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## Origin and Evolution of Human Language - A Brief Survey of Some Theories and Approaches

Mohammad Nehal and Mohammad Afzal

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### Abstract

Language is a complex human behavior which defies many disciplines in describing its formal structure and function (theoretical linguistics). Origin of language has been all the more difficult to explore as the archaeological, anthropological, biological, genetic, neurological and psychological evidences are varied and a unified view of language development and behavior is difficult to reach. The process of language acquisition and application of the tool of language for educational and mental development is being seriously explored. The theoretical discipline of linguistics has to give a comprehensive view of syntax, semantics and pragmatics in language comprehension, whereas a mathematical theory of information in philosophy and language has still some challenging problems. The present article reviews the major trends in linguistic research and their implications for solving human problems in education, behavior and artificial intelligence.

**Keywords:** Origin, Evolution, Language, Approaches, Grammar

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## **Introduction**

There are two schools of thought which try to describe the evolution of human language in their own ways. The nature and nurture dichotomy has been solved at the biological level in regulation of gene expression at molecular and cellular planes by an environmental impact on timing and quantitative regulation of gene product, which bring about phenotypic development in its final shape. However, in case of complex phenotypes this simple programme is not enough. There are so-called genetic pathways and cell to issue and organ differentiation leading to establishment of functional phenotypes. In case of brain and language as organ, this becomes all the more complex and when we try to study origin of language at the organismal level, cultural and social factors get involved (Kirby et al., 2007).

These problems have arisen due to disciplinary perspectives, as philosophers, linguists, psychologists and cognitive scientists approach the issue from an angle of mind (cognitive) whereas anthropologists, historians, geographers, and sociologists approach this through social interactions (cultural perspective).

Biologists have recently contributed the data through human genome mapping, a field which has revolutionized thinking on human evolution and behavior. At this point, it would be natural to accept that evolutionary biology unites all these together so far as data and evidences are concerned.

At the conceptual level, language still remains to be discussed through different models and tools (Jablonka and Lamb, 2002; Afzal, et al., 2007). Application of language as a tool for communication and thought processing is another realm that is important in education and language teaching.

From where language has arisen and to what it can be applied has two different goals to be pursued by scholars of language and other disciplines.

## **Genesis of Language**

While Chomsky (2004; 2005) considers language as a unique event in human evolution taking place about 100,000 years ago by a chance mutation that led to indefinite recursive data structures in human mind (animals have only finite one), Pinker (1996) only believes in gradualist increment of the faculty from primates up to the modern man. However, communication or even speech are not

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precursor of language, rather cognition is. For some scholars bird song was a convergent route to vocal adaptation while speech was nearly the exclusive human counterpart. In evolutionary time scale phylogenetic radiation in apes, range more or less 2.3 to 2.4 mya for appearance of *Homo*, 5 mya for *Pan*, and the modern man from 150-50,000 years ago. Proto language might be traced as early as to *Homo habilis*, though symbolic communication could start with *H. erectus* (1.8 mya), *H. heidelbergensis* (0.6 mya) and proper language in *H. sapiens* some 200,000 years ago. Vocal language might have evolved 100,000 years ago in middle stone age in sub Saharan Africa (Nichols, 1992). The FOXP2 gene variant shared with Neanderthals further adds to this ancestry (Krause et al., 2007). This FOXP2 gene shows human-ape differences, perhaps including language, but until we know exactly which other genes FOXP2 turns on or off, it is at best premature to claim any specific function, and simply unscientific to treat it as a major driving force in language (Bickerton D., 2007).

