

PHYLOGENESIS OF CAPACITY FOR (PROTO)LANGUAGE, GLOSSOGENESIS OF LANGUAGE DIVERSITY: TOWARDS A COMPREHENSIVE AND REALISTIC FRAMEWORK OF LANGUAGE EVOLUTION

Svetlana T. Davidova

Abstract

The argument for the evolution of language defined either as phylogenesis of the Language Faculty, or as glossogenesis and diversification of languages is reinterpreted. The present article argues that a Language capacity as innate predispositions for the learning and use of the basics of language, i.e. the most primitive, protolanguage-like systems, has evolved in response to the most basic needs of communicators in pre-civilization environments. From these humble beginnings the semantic and structural complexities of modern languages are viewed as the reflection of language diversity and the function of languages as markers of group identity as a result from glossogenetic processes in idiolects and sociolects.

Keywords: language evolution, Language capacity, phylogenesis, glossogenesis, co-evolution,

Introduction

The current understanding of language is along two mutually exclusive alternative visions: language as a biological organ and linguistics as biology vs. language as communicative technology and linguistics as a social anthropology.

A powerful and influential argument has been made in the last half century by the generative perspective that human language is an algorithm dedicated specifically and exclusively to the processing of grammar. Its unique features are said to be universally present, either implicitly or explicitly, in all human languages, real and possible, explicable with innately predetermined cognitive mechanism containing the said algorithm, i.e. Language Capacity, or innate body of knowledge of language. The understanding of language in terms of bio-cognitive properties of the human organism furnishes the biolinguistic perspective on language.

An alternative view defines grammar as patterns of linguistic behaviour emergent during language learning and use for the purposes of efficient communication. Thus, grammar is a form of adaptation of language to its use and users. In other words, grammar is a cultural product, a type of technology.

These two very different perspectives on language inform different understanding of language evolution and determine the methods and trajectories for the inquiries in evolutionary linguistics. On the one hand, the biolinguistic perspective aims to uncover the evolutionary history of the Language capacity. On the other, the usage-based perspective studies languages evolution starting from the assumption that what evolves is communities and their languages within the limits of the biological body and mind and aims to uncover patterns of language change and understand the factors which influence them. Thus, the term “language evolution” refers to two different processes, as phylogenesis of language-relevant aspects of the human

organism or as glossogenesis as an instance of cultural change guided by Darwinian principles. The present article articulates an alternative view of language evolution, starting from the assumption that language is a multifaceted, heterogeneous phenomenon : its components represent all ontological categories: from physical matter (sound waves), to biological material (organs , tissues and neurons), to abstract concepts . At the centre of this unusual phenomenon is the human individual both as a bio- cognitive entity, equipped with predispositions to learn and use language, and as a social being and a group member, whose linguistic behaviour is guided by compliance to social norms. This suggests that the process of language formation must be understood as multifaceted evolutionary processes taking place in diverse contexts in diverse timeframes. In this sense both phylogenesis and glossogenesis are expected to interact as the human bodies and communities adapt to their natural and social environments.

The present article argues for phylogenesis of the very essentials of language as adaptation of human bodies and minds of the first language speakers to their pre-civilization environments. Given the primitive demands for information and thus, for information exchange, the human organism has evolved some limited, although specific, innate predispositions for learning and processing of the very essentials of linguistic communication. The emergence of civilization with the formation of social stratification and resulting from it information inequality has driven increased demand for information. This has encouraged semantic complexity and the formation of more refined linguistic categories and forms to accommodate this demand with accuracy and speed. In addition, in response to historical and cultural circumstances communities converged on different patterns of linguistic meanings and forms as signatures of communal identity. Thus, a Language Faculty as innate predispositions for the basics of language is explicable with phylogenesis, while glossogenesis is the most reasonable explanation for the diverse intricacies of modern languages.

1. What is language which has evolved: continuity of meaning and structure, grammar and lexicon

The generative/biolinguistic perspective, defines language in terms of mutually exclusive oppositions of meaning vs. structure or lexicon vs. grammar, where a biological code for Universal Grammar is featured as its distinctive trait. The theoretical ramification of the dichotomy is justified on the premiss of “clear division of labour between functional and lexical items ” as they argue that there is a definitive difference between the information encoded in a lexical verb (the type of an action, state) and that encoded in its grammatical markers, i.e. to locate this action in time by tense markers, to specify its manner by aspect markers, etc.. (M. Tallermann et all, 2009, p.138).

