WHAT IS LANGUAGE WHICH HAS EVOLVED: RETHINKING LANGUAGE FROM EVOLUTIONARY PERSPECTIVE

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Abstract

Language is a highly complex and multifaceted phenomenon, incorporating diverse , seemingly incompatible components. This makes it elusive to define, resulting in diversity of theoretical perspectives as each selectively focuses on some to the disregard of other components, subsumed under the dominance of two mutually exclusive alternatives. On the one hand it is defined by the generative/bbiolinguistic perspective as a biological entity of the human brain, comparable to any other biological organ and system, with properties determined by evolutionary developments during human speciation, which remain stable and universal ever since.

On the other it is defined by the usage-based/emergentist paradigms as a communicative technology, flexible and mutable in adapting to human demands for information and socialization. As a communication system language is defined as either a code (by the biolinguistic perspective), or as inferential system (by the usage-based approaches). Thus, language is viewed as either permanently fixed or a infinitely flexible.

The present article offers a different interpretation of key concepts as it defines language as a system of communication which incorporates elements of code and inference, i.e. a system stable and flexible at the same time. The best example of a human language user is the typical normal adult human with average cognitive and physiological abilities. The best representation of E-language, or languaging is the dialogue.

Such interpretation of language, the human language user and his/her communicative behaviour as participant in dialogues could have profound consequences for evolutionary linguistics in tracing the evolution of the language faculty and its implication in languaging by dialogues, well adapted for accommodating human demands for communication from the dawn of humanity to the present.

Keywords: language system, languaging, dialogue, language evolution, language faculty,

Introduction

Language is a very complex phenomenon. It has proven to be elusive to define and a controversial subject to study. This is because it is a multifaceted and multidimensional complex.

The two most prominent approaches, the generative and the usage-based/functionalist, define language as either an algorithm of permanently fixed linguistic primitives and rules of their combination, or as a system for communicating human experiences, flexible and adaptable to the constantly changing demands of communicators. So, language is defined as either permanently fixed or in permanent flux.

That said, language can only successfully function as a blend of both, i.e. a communication system able to successfully serve multiple generations of speakers simultaneously, i.e. it has stability. In addition, it makes possible the expression of infinitude of thoughts by successfully adapting to the creative human mind, i.e. it is flexible and adaptable.

The following article argues that language is both stable and adaptable. i.e. it is a hybrid. It is

stable as it it exhibits the trademarks of a code system. It is adaptable as it is at the same time an inferential system as the meanings of linguistic constructions are fixed in a lexicon, learned and retained in memory by all speakers. These are interpreted in unique ways in every instance of language use dependent on the individuality of participants and the communicative circumstances. This hybrid nature of language is best demonstrated by the spontaneous dialogue of the normal human adult, i.e. the typical language user .

I will start by grounding my argument with a quick recap of the two most prominent visions of language in contemporary linguistic thought,the generative/biolinguistic and the usage-based/emergentist approaches.

1. Language: discreteness and permanence in the generative approach

1.1. Language as an artificial system

Turing made the extraordinary claim that reasoning is a process of computation, where a finite and predetermined set of abstract symbols automatically combine according to a finite number of equally predetermined rules results in infinite number of combinations. He constructed a computer, a machine capable of reasoning, i.e with decision- making ability. It is based on principles of mathematics which studies universals in nature and their assemblages and interactions context and meaning free. The automat follows instructions and performs the job always to perfection, it does not make mistakes.

The generative perspective adopts the computational theory of Turing in the conceptualization of the brain attributing to it machine-like ability to automatically recognize discrete symbols and combine them according to a set of rules. In this context language is defined as an algorithm, performed by a bio-cognitive Turing machine.

Linguistic computations are said to be represented in the mind of the ideal speaker in the form of a Language Faculty, an imagined computational hardware where the linguistic algorithm is instantiated. (Chomsky, 1972, 1980, 1986, 2002 and elsewhere).

The generative formalism, having inherited from structuralism and the Saussurean tradition, he strategy of polarization in linguistic theorizing, illustrated by the dichotomy of langue vs. parole defines language along the dichotomies of :

* innate vs. learned as core grammar vs. all else;

* perfect vs. imperfect as well-formed vs. ill formed grammatical forms

* competence vs. performance as cognition vs.behaviour.

1.1.1.Language as a code

Algorithms are based on a code and language as an algorithm is by definition a code.
As such it has the following characteristics:
* It is composed of linguistic primitives, understood as discrete, object-like abstract entities which stand in fixed relations with one another and have existence independent of their users.
* These consist of equally discrete and finite component parts. So sentences are decomposed into clauses, phrases, words, morphemes, syllables, phonemes, phonological segments.
* Members of a lexicon are one-to-one stable associations of a meaning and a form, i.e. synonymy and homonymy is non-existent. These are defined by their membership in discrete

and well defined grammatical categories and organized into sentences according to predetermined and fixed principles of grammaticality.

 * The meaning of a sentence is the sum total of the meanings of the composing words and their place in the architecture of the sentence.

* A sentence is the encoding of a complete thought. Explicit and complete mapping between semantic structure and grammar is the norm. All thematic roles in the theta grid of a verb are expressed in grammatical categories. The agent consistently occupies the subject position in the sentence structure.

* The language system is self-contained, stands alone , independent of context of use. This facilitates the uniform decoding of the meaning by people with vastly different experiences and views at any place and time .

* The sentence structure is highly detailed , it contains multiple embedding of phrases and sentences and highly abstract grammatical forms.

* The message for the sender and the receiver are identical.

* The code system assumes that communicators have identical minds.

* The function of code systems is mainly to inform, ergo, sentences are mostly statements, usually articulate in monologues.

Moreover, the study of langue has been done with theoretical tools which reflect the properties of written texts as these are determined to exhibits the main characteristics of language as defined by modern theories : compositionality, hierarchical organization and situation -independence. In biolinguistic context the language faculty as a code processor.

