

Tejesh Vaish

Assignment-2

Based upon the **papers** you have read on language evolution, what do **you** think **could** be the **key developments** that led to the evolution of human language. Explain using any of the **theories** of language evolution.

The evolution of language has always been one of the most interesting mysteries which we humans have tried to explain by various theories. Bickerton has rightly said “Evolution of language is far too vast and complex (and vague) a concept for anyone to say anything sensible about it .“

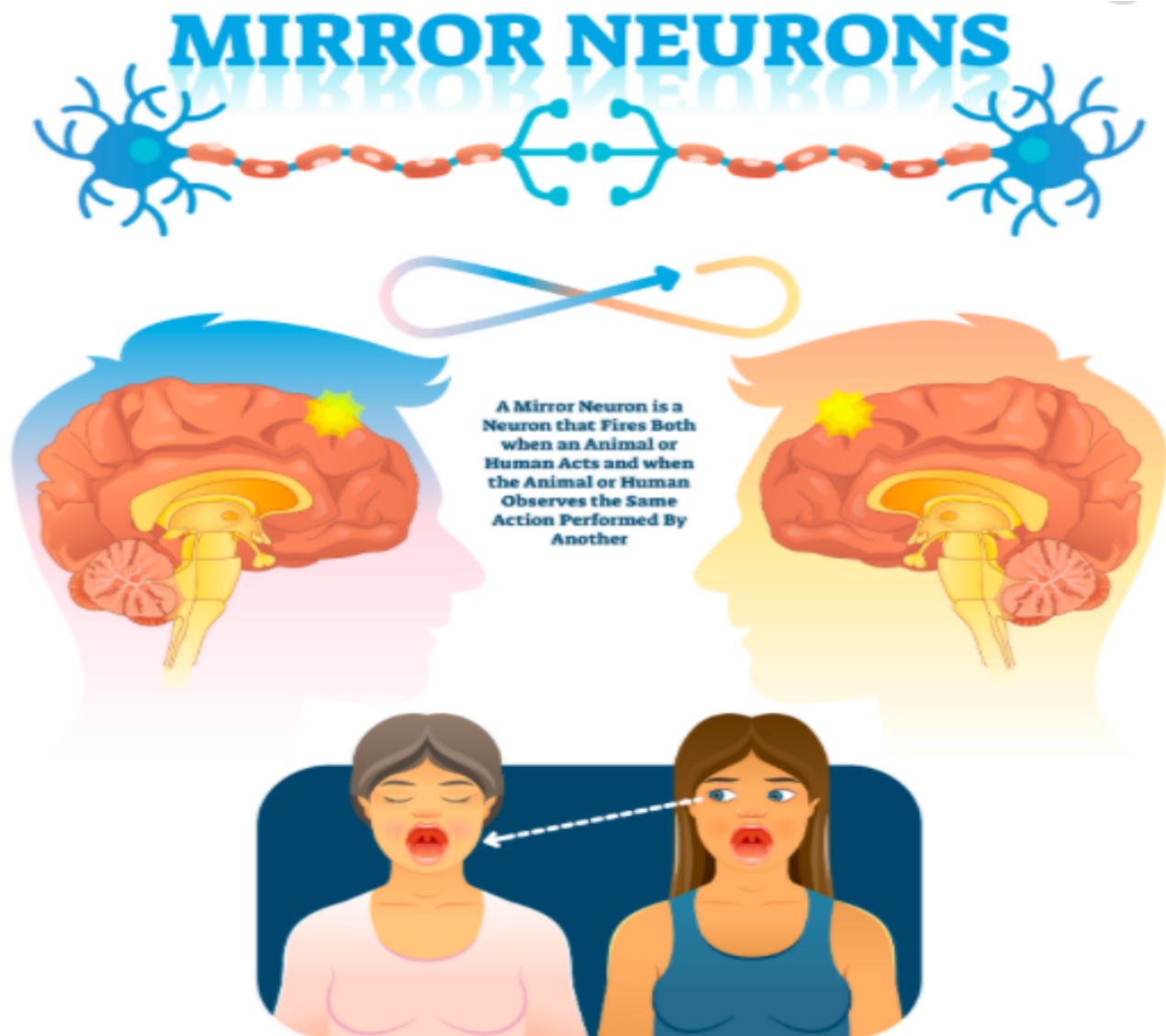
I also don't believe that I will be able to say something very sensible about it either :p , but based upon the interesting papers that I read on the evolution of language , I am really mesmerised by them and truly excited to tell you my hypothesis about the evolution of language .