### **Language Organ or Language as Organ**

While primate language is linked to Broca's and Wernicke's areas in brain and the same are used by monkeys in utilizing circuits in brain stem and limbic system, monkeys have been taught only limited words on the computer key boards, and only a few hundreds of lexigrams. The transition in man was necessitated due to bipedal gait (*Australopithecines*) 3.5 mya and by an L. shaped larynx (Freeman and Herron, 2007). However, the protolanguage lacks syntax, tense and auxiliary verbs, and non-lexical vocabulary (Bickerton, 2009). A pre-linguistic system of communication can be characterized as *Huummmon* (Mithen, 2005) standing for holism (non-compositional), manipulative (utteral commands), multi-model (acoustic, gestural, mimetic), musical and mimetic forms. This language was used by archaic Homo (*H. ergaster*, *H. heidelbergensis*, *H. neanderthalensis*). The anatomically modern and the behaviourally modern man respectively came 70,000 to 50,000 years ago. In fact, the use of sophisticated tools required development of language from pidgin-communication to creole like language and later on with modern grammar and syntax. Broca and Wernicke's area are used by primates respectively for cognitive / perceptual tasks and language skills and these are present in humans. However, among humans these are used for non-verbal sounds, crying and laughing. The anatomical modification came later on unique to humans and after split from the chimp and bonobo lineage. Thus, humans left out of Africa 50,000 years ago (Minkel,

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2007), after they developed skills for migration and language, though *H. erectus* left it much earlier due to some unknown reasons. Thus, there has been something like what is called pre-adaptation (exaptation) which served full development of language only in the genus *Homo* (Fitch, 2010a).

### **Three Levels of Language Development and Evolution – Proximate and Ultimate Cause**

In order to remove confusion, it is worthwhile to recognize three levels of language development and evolution - phylogeny (the ancestry of organisms evolution), ontogeny (the development of the trait), and glossogeny (the development of skill of language).

The evolutionary biology has a four-fold question in explaining a behavior or trait, viz., the proximate cause and the ultimate cause. The proximate cause is the mechanical description, ie., how language behavior is anatomically wired and how does it develop ontologically, whereas the ultimate cause addresses the phylogenetic pathway and the functional advantage (Timbergen, 1963; Tecumseh Fitch, 2007).

### **Linguistic Theories and Approaches**

Among linguists, Maxmueller's (1861) speculation about origin of language was based on animal sounds – the so-called low-wow, (cuokoo) prfoto-posh (pair, pleasurfe) ding-dong (renovant vibrations) and yo-he-ho (collective rhythmic labour) and tata (tongue movement and audible words (Paget, 1930). This, however, necessitated reliability and deception which form other major criteria for language evolution. The main problem for language acceptance among humans was not mechanical or sound or vision signals as was the meaning (symbol) carried by it, and interestingly, which could be faked (Zahavi, 1993). As words are cheap, man can easily fake them (primitive animals never faked (Goodall, 1986). Thus attachment of meaning and symbol was the real trust posited by man in this regard and animals lacked this (so-called signaling theory).

There are various theories to explain this trust. W. Tecumseh Fitch (2004) suggested mother-tongue theory as only mothers and offspring trusted each other and hence this was carried on to other members of the family. Thus, trust was genetic with incest taboo guarding it. However, as members or non-kins also come together for sharing trust, this theory cannot be accepted. The obligatory social-altruism hypothesis suggested by Ulbaek (1998) says that altruism could be more helpful in this regard and hence language sharing evolved. Yet another theory is grooming theory (Dunbar,

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1996) which explains the practice of use of grooming among monkeys and practice of gossip among humans serves the bondage and language development better, especially by vocal grooming. However, the further development of speech and language could take place through ritual-speech co-evolution (Knight, 1998; Lewis, 2009; Watts, 2009; Steel, 2009; Deacon, 1997). Thus there cannot be any evolution of language without a symbolic culture. Without a common society and its rituals, no language can evolve.

Since language is a costless digital scheme and it can carry no direct reliable gestural or emotional communication (as calls or signals are among animals), language is possible only through a collective ritual (Durkheim, 1915). Gestural theory states that language developed from gestures which is used for simple communication.