In Saussurean linguistics the visualization of the linguistic structure is achieved by the use of the Roman alphabet. Phonological segments, vowels and consonants, are marked by letters of the Roman alphabet. The graphic representation of words is marked by Roman letters and their boundaries are marked by empty spaces and the boundaries of the sentence are marked by capital letters and punctuation marks. Moreover, the view of language as represented in terms of spatially arranged discrete characters clearly reflects the influence of writing as technology on linguistic theorizing.

1.2. The language faculty, universal and eternal

The generative vision of language as part of human biology furnishes the biolinguistic argument for a Language Faculty as instantiation of the language algorithm in brain tissue as stable and universal, given its instinct-like properties attributed to genetic influence in its phenotypic formation. The FOXP2 transcription factor has long been associated with Broca's region (Gopnik M. et all. 1996) in addition to a number of other genes implicated (A. Fedor, P. Itzess, E.Szathmary, 2009, p. 22; D.Dediu, V.Levinson, 2018).).

A major part of the generative claim for linguistic nativism is based on the assumption that despite differences in upbringing and environmental influence on language acquisition, all human individuals reach uniformity in their mastery of grammar. The innatist explanation of the putative uniformity of linguistic achievements is a grammar organ /language faculty/ Universal Grammar viewed as a universal property of the human brain, i.e. all humans have identical copies of it.

In this context language is defined as a universal, stable and immutable product of the innate

language faculty which, once installed in the human organism, has remained unchanged.

That said, linguistic production as indication of the bio-cognitive representation of language in the human mind changes with age and education, is undeniable fact. Moreover, uniformity of innate linguistic knowledge is in contradiction with the fundamental principle of biology, i.e.genetic, epigenetic, developmental diversity of biological bodies and minds. From neuro-scientific perspective variation is found in: 1. brain weight, 2.neurovascular organization, although not directly linked to cognitive abilities, differences in vascular patterns can lead to different outcomes in cases of brain damage. 3. variation in the structure of Wernicke's area corresponding to differences in sex, education and profession, 4. individual brains are shaped differently, influenced by multiple factors , sex and hand preference being of primary importance. From these facts Mueller concludes that " it is clear that there is no universal pattern and many variables lead to a broad spectrum (of variation)." (in Mueller, 1996).

In short, if language is to be defined in biological terms, variation must be acknowledged.

A recent and less popular version of generativism, the evo-devo perspective (A. Benitez-Burraco, C.Boeckx 2014; C.Boeckx, K. Groghmann, 2013; C. Boeckx 2013) recognizes variation and offers a novel understanding of the participation of both genomic and extragenomic factors in the formation of phenotypic traits under the influence of the environment during development. While acknowledging the diversity , i.e. lack of uniformity, of environmental factors and their influence on language development, diversity in language attainment is the natural outcome, the evo-devo perspective also points at convergence on typical cognitive profiles across normal populations.

2. Language: continuity and flexibility: the usage-based approach

In the usage-based approach language is defined as patterns of human communicative behaviour, a system of social conventions, formed and periodically altered by language use. It defines language as a system of signs, grounded in the speakers' concrete experience with the world and with language. In this context all types of linguistic signs , from lexicon to the highly abstract grammatical rules , derive from concrete examples of experience in communication. Utterances used in real communicative acts are regarded as potential sources for extracting the rules of the language system through generalization. In this way the gap between concrete and abstract, lexicon and grammar, grammar and use, is bridged and language is viewed as a continuum of lexicon and grammar and grammatical system and its use, as a smooth continuity of past and present forms.
In the usage-based view categories are gradient, not discrete entities. The idealized representation of a category is a prototype, the best example of a category or a representation of the most distinctive features of a class of entities. The degree of membership in a category is defined based on similarity to the prototype. For example, the distinction of regular and irregular verbs is a matter of degree. As per Givon (1979, p. 14) the lexical categories verb, adjective and noun are not discrete but form a continuum based on their semantic representation of time-stability. The gradient nature of language is also pointed out by Greenberg who understands universals as organized in clines. (see J. Greenberg, 1963). Lexical items can change their position on the cline by undergoing a process of

grammaticalization (see Hopper, Traugott, 1993)

Thus language is understood in gradient terms as a living organism, mimicking the continuity and mutability of life forms.

Functionalist approaches focus on diversity of languages and their historical changes, often perceived as deficiency in linguistic theorizing for not focusing on formalization of human language in abstract terms. That said, Construction Grammar (A. Goldberg, 2003 and elsewhere) which defines language as a repository of constructions of various types and sizes, captures the flexibility and continuity of linguistic forms as a universal of human language. In this context the person's knowledge of language is a repository of constructions (for more see A. Goldberg 2003). In Hurford (2012, chap. 6) the language capacity is defined as a cognitive capacity specified for learning and creatively combining constructions .

2.1..Flexibility of language as inferential system in face-to-face dialogues

In usage-based context language is defined as communicative system, shaped by language use in communication, where the most typical circumstances of language use is universally the dialogue. As such it is meaning-based, not structure-based and the intended meaning is recovered, or inferred with assistance from context. In this sense language is an inferential system.

* The inferential system has information-based, not structure-based internal organization, that is, organized around information structure (topic vs. focus)

* It exist mainly in spoken form, where intonation assumes some grammatical functions, e.g. the formation of questions without the use of question words.

* The building blocks of the system are flexible associations of form and meaning as standard meanings are interpreted with context-dependent flexibility.

* These form utterances composed of the most frugal use of constructions, the choice of which varies with the circumstances.

* Most verbs have incomplete argument structure with only a single argument and when an utterance is a full sentence the order of the elements is flexible to signal speaker's attitude.

* Semantically vague words and phrases, e.g.'that fellow', 'that thing', 'people' are often used, the intended meaning of which varies with the context .

* The meaning of a sentence is different from the meaning of the utterance and the difference between the two cannot be stipulated in advance by a code-like rules. The meaning of an utterance is calculated as the meaning of a sentence and the speaker's communicative intentions. Utterances communicate the literal meaning in addition to the speaker's attitudes.

* The meaning intended by the sender is most often different from the meaning understood by the receiver. An inferential system is based on the assumption that participants are individualities with different minds and different life experiences in different communicative circumstances , which creates the potential for different interpretations of the same linguistic forms.

* Utterances form part of spontaneous spoken dialogues mainly conducted in speech .

