complex**
- **What do we mean by "complex"?**

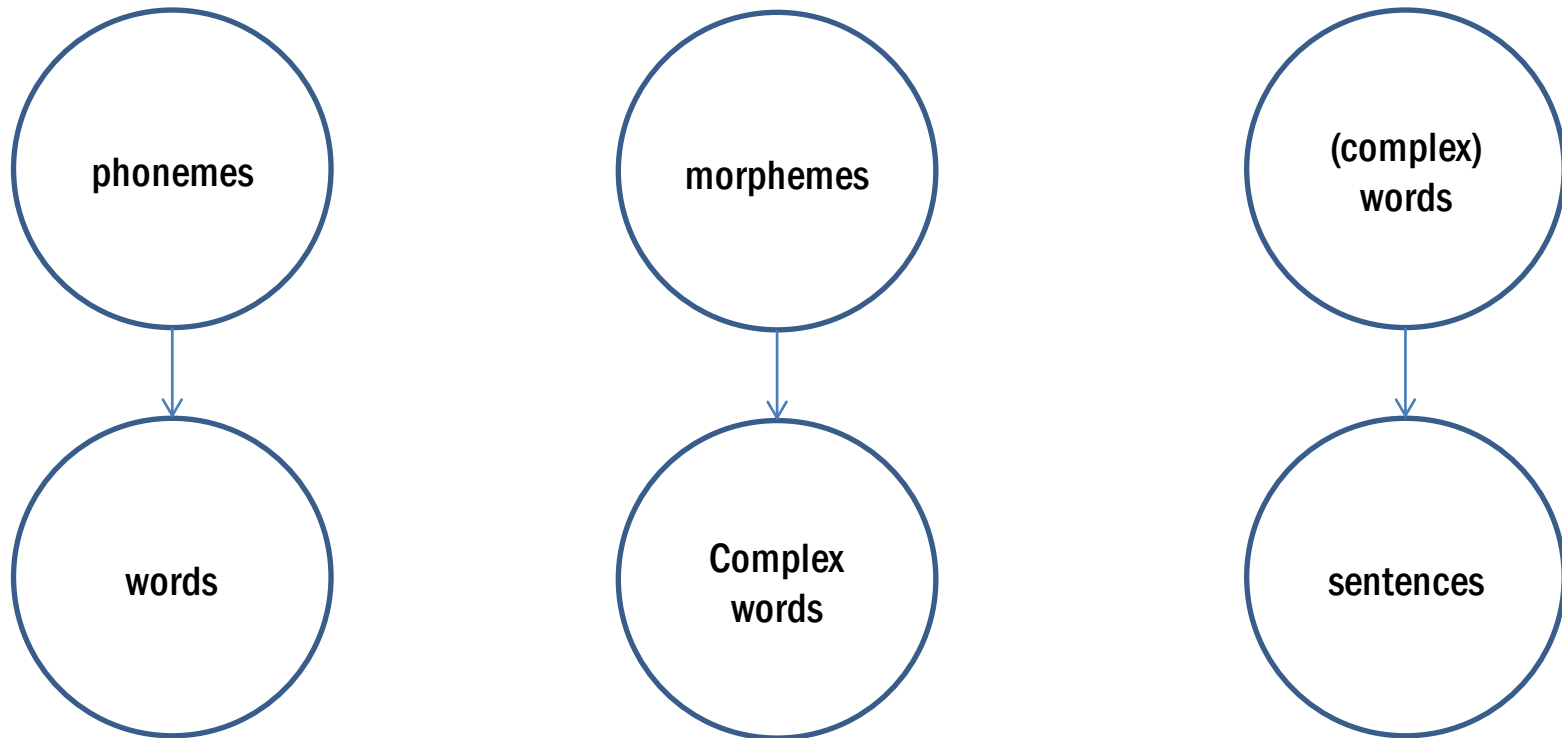
"duality" and "productivity"

