

The Science that studies the Psychology of language called Psycholinguistics.

## Chapter - 1

### Communication and Language

Bird songs by bird  
waggle dance of honeybee  
sp. making of cow  
strange sound - squirrels make to alert herd

- Ethologist (scientist studying animal behaviour) refer to the four F's - food, foe, friend and finding mate as the reason for communicating among animals.
- Communication - any behaviour on the part of organism intended to influence the emotions, thoughts or behaviours of another organism.

enemy  
Four F of Animal comm

- Communication
  - vocal
  - facial
  - body posture
  - odours
  - movement

Conspecific → Member of same species

Why Animals communicate?  
(1) Food Austrian ethologist

Karl Von Frish (1967) first described the honey bee waggle dance which is a communication about resources.

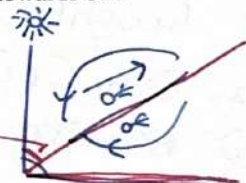
- Waggle run → turn to right to circle back to start — waggle run → turn to left and back.
- Systematically changing resource location Von Frish deduces that waggle dance provides

a) direction b) distance info. ← Dance Performed on vertical surface of honeycombs

- Direction of waggle to vertical axis provides direction e.g. straight left is towards sun and likewise for any angle subtending with the vertical axis.
- Length of waggle is correlated to distance from hive.

the angle made to the vertical axis will tell at

what angle the source of nectar is



vertical axis

(2) Foe

- Squirrel chattering is an alarm call. It is used to warn members of something about approaching predator.

- Vervet monkey (Africa)
  - Leopard (attack)
  - Eagle (carrying away offspring)
  - Snakes (bite them)

(3) Friend

- Cattle expresses a variety of emotional states through vocalization.
- Vocalize to maintain social structure within the herd.
- Attachment process.

Rot pups emit ultrasound when they fall from nest  
(4) Finding mate - cutting your genes into the next generation

Speech:-

Modes of Human Language:-

- (1) Speech most resembles vocalised comm systems.
- (2) Writing has taken on its own forms and conventions.
- (3) Sign languages are fully fledged languages independent of spoken languages.

Primacy of Speech:-

Virtually all language use is in the spoken mode (Hockett, 1966)

Form of language / way of communication is:-

- (1) laughter
- (2) ~~Speech~~ Speech / Writing
- (3) ~~Writing~~ Sign Language

Three Imp features of Any language:-

- (1) Rules
- (2) Structure
- (3) Arbitrary Symbols

(Animal comm sys may have some, but not all, of these characteristics)



of interest is how the brain processes those sentences

Males advertise the genetic prowess to attract mates

- (1) Peacock feathers
- (2) Bullfrog croaking
- (3) Bird song
- (4) Firefly

Cardinal singing (bird song) call for mate.

- Peacock.

Females also advertise

- (1) Mating Rituals
- (2) Pheromones (scent) through body molecules

### General features of animal communication

1. Limited range of expression. eg Vespers comm about 3 diff predators (nothing else)
2. Utterances are holophrase (vocalization refers to whole situation and not specifics).
3. Lack ability to combine symbols to form complex ideas. eg Bee dance combines direction & distance info, but nothing else
4. They are always about here and now.

eg "leopard" here and now, not "leopard" yesterday by tiger

### Human language

- For human language - replaces -vocalization.
- We communicate with language but when emotional language shut down and animal vocalization and face expression persist.

- ① Laughter is a social vocalization we share with chimpanzees; we use it together with conversation to enhance social interaction.

Laughter encourage conversation

Laughter and language share same vocal apparatus.

- Language bears 3 important features as a communication system.

- 1) It is governed by rules; 2) it consists of structured components; 3) it makes use of arbitrary symbols.

Certain animal system shares some but not all of these features.

3 rules

1. Language is communication govern by rule
2. Language is communication system consisting of structured components.
3. Arbitrary symbol - word is a symbol that bears no resemblance to what it refers to.

eg Chinese  
Dog, Gou, Inu - 4-legged pet animal

- Animals have iconic symbol.

- Language is conveyed in 3 different modes: 1) In vocal mode (spoken language), 2) Manual mode (sign language), 3) Visual (writing).