That said, corpus-based linguistic analyses reveal continuity in the semantics of linguistic items around the continuum from content nouns to forms with increasingly more abstract meanings, i.e. prepositions, tense/aspect/mode markers, definite/indefinite articles, etc. Thus, language is organized along a continuity of lexicon and grammar and continuity of meaning and structure is inherent to the language system. Moreover, forms of some level of abstraction , e.g. prepositions, depend for their existence on content words, tense/modality/aspect

morphology are conditioned upon the existence of lexical verbs confirming further the internal integration of the system as a whole.

A further justification for the dichotomy of meaning and structure is based on the apparent dissociation of the two aspects of language in terms of brain functions. Segregationist accounts, traditionally focus on Broca's area in the frontal cortex, assumed to be the language organ and the processor of syntax, and Wernicke's area in the temporal cortex in the left hemisphere as traditionally associated with processing of meaning . The contribution of each was understood in terms of division of labour between computation vs. comprehension or syntax in Broca's vs. meaning and lexicon in Wernicke's .

That said, recent studies have revealed that this picture is too simplistic and outdated. Broca's region has a broad range of cognitive functions which prompts the term “ Broca's complex” (P. Hagoort, 2009). It integrates various types of information retrieved from memory and provides internal organization in music, language, praxis, etc.(C.Sherwood et al, 2008) by continuously integrating new information as it is made available from perception . Moreover, Broca's region has similar functions of integration of perception and motor functions essential in observation, imitation, planning, in macaques and humans (C. Sherwood ibid.) Consequently, deficits and/or damages affecting this part of the brain would impair a number of functions. Broca's complex participates in language processing by integrating phonological, semantic , grammatical , extralinguistic information in the formation of individual words and their further integration into larger structures, phrases and sentences. It builds a sentence incrementally from bottom-up and adds structural complexity as new lexical and grammatical information becomes available as communication progresses . For example, in lexical words with complex morphology the semantic component in the stem becomes available before the syntactic category as grammatical morphemes are usually sequentially positioned towards the end of the word, thus contradicting Chomsky's argument for primacy of syntactic template which predicts that the grammatical information would be available a priori. Moreover, the “ mirror neurons” providing link between cognition and communication, are located in Broca's which suggests its involvement not only in formation of language system but also in communication. Thus, Broca's region (Brodmann's areas 44 and 45) is found to have heterogeneous composition and functions.

In addition, empirical studies in language disorders, language use and attainment by youngsters have demonstrated that the human brain treats lexicon and grammar as a continuum (E.Bates, J.Goodman, 1997). Moreover, Bates and Goodman find “ no evidence in individual children for selective dissociation between grammar and lexical development. Children who are delayed on one tend to be delayed on the other “ (ibid. p.15) strongly suggesting a general pattern of interdependence of vocabulary and grammar in child language attainment. More recent inquiries into the representation of language in the brain confirm that both lexical words and grammatical structures are processed, stored and retrieved in the same way by the same regions of the brain (Kaan, 2009). Moreover, B. Comrie and T. Kuteva (2005) have argued that concepts usually encoded in grammatical forms almost always can alternatively be expressed in lexical words adding strength to the argument for continuity in language processing. Thus, empirical studies in various related fields demonstrate the continuity of lexicon and grammar in the language system, language processing , learning and use, irrespective of

variation in space and in time, suggesting that it is a universal property of language. The very existence of grammar is predicated on the lexicon and the two function and evolve only as parts of a unified system of human language as a distinct entity, unmistakably different from grunts, gesticulations, songs or any other forms of non-linguistic human communication. It is definitely distinct from non-human communication.

The generative/biolinguistic perspective on language as lexicon vs. grammar dichotomy has influenced evolutionary linguistics. D. Bickerton (1990) depicts language evolution in terms of accidental appearance of a grammar-producing cognitive algorithm overlaid onto pre-existing abilities for lexicon-based protolanguage, i.e. the evolution of language is portrayed as two independent processes separated by long evolutionary time and species' boundaries. At the same time the focus is on origin of grammar while the origin of the lexicon is generally ignored.

In usage-based context, on the other hand, the continuity of lexicon and grammar is acknowledged and grammar is explained as having emerged from the lexicon as an adaptation for more effective communication, extrapolated from demonstrations by historical linguistics (T. Givon 2002; B. Heine, T. Kuteva 2007 and elsewhere).

Consistent with this view is the argument by Jackendoff and collaborators (P. Culicover, R. Jackendoff 2005; R. Jackendoff, E. Wittenberg, 2014) that there is no dividing line between protolanguage and language.

Thus, language is an integrated system of lexicon and grammar which exist and function only as components of the language system.