# What is language?

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- **Duality**

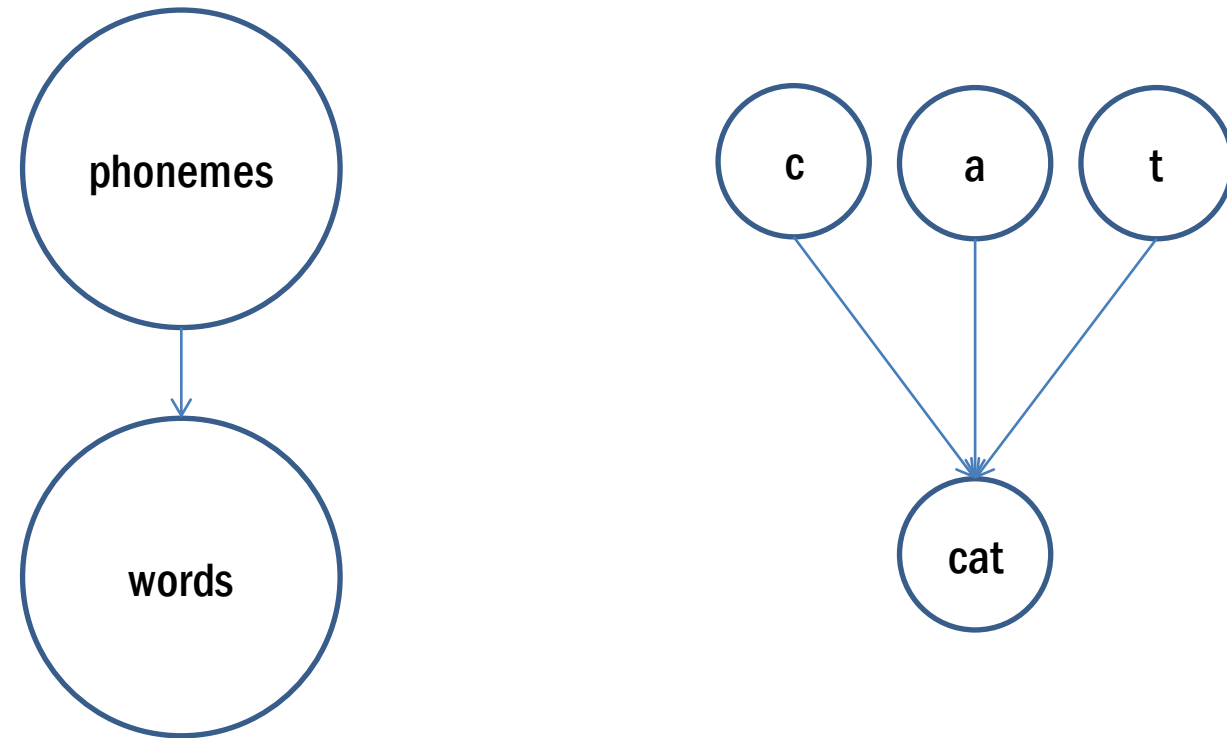
- Language consists of two levels



# What is language?

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- **Duality**
  - Phonemes - words