Thus, language is understood here as a flexible system in constant flux as a process of constant adaptation to human communicative demands.

To note, the inferential system is usually regarded as unsystematic and unruly, and as such, unworthy of serious study, although it demonstrates unique internal organization, systematic

and universal. A notable exception is J. Ginsburg's work (2008 and elsewhere) on formalization of the dialogue by incorporating it into the generative spectrum of paradigms as an extension based on constraint-based generative paradigm approach. It defines the dialogue as a string of utterances united by common topic and common universal principles.

2.2 .Language as a living organism in constant flux as adaptation

Languages are understood as existing in a perpetuate state of change where individual linguistic entities follow a common trajectory of transformation : lexical (content) word>grammatical word> clitic>inflectional affix, a process of grammaticalization by which the original function of lexical words, i.e. encoding of concepts as part of the lexicon , is gradually replaced by grammatical functions of providing internal structure and become part of grammar. Grammaticalization is a change in all aspects of a linguistic form: semantic, structural, phonological (Hopper, Traugott, 1993)
Moreover, glossogenesis is hypothesized by some as an evolutionary process of constant and evenly spaced small changes, occurring with every new generation as a result of iterated learning (S. Kirby 1998 and elsewhere).
Nevertheless, the facts on the ground demonstrate that, although change is clearly a fact in the life of all languages, it is far from constant. Nettle (1999) argues that rates of change vary and are influenced by community size and other historical and geographical factors. Language systems evolve with uneven speed as periods of slow and gradual quantitative changes alternate with sudden leaps (D.Nettle, 1999). Language change can be regular and incremental, as abundant examples of grammaticalization of lexical items have been shown to take centuries. It can also happen in spikes. Very often extended period of stability is replaced by a spike of innovation and originality, usually triggered by historical factors . Some of these innovations fade away, others are selectively perpetuated, to gradually become stabilized as norms.
Moreover, variation in rates of change is well known to exist among linguistic forms as some lexical words consistently resist change, e.g. basic vocabulary, while others change frequently, e.g. vocabulary of cultural concepts.
Thus, while individual linguistic forms vary in the pace and trajectory of change, language systems maintain a balance of stability and flexibility.

2.3.Flexibility of language in the human body: emergent language faculty

Ellis (1998) argues that ruled behaviour in general and rules in linguistic communication, in particular, emerge as neuronal patterns of connectivity in the human brain by interactions at epigenetic level as part of the development of the phenotype. The emergentist argument is supported by studies of human development which show that the human brain displays increased flexibility at early age , but this initial flexibility diminishes later and specialized cognitive modules emerge as a result of experience. MacWinney (1998 p. 7) describes the learning of lexicon as emergent association of three types of neuronal maps in three areas of the cortex : concept map, articulatory map and auditory map.
Similarly, R. A Mueller (1996)states that " Language areas' develop epigenetically. They are the end products of complex chains of interactions with internal and external environments.

These interactions are probabilistic events based on, but not rigidly determined, by the genome…(R.A. Mueller, ibid. 6.3.)

Thus, each individual brain constructs its own version of a language capacity as each individual experience with language is unique. There are as many language capacities as there are individual language users.

In this context patterns in language emerge when properties of general cognition in the flexible young brain are exposed to samples of the local language and youngsters are encouraged to participate in communicative behaviour. As a result patterns of neural activity specified for supporting linguistic communication gradually emerge and solidify with age, forming a unique language faculty.

In sum, neither of the perspectives on language discussed above can offer a complete understanding of language as each focusses on some aspects of it while ignoring others. One studies the human body, another, human behaviour. The biolinguistic approach is focussed on discreteness, stability and universality of linguistic elements , while disregarding the magnitude of diversity and flexibility of language. The usage-based/functionalist perspectives are concerned with the flexibility and adaptability of languages as they cope with changing individuals and communities, while ignoring the specificity, stability and universality of human bio-cognitive traits which underly language learning and use.

3. On language and languaging

The tradition of the generative paradigm from its inception is based on Chomsky's famous rejection of Skinner's behaviourism (Chomsky 1959 and elsewhere) leading to a complete rejection of the role of observable behaviour, stipulating the leading role of innate factors in cognition. In this context linguistic behaviour was deemed as unreliable indication of the properties of the Language Faculty, conceived as inward-looking system designed to function in isolation from the rest of cognition and the human organism and its interaction with the external environment in terms of perception and general intelligence.

Nevertheless, in life sciences it is a truism that that in all life forms biology and behaviour are closely interconnected and interdependent given that in all species the purpose of innate traits is to guide behaviour and in this way facilitate survival. Moreover, the only way to detect biological and cognitive capacities is by monitoring and/or provoking, their use in behaviour, usually by performing tests. From the muscles to the nervous system to the brain cells, one can detect their function, suggestive of their biological properties and, therefore, their evolutionary raison d'etre , by triggering a behavioural response. That is, behaviour is the clearest indication of biological and cognitive resources in any biological form. And if one subscribes to the idea of innate Universal Grammar (UG) one would apply the same logic and assume that language use in communication is indicative of the Language Faculty.

That said, although language as a behaviour unique to humans, it is not the only one. And as a general principle of biology unique behaviours must rely on some specific adaptations. As to language, although it is indisputable that aspects of the human organism are designed by evolution specifically to support linguistic behaviour, scholars are increasingly convinced that these are not in the form of innate UG. Moreover, contrary to the assumption by biolinguists

that the application of the language faculty in communication is an automatic reaction as part of language instinct (Pinker, S. 1984 and elsewhere) the use of language is an intentional behaviour and a choice, among non-linguistic alternative avenues, and involves planning with a purpose in mind. In this sense the focus on linguistic behaviour, i.e. performance, in the search for understanding the nature and extent of innate predispositions for language is a continuation of a well established pattern of inquiries.