Chomsky has correctly said that understanding the language is an **interdisciplinary** field and that is what makes it even more complex and interesting . I believe that all the papers are saying the different parts of the same story , I believe in all five papers that I have read, though some of them have contrasting views with each other, so , I will tell my own view of what I believe , that how language must have evolved .

Starting from the **technological hypothesis** of language , It explains very well how human gestures must have turned into a language .

Broca's area, the neural mechanism which enables us to communicate developed around 2 million years ago, it is located in the frontal cortex of the brain , it contains a very special type of neuron popularly known as mirror neuron, the bunch of neurons which gives the human the ability to do things which it hasn't seen before , basically the ability to understand and mimic the actions done by some other human and learning by imitation is because of mirror neurons.

Ramachandran has famously said that a mirror neuron would do for psychology what DNA has done for biology.



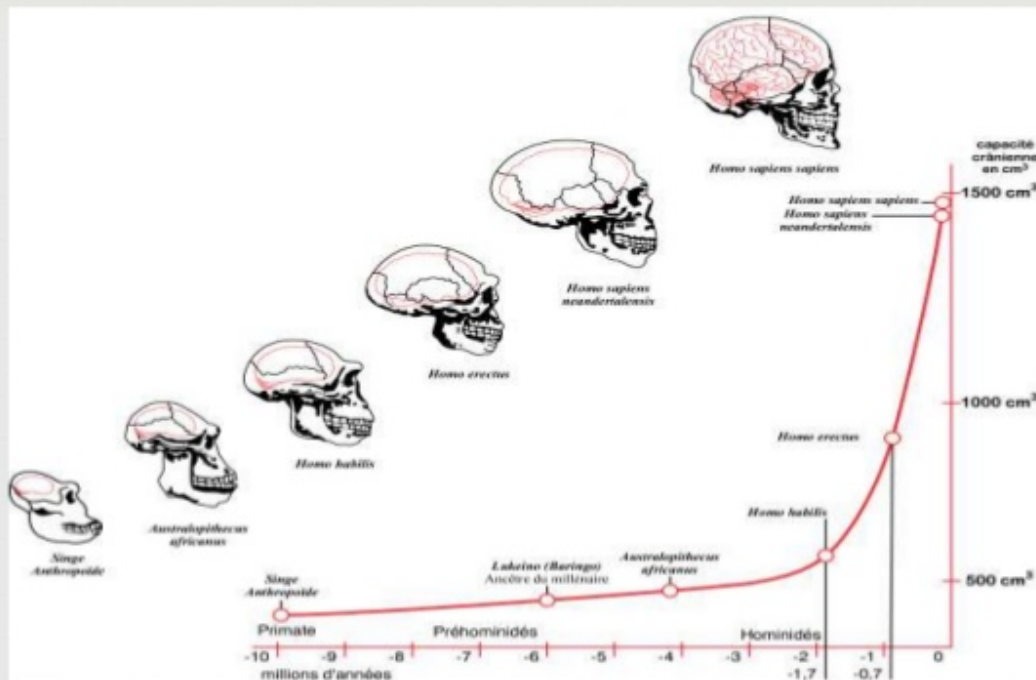
These mirror neurons are the reason why we humans are qualitatively more intelligent than other animals. They help us observe others and produce the same. It is a strong evidence that language evolved from manual gestures . The **neuroplastic** nature of the brain and mirror neurons were the ones which led to **discontinuity** in the development of the human brain which in turn led to development of language , I have talked in an interesting manner about discontinuity in this assignment on the last page [here](#).