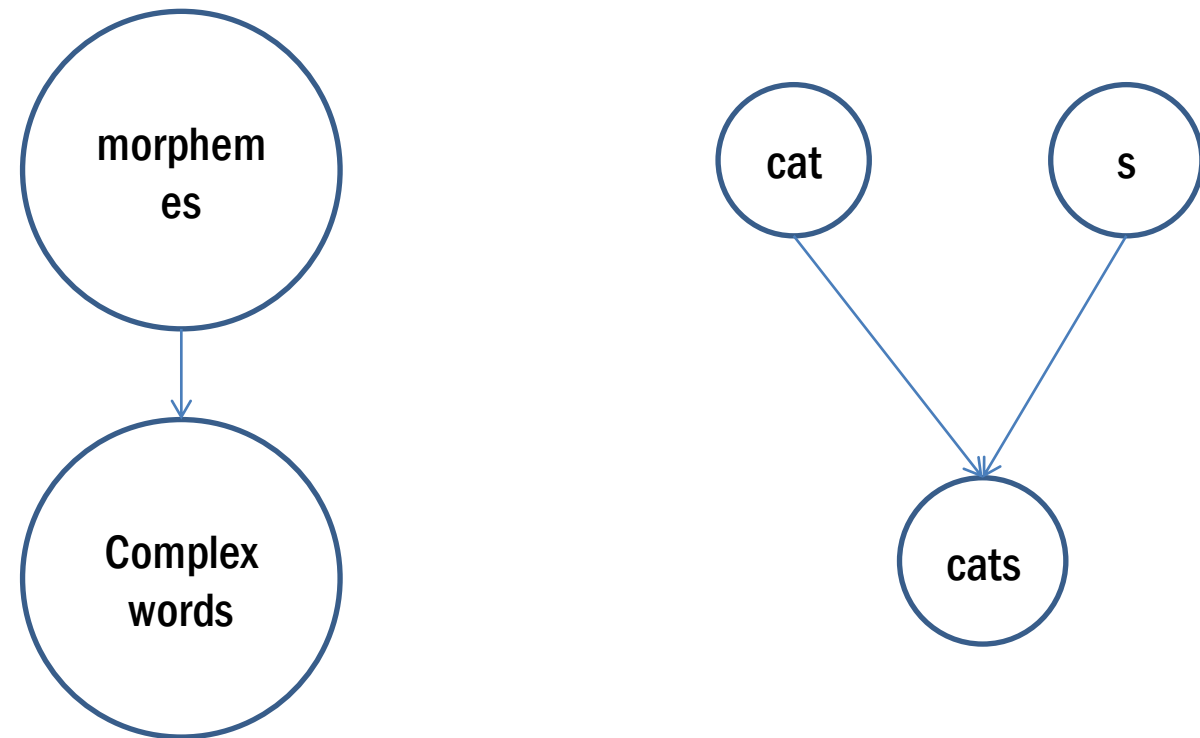




# What is language?

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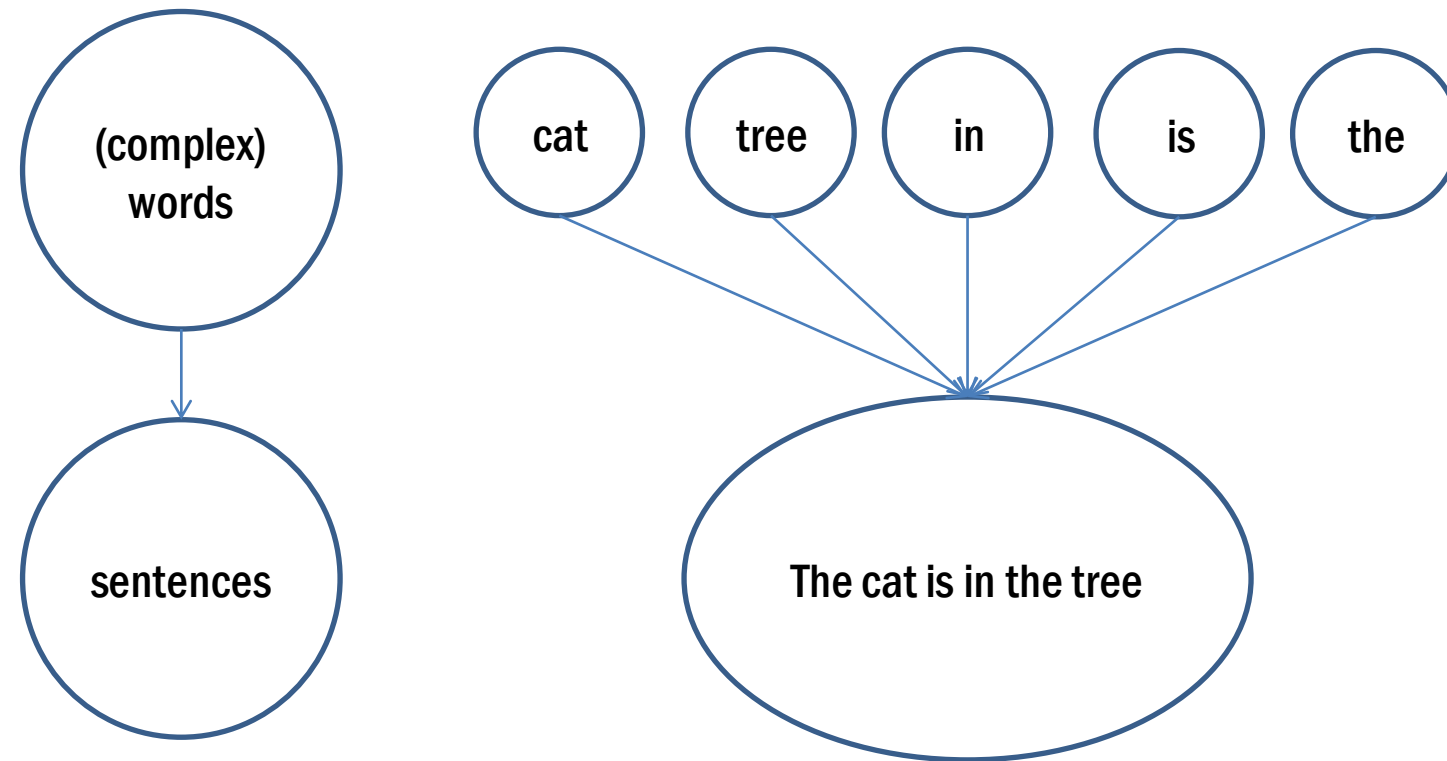
- **Duality**
  - Morphemes – complex words



# What is language?

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- **Duality**
  - Words – sentences



# What is language?

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- **Duality enables "productivity"**
  - Understand and make new words, new sentences
  - Creativity!
- **"El Teide is a happy volcano"**
- **Non-human language is less (not?) productive**

# What is language?

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- **Complexity means "productivity"**
- **Complexity main difference between human and language of Capuchin monkeys**

# What is language?

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- **Look at species even more "like us"**
- **Perhaps they have complex language system?**

# What is language?

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- Our closest (phylogenetic) relative:



*Pan paniscus (bonobo)*

# What is language

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Bonobo video

# What is language?

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- **Can chimps learn language?**
  - No vocal system
- **Use signs or computer**
- **Can chimps learn that words stand for things?**



# What is language?

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- **Kanzi learned vocabulary of > 400 words**

Kanzi video1

# What is language?

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- **Kanzi can learn "reference"**
- **Started to produce "speech" spontaneously**
- **Resembled child with "me-me" attitude**

# What is language?

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- **What about productivity?**
  - Is Kanzi creative with language?
  
- **Kanzi understands spoken English**

# What is language?

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- **Kanzi understands spoken English**

Kanzi video2

# What is language?

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- **This was controversial for two reasons:**
  - 1. No other study had achieved this. Perhaps because Kanzi was born in the lab and learned before a “critical period”**
  - 2. No other study had shown that apes can use sign language in syntax-like way**

# What is language?

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- Understood sentences like:

“can you throw your ball in the river?”

“can you pick up the towel under the table?”

# What is language?

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- Controversial results:



# What is language?

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What we say:

“can you throw your ball in the river?”

What they hear:

“bla bla ball bla bla river?”



# What is language?

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- However,

"Can you throw a potato at the turtle?"

"bla bla throw bla bla potato bla bla turtle?"

# What is language?

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- **Kanzi's language system**
  - Reference (large vocabulary)
  - Word order
- **Evidence for a fairly complex system**
  - Resembles that of a young child (proto-syntax)

# What is language?

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- **Summary – properties of complex system**
- **Human language**
  - complex system of communication
  - is meaningful
  - has duality and productivity
- **Animal language**
  - for communication
  - is meaningful
  - but lacks productivity (less complex)

# What is language?

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- **Human vs animal language**
  - Complex versus less complex
- **Are we unique?**
  - Human language *fundamentally* different? (qualitative)
  - Or is it a matter of degree? (quantitative)
- **Language evolution**

