

# The faculty of language: what is it, who has it, and how did it evolve?

**Shubham Gupta**  
**180749**

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## Introduction

In recent times there has been a debate in the linguistic community whether the evolution of language as acquired by humans (*homo sapiens*) is a product of adaptation or this ability is uniquely human. Other language evolution issues include 1.) Why do humans have an abundance of expression compared to non-humans? 2.) How did this evolution progress? Was it gradual or spontaneous? 3.) What part of the human linguistic capacity is shared with non-humans? Many comparative, theoretical and empirical studies are completed by prominent linguists to address each hypothesis. I will constrict this study to the developments made by Noam Chomsky (suggesting that only syntactic recursion is unique to humans) and Steven Pinker (rejecting the hypothesis presented by Chomsky and suggesting that language is an adaptation).

## What is the faculty of language?

According to Chomsky, the faculty of language is the innate capacity of the human brain to acquire language. He differentiates the faculty into FLB (Faculty of language - broad sense) and FLN (Faculty of language - narrow sense). FLN includes the “abstract linguistic computational system”, i.e., the tendency to generate infinite expressions with a limited/finite set of words and streams of sound. This propensity is also known as “Syntactic Recursion” or hereafter recursion. FLB includes FLN and the biological capacity (to produce sound and signs) and cognitive ability (to understand meanings).<sup>1</sup>

Pinker had a slightly different explanation for the faculty of language. He defined two principles: Words (finite list of distinct arbitrary meaningful elements) and Grammar (set of rules using which recursion is possible). Grammar can be used to express the infinite range of thought, and this is achieved as it uses abstract categories like verbs, prepositions, adjectives, nouns, etc., rather than concrete concepts. The creation of sentences is unrestricted by the abstract nature of grammatical categories, while their complexity and length are unrestricted by the recursive and combinatorial character of Grammar.<sup>2</sup>

Language also includes phonology which determines a language’s sound pattern. No language has a separate speech gesture for defining every word differently; instead, these gestures are combined using phonological rules and constraints to define each word differently.<sup>3</sup>

Since language is bidirectional(i.e., speaker and listener should have the same perception of language articulation) by nature, speech perception and production will be a part of the faculty. Several non-human species like tamarin monkeys can differentiate between sounds, and human

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1 The Faculty of Language: What Is It, Who Has It, and How Did It Evolve? (Marc D. Hauser,1\* Noam Chomsky,2 W. Tecumseh Fitch1, 2002, 1570-71)

2 Language as an Adaptation to the Cognitive Niche (Steven Pinker, ,17)

3 Language as an Adaptation to the Cognitive Niche (Steven Pinker, ,20)

children suggest that some parts of the ability to sense speech existed long before language was invented in humans.<sup>4</sup>

The conceptual system of humans consists of ideas (sometimes abstract) such as emotional feelings, instinctive physics, morals, mythology etc., which is also included in the faculty of language. There are certain domains in human understanding that are unlearnable without language. The concept of numbers is based on counting that cannot all be observed simultaneously. There is a doubt that such a concept could be established or learnt without using language.<sup>5</sup>

## **Who has the faculty of language?**

Many explanations are prevalent in the linguistic community about the evolution of the faculty of language. Some suggest that animal communication is analogous to FLB; others defend that FLB is a language adaption unique to humans. Chomsky suggested another hypothesis that only FLN is uniquely human. Chomsky introduced the “Minimalist program” (MP), his current approach towards a unified theory for language and its faculty. MP states that only representations of sound and representations of meaning are indispensable in language because it is a mapping between sounds and meanings. Because language combines words into hierarchical tree structures, MP introduced a combining operation known as “Merge”, which recursively amalgamates the meaningful elements of language.<sup>6</sup>

Before MP a number of theories were discovered to explain the infinite recursion of the language. The generation of infinite strings by transformations in a limited number of components is the foundation of Generative Grammar. Some other theories leading Generative Grammar theory are X-bar theory, Government and Binding theory and finally we have MP. Various empirical studies have been conducted to verify each claim. We will discuss some of them here. Birds acquire song for mating purposes is seen as an analogy relevant to language. These songs are highly species-dependent and are learnt by listening to other members of their species. If the birds are isolated during their acquisition stage, the songs learnt are pretty deviant from the general species-specific song. Vocalization is innate in non-human primates. Compared to most other mammals, the human vocal tract has a lower larynx, allowing us to pronounce a wide range of sound patterns. Nevertheless, it comes with physiological costs like the risk of death by choking, breathing, chewing, swallowing, etc., which were neglected to improve and benefit from the communication system in humans.<sup>7</sup>

