

# **Language**

**What is it good for?**

**Where did it come from?**

# Why Have Language?



communication?



thought?

# Thought and Language

Complex thoughts are built of simpler parts in structured compositions

Could you  
have a thought  
like this  
without  
language?

Mentalese

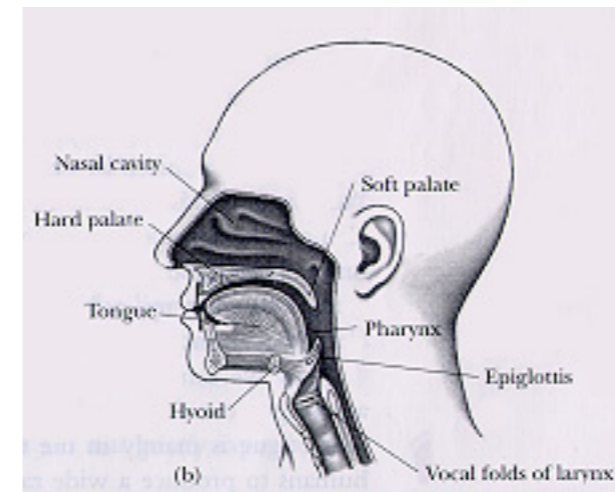
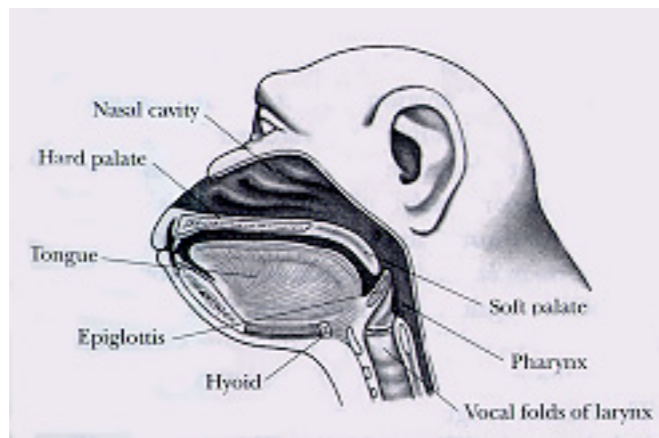
If three of us sneak in the back, we can  
steal at least a bag of apples without  
getting caught



Language is a tool for  
solving problems

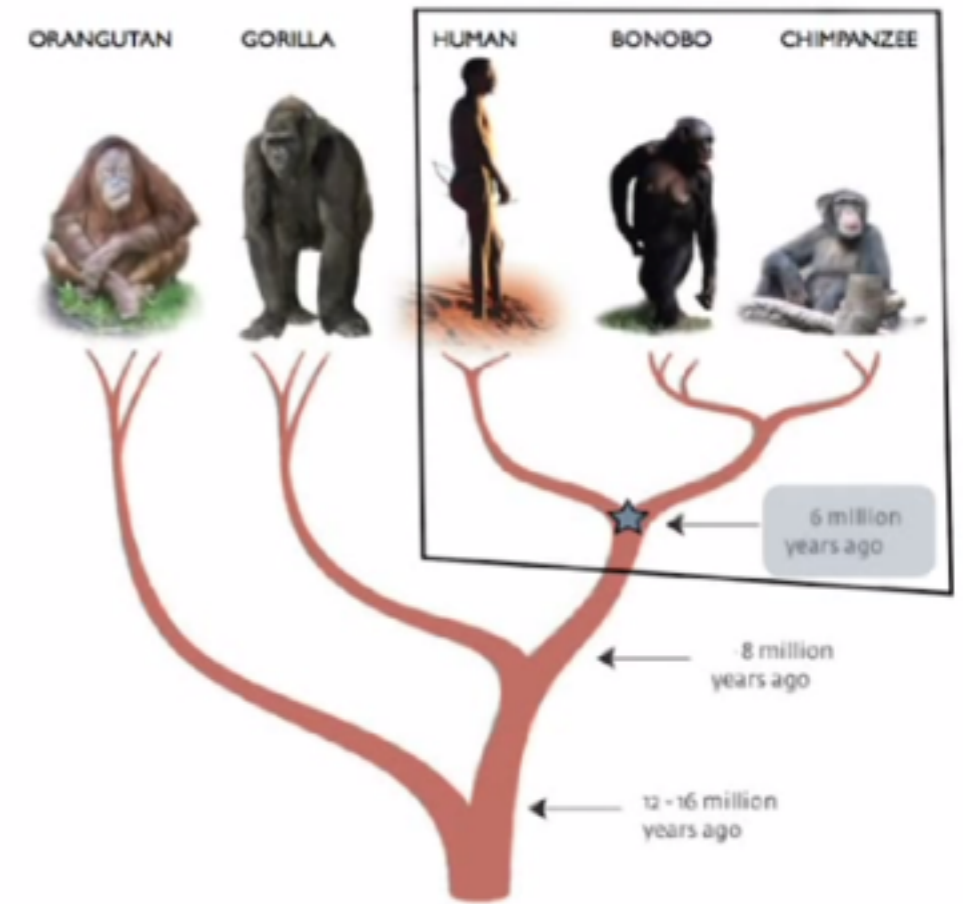
Even the simple use of labels can  
radically change a problem

# Evolution of Language: Why? When? How?



What data? How might we study this?