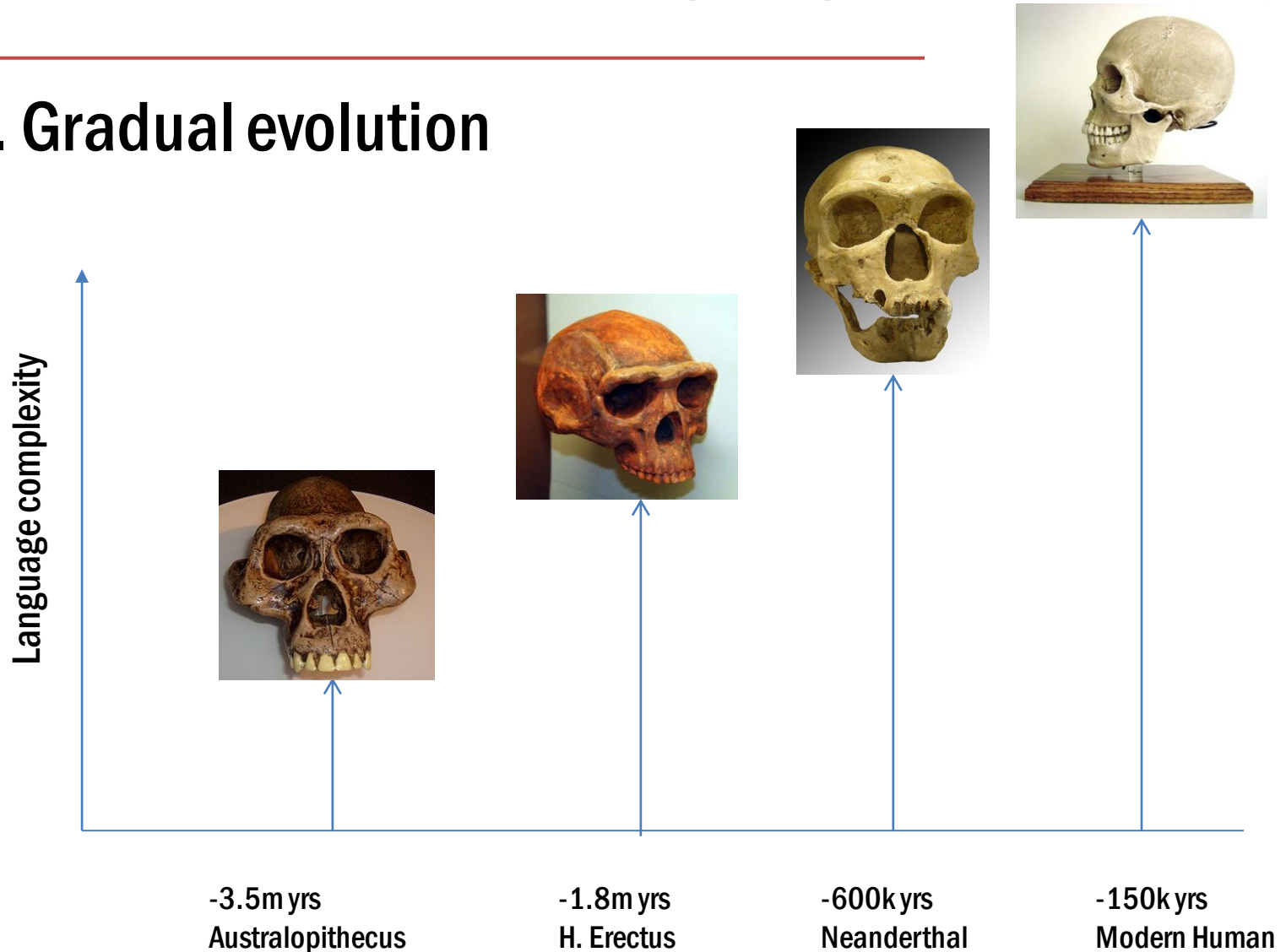
# What is language?

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- **A. Language evolution was gradual**
  - Became increasingly complex
- **B. Language evolution was not gradual**
  - A sudden mutation caused language

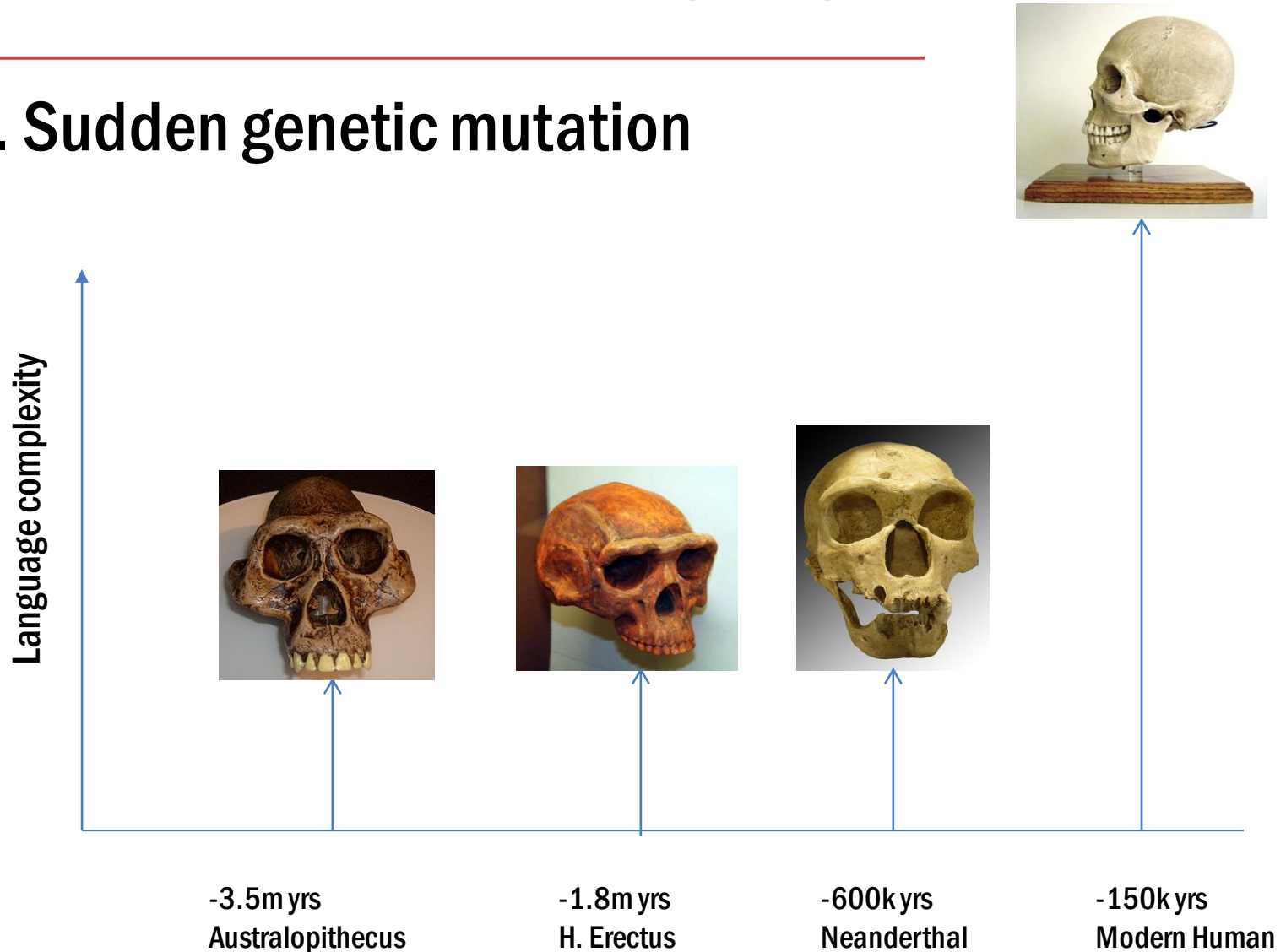
# What is language?