Duality of pattern

- Ovelity patterning gives language its expressive powers; it is a process that takes units at a lower level and combines them according to rules into new unit at a highest level. By repeating this process many times, a multilayer structure of great complexity can be built out of a small set of simple elements.

- The building blocks of language are phonemes, which are meaningless speech sounds. Phonemes combine to form morphemes, which are the basic units of meaning. Morphemes combine to form words, words combine to form phrases, phrases combine as sentences and sentences as discourse.

Take unit at lower level  
↓

combin

↓  
Form new units at a higher level

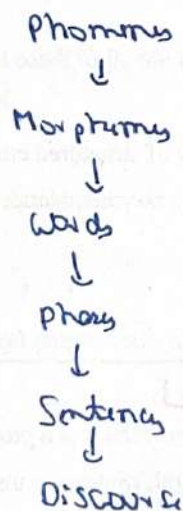
### Pyramid structure

## Pyramid Scheme:

- ① Phonemes → meaningless speech sounds, fundamental building blocks of language.
- ② Phonology → Rules for combining phonemes to form morphemes
- ③ Morphemes → Basic units of meaning (root words, suffixes, prefixes)
- ④ Morphology → Rules for combining morphemes to form words
- ⑤ Words → Minimal stand alone units of lang

\* Syntax →

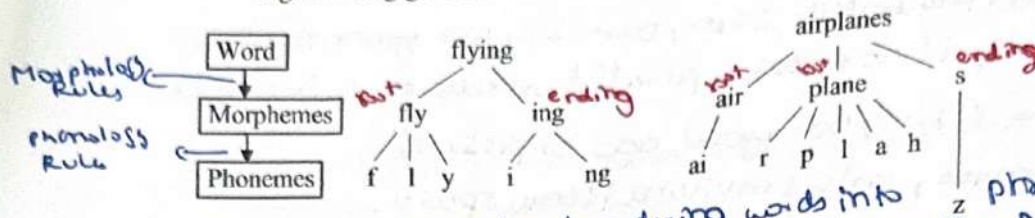
- \* Chunking → Groups meaningless items into meaningful units to increase Working Mly capacity.
- Phrases serve as chunks, allowing for sentences that exceed WM capacity.





Standard American English (SAE) is composed of 40 phonemes (meaningless speech sounds that serves as the fundamental building blocks of language).

English - i-ng-g-l-i-sh



**Syntax** → Set of rules for ordering words into phrases & sentences.  
 → Short only for what we are currently thinking about.  
 → Limited to about seven items.  
 Sentences and discourse

Human language is built in hierarchical structure.