2. Rethinking language evolution

The term “language evolution” has been used with multiple meanings depending on the theoretical perspectives on language. These can be summarized as follows: a. biological process of evolution of the Language Capacity, a cognitive module with innate rules for grammar, b. formation of grammar as a result of a cultural process of variation and selection similar to this in biological evolution. The generative/biolinguistic perspective attributes a prominent role to phylogenesis, arguing for phylogenetic explanation for grammar, while attributing a marginal role to glossogenesis and the formation of the lexicon.

The usage-based/functionalist perspective views language evolution in purely glossogenetic terms and explains the structural features of language with its utility in communication. Thus, theoretical perspectives on language evolution borrow from the theoretical machinery of the Darwinian theory of evolution of species, both literally and metaphorically.

That said, given that language is a multidimensional phenomenon, the currently dominant understanding of its evolution in terms of two mutually exclusive alternatives seems too simplistic.

2.1. Evolution as a multidimensional complex, a new and improved understanding of evolution

Evolutionary linguistics has centred the study of language phylogeny on understanding the

evolution of cognition. That said, biologists know that individual organs and systems do not evolve in isolation, only as a part of a unified whole. The genome and the phenotype, the individual organism is a unified complex where the individual parts function and adapt in concert. Jablonka E., Lamb, M. (2005) argue that the evolution is a multi-dimensional process of multiple coordinated evolutions in multiple contexts. Ernst Mayr, argues that the genotype is an integrated unity where individual genes function only as its components and become interpreted only in the context of the whole genotype as the same genes and assume different functions in different genotypes. (E. Mayr, 2001, p.141). Mayr also explains that the phenotype, i.e., the organism adapts as a whole. As such it is a balanced coexistence of multiple interrelated organs, systems, etc. which makes it difficult if not impossible for an individual organ/system to directly respond adaptively to a specific aspect of the external environment and for scholars to detect and evaluate that (Mayr, 2001, chap. Adaptedness). Thus, the biological body evolves as a unified complex.

As a corollary, the language capacity and its evolution should follow the same principle. This extended and improved view of evolution has lately influenced evolutionary linguistics. S. Kirby (2007). Three evolutionary processes, phylogenesis, glossogenesis and ontogenesis are identified, each a contributor to the overall process of language evolution with its unique role in it. In addition, E. Jablonka and M. Lamb (2005) argue that both biological and cultural processes have interacted in complex ways still to be understood.

2.2. On the concept of protolanguage

The concept of “protolanguage” (Bickerton 1984,1990) refers to a hypothetical pre-human communication system preceding the emergence of modern language, defined as semantically structured system organized around predication and centred on the proposition, but structurally inefficient, ambiguity-ridden and context-dependent. It is characterized as “lexicon without syntax” with the following defining characteristics: 1. a small vocabulary of proto-words, i.e. lexical words in their basic, morphologically simple form, 2. with concrete meanings, organized in categories of object words (nouns) and action words (verbs). 3. extensive use of compounding, 4. serial verb constructions instead of sentence embedding. 5. hierarchical structure based on semantic relations, 6. absence of abstract grammatical categories of subject, direct and indirect object, case, tense, aspect, complementizer, characteristic of grammars of modern languages, 7. no linguistic means to express negation and questions, replaced by intonation, 8. no signs of grammaticalization process, 9. no fixed phrase structure and phrase embedding, 10. one-place predicates, 11. extensive use of stress and intonation as a replacement of grammatical devices. 12. proto-words combine to form proto-propositions usually referring to current events, (reference to here and now).

It is hypothesized as equivalent in form and function to rudimentary forms of linguistic communication: 1. the communication of small children during the initial stages of language learning/acquisition, who learn language under normal circumstances. 2. the communication of feral children, 3. the early stages of newly emerged sign languages and homesigns, 4. pidgins, creoles and Basic Variety, 5. the linguistic communication of agrammatic aphasics. 6. the linguistic achievements of trained apes. It is argued to be a well defined, stable

communication system, a temporary, although lengthy, stage in the transformation from animal communication to modern human language.

The concept of protolanguage is based on the generative vision of language as a dichotomy of lexicon and grammar argued to be exemplified in language development, processing and evolution.

That said, empirical studies in language development (Lenneberg, 1967; Bates, Goodman, 1997; Tomasello 2000; Slobin, 1982, 2002, 2004), language processing (Bates, Goodman 1997, Kaan 2009; Bishop, 2009), language evolution (Dediu, Levinson, 2013, 2018; Barney et al. 2012, Krause et al. 2007) have failed to confirm such theoretical speculations.

To the contrary there is a convincing evidence for the continuity of lexicon and grammar in all stages of language development, processing and evolution which makes the concept of “protolanguage” vacuous. I find prudent to substitute the term “protolanguage” with the term “primitive/rudimentary” language system, which, in my mind most adequately describes the referent.