# Tomasello et al: The Cooperative Eye Hypothesis (2007)



One small biological change facilitating **joint attention** leads to massively increased dynamic entanglement

# **Language and Linguistics**

- 1. Pragmatics**
- 2. Semantics**
- 3. Syntax**
- 4. Morphology**
- 5. Phonology**
- 6. Phonetics**

Speech and Language encompass a vast array of phenomena without which the human world would not exist.

Any “science of language” can only address some aspects, and the boundaries of “language” are always under revision

1900

1950

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**philology**

**structural  
linguistics**

**generative  
linguistics**



# Philology

Before ca. 1800, language was studied for a variety of reasons, including

- \* interpretation of religious texts
- \* teaching of “grammar” to learners
- \* teaching of foreign languages
- \* study of highly respected authors

None of these is strictly scientific

Philology is the scholarly study of languages & texts, including deciphering, interpretation and history.

# Structural Linguistics

From about 1916, and with the work of Ferdinand De Saussure, (some aspects of) language became the object of scientific inquiry

Language was seen to be *systematic*, and a new scientific goal arose: characterising the abstract system which underlies the slightly messy business of everyday language use

Although overtaken by modern linguistics, many of the basic elements of structural linguistics are still taken for granted by linguists.

# THE INTERNATIONAL PHONETIC ALPHABET (revised to 2005)

CONSONANTS (PULMONIC)

© 2005 IPA

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill	ʙ			r					ʀ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

These two tables illustrate the spirit of science about 1890: systematising very many observations

**Periodic Table of the Elements**

1 H Hydrogen 1.008																	2 He Helium 4.002
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305											13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.065	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 84.190
37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.905	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.711	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.905	54 Xe Xenon 131.294
55 Cs Cesium 132.905	56 Ba Barium 137.328	57-71 Lanthanides	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.222	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [209]	85 At Astatine [209]	86 Rn Radon 222.018
87 Fr Francium [223]	88 Ra Radium 226.025	89-103 Actinides	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [265]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [268]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Fl Flerovium [289]	115 Uup Ununpentium unknown	116 Lv Livermorium [293]	117 Uus Ununseptium unknown	118 Uuo Ununoctium unknown
57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.242	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.502	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.054	71 Lu Lutetium 174.967			
89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.065	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]			

Alkali Metal   Alkaline Earth   Transition Metal   Basic Metal   Semimetal   Nonmetal   Halogen   Noble Gas   Lanthanide   Actinide

# Modern Linguistics

Since about 1957, Linguistics has been dominated by a formal approach known as Generative Linguistics.

At the heart of this is the formal (mathematical) treatment of Syntax (more on that in a moment)

The rise of Generative Linguistics is intimately tied to the origin of Cognitive Psychology and the development of the modern Computer

Although many people have contributed, Noam Chomsky is very central to this development



Modern Generative Linguistics has many sub-fields, each attending to one form of regularity in language

1. Pragmatics
2. Semantics
3. Syntax
4. Morphology
5. Phonology
6. Phonetics

“Language is Use” Ludwig Wittgenstein

## **1. Pragmatics:**

How does the thing someone says relate to what they want?

Do your sentences mean what you want to convey?

“Can you pass the salt?”

# Grice's Conversational Maxims

In linguistic interaction, cooperation is the norm

Even conversational partners who are arguing typically exhibit cooperative behavior in selecting when to speak, how much information to provide, etc.

# Grice's Conversational Maxims

- Truth:** Do not say what you believe to be false  
Do not say that for which you lack adequate evidence
- Quantity:** Make your contribution as informative as is required  
Don't make your contribution more informative than is required
- Relevance:** Be relevant
- Clarity:** Avoid obscurity of expression  
Avoid ambiguity  
Be brief  
Be orderly

These are assumptions listeners make. They are not prescriptions. If you flout them, it probably means something



**2. Semantics:** The study of (some aspects of) meaning.

*All Dubliners are not dumb vs  
Not all Dubliners are dumb*

Do *student* and *pupil* refer to the same thing?