Thus, there are two alternative visions of language as abstractions vs. actions. Should we define language as abstractions or as actions? The most pertinent question is how are the language system and linguistic behaviour related? Does the language system have existence independent of linguistic behaviour?
And as language is only one of various uniquely human behaviours, e.g. music, dancing, building construction, etc., the same question can be extended to these with broad philosophical implications. Does a music score have independent existence from concert performances ? Do plans of an architect have independent existence from building construction ?
As in language, competence in any of these unique human activities, being uniquely human, must rely on some innate propensities, e.g. infants demonstrate innate propensities for rhythm, which are the innate seeds of music, toddlers build castles with lego, demonstrating budding abilities for creative thought and manual dexterity, etc. That said, although the seeds are innate, these activities are largely learned and intentionally put to use, improved by extensive education and practice with planning and a goal in mind.
Abstractions are ideas, i.e they are by definition non-material. The act of attaching a material form to ideas by representing them in signs, be it as stream of speech sounds, alphabetic characters, pictures or other signs, is done with a purpose, e.g. to disseminate them by teaching or implementing them in practice . In addition, marking ideas with signs makes them explicit even to the author, e.g. verbalizing one's thoughts in speech and/or writing adds precision as it helps clarify their shape and mark their boundaries. What is the purpose of abstractions unless they are used for something?
Returning to language and its use, which some label as languaging, the language system, i.e. a system of abstractions, can only be demonstrated by its use through its material form. Given that even programming languages, which have influenced linguistic theorizing and the very definition of natural language, are designed with a specific application in mind and, thus, have no independent existence beyond that, it is reasonable to extrapolate the same relation of language and languaging.
Moreover, the language system is tailored to its utility and shaped by its material form for the practical purposes of languaging. In written discourse the language system is represented by a code and exhibits the features of a code listed above. It is tailored to its functions in written texts of disseminating universal and timeless ideas by monologues addressed to audiences separated by space and time. Significantly, written texts are produced and consumed by learned and linguistically trained individuals.
Spontaneous dialogues have different semantic and structural properties, reflected in the organization of inferential systems outlined above.
The vocal-auditory channel influences the language system both in form and in meaning as follows: the linguistic units are packaged in intonation contour. The utterance is structurally organized to fit in a single prosodic contour. In occasional use of clause subordination the

boundary between a main clause and a compliment clause is marked by a pause. As sounds are ephemeral, the rapid speed of processing limits the length and complexity of the utterance both in meaning and in structure.(M. Mithun, 2009,in Givon , Shibatani, 2009 p. 67).

Dialogues are conducted among people with close social ties in casual, relaxed interactions, with non-linguistic communication having major contribution to the understanding of the message. It is universally used by all speakers, regardless of age, gender, education , social status or profession.

The language system of written monologues and spontaneous dialogues is differently organized because it has different communicative purposes. The tool is tailored for the task.

3. 1.The human language user: ideals and reality

The Language Faculty postulated by the biolinguistic perspective is defined by the idealized version of the human individual (Chomsky 1980) and deviations from the ideal are labeled as abnormalities. The biolinguistic understanding of human cognition in terms of binary features, 1s and 0s stems from its roots in artificial systems.

Importantly, the generative perspective does take into account linguistic behaviour , only it is biased towards the linguistic behaviour of individuals whose language proficiency was formed under the influence of writing, e.g. mainly from industrialized societies, where the level of literacy is very high, prompting the use of very sophisticated grammatical forms with high frequency. In generative/biolinguistic context these individuals are thought to be the closest approximation to the ideal speaker and a reflection of the language faculty in its purest form.

And although one may argue that, given that at this point in history most known languages have developed writing systems a large percentage of humans today are literate, i.e. today the literate human could be taken as the typical human, one must remember that , although the first writing systems are dated at 4,500 BC (by Encyclopedia Britanica) until the invention of the printing press in the 1400s literacy was a privilege of few. Thus the mass proliferation of literacy today is atypical in historical perspective. Moreover, the majority of languages known to science today have no writing systems and are spoken by small populations between 10,000 and 100,000 people. In Africa alone some 2,000 such languages are known. Thus, the typical language speaker is illiterate.

And although one may counter argue that the later versions of the generative paradigm, e.g. the minimalist approach, have incorporated examples form numerous languages and proposed theoretical machinery which accommodates a wider variety of examples of language use , the quintessential property of the innate language algorithm is still defined in terms of multiple embedding of phrases and sentences, a property found almost exclusively in written texts. That said, multiple embedding is rarely used by the average human adult in unplanned dialogues. Thus, the innate propensities for language attributed to humans as species are inferred from atypical behaviour.

Significantly, the conceptualization of "normal" as " ideal" is misleading and in some occasions results in defining naturally occurring variations in human anatomy, physiology, cognition, as abnormalities and deficiencies. For example, a brain which fails to correctly interpret the sentence " The boy who the girl pushed was tall", but is able to correctly interpret the sentence " The boy who pushed the girl was tall" in the context of the generative paradigm explicable by incorrect interpretation of traces , is labeled as deficient , thus, abnormal

(D.Caplan, 2009).

Not unexpectedly, students of human biology have demonstrated that real biological bodies and minds deviate substantially from idealizations and there is nothing abnormal about that. Moreover, some deficiencies in language processing do not result in complete language impairment. Empirical studies of human brains report reduction in the cognitive resources for syntax processing, not complete absence. As Bishop observes, "even in the severely affected members of the KE family we do not see people with no syntax, we see people with impaired syntax" (D. Bishop 2009, p. 203). Thus, linguistic abilities cannot be measured with 1s and 0s. And although there is some variation in the linguistic abilities, there is a considerable overlap which makes linguistic communication possible, as demonstrated by one's participation in dialogues. This overlap represents the typical human language user.

4. Natural language: stability and flexibility, code and inference

The code system and the inferential system are abstract types and do not exist in their pure forms in linguistic communication. Any individual communicative act contains elements of both code and inference. Knowledge of a language includes memorization and retention in memory of a list of constructions interpreted in every communicative act in a particular context.

Language cannot serve as a communication tool without some standardization both of meaning and structure. The inferential system and the code both interact as components as the standard meanings of constructions are creatively interpreted in spontaneous dialogues. In this sense understanding natural language includes understanding both the linguistic code and the rules of its application in communication, i.e. the rules of inference. Moreover, historical changes in the language code, e.g. the introduction of a new construction or a new meaning of an existing one are standardized from individual instances of inference, i.e. the relation between the code and the inferential system is dynamic.