Moreover, the qualification “proto” as a label for a primitive stage marking an initial stage of an evolutionary process is known in any other field. I have never encountered an example of “proto-eye”, or “proto-species” to refer to primitive biological entities. Neither have I encountered a similar qualification term to refer to products of human behaviour, e.g. “proto-computer”, “proto-radio”, “proto-song”, “proto-alphabet” etc. Something is either an eye, a radio or a song, or it is not. By the same token, I do not find the term “protolanguage” appropriate as a label for forms of linguistic communication less complex than modern language. Something is either language or it is not.

The concept of “lexical protolanguage” stems from Bickerton's studies of Haitian creole which furnish broad conclusions about pidgins and creoles and his views on the language evolution, the Language capacity and human speciation. The bioprogram hypothesis (1984, 1990) is instrumental to the vision that pidgins are a modern illustration of protolanguage, thus, they reveal the cognitive and communicative abilities of pre-linguistic communicators, a pre-human stage of the Language Capacity in pre-human species.

That said, more recent studies and closer look at a broader range of pidgins/creoles reveal inconsistencies with Bickerton's claim. De Graff (2001) argues that pidgins are not grammarless, e.g. Haitian creole has morphology almost all inherited from French and no stage of lexicon-only is documented at any point of its history.

“Indeed there is no documented stage in Haitian Creole diachrony where the language was affixless or with most affixes derived from “erstwhile free morphemes” (ibid. p. 240).

Thus, the pidgins reflect the idiosyncrasies of the lexifier and pidginization cannot be understood as universal phenomenon of eliminating grammar.

The status of pidgins as instantiation of protolanguage is contested by Mufwene (2007) who opines that pidgins, while mark the lowest boundary of language complexity, are languages. Moreover, some modern languages show striking similarities to the putative protolanguage as they demonstrate extreme simplicity in all aspects of the language system (Gil, 2009, Everett

2005; Cysouw, Comrie, 2013) .Thus, modern language systems which by the standards of modern linguistics barely qualify as languages and closely resemble Bickerton's lexical protolanguage are fully functional and cover all communicative needs of their respective communities.

Thus, the concept of protolanguage as grammarless , pre-human stage of language is inadequate in its understanding of the language system, language processing, the origin and functions of pidgins, human speciation and its prominence in evolutionary linguistics is outdated.

3. The beginnings of language

The most fundamental function of language is to encode and disseminate human thoughts and experiences which demands a systematic encoding of semiosis. In this sense the beginning of language would be defined by the formation of common meanings.

3. 1. The formation of common semiosis as the beginning of language

In most species concepts are innate and, thus, belong to the individual mind, even in highly social species, e.g. bees. In contrast, human concepts are formed by convergence on common perception of reality through social agreement, a process preceding the formation of common semiosis, i.e. the process of signification or formation of meaning and signs.

The origin of language begins with formation of common ground, i.e. convergence among all members of a group on common conceptualization of reality, beliefs, world views as in a closed group of interacting individuals the members are united by common daily experiences. Eventually these become routinized and common patterns of behaviour emerge and become recognizable. They become behavioural common ground, i.e.group members are expected to behave in certain predictable ways. It is plausible to suspect that the formation of common habits was one of the prerequisites and a stepping stone for the origination of language as common habits lead to the formation of common meanings, an essential component of signs. The uniquely human propensity for cooperation has resulted in the formation of common ground as potential meanings, a sine qua non of any type of communication. It is paramount for the formation of the lexicon of constructions as stable meaning-form pairings. Moreover, behavioural common ground reflects the structured nature of experience and becomes a prerequisite for the formation of semantic structure and, subsequently, the structured association of abstract categories and grammar.

Inquiries into the origin of language are based on the premise that the circumstances which prompted the origin of language can be inferred indirectly, from processes documented by records and/or observable in modern languages . Heine and Kuteva, (2007)demonstrate through reverse engineering by examining the histories of multiple languages that the lexical categories first to emerge were nouns and verbs with concrete meanings, most likely to have encoded the most primitive concepts essential to human survival.

Others applying modern technological advances, e.g. artificial intelligence, to recreate and mimic the original conditions of the beginnings of language. L. Steels '(1995) experiments

with robots, among various others, demonstrate that it is possible for individuals with different mapping of a meaning and form, after repeated interactions to converge on a small shared vocabulary as markers for concepts of concrete objects.

Yet others demonstrate that words with concrete meanings are also the first to emerge in new languages(Sandler, W et al., 2005) and home signs (S. Goldin-Meadow 2002). As these are treated as windows into language evolution, it is logical to extrapolate that this process has been repeated since the onset of language. This also suggests spontaneous, instinct-like urge for coining lexical words.