### **Theories of Speech and Language**

When we take gestural and vocal language to use similar neural mechanism, this language is present in non-human primates too (Kimura, 1993) However, in man, shift to vocalization occurred for reasons, namely, pre-occupation of hands for tool job, lack of visibility in the right and a shift from analog of gestural mode to digitally encoded spoken signals. Yet another type of theory for evolution of language is so-called self-domesticated ape theory in place of singing ape theory (Mithen, 2005). The wild animals sing a song which becomes different in captive conditions, say, after 1000 generations of breeding, as shown by Bengalese finches (Somes et al., 2009).

A different approach to language evolution followed self-domestication of man, i.e., by cultural transmission. Thus, man had a different expression of language as compared from wild ape. Thus, while language competence is inherited, language is transmitted via culture (Kirby et al. 2007). It has also been recognized that Proto humans were engaged in some niche construction, mainly the *cultural niche* which led to language development (Deacon, 2010).

Yet we have to consider here a distinction to be made between speech and language which, though linked, are quite different. Speech is gestural, language is cognitive and develops by syntax and recursion (embedding clause within sentence, Hauser et al., 2002) and by a process of asking questions which even trained bonobos and chimpanzees fail to posit (Joseph, 2006). The cognitive development of language, according to Chomsky, Hauser and Fitch (2002), have a high level of

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referral system characterized by some principles which include (a) a theory of mind by (b) capacity for non-linguistic representation, object/kind distinction, (c) referential vocal signals, (d) invitation, (e) control on signal production for intentional communication, and (f) number representation. Human numeral capacity is also open ended. In this regard, Chomsky believes language to have two types of faculties, viz., faculty of language in the broad sense (FLB) and faculty of language in the narrow sense (FLN) which is exclusively human.

### **Linguistic Structures**

Linguistic structures are now well-understood. Noam Chomsky (2007) championed a ‘universal grammar’ hard wired into brains that is not there among animals. Others (Hockett, 1966) have advocated some universals which characterized human language. Hockett also sees lexical-phonological principles to be main factor characterizing productivity (new messages can be coined and semantic messages can be assigned to old ones). Similarly language is also characterized by duality (patterning), which gives new meanings formed from smaller basic concepts. Language, however, is different from pidgins (devoid of syntax) and creoles (when people share their communication from different languages). Creoles may develop grammar of Subject-verb-object order (Diamond 1992; 2006), which cannot match the full-fledged language.

### **Key Features of Linguistic Structures**

Though the problem of origin and evolution of language does not include the entire gamut of linguistic structures, which are more important for the basic linguistics study, it would be worthwhile here to briefly catalogue some key features of linguistic structures. A list of the major characteristic features of the language has been compiled by W. Tecumseh Fitch (2011) which is as follows:

Table 1 Hockett’s design features of language, and resulting universals.

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#### Hockett’s (1960) design features of language

- (1) Vocal auditory channel—signal modality involves vocalization and sound perception
- (2) Broadcast transmission—everyone in earshot can hear what is said
- (3) Rapid fading—signals fade quickly, and do not ‘clog the airwaves’

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- (4) Interchangeability—any speaker can also be a listener, and vice versa
- (5) Total feedback—speakers can hear everything that they say
- (6) Specialization (speech as ‘trigger’)—linguistic signals accomplish their results not via raw energy (as in pushing or biting) but by their fit to the receiver’s perceptual and cognitive systems
- (7) Semanticity—some linguistic units have specific meanings (words or morphemes)
- (8) Arbitrariness—meanings are generally arbitrarily related to signals, rather than iconic
- (9) Discreteness—each utterance differs from all others discretely (by at least a distinctive feature)
- (10) Displacement—meanings about past, future or distant referents can be encoded and understood
- (11) Productivity/openness—new utterances can be readily coined and understood
- (12) Duality of patterning—meaningless units (phonemes) are combined into meaningful ones (morphemes), which can then be combined into larger meaningful units (sentences)
- (13) Traditional (cultural) transmission—languages are learned, not genetically encoded

Hockett (1966): additional design features

- (14) Prevarication—it is possible to lie
- (15) Reflexivity—it is possible to use language to talk about language
- (16) Learnability—it is possible for a speaker of one language to learn additional languages

Hockett (1966): language universals resulting from design features (an abridged list)