The role of code and inference changes according the different communicative circumstances as professional communication is predominantly, although not exclusively, a code, inferential aspect playing a contributing and clarifying role. Spontaneous dialogues, on the other hand, are predominantly inferential with elements of code playing a secondary role.

Modality influences the balance of code and inference as written texts are better suited for code and speech and gesture are better suited for dialogues.

In sum, any individual act of language use contains both fundamental elements of language although to various degrees.

The language system is an abstract model, a general framework with the role of guiding , not determining, its use in real communicative acts. Its activation and communicative utility is determined by the context. Thus, language as a communication system is an integration of code and context, underdetermined by the code and enriched by inference from the context.

Knowledge of language must include knowledge of the linguistic code, i.e. stable patterns of association of meaning and form, and knowledge of the communicative situation, cultural and social values and attitudes, likely to be reflected in the communicative attitudes of the individual participants, both senders and receivers.

In modern linguistics the attention to the language system as a code has taken central stage, while the contribution of ostensive-inferential component of the language use and the role of

context in dialogues is marginalized. In this way the language system is divorced from the language user and context, ignoring the obvious fact that the language code has no independent existence without its use in communication and that all communication happens in context.

At the same time it is not a coincidence that the dialogue is the universal demonstration of language use. It is an empirical demonstration of the most distinctive features of language, i.e. code and inference, meaning and structure.

Moreover, although in written monologues the focus is on the sender and the linguistic message is meant to be received precisely given that linguistic communication in code is considered the most effective in terms of efficiency and precision of encoding and publicizing eternal and universal ideas, it is always open to interpretation, e.g. laws are interpreted differently by different jurists, works of literature, philosophy and science are interpreted differently by different readers according to their cultural, educational, age, etc. backgrounds. It is an everyday occurrence that public statements in politics, media etc. are interpreted differently by different receivers and some deviate significantly from the originally intended, often prompting additional clarifications.

Thus, the language code allows for some flexibility of inference as the intended message is almost never the same as the received. So, formalizing language as code is not a sufficiently precise representation of the object at hand. Language is both code and inference and its hybrid nature must be reflected in its formalization.

A number of theoretical paradigms reflect in some way or another the internal balance of stability and flexibility of language.

4. 1. Stability and flexibility in on-line processing of dialogues, the Relevance theory

The Relevance theory (Sperber, D. Wilson D. 2004 and elsewhere; Scott-Philipps, T. 2017) states that expectation of relevance is a property of human cognition to anticipate a potential contribution of any input to cognitive processes, be it perceptual, cognitive or communicative, applied intuitively in decision making by evaluation of available information in context to reach a positive cognitive effect, e.g. solving a problem, correcting a mistake, uncovering new knowledge, etc. Here relevance is understood as a matter of degree as some input may be more relevant than others and by zeroing on the most relevant input one reaches the best cognitive effect e.g. the best decisions.
The application of the principles of relevance to linguistic communication are in focus here. In the Relevance theory every utterance implies its own relevance which makes it worthy of processing effort as it has the highest degree of relevance among competing alternatives. Thus, the very fact of communicator's producing an utterance implies his/her desire to be understood. The information encoded in a sentence is the input which , under the automatic assumption of relevance, receives the interpretation determined to represent the sender's intensions most accurately. Thus, any instance of language use incorporates code and inference. The sender encodes the information in a construction and conveys his/her intensions by suggesting its best interpretation in the given context. The receiver, under the automatic assumption of relevance entertains hypotheses about the intended meaning given the current communicative context. The theory aims to identify the processes and principles by which the gap between the

linguistic meaning encoded in a sentence and the utterance meaning intended by the sender and interpreted by the receiver is bridged. In this sense the meaning encoded in a sentence is just a clue, guiding the receiver towards the correct interpretation of the message intended by the sender. The same sentence may have infinitely many utterance interpretations depending on the particular circumstances of the communicative act and its participants.

Spoken dialogues are constructed by universal principles of cooperation in communication outlined in the theory of speech acts. The theory of speech acts seeks to understand the universal principles of language use/ performance as the interface of code and context and the role of the human interpreter in the production and interpretation of the message. It distinguishes between sentence and utterance, i.e. the linguistic code and its use in individual acts of communication. The concept of "conversational implicature" is introduced in recognition that the message cannot be reduced to the code or what is explicitly said. Pragmatics is quite a heterogeneous branch of linguistics and includes a broad range of topics of research including   the formalization of referential aspects of grammatical forms .e.g. definiteness , deixis etc. as well as the use of language as verbalized action detailed by theory of speech acts (J. Austin 1975.).

Conversation among at least two participants is the universal frame of linguistic communication as a chain of utterances , each organized around information structure based on the opposition new vs. old information or Topic and Focus. The internal organization of a conversation incorporates another layer of structure organized around the rules and principles of conversation. Paul Grice (1989) has articulated the foundational principles of conversation as a joint activity and states that all participants voluntarily make cooperative contributions to the conversation by inferring each other's intentions and responding to these linguistically:

a. maxim of quantity, i.e. the information volunteered by the communicator is determined by the needs of the conversation, not less or more,

b. maxim of quality, i.e. the assumption that the information given is truthful and not deceiving.

c. maxim of relevance , i.e. the participation of all communicators must be relevant to the topic discussed.

d. maxim of manner, i.e. communicators are bound by the demand of clarity to avoid ambiguity.

The theoretical perspective discussed here defines general patterns of conversation and the cooperative contribution of participants, highlighting the fact that human speakers are inherently social beings and their communicative behaviour is intentional and rational and their choices of linguistic forms are determined by their communicative situation and their goals. Moreover, the human communicator is cognizant that fellow communicators are also rational beings with explicit communicative goals, thereby defining language use as deliberate choice, unlike the instinctive vocalizations of non-humans.

The Relevance Theory in its implications to linguistic communication incorporates some of Grice's vision of intuitive expectation of relevance in utterance production and interpretation, while rejecting others, e.g. the need for Cooperative maxims and the notion of Maxims violations in the interpretation of metaphors and other figures of speech as deviations from literal interpretation.