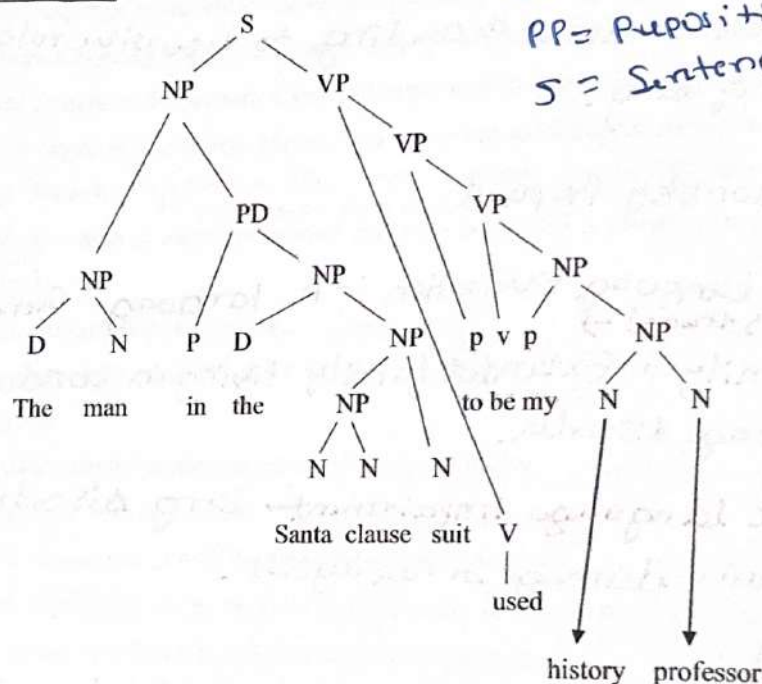
Word + rule → phrases

Phrases + rule → sentences

rule is called syntax

Phrase - structure - rule

D = Determiner  
 N = Noun  
 P = Preposition  
 V = Verb  
 NP = Noun Phrase  
 VP = Verb Phrase  
 PP = Prepositional Phrase  
 S = Sentence



The man in the Santa clause suit used to be my history professor

Discourse - language structure consisting of sentences that are ordered according to rule.

Sequences of sentences ordered according to rules.

## Evolution:-

- (1) Homo erectus (1.8 million years - 200,000 years ago)  
→ First human like creature to walk upright, use fire & stone tools
- (2) Homo neanderthalensis (200,000 - 50,000 years ago)  
→ Desendant of H. erectus, parallel species to early humans
- (3) Homo sapiens (200,000 years ago to present)  
→ Modern humans, only surviving Homo species.
- (4) Common ancestor  
→ Human, gorillas, chimpanzees and bonobos descend from a common ancestor 6 million years ago.  
→ No longer extant today

## \* Recursion

- \* Centrality of Syntax → View that ability to organise words into phrases & sentences according to recursive rules is the distinguishing feature of lang.

then Chomsky Proposed

Language Evolution :- A language Gene?  
(Discontinuity theory) →

**KE family** → Extended family living in London with genetic language disorder.

**Specific language impairment** → lang disorder not attributable to brain damage or hearing loss.

## **FOXP2**

- Gene that plays a role in brain development
- KE family members with normal lang have normal version, those with SLI have defective version.
- Has wide-ranging influences on embryonic development, not specific to lang.



- While animal communication systems are always about the here and now, human language allow us to talk about events happening in other time and places, this is displacement → ability to refer to things & events beyond the here & now

## Evolution of language

### Six blind men and elephant

- Human and chimpanzees share a common ancestor: Homo erectus was an ancestor of both the Neanderthals and modern human.
- Human evolves following the evolution ladder.
- Species do not evolve from one another, rather population that were once a single species split in two, and the two adapt to new environments forming newer species.
- Interbreeding reveals if two population are from same species.
- Homo erectus was the first successful species.
- 200,000 years ago, Homo sapiens appear.
- Neanderthals – 400,000 years ago.

Set of Russian dolls → Each doll resembles the others, but one fits inside other & those inside a third & so on

Recursion, or the process of extending a pattern by placing it inside itself is an important feature of human language in particular and human thought in general.

Common in nature → DNA structure, flower petal arrangement

According to Noam Chomsky (2011) recursion is the key to understanding how human language evolved from primitive system. Chomsky emphasizes the centrality of syntax

– is the ability to organize words into phrases and sentences according to recursion rules.

Hopeful Monster Hypothesis → Idea that a single mutation can lead to rapid transition of species.

- The question whether human language evolved gradually or rapidly is known as the continuity debates.

- Evidence for discontinuity theories include: radically ~~continuity~~

- 1) The specific language impairment of KE family.
- 2) The FOXP2 gene
- 3) Disparity between animal communication and human language.

- Evidence for continuity theories include: gradually ~~radically~~

- 1) These theories are consistent with the principle of natural selection.
- 2) The existence of pidgins which suggests the possibility that pre-human spoke a photo-language half way between animal calls and full language.

Social theories of language evolution emphasize:

- 1) The special nurture of mother-infant- interactions.
- 2) The relation between music and speech.
- 3) The role of conversation in building and maintaining social relationships.

Continuity theories → Steady transition from animal comm to human lang. As a rule, evolution is continuous, not abrupt.

Discontinuity theories → Sudden transition from animal comm to human lang. No living species has intermediate comm ability.

basic form of lang with few words, expressions  
more knowledge  
next page

## Protolanguage

Hypothetical pidgin-like lang spoken by ancestral humans:-

(1) Bickerton (1990) proposed:-

(a) Animal communication (pre Homo erectus)

(b) Protolanguage (Homo erectus)

(c) Full lang (Homo Sapiens)

## Protolanguage as Continuity theory

→ Chimpanzees in the wild do not use pidgin, but can be taught pidgin in the lab.

Humans transition from Pidgin to creole in one generation

is the evidence of continuity theories

## \* Social Theories of Language Evolution

(1) Mother tongue Hypothesis → lang evolved from maternal vocalizations that took on meaning over many generations.  
(Falk, 2009)

(2) Singing Neanderthal Hypothesis:-

Both music & lang evolved from the vocalizations of pre human social interactions (Mithen, 2005)

(3) Social grooming Hypothesis:-

Gossip for humans serves same purpose of social bonding that grooming does for chimpanzees (Dunbar, 1997)



## Living fossils

- Pidgins are simplified language, but they are very useful for communication when no common language is available.
- They alone suggest that an intermediate step between animal communication system and full-fledged human languages is evolutionary viable.
- The one generation transition from pidgin to creole lends some support to discontinuity theory.  
→ fully fledged language based on pidgin, children of pidgin speakers flesh it out as a full lang.
- All pidgins have certain characteristics in common;  
a) They have same phonology [th/replace dem, dere] → them, there → dem, den or business pidgin  
b) They generally lack morphology [sig/plural. One man, two man, go today, go yesterday].  
No morphology  
c) They have limited vocabularies [content word limited vocabularies function word-less]. [few function words (th, a, is, of)]  
d) They are little or no syntax [word order free].  
e) They are effortful to produce and comprehend [no one speaks so effort].
- Early attempts to teach speech to primates failed because they lack the vocal tract structure required to produce full range of speech sounds.
- Later attempts to teach signed or visual-symbol language to primates have shown that they can acquire a small vocabulary and can actively produce 2 or 3 word utterances, but the complexity of full language seem beyond their grasp.
- Language development suggest a trajectory for language evolution.
- The shift from short utterances to full sentences show that the change is continuous, consistent with continuity theories, but rapid, consistent with discontinuity theories.
- Brain damage can lead to a loss of language abilities. These patients often are only capable of pidgin - like utterances that are short, ungrammatical and effortful to produce.

### \* Early Attempts to Teach Lang to Apes.

(1) Gua → Kellogg & Kellogg (1938) raised chimpanzee infant along with their own infant.  
→ Failed to learn any words by 18 months, unlike human infant.

### (2) Vicki

→ Hayes & Hayes (1952) raised chimpanzee infant as human.  
→ learned only 4 words after 3 years.

→ vocal tract → sys of air passages (throat, mouth, nose) where speech is produced.  
→ Chimpanzee vocal tract does not allow for articulation of speech

### ③ Koko

- Patterson (1978) trained gorilla in American sign lang)
- Active vocabulary of about 100 words, novel combinations

### ④ Kanzi:

- Savage-Rumbaugh & colleagues (1998) trained bonobo to communicate with visual symbols called lexigrams.
- Spoken English comprehension similar to 2-year old human.

⑤

But is it like?

- Pidgin like structure, little evidence of syntax
- utterances are communicative & socially engaging.

## Baby Talk

- (1) 0-12 months → vocalisation, babbling, gradually becoming lang like
- (2) 12-18 months → few dozen words, used as holophrases.
- (3) 18-24 months → Beginning of vocabulary spurt (word learning at a rapid rate)
  - Two-word utterances, pidgin like structure.
- (4) 24-48 months →
  - vocabulary and syntax develop, approaching adult lang model.

Child lang develop suggest a trajectory similar to lang evolution

Holophrases → Pidgin → Syntax

## Language loss

Aphasia → language deficit due to brain damage.

- ↳ (a) Broca's aphasia → characterized by disjointed, ungrammatical speech.
  - Effortful lang production
  - Pidgin like, mostly content words, few function words.
  - Affects spoken, written & signed lang.
- (b) Broca's area →
  - Brain region (left frontal lobe) that plays a role in speech production, organising lang into hierarchical structures.