- (1) Every human community has a language
- (2) Every human language has tradition, but also changes over time

Every language

- (1) can express unrestricted meanings (displacement/productivity)
- (2) has duality of patterning (both meaningless and meaningful units)
- (3) has both an intonational and non-intonational system
- (4) has ‘shifters’: deictic elements, personal or demonstrative pronouns, etc.
- (5) has elements that denote nothing, but effect the denotation of the composite form in which they occur (markers or ‘function words’)

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- (6) has proper names
  - (7) has a vowel system
  - (8) has a tendency towards phonological symmetry, but nonetheless has gaps or asymmetries
  - (9) contrasts stops with non-stops
- 

Table 2 A sampling of linguistic proposals concerning language universals.

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Jakobson (1990)

All languages:

- (1) have syllables with initial consonants
- (2) have syllables with final vowels
- (3) distinguish nouns ('existents') from verbs ('occurrents')
- (4) distinguish subject from predicate
- (5) have 'indexical symbols' like pronouns
- (6) distinguish singular from plural

Greenberg (1963)

- (1) In nominal sentences, subjects typically precede objects
- (2) Languages with SOV order are typically postpositional
- (3) In conditional statements, the conditional clause always precedes the conclusion
- (4) If a language has inflection, it always has derivation
- (5) If the noun agrees with the verb in gender, the adjective also agrees with the noun
- (6) No language has a dual number unless it has a plural
- (7) No language has a trial number unless it has a dual
- (8) If a language has gender nouns, it has gender on pronouns

Chomsky (1965)

- (1) All languages make infinite use of finite means; the creative aspect of language
- (2) All languages map proper names to objects meeting a condition of spatio-temporal contiguity

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(3) Syntactic rules apply to syntactic structures, rather than linear sequences of phonemes or morphemes

### Pinker & Bloom (1990)

All languages:

- (1) have major lexical categories (noun, verb, adjective, preposition)
- (2) have major phrasal categories (noun phrase, verb phrase, etc.)
- (3) use phrase structure rules (e.g. 'X-bar theory' or 'immediate dominance rules')
- (4) distinguish subject from object, etc. using rules of linear order or case affixes
- (5) have verb affixes or other means to signal aspect and tense
- (6) possess auxiliaries
- (7) use anaphoric elements, including pronouns and reflexives
- (8) have 'wh-movement'

### Jackendoff (2002)

- (1) All languages use a parallel architecture with three interacting tiers: phonology, syntax and semantics
- 

## **Conclusion**

Biologically speaking, human language is monogenetic-evolved 1,50,000 years ago from mitochondrial eve and out of Africa, but has undergone a bottleneck effect of some 70,000 years ago. Human speech, on the other hand, developed with a descended larynx (Ohala, 2000), though earlier for motor control, breathing, etc.) and later on it was used to make speech.

Language research has a strange history. The early scholars recognized the Indo-European languages to be the first well-developed one (Johan Goldfried and Johann Christoph Adelung were much influential in 19<sup>th</sup> century). The Linguistic Society of Paris (1866) banned all such research. The new schools came in 1950s known as universal grammar, mass comparison and glottochronology. The subject of the origin of language forms the base of neuro-linguistics, Language in India [www.languageinindia.com](http://www.languageinindia.com)

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psycholinguistics and human evolution. Evolutionary linguistics emerged in 1990s (Pinker, 1994; Carstairs-McCarthy, 1999; Jackendoff, 2002; Wray, 2002; Hurfford, 2003; Bickerton, 1990; Chomsky, 2009) which focused also on animal behaviour (Premack, 1983; Savage-Rumbaugh, 1988; Dunbar, 1996; Hauser 2002), neurobiology and neuro-physiology (Calvin, 2000; Arbib, 2005; Fitch, 2010b), psychology (Donald, 1988; 1991; Corballis, 2002), anthropology (Deacon,1997), archaeology (Davidson, 1993) and finally computer science (Batali, 1998; Kirby, 2007; Steels, 2009).

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