4. 2 .The Parallel Architecture

A less known version of generativism is encapsulated in a paradigm known as Parallel Architecture (Jackendoff, 2002 and Cullicover and Jackendoff , 2005). It marks a significant departure from traditional generativism in acknowledging the role of performance and incorporating it in the formalization of language.

The language system is hypothesized as a complex structure composed of various differently organized subsystems, each composed of interconnected and interacting tiers: phonological, semantic and syntactic, each independently organized in accordance with the characteristics of their basic units, connected to one another by interface rules, which map the components of each pair of structures and constrain the possible outcomes by licensing the well formed ones. The paradigm envisions that a strict one-to-one mapping between the three structures is rather the exception than the rule and shows that it is a correspondence of one-to-many, leading to homonymy, synonymy, etc. as explanation for the richness and diversity of linguistic communication.

Significantly, the parallel architecture paradigm also incorporates formalization of performance.

" The competence grammar encodes the knowledge involved in the correspondences between phonology, syntax and semantics, and it is the establishment of these correspondences in real time that constitutes the computations that speakers and hearers perform in the course of using language". (Cullicover, Jackendoff, 2005 p.163).

The parallel architecture incorporates fundamental theoretical innovations to the generative tradition, i.e. the model allows constant interaction between competence and performance at every level of the architecture of language. The sharp division of lexicon vs. grammar, as a distinction between learned and innate, or core/periphery and irregular vs. regular grammatical forms is avoided here and is shown to be a matter of degree, as numerous grammatical forms and structures are viewed as derived through violations of grammatical rules and thus are mastered through learning.

Thus, the parallel architecture describes language as integrated system in terms of continuity of lexicon and grammar or meaning and structure, continuity of code and inference.

4.3. The formalization of the conversation in generativism

The major paradigms in contemporary linguistic thought reflect language use as code and ignore the most wide spread language use in conversation. Ginsburg's pioneering work in this sense argues that the dialogue , as much as the language system, is a rule governed activity. Moreover, he aims to outline a grammar of conversation in which the language system is only one of various other components. Importantly, at the centre of his search for a formal paradigm of the dialogue i.e. language in action, is meaning (Ginsburg, J. 2008 and elsewhere). The conversation as a chain of utterances united by a common topic and context, as a unit of language, is modelled.

A conversation has a distinct organization, although it is a flexible unit of interaction with a distinct meaning and structure and its own " communication management" (Ginsburg, Poesio, 2016, p. 14). A common set of assumptions shared by the participants, i.e. initial common ground at the start undergoes alteration during the conversation as with each move a new repository of facts is added to the initial common ground. The initial topic of the

conversation can change in the process as some communicative actions are clarifications of earlier statements and others are not directly related to immediately preceding moves.
ex. A. Several people showed up today.
B.Who? (Ginsburg, J. 2001)
Significantly, the extralinguistic context determines the range of topics and the semantic and grammatical organization of the dialogue, e.g. a conversation in a bakery prompts the topic of bread and a conversation in a courtroom prompts a discussion on witnesses, guilt pleas, etc. , introducing the concept of *genre specificity*.
The meaning of an utterance in a dialogue is represented by a variety of linguistic forms , from complete sentences to non-sentential utterances. The majority of utterances are incomplete sentences, i.e. lacking overt predicate, which have meaning only in a specific context.
ex. That one.
In addition non-linguistic signals, e.g. a head shake and nod, laughter, eye rolling, etc. accompany and complete the linguistic message . Silence, i.e., the absence of explicit reaction, often carries a meaning.
A dialogue is described as a type of game , i.e. alternation of move and counter move, where every move triggers a countermove.
ex. A. We have a flat.
B. Uh. I see. (pause) Nice? (Pause). A flat. It's quite established, than, your..uh.... affair?
A. Yes.
B. How long?
A. Some time.
B. But how long exactly?
A. Five years.
B. Five years? (Ginsburg J. 2001)

A dialogue usually begins with a greeting word or a phrase.
e.x. Hi. Hello.
Some languages have also phrases used exclusively as a response to greeting.
ex. A. God dive you health. B. God helthify you. (Ginsburg, Poesio, 2016)
Thus, a conversation has a universal structure which is at the same time flexible and adaptable. In this context the theoretical distinction of competence and performance, on which current linguistic thought is based, appears unjustified and even detrimental for describing and theorizing of language, which is better understood in terms of grammar of interaction.

5. Language in the human body

This integrated nature of language is reflected by various aspects of the human organism at different stages of lifespan.
* bio-cognitive capacity for speech and structure, a phenotypic expression of various genes (D.Dediu, V.Levinson, 2018) most prominently FOXP2 involved in the formation of the human basal ganglia, responsible for rule-governed complex structured behaviours in cognition and praxis, e.g. ability to dance, produce and manipulate tools, language, demonstrating the innate link between language use and extralinguistic activities. (Liebermann, Ph. 2016 and elsewhere) One would hypothesize that this innate capacity would be used as a

potential for grounding linguistic symbols in extralinguistic activities as potential referents.
* developmental instinct to babble as training of the articulatory apparatus for speech by mimicking the speech production of adults witnessed in conversations (J. Hurford, 2011)
* a critical period for language learning, where proficiency in a first language is gradually achieved by participating in dialogues (Hurford 1991; Hurford and Kirby 1999)
* capacity for anticipation of communicative intention and communicative relevance as as ability to participate in dialogue as part of a Theory of Mind (Sperber, D. Wilson D. 2004 and elsewhere ; Scott-Philipps, T. 2017)
* developmental instinct for word learning by witnessing and experimenting with the referential use of words in communicative interactions (Bloom, P. 2000).
* an innate human capacity for symbol formation and symbolic reference (Deacon, T. 1998), a complex combination of various types of referential relationships, e.g., among symbols as members of a symbolic system, between a symbol and its referent, and among objects in reality as perceived by the human organism. In Deacon both words and grammatical rules are symbols.
* integrated neurobiological mechanisms for processing code and inference
The nature of language as interaction and interdependence of code and inference is reflected in the organization of the brain at the neuronal level. Neuronal networks processing linguistic symbols are associated and interact with networks processing symbolic referents, i.e. the symbol grounding in aspects of extralinguistic reality. In this context the semantic features of linguistic forms as prototypical examples of linguistic symbols are "only suggestions in need of further elaboration and modification"(Pulvermuller, 2018, segment 6)
In sum, the interaction of code and context during participation in dialogues is reflected in the body and mind of the language user.
To recap, the human individual is equipped with cognitive abilities to learn a code and interpret it in context and must be acknowledged in the study of the language capacity. In this sense linguistic theorizing would be enriched by universal principles of pragmatics an integral part of linguistic theory in reflection of the nature of natural language as integration of code and inference, stability and flexibility.