- A. Gradual evolution



# What is language?

- **B. Sudden genetic mutation**



# What is language?

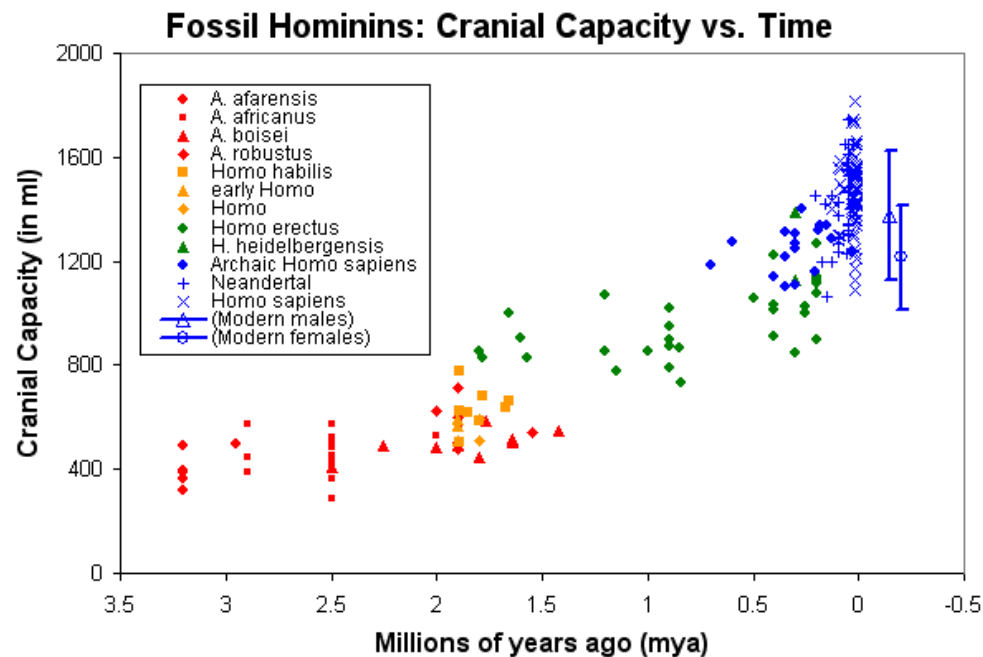
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- **How to decide between A and B?**
  - Language does not fossilize!
  
- **Brain size?**
  - Language complexity increases gradually, this causes gradual increase in brain size



# What is language?

- Changes in brainsize



**Dataset:** All measurements of hominin cranial capacity available in the literature as of September 2000, for skulls older than 10,000 years old. Adult specimens only. Average is presented where multiple measurements were made. N = 214 points.

**Data source:** C. De Miguel and M. Henneberg (2001). "Variation in hominid brain size: How much is due to method?" *Homo* 52(1), pp. 3-58. Data copied into Excel from Appendix: "From Lucy to Boskop" (pp. 20-49). Figures for modern humans from McHenry et al. (1994). "Tempo and mode in human evolution." *PNAS*, 91:6780-6.

Chart by **Nick Matzke** of **NCSE** ([www.ncseweb.org](http://www.ncseweb.org)). Free to use for nonprofit educational use (with acknowledgement). Version 1.1, September 30, 2006.

# What is language?

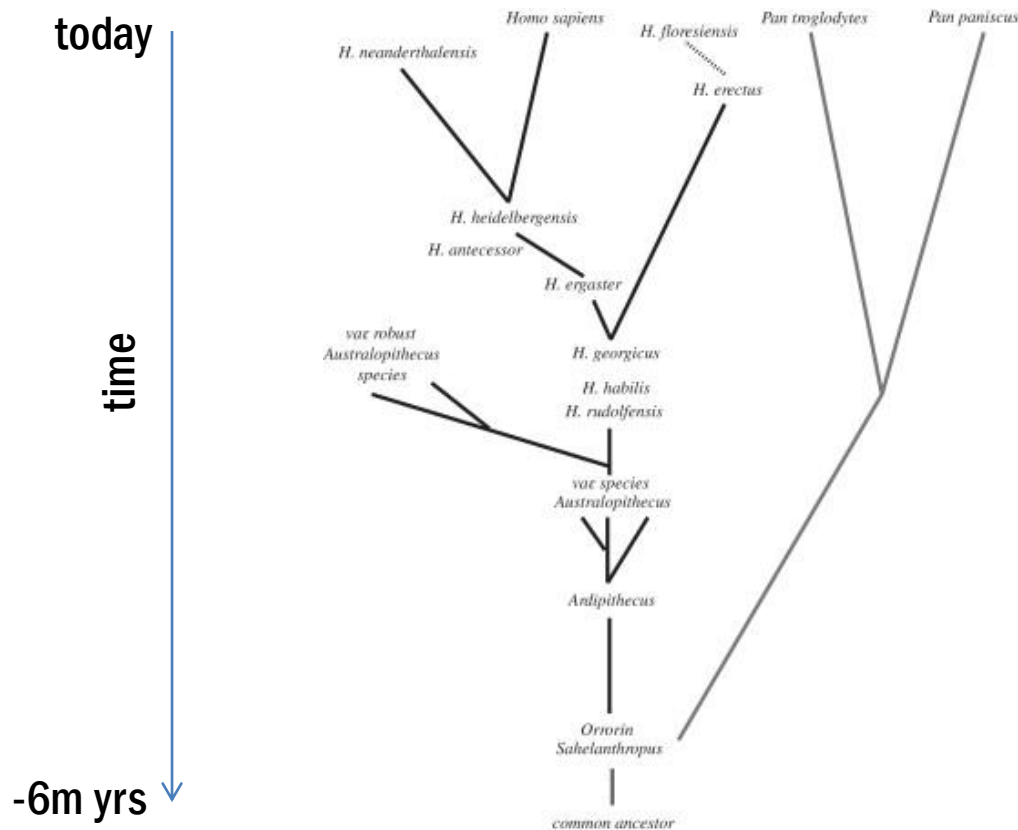
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- **So what?**
  - What does this say about the evolution of language?
- **Brain size might increase gradually for reasons unrelated to language**
- **Perhaps look at language areas of the brain?**