Recent genetic discoveries have placed doubts on the recursion-only idea. FOXP2 is a dominant allele of a single gene. It causes a rare inherited language and speech disability. This gene is associated with Specific Language Impairment (SLI). In an investigation in 1990, a big multi-generational family in which half of the individuals have a speech and language issue, it was discovered that they have problems distinguishing phonemes, interpreting sentences,

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4 The faculty of language: what's special about it? (Steven Pinker,\* , Ray Jackendoff, 2004, 206-210)

5 The faculty of language: what's special about it? (Steven Pinker,\* , Ray Jackendoff, 2004, 205)

6 The faculty of language: what's special about it? (Steven Pinker,\* , Ray Jackendoff, 2004, 219)

7 The Faculty of Language: What Is It, Who Has It, and How Did It Evolve? (Marc D. Hauser,1\* Noam Chomsky,2 W. Tecumseh Fitch1, 2002, 1572)

determining grammaticality, and other skills. Due to these reasons, their language issue cannot be reduced to a motor problem, and it seems that it is a product of adaptation.<sup>8</sup>

Before going on to the question of how the faculty of language evolved, we should have an idea of why the language evolved in the first place. We will learn this in the next section.

### **Why did the language evolve?**

Language is seen as an adaptation, but why did it evolve in the first place? Pinker stated that language is an encoding system that encodes information about anything the human mind can interpret (language conveys information about innovation, the local environment (materialistic space), the social environment (when, where, and why did who do what to whom), and intentions (promises and threats)) into speech signals for communicating from one person to another.

In general, as suggested by Tooby and DeVore, humans live a peculiar life different from any other creature in the animal kingdom. Exchange and generation of information are very trivial to the human population, distinguishing us from non-humans. We rely on complex tools, live in diverse environments, have a region-specific diet, have complicated sexual patterns and sexuality, and follow various religions. All these social constructs and cognitions can be held together with the help of language. Humans have thus evolved language to encode and exchange information amongst themselves. One argument against that hypothesis is that members of a species are competitors, and the exchange of information can provide competitors with an advantage. Nevertheless, this can be easily tackled as cooperation can be seen in other organisms as well, and this type of exchange makes language-specific genes in our kins to express naturally in the next and upcoming generations.<sup>9</sup>

Other theories are also prevalent, like one presented by Dawkins and Krebs that language evolved to deceive and manipulate other organisms. Another theory is that instead of allowing us to communicate, language evolved to allow us to think. However, an argument against this theory is that humans usually do not use algorithmic rules while thinking about themselves, and the construction of syntactic rules is an overkill to express thoughts to oneself. I do not deny that there have not been any such examples in morphology, but I am just stating that it is unlikely to be evolved with these selection pressures.<sup>10</sup>

### **How did the faculty of language evolve?**

Over the past few decades, the study of the evolution of language has picked up speed. I will capture some critical studies and their critiques to explain how the faculty of language was developed. Humans have a prominent ability for vocal imitation (as suggested by Chomsky). Imitation is an essential component of the human capability to learn a shared and arbitrary lexicon, which is central to language ability. As a result, the ability to imitate was a fundamental requirement for FLB to function as a communicative system. It is striking to notice that we share the ability of imitation with dolphins (mammals) and some birds (parrots), but in monkeys (close

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8 Language as an Adaptation to the Cognitive Niche (Steven Pinker, ,34)

9 Language as an Adaptation to the Cognitive Niche (Steven Pinker, ,27)

10 Language as an Adaptation to the Cognitive Niche (Steven Pinker, ,29)

genetic relatives of humans), imitation is virtually absent. Non-human primates are infamous for being resistive to vocalisation training (Hauser). By the time humans graduate, their vocabulary is as large as 60,000 words, far greater than any other non-human species. Neurobiological studies on macaques have shown that they share “mirror neurons” in the premotor cortex responsible for imitation. Fewer of these neurons are present in macaques which diminishes their chances to imitate. Pinker argues that humans are not good at imitation and present examples that humans cannot reproduce environmental sounds (as done by some birds), and humans are notoriously poor in imitating any other language except their mother tongue. Therefore, vocal imitation in humans can be explained as a capacity to produce speech rather than the idea of grammatical recursion.<sup>11</sup>

Some research suggests that animals have a theory of mind (socio-cognitive construct which to think about various mental states. It can also be seen as knowledge of self and surroundings.), i.e., they know the relationships in their kins and their respective roles in the family. This concludes that animals may have developed a mind strong enough to acquire some aspects of FLB, but no evidence is present to claim that FLN is present in non-humans.