6. What is a good theory

The defining characteristic of science as a reliable source of knowledge is its reliance on facts. But the observable reality is messy and sanitizing the raw facts , that is, their partial alteration in order to make them amenable to scientific inquiry in artificial conditions, e.g. in labs, zoos, etc. is a standard methodological procedure in all fields of study. For example, in chemistry experiments are performed with purified elements, which is unnatural condition for chemical elements as in nature they are found in compounds with other elements. In biology experiments are performed in artificial environments in labs and/or zoos.
Nevertheless, during this process of purification the defining properties of the object of study are preserved in order for the conclusions to be relevant and reliable. The representational individual examples of the object of study are typical examples, not exceptions. These are the factual foundations of a successful theory.
What is a successful theory? Generally, it is a healthy compromise, a balance between

accuracy of description of the object at hand and the simplicity of the formal machinery which aims to define it by identifying the defining properties distinguishing it from any other. A theory is considered successful if:

* It is a generalization of a wide range of data. The selected facts must represent all , or at least, the majority of the unique features of the object of study, thus, to have descriptive power.
* To align as close as possible with the Occam's razor, a requirement for simplicity of conceptual arsenal and principles of internal organization of the formalism
* It must allow for conceptual integration with neighbouring fields.
* Theory's explanations and predictions must be confirmed independently of the conceptual machinery by which these are conceived.

A good theory is also based on the isomorphism between the data, the model and the explanation.

Scholars have different criteria for a successful theory of language . Givon opines that a theory must comply with the following criteria: maximum clarity, maximum economy , maximum generality, maximum correlation between separate facts (Givon,1979, p. 5) Other prominent figures in modern linguistic thought , consider a theory successful if it is capable of subsuming a wide range of diverse data under a few simple theoretical concepts and principles (see Cullicover, Jackendoff, 2005, p. 4). Thus, simplicity of theoretical machinery and the power of generalization are valuable features of a formal theory. In addition, for the same authors the success of a theory also means that it must be compatible with other theories in related fields. In the case of language , these are human cognition and cognitive evolution, language learning/acquisition, evolution of the human species, language evolution, etc.

A theory building starts with identifying the object of study.

The object of study of linguistics is natural language. Given that for the most part of human history linguistic communication has been exemplified by the spontaneous communicative interactions of average normal adult humans engaged in dialogues, it is natural to assume that this type of linguistic communication should be defined as natural language and thus, the object of study for linguistics and the factual foundation for formalization.

5.1.On prototypes

Again, an essential criterium for a successful theory is the requirement to reflect faithfully the unique characteristics of the object of study as a typical representative or the best example, reflecting the most distinctive traits of a class, which make it distinct from any other.

The formation of prototypes is not limited to scientific inquiries, it is a natural propensity of the human mind.

Some typical examples are reflections of cultural and social customs and values, e.g. a town, a school, a street, etc. is recognized by a community as typical and vary in time and space. A typical house is a single family, detached, brick, one or two-storey building , not the Buckingham palace or a mobile home.

In science a typical human brain is the brain of an adult of average health and intelligence, not that of Einstein or a person with some mental deficiency. This explains why new medications and vaccines are tested on individuals with average health, not on athletes or other individuals with deviations above or below what is considered normal. By the same token the typical human linguistic abilities must be defined by the ability of a normal adult human to learn and

display an adequate proficiency in a human language by successful participation in dialogues with fellow speakers.

Although typical examples are abstractions, they are represented in minds as memorable experiences with the real world, not imagined perfections, suggested by the minimalist approach in linguistics. In this sense qualifications like perfections and flaws are meaningless. A summation of reality is neither good nor bad, it is what it is, and characterizations in terms of absolutes like perfection are unproductive.

A theory of language should reflect the most distinctive characteristics of language as one of the most unique human traits. The determination of these distinctive characteristics must be based on the generalization of the widest possible variety of data. It is logical to assume that the linguistic behaviour of the average adult normal human as the typical representative of the human species would be the most appropriate source of data in determining the typical human linguistic abilities.

5.2. The dialogue as the best demonstration of the distinct features of natural language

All humans of any age, ethnicity, cultural traditions, education, profession, communicate by dialogues. Spoken dialogues are universally the most frequent form of language use. Casual conversations among individuals with close social ties occupy about 20% of all waking time of humans (J.L.Dessalless, 2007). So, the dialogue is the best example of natural language and its most distinct traits in its role of a communication system.

*The dialogue reflects the essence of language as a system of communication i.e. designed for making private thoughts public and an illustration of human propensity for socialization and cooperation.

* It implies the active participation of at least two participants, who alternate their participation and continuously adjust their input accordingly by turn-taking, therefore illustrating an important feature of language as communication by continuous interactions.

* Communication implies sharing meaning through signs. Language is represented in dialogues as a system of symbols which as signs have an abstract and a material dimension. It can only function as communication system through its externalization by material signs. It is only through its material expression that we can glean knowledge about the language system. One cannot exist without the other.

* It illustrates both the code-like and the inferential aspects of language as a communication tool as linguistic meanings are interpreted as utterance meanings. Novel interpretations of standard meanings illustrate the infinite opportunity for creativity in language.

* Successful participation in dialogue is the quintessential illustration of language proficiency of the typical human speaker.

* Participation in dialogues is the behavioural frame for first and second language learning and language change.