# What is language?

- **Phylogenetic method**

- compare species based on phylogenetic trees



# What is language?

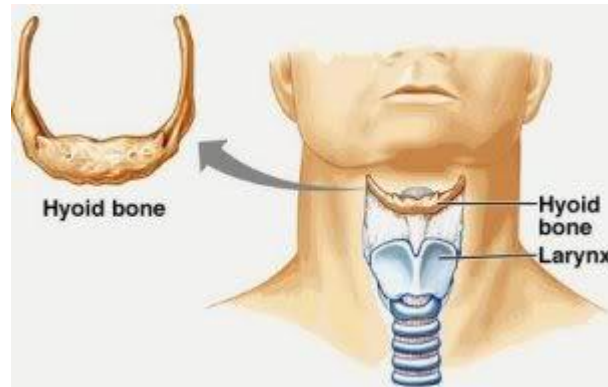
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- **Chimps (*pan paniscus*) have capacity for learning some aspects of language**
  - See Kanzi evidence
- **This means many of our forebears had capacity to learn part of language**
  - However, this does not mean they used it!

# What is language?

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- **Best evidence to date**
  - **Hyoid bone in Neanderthals**



- **Important for production of speech**

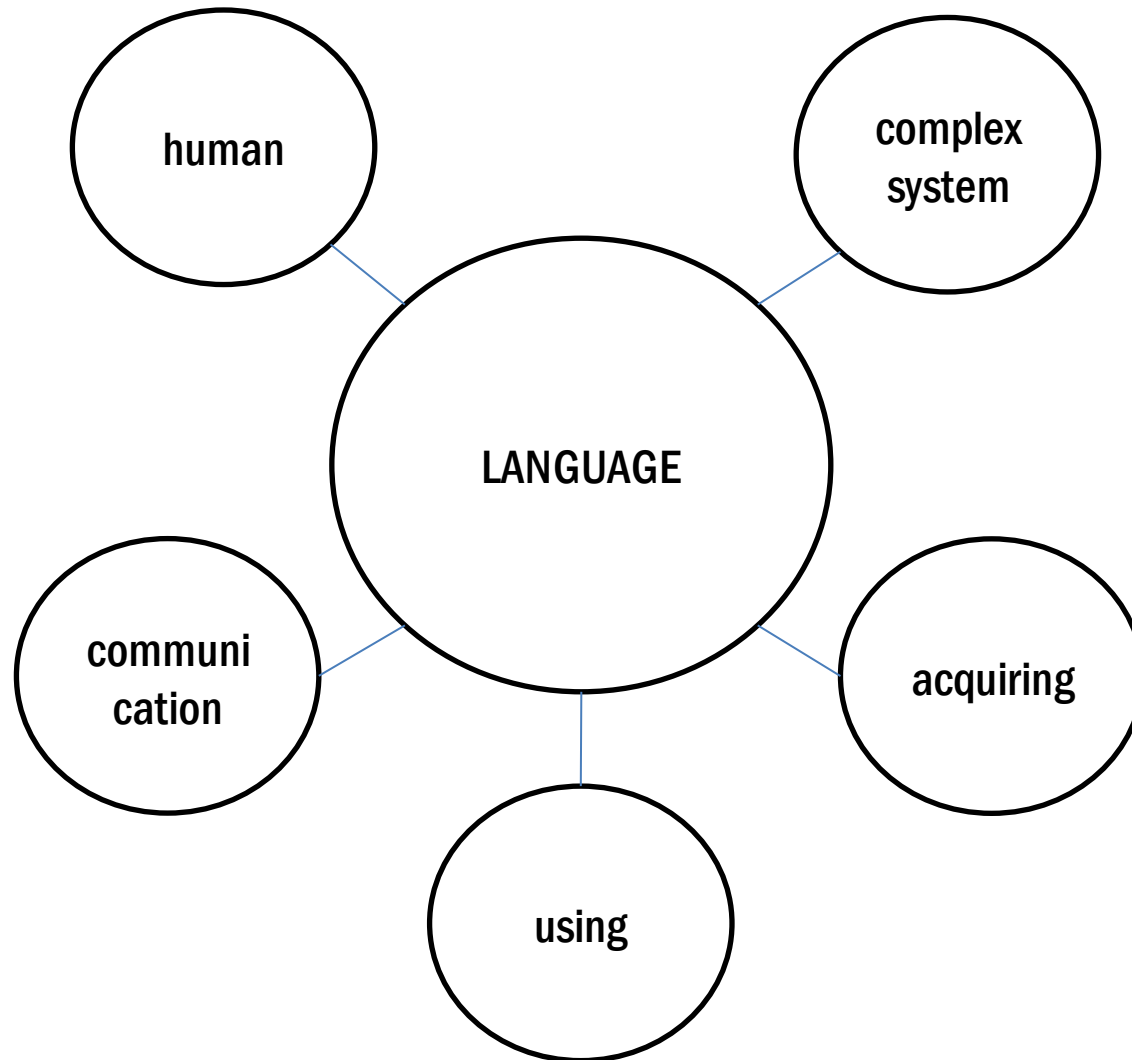
# What is language?