Many approaches use *formal logic*

## Examples of semantic relations

*Synonymy* (same meaning), (example: sofa/couch)

*Antonymy* (opposite meaning), (ex: up/down)

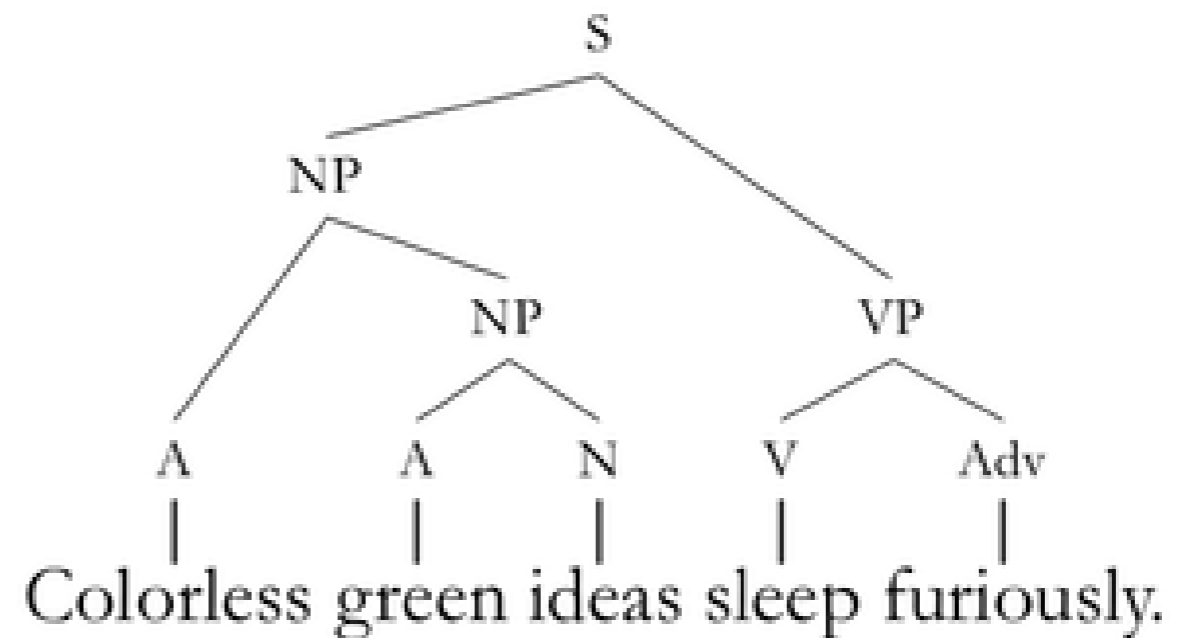
*Polysemy* (several related meanings), (ex: chip)

*Homonymy* (several unrelated meanings) (ex: bank)

*Hyponymy* (ex: triangle is a hyponym of polygon)

### 3. Syntax:

Sequences of words are highly structured, i.e. there are implicit rules about what can go with what.



Parts of speech  
Phrase structure  
Grammar

In linguistics, the word “Grammar” describes the regularities that determine what sequences of words can occur and what can not occur in a given language

When we say “rules” or “regularities” we are using the term as *scientists*, not as *teachers*.

The law of gravity is not the same kind of law as a law enacted by politicians.

Likewise a rule of syntax is not the same kind of rule as a rule made up by teachers.

# Prescriptive vs Descriptive

*Prescriptive:* Lays down the law.

Appropriate for language learning texts

*Descriptive:* Attempts to describe actual use and structure

Scientific agenda

Data: actual sentences/speech

Goal: understand and describe what people do

Linguistics is a science. It is thus *descriptive*, and not *prescriptive*

# Many Languages, Few Principles?

**Principles:** Languages do not vary arbitrarily. It is hard to make up an artificial language (Klingon?). A few *principles* of syntax determine the basic shape of all languages.

**Parameters:** Each language represents a specific choice among a small number of mutually exclusive options. E.g. most languages, English included, use the order

*Subject    Verb    Object*

for simple sentences.

**Irish:** Ith mé arán (eat - I - bread)

Verb subject object

**English:** I eat bread

Subject verb object

(Yoda is not entirely consistent)

Yoda: Lost a planet Master Obi-Wan has.

Verb object subject



**4. Morphology:** Morpheme: the smallest unit of language which has some independent meaning.

dog dogs doubtful cranberry  
Strassenbahnritzenreinemachefrau

Word formation

Lexicon: mental vocabulary. What is stored  
(morphemes? sounds? spellings? meanings?)

Expletive infixation



**5. Phonology:** Systematic organization of sounds within a language.

Which of the following are potentially legal words of English:

scraw stlomp pfiff poink

**Phontactics:** the rules which determine legal combinations of sounds in a language. (Are all 'illegal' combinations equally bad?)

# Phonology Example 1

What is the shape(s) of the plural marker(s) in English?

*lip, rock, tree, latch, gum, myth, laugh, two, cove, toe, bell, wretch, rib, load, breeze, fudge, hen, law, fez, bar, bat, tea, garage*

How do you know which one to use?

# Phonology Example 2

Some American dialects pronounce some of these words differently than Irish locals:

*pure, cute, tune, abuse, dues, argue, muse, mew, new, lewd, few, view, enthuse, suit, hue, spurious, beauty, bugle, cue*

Which ones are subject to variation? Can you predict this for other words? Is the process regular?