In 2020 , we very well know that the human brain has this great ability to evolve and transform based upon the task and thoughts we have .

I have once read a book “As a Man Thinketh”, “The Power of the Subconscious Mind “ and many more. Those books explain the importance of this property of the brain.

The London taxi drivers have more capacity to learn different things quickly as they have done that task several times , so their brain has evolved in that direction , same can be said for the human species .

Around 2.3 million years ago , the size of the human brain increased significantly .



Human brain has evolved and got bigger throughout thousands and millions of years.

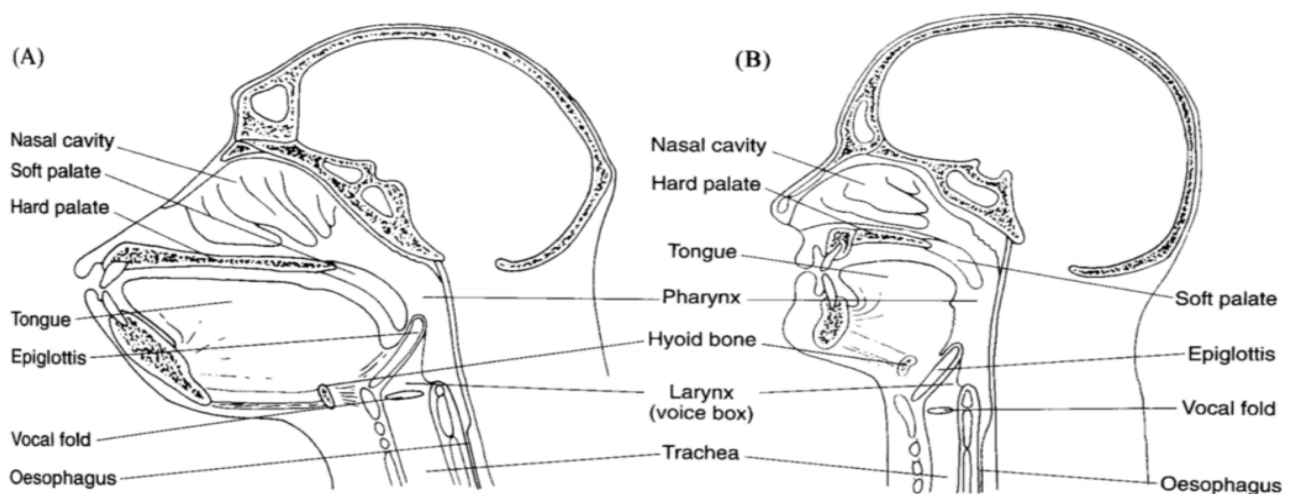
In the stone age , when humans used to communicate through manual gestures , only one or two humans might have got that ability , but due the **mirror neurons** , every other human present there and also all the following species got that ability to communicate through them.

When some human (one or two or more) discovered this complicated and sophisticated task of tool manufacture and all other advancements in our long journey , it changed our brain structure by leap and bound , inventions like this are the reason for the discontinuities we have in the evolution of language , and after these events all the humans through their special abilities of mirror system have tranmuted at the cultural level to every single human at that time.

The humans before 60,000 years ago did not have the biological capacity to vocalize like they do now . So , they communicated through manual gestures with the help of the broca area .

The evolution of functioning vocal boxe is one of the most important developments in the evolution of language , because that started the chain of never ending growth of language through various other reasons.

The vocal apparatus of humans differentiated from other species at around 60,000 years ago.



Comparison between ape and human larynx positions. (A) Ape and (B) Human

FOXP2 gene mentioned in mirror paper is involved in vocalization and is added to the human genome recently (60,000 years ago). Now ,families who do n't have this gene and have faced many problems to grasp vocalisations, thus humans have undergone a biological mutation recently which led to evolution of language .

We have seen that how much language must have originated and evolved to a certain point , now we will see that how does actually human language come in its full glory from just gestures.