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- **Summary**
- **Language evolved gradual or by sudden mutation?**
  - The debate continues

# What is language?

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# What is language?

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- **Complex system**
  - Many words
  - Constraints on order and appearance of words
  - Meaningful
  - Productive



# What is language?

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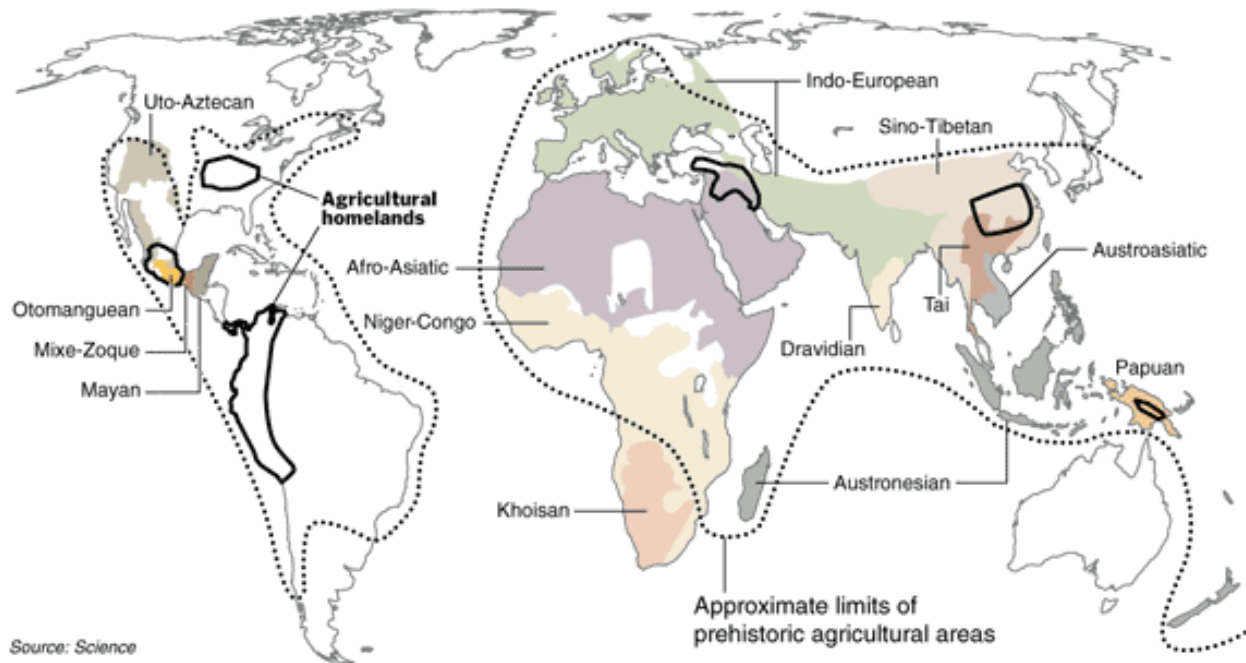
- **From Anthropological to linguistic perspective on language**
- **Other properties of language?**

# What is language?

- 5000-6000 languages in the world

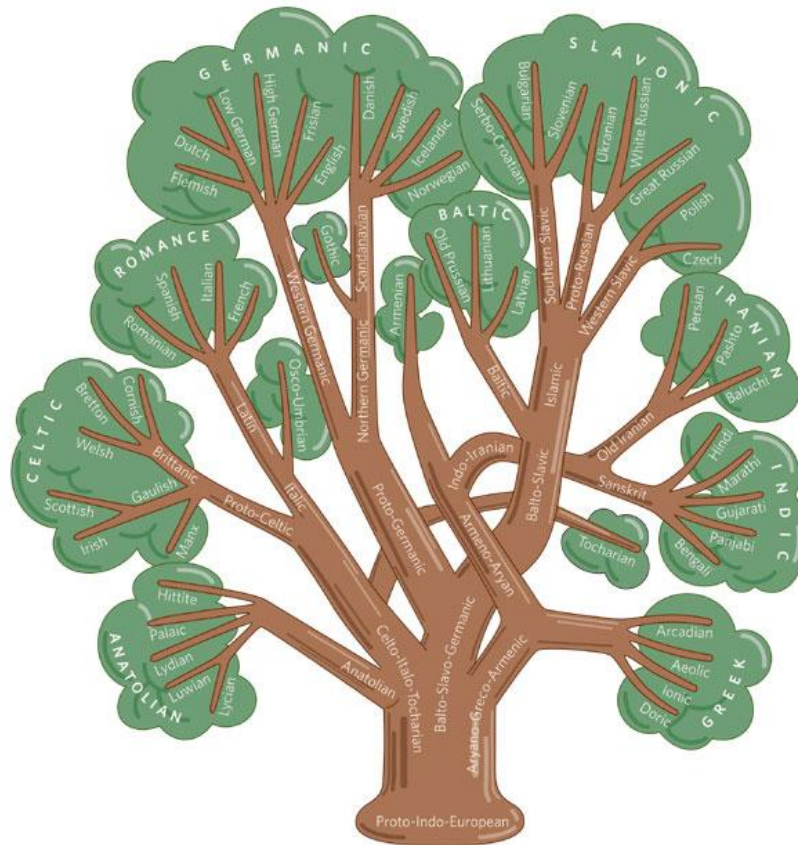
## The Spread of Language

Language families may have originally emerged from six agricultural homelands. Some scientists believe that speech used by early farmers spread outward as agriculture supported ever greater populations.