And while the findings of these inquiries remain speculative, one can assume with high degree of confidence that early forms of language were simpler in reflection of the limited knowledge the first speakers had of their natural and social environment and the limited demand for information transfer in these circumstances.

3.3. Semantic categories, nature and nurture

Meaning is the species-specific way in which the external world is reflected in concepts by patterns of brain activity . Concepts reflect the cognitive capacities of the species. Thus, concepts are species-specific.

Linguistic meaning is the interface between thought and language. Linguistic semantics is formed as selected parts of the semiosis are focused upon and elaborated by imposing additional generalizations for the purpose of being represented in linguistic form. Semantics, arguably, the most central aspect of language, ironically, is understudied and underdeveloped in modern linguistic theorizing.

The generative approach understands linguistic meaning in terms of principles of computation, i.e., as stable, timeless and objective i.e. disembodied, thus, independent of reality and human experience, meaning primitives organized into fixed semantic categories the most basic of which are agent, object, action , location, property, etc. , under the Language Of Thought hypothesis (LOT)(Fodor, J. 1975). These form semantic structures as a representation of a complete thought. The meaning of a sentence is computed when the semantic primitives combine by predetermined rules and form hierarchically organized semantic structures. In this context both the semantic categories and the hierarchical structures are understood as abstract, universal and independent of experience with reality. The use of semantic structures in communication as a statement of some fact in reality is defined in binary features as either true or false. The interpretation of linguistic meanings is defined as correct if it is in accordance with strict rules of interpretation, borrowed from logic. The conditions under which the statement expressed by the sentence is true corresponds to some fact of extralinguistic reality. In this context human concepts are innate , i.e. predetermined, and eternal, as the LOT is a set of all possible concepts human mind will ever need to know, a vision of the human mind adopted from Descartes and his “ innate ideas”.

Such understanding of human cognition has profound and broad consequences, theoretical and practical. For philosophy of knowledge if all concepts are innate, it follows that humans do not acquire new knowledge. Thus, a new discovery in science or invention in technology is not

new at all and creativity is reduced to realization, awareness of something we instinctively know from birth. Moreover, as a matter of practice, if all humans have the same concepts, mistakes in translation would be impossible.

Thus, as from both scientific and pragmatic perspectives the LOT hypothesis, as well as Descartes' vision of the human mind in terms of God-given, or innately-predetermined “innate ideas” reveal inadequate understanding of human cognition.

As a counterargument scholars (L. Steels 1995) argue that semantic categories are emergent as a result of human experience. And as experiences vary, semantic categories are arbitrary and idiosyncratic, not universal, given that communities differ in choices on which concepts to be linguistically encoded as well as in choices of the type of constructions by which they are represented. In this context semantics is a product of self-organization and unique to the individual languages in specific cultural circumstances.

That said, there must be a considerable overlap in semantic categories in the minds of all human speakers as they share the same natural environment. Thus, although languages appear to conceptualize the world in different ways in reflection of cultural idiosyncrasies, there exist a common core of semantic universals, which makes translation generally possible. As per A. Wierzbicka A.1992; C. Goddard, 2007 these include:

- * the material reality from anthropocentric perspective : topography, flora and fauna, climate, including human perspective of size, distance, speed, time,
 - * human body and mind: body parts, internal organs, cognitive processes, physical activities,
- In addition, semantic categories are formed by self-organization at the level of the idiolect and vary from person to person, depending on people's experiences.

Moreover, there must be a considerable overlap in the semantic categories in the minds of the individual speakers as speakers of the same sociolect as they have the same bodies and brains, the same or highly similar cultural experiences. This overlap among idiolects of a language makes communication possible.

- * artifacts : housing, clothing, life style, nutrition,
- * civilization : agriculture, science, philosophy

Thus, despite demonstrable diversity, universal semantic categories are a fact of language . This suggests that these are more likely to have some innate foundations in the human organism, explicable in phylogenetic terms as a component of the language capacity.

4. Language faculty, an instinct for the learning and processing of the simplest language systems

In biolinguistic context the language capacity as innate predispositions for subconscious , nearly instantaneous acquisition and automatic use of the grammatical complexity of languages in modern industrialized societies i.e. a human instinct for grammar in the form of Universal Grammar was proposed by Pinker (1994).

To remind, instincts are species' specific , patterns of behaviour, innately predetermined and, thus, universal and unalterable by experience. Instinctive behaviours appear early in life and are displayed during lifetime as subconscious , automatic responses to emergency situations. That said