* The universal features of dialogues are the common denominator for languages with long literary traditions as well as pre-literate languages, spoken and signed, e.g. Piraha (D. Everett, 2005), Riau Indonesian (D.Gil 2009), Kalam, a language spoken in Papua New Guines (A. Pawley in T.Givon, M. Shabatani, 2009)

Their commonalities are illustrated by preference for grammatical categories representative of universal human experiences, e.g. classifications of material objects with significance to everyday life, persons and their interactions with objects and one another, processes and their development in time, properties (changing and permanent), etc., preference for simple and concise grammatical forms with clear contribution to meaning representation, significant reliance on the extralinguistic context.

* The overwhelming majority of dialogues are conducted through the vocal-auditory channel in speech, thus, speech is the universal default channel for externalization of the language system in dialogues.

* The human organism has the ability to process spoken dialogues with remarkable speed and accuracy. A linguistic item is processed on average as follows: 65 milliseconds (msec) for the processing of a phonological form, 250 (msec) for processing the semantics, 1-2 sec for processing the grammatical properties of a sentence (T.Givon ,2002, p.74, see also Christiansen, Chater, 2016). The influence of the vocal-auditory channel on the organization of linguistic utterances in dialogues is as follows:

a. The demand for efficiency in articulation explains the fact that shorter forms are used with high frequency in all languages (Zipf 1949). Thus, the physiology of speech influences the choice of linguistic forms in an utterance.

b. The linguistic units are packaged in intonation contour. A sentence is organized to fit in a single prosodic contour. The boundary between a main clause and a compliment clause is marked by a pause.

c. Extensive use of intonation assumes some grammatical functions, e.g. the formation of questions without the use of question words and/or other forms of grammatical machinery, e.g. subject-auxiliary inversion in English.

d. Speakers regulate their communicative contribution to fit a prosodic contour.

" ...spontaneous speech is typically not produced in a continuous stream. Speakers regulate the flow of information such that, in essence , they introduce just one new idea at a time per intonation unit or prosodic phrase. This new idea might be introduction of a new participant, action, time , place, or other new or significant item of information"(M.Mithun, in T.Givon, M.Shabatani, 2009. p. 67)

e. The high speed of processing of speech exerts influence on the cognitive aspects of spoken dialogues, e.g. an utterance is semantically limited to a single idea.

"an intonation unit can express no more than one new idea. In other words thought, or at least, language, proceeds in terms of one such activation at a time, and each activation applies to a single referent , event, state, but not to more than one" (M. Mithun, citing W.Chafe 1994, in T.Givon , M.Shibatani 2009, p.67).

Sign languages are alternative avenue for materialization of linguistic signs in a dialogue by utilizing the whole body as an instrument of linguistic communication. Gesture signs, like speech sounds, are ephemeral signs which makes them naturally suited for face-to-face communicative interactions, parallel to spoken dialogues.

* Communication by speech in dialogues is complemented by non-linguistic body signals, e.g. pointing, body movements as a vital component of human multimodal communicative ecology. To note, the difference between linguistic signs and non-linguistic body signals is a matter of debate.

To sum up, the dialogue illustrates the quintessential properties of language as a system of sharing experiences in a systematic and structured way and demonstrates the essence of humans as cognitively advanced and inherently social and cooperative species.

6. The dialogue and the study of language evolution

A credible theory of language must be able to explain the current state of language as well as language genesis from the onset to its current state . A theory of language is foundational to the study of language evolution.

In current linguistic theorizing language is defined as a code, exemplified by the linguistic production of literate individuals who use highly complex and abstract forms and multiple embedding of phrases and sentences, emblematic for languages with long literary traditions, to articulate complex ideas with detail and precision , defend arguments, describe new technological discoveries, etc. usually presented in monologues. Starting from these theoretical foundations theories of language evolution aim to chart the trajectory from primate grunts as a starting point, to the language of philosophical tractates, university textbooks, court arguments, etc.

Not surprisingly, this creates a puzzle close to impossible to solve despite the efforts of an army of scholars of formidable talent and dedication, prompting explanations involving miracles and mysteries.

The root of the problem, as I see it, is in deviation by modern linguistic thought from the standard practice followed in all fields of scientific inquiry, by defining natural language in terms of an exception, i.e. the linguistic production of a small percentage of the human population as a result of deliberate, focussed, decades long effort, not as the most representative example, i.e. the communication system used by the typical adult human of every race, ethnicity, profession, to converse with fellow humans as they go about everyday life since the beginning of humanity.

As such, the goal for evolutionary linguistics must become to explain the road from spontaneous multimodal communicative interactions of pre-human species to spontaneous, unplanned and unaltered by deliberate education and writing, communicative interactions of the average normal adult human by participation in spontaneous dialogues.

The evolution of language as evolution from asymmetric persuasion by pantomime , to conversation as " reciprocal persuasion" by evolution of grammar and speech demonstrated in dialogues, where each communicator defends one's viewpoint by elaborate argumentation is identified as paramount in the evolution of complex language is argued by Ferreti, Adornetti (2021). In this context the human brain has adapted to this new form of communication by evolving enhanced conversational abilities.

Christiansen and Chater's vision for the evolution of language in the interaction of three interrelated contexts, i.e. on-line processing, learning and historical change (2016a.b.), explicable with the limitations of human memory which triggers a " now-or-never bottleneck" , resulting in the formation of the multilevel structure of language, implicitly assume the face-to-face dialogue during which the bottleneck is created. In this context the dialogue is at the centre of formation of the defining properties of language at every level.

Summary and conclusions

The article advocates for a significant departure from the current understanding of natural language widely adopted by modern linguistic thought. It offers an alternative view of language as a system of communication, designed with a focus on meaning representation and dissemination. It is identified as a hybrid system of code and inferential components, predominantly materialized by speech, although in selected circumstances alternatively represented by the systematic use of combinations of discrete manual gestures.

It argues that natural language is represented by the linguistic output of the average normal adult human. The most natural form of language use by speech and sign is in spontaneous informal dialogues.

Significantly, language is stable although flexible and adaptable system which allows for creativity without compromising intergenerational communication.

This new understanding of natural language should alter the current goal of evolutionary linguistics which must become to understand the trajectory from pre-human pre-linguistic communication to natural language demonstrated by the spontaneous participation in dialogues of the typical human.

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