# What is language?

- Indo-european



# What is language?

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- Tocharian



# What is language?

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- **Historical linguistics**
    - **Comparing languages to reconstruct proto-language**
- 1. List cognates**
  - 2. Find correspondances**
  - 3. Reconstruct proto-sound**

# What is language?

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## 1. Cognates English - Latin

Sal – salary

Ten - decem

Prunus – prune

Two – duo

Tongue – lingua

Campus - camp

# What is language?

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## 2. Correspondances

Sal – salary

Ten – decem

Prunus – prune

Two – duo

Tongue – dingua

Campus – camp

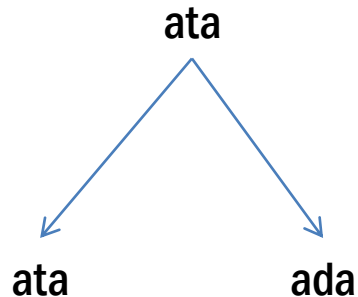
# What is language?

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## 3. Reconstruct proto-sound

Latin /t/ → english /d/

t-sound in between vowels, in all languages ata is more common

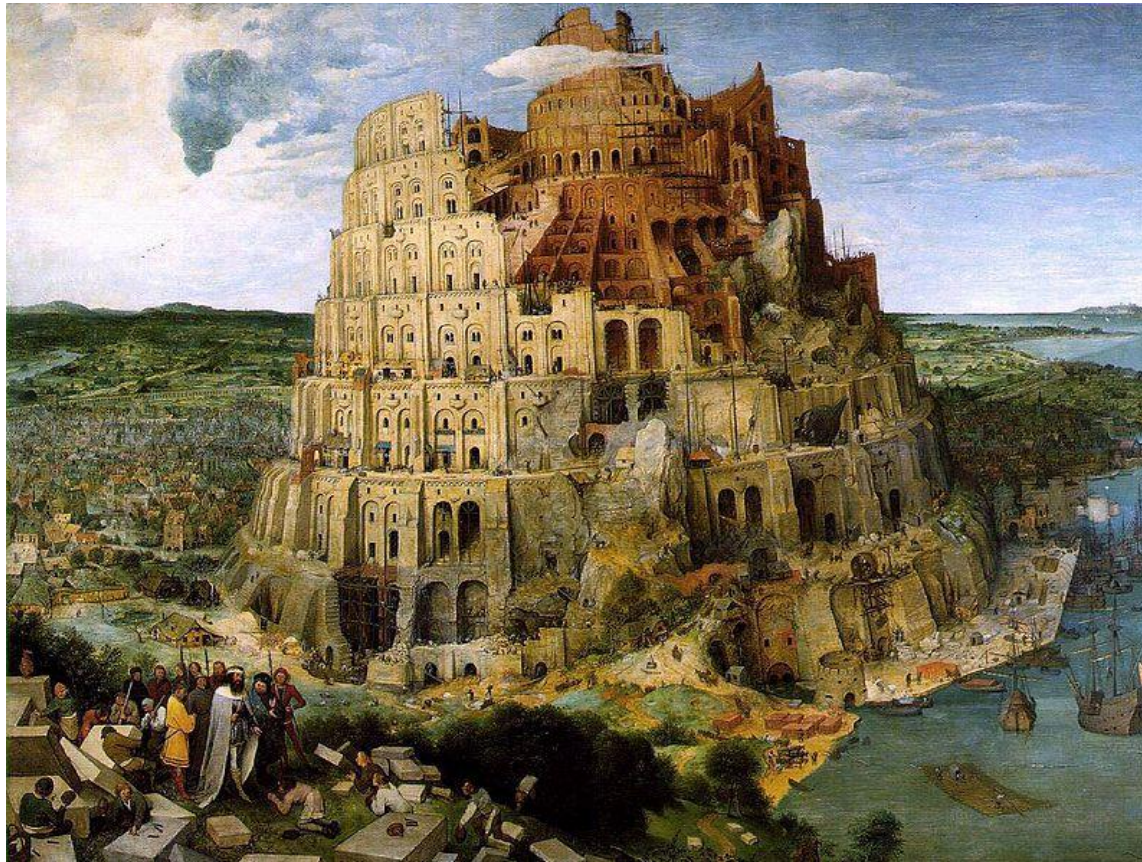




# What is language?

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- What is the original language?



# What is language?

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- **Much speculation:**

- Greeks and Romans thought it was...Greek or Latin, the rest (Barbarians) “merely stuttered, not speaking language at all”
- 7<sup>th</sup> century, Irish grammarians thought it was Gaelic
- 14<sup>th</sup> century Mercurius van Helmont “Alphabeti veri naturalis Hebraici brevissima delineatio” argued that Hebrew was the most natural language in the world, deaf-mute people could understand immediately.
- 1569 Goropius Becanus said it was Dutch (particularly the dialect of Antwerp!)

# What is language?

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- **1866 The linguistic society of Paris banned all research on this topic**
- **Unanswerable**

# What is language?

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- Besides languages, there are dialects

# What is language?

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- **What is the difference between a language and a dialect?**
- **“A language is a dialect with an army and a navy” – Max Weinreich.**
- **It’s a political issue – everybody speaks a dialect.**

# What is language?

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- **What happens with speakers of different languages come to live together?**
- **Pidgin = a system of communication among people who do not speak the same language.**
- **Creole = a pidgin that has developed into the mother tongue of a community.**

# What is language?

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- **Pidgin = a system of communication among people who do not speak the same language.**
  - Limited vocabulary
  - Reduced syntax
  - Often based on European language

# What is language?



From Philippines, speaking pidgin of Spanish and local language Chabano



# What is language?

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- **Creole = a pidgin that has developed into the mother tongue of a community**
  - **De-creolization = pressure for community to speak standard, not creole language**
  - **Hypercreolization = reaction against standard to emphasize importance of creole**

# What is language?

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Papiamentu, spoken in Dutch Caribbean and is a Creole of Spanish, Dutch, and Portuguese.

# What is language?

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