The open-ended generative system has been an area for research in recent years. Studies on discrimination of numbers in the animal kingdom have proven effective in studying the magnitude of open-ended generative systems present in animals. I want to state Weber's law that animals show a higher discriminability between numbers placed far apart and amongst large numbers (we keep distances between pairs the same). Animals and human infants acquire the integer list in very different ways. Humans babies learn the arbitrary order first and then, with time, commit to their meanings, whereas other animals learn by understanding the meanings of numbers without learning the list. This adds to the evidence that animals cannot form an open-ended generative system.<sup>12</sup>

Chomsky also provided three other themes: Language is not meant for communication and is poorly designed. Language is perfect. FLN has evolved for any other cognitive ability than language. As suggested by Pinker, all these claims challenge the theory that language has gradually evolved due to adaptation. For the first claim, Pinker argues that it is a product of Chomsky's reasoning that language was developed in the first place for innate thoughts (talking to oneself). There is no need to develop complex phonological and morphological features for talking to oneself. When one portion of the brain communicates with another, it does not need to encode the data in a vocal-acoustic channel; instead, it uses parallel transmission. The perfect example is the visual system in the animal kingdom, which does not use any encoding to communicate to the brain.<sup>13</sup>

The counter given to the notion that language is perfect is that this perfection can only be achieved in only one domain of language while having a trade-off with other language components. An object having evolution can never be perfect, and it always gets better and better. Some say that what good is some per cent of a particular trait/character? Pidgins are an essential source of evidence in the field of language. The phonological mappings in the pidgins have no defined word order, case, or agreement. They also lack subordinate clauses, which are a hallmark of recursion, and may entirely be devoid of phrase structure.

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11 The Faculty of Language: What Is It, Who Has It, and How Did It Evolve? (Marc D. Hauser,1\* Noam Chomsky,2 W. Tecumseh Fitch1, 2002, 1574-75)

12 The Faculty of Language: What Is It, Who Has It, and How Did It Evolve? (Marc D. Hauser,1\* Noam Chomsky,2 W. Tecumseh Fitch1, 2002, 1575-77)

13 The faculty of language: what's special about it? (Steven Pinker,\* , Ray Jackendoff, 2004, 223-25)

Nevertheless, they are useable, albeit not as consistently as fully formed language. Talking about the non-redundancy of language as claimed by Chomsky, Pinker argues that encoding thoughts in words and sentences can be done in many ways and learners of a particular language have next to no issues while interpreting them (they might need some time). Like other biological systems, language is valuable but imperfect, rather than being useless but perfect.<sup>14</sup>

The argument that FLN has evolved for other cognitive abilities like number quantification, navigation, or relationships and not particularly for language assumes a logical fallacy that if a system was selected for one function at the start, it was not selected for another purpose later. An example can be limbs in the animal kingdom, which are now used for flight, locomotion, etc., was initially being selected for stability underwater.<sup>15</sup>

## Conclusion

All this discussion suggests that the faculty language is a pervasive concept. Such a construct does not seem to be an outcome of a single macro mutation, and all the studies we discussed point towards a more apt and relatable theory, i.e., language is a gradual and fragmented evolution of a complicated communication adaptation.

Chomsky presented that FLB is shared with other animals, whereas FLN is a unique construct only available in humans. Chomsky's hypothesis has many critiques, one being Pinker, who advocates that language is an adaptation. Language, rather than using one component (recursion), exhibits several partial specialisation signals, which are compatible with behavioural and genetic findings. Adaptation as a reason for language evolution does not indicate that linguistics is a threat to biology, but rather it can assist bring the two together.

This debate has left us with several questions: Why did only humans and no other animal use the ability of recursion to develop a communication system that was open-ended and limitless? Why does our recursive system work with a broader range of elements (for example, numbers) than other animals'? To answer these questions comparative approach is most likely to yield fresh insights into both shared and derived traits, resulting in novel ideas about the evolutionary factors that led to the development of the language faculty.

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<sup>14</sup> The faculty of language: what's special about it? (Steven Pinker,\*, Ray Jackendoff, 2004, 225-228)

<sup>15</sup> The faculty of language: what's special about it? (Steven Pinker,\*, Ray Jackendoff, 2004, 228-230)