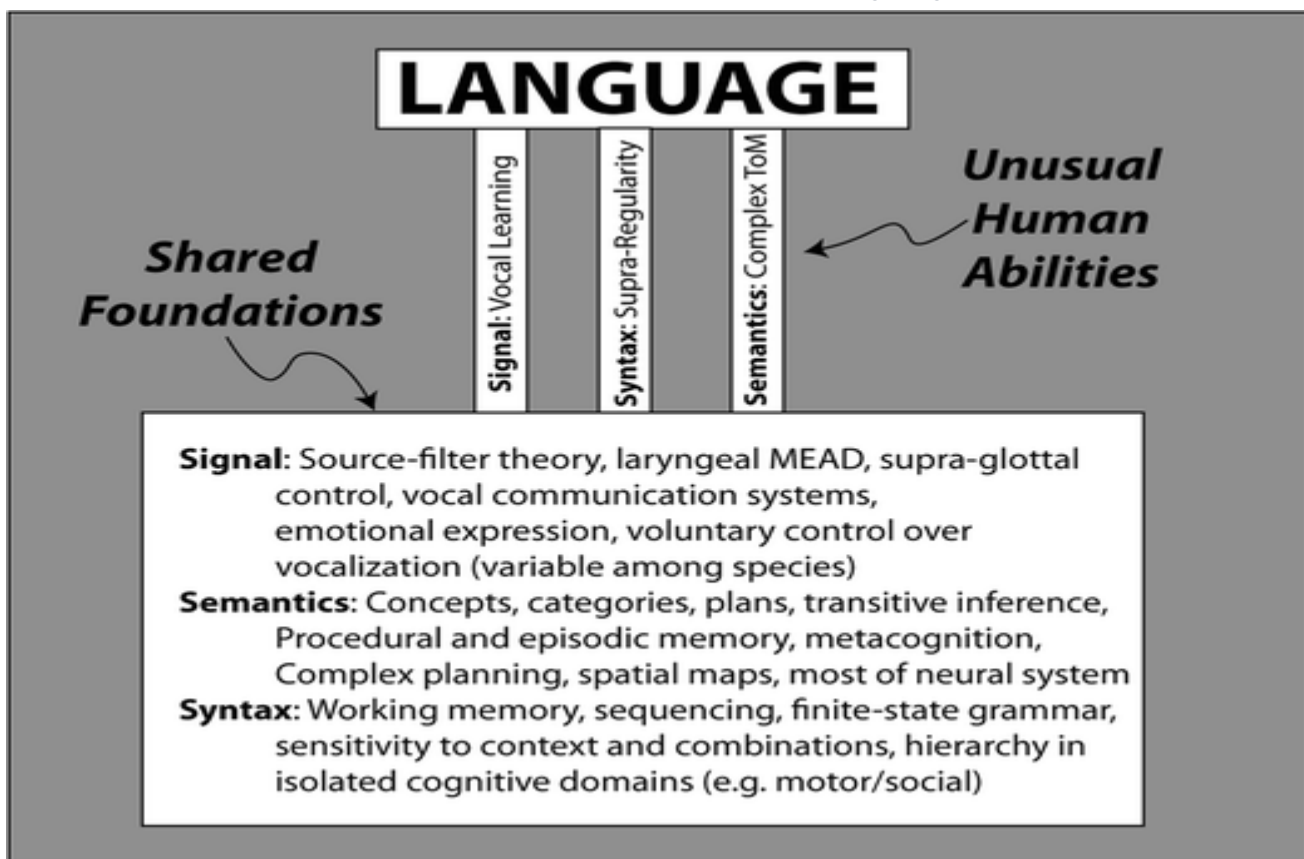
I believe in **Chomsky's biological and Kirby's social perspective** of the evolution of language .

By biological perspective , we have two organs of internal features distinguishes human language evolution from the animals:-

1) **Facility of language broad (FLB)**, includes a sensory motor system and conceptual intentional system that help to form language. FLB is a **superset** of another system which together with FLB gives the biological capacity to learn and master any human language.

2) **Facility of Language Narrow**, a computational system that generates Internal symbols and **maps** them to necessary sensory motor systems with the help of **phonology** and linked conceptual intentional System with the help of **semantics**. It gives the human language the characteristics which separates it from all other animal communication systems, i.e., **recursion**.

This FLN is what is uniquely present in humans, and this faculty **qualitatively** separates us from animals for the purpose of the language.



This whole box represents FLB and just the unusual human abilities are analogous to FLN, this is what separates us from others animal evolution.

The Biological Perspective (Hauser, Chomsky & Fitch, 2002)

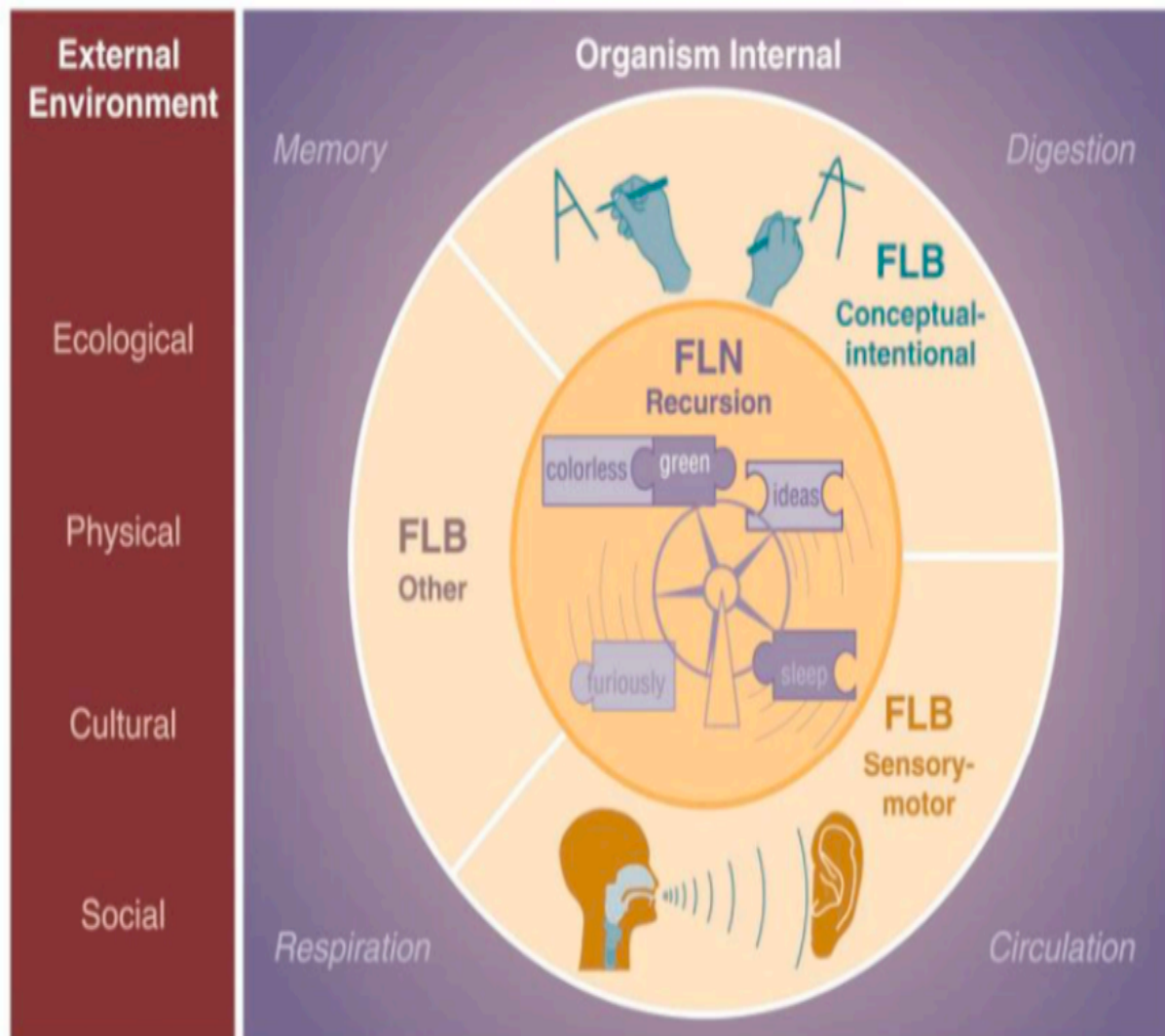
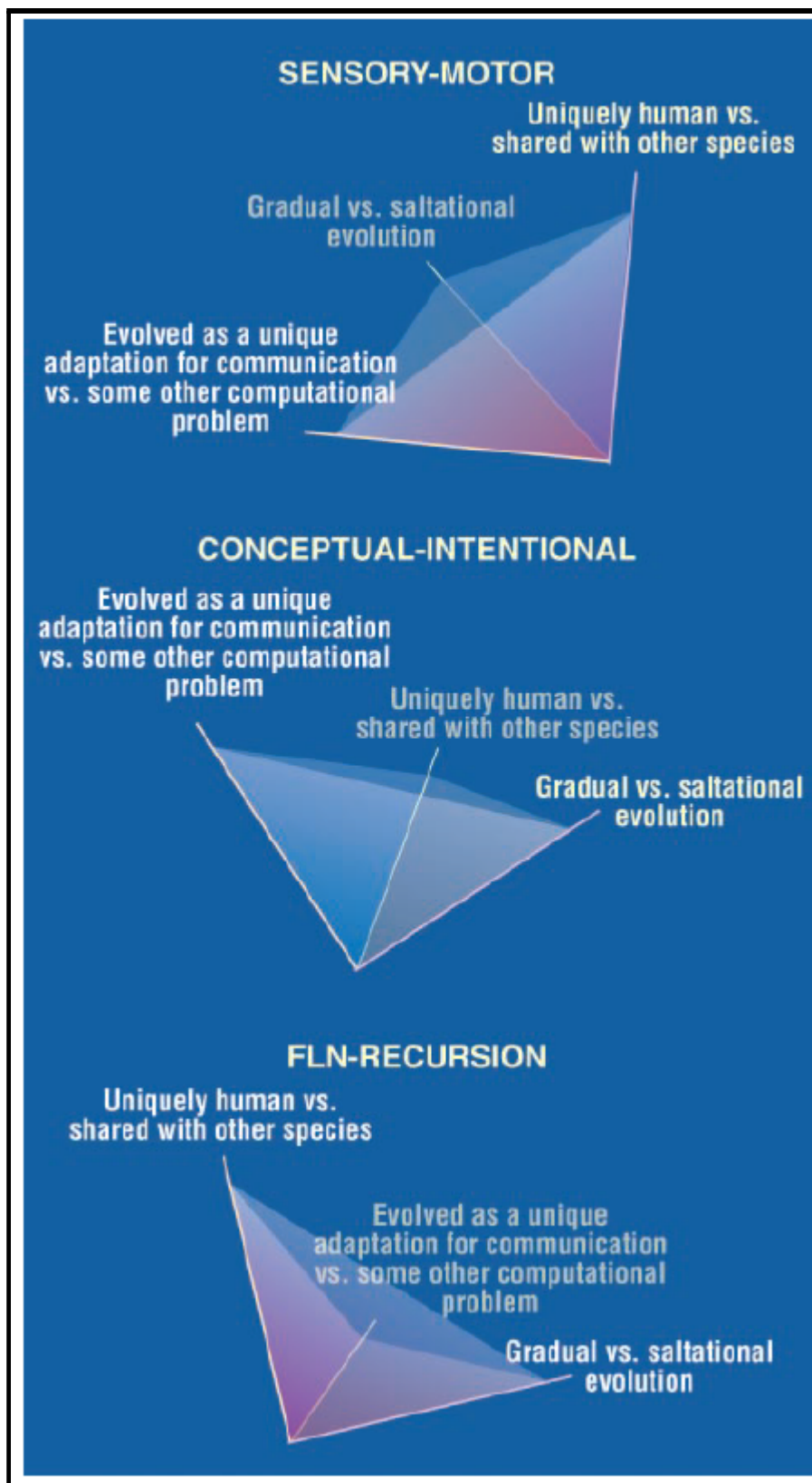


Fig. 2. A schematic representation of organism-external and -internal factors related to the faculty of language. FLB includes sensory-motor, conceptual-intentional, and other possible systems (which we leave open); FLN includes the core grammatical computations that we suggest are limited to recursion. See text for more complete discussion.

This picture clearly summarises FLB and FLN and the function of both of these. And how FLN is uniquely present in humans which gives us this ability of recursion.



Brain can computationally handle this generation of new information, these concepts of productivity, generativity using Recursion.

This is definitely unique to our species, it is the deciding factor, that our species which has language while other species do not.

The FLB, is a generic thing, thoughts and desires and knowledge of the world that we want to communicate form the part of the conceptual intentional system, and how we execute them, is a part of the sensorimotor system.

It has been experimentally observed that other animals lack **temporal characteristics**

of language but we humans have this due FLN.

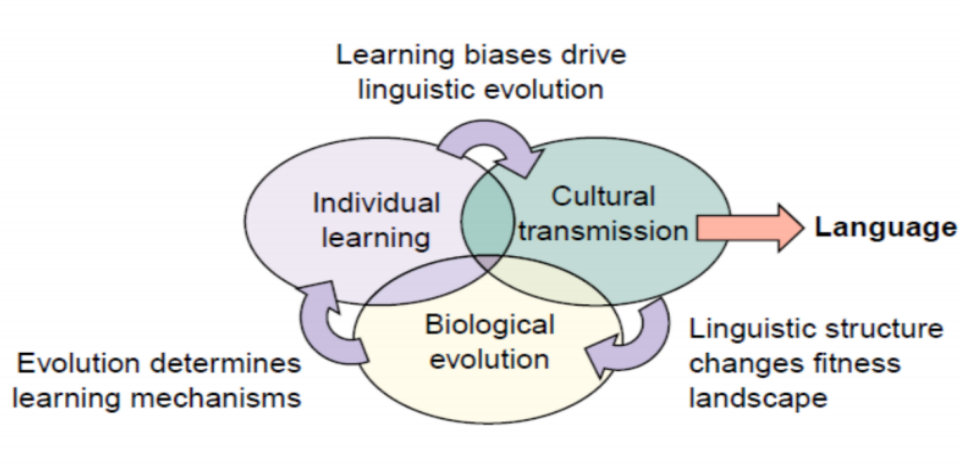
Daniel everett paper on piraha language, is a contrast to chomsky and hockett features of the language, he observed that some of the very basic features of the languages that should be there in any human language are absent in piraha language, e.g, they don't have numbers, verbs, recursion, Lack of embedding, he

argues that language doesn't come from our biology , as if it would have been coming biologically , then piraha language would have same features as other human languages .

Their language is coming from their cultural , traditions , social , anthropological , societal practices . This seems to me more of an exception than a rule . So , I don't consider it to be a valid contrast against a chomsky perspective.

Christiansen & kirby (2003) papers says , that there are many features which interact with each other in evolution of language .They took the common ground on all other theories , A biological evolution, the **change in genotype** of the humans , that would have determined the learning mechanism of the humans , and these learning mechanism than moved up to the individual learning , and then it transmits culturally through generations.

A more rounded approach



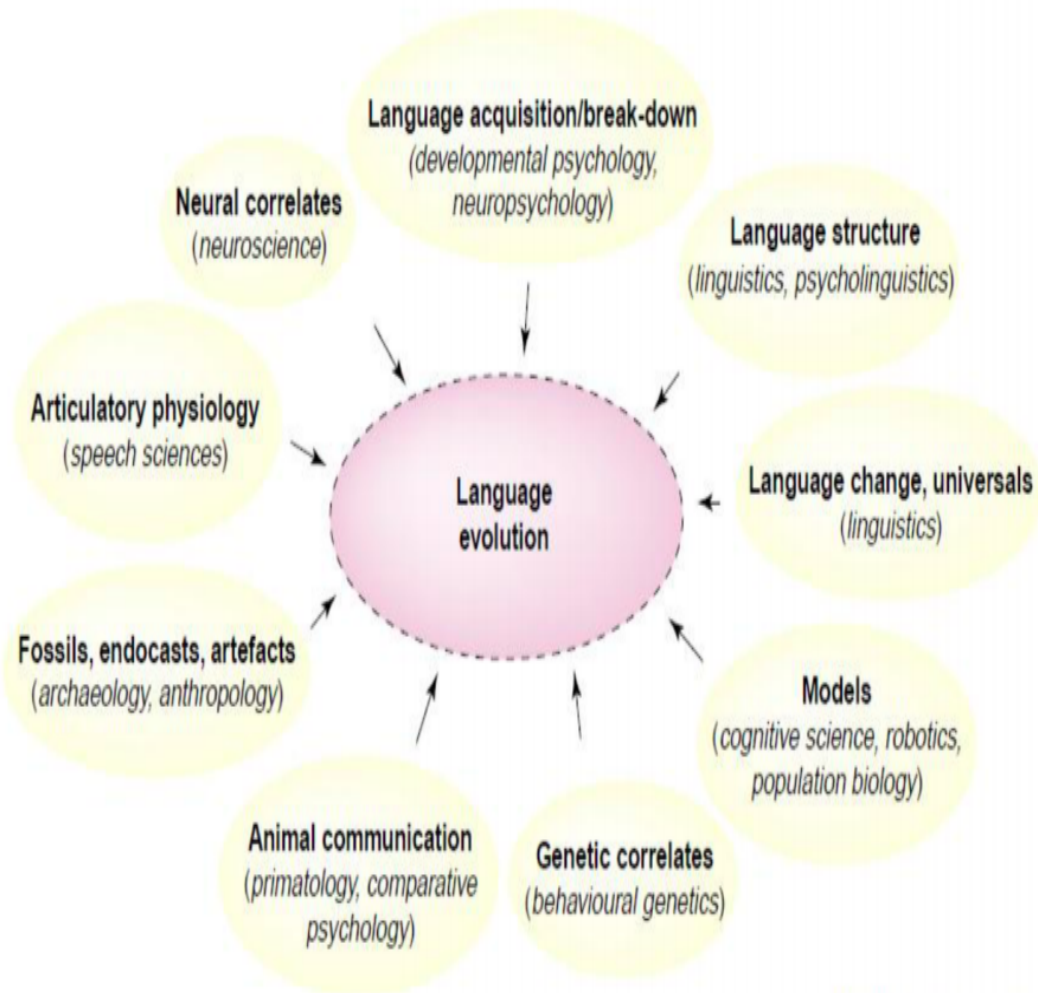
Interaction of Factors Contributing to Language Evolution (Christiansen & Kirby, 2003).

Language evolution is at the intersection of three of these.

I believe that this theory also supports my hypothesis , which is a mixture of all the five theories that I have read in these papers.

We humans adapt through the system of cultural transmission , though Kirby says that it is not obvious , but I feel , mirror neurons , help us in doing so !

Overview of research on Language Evolution



TRENDS in Cognitive Sciences

This picture lists many factors which led to the evolution of language, which give us the idea of how intricate and interesting this evolution of language is !

To conclude , there are many Key developments which have led to Language evolution, it is a topic of great mysteries ,evidences from fossil record ,**genetic analysis** , neuroscience , infancy research and **cognitive grammar(like internal language)** , this increasing knowledge about these things , we will be able to give more precise theory of **co-evolution** of language and brain.

Modern children learn language from **imitation** , **play** , **articulation** ,**lexicalization** which have been talked about in detail in these papers , these learning techniques have been developing since millions of years , and while in their lifetime , they use language to further modify and **culturally transmit** to the future generations.

From all the theories from given papers , leaving the piraha one, according to my belief, are in support of each other , from the starting of our species to the present time , **every theory has different colours of a common theme** , of how the language was evolved.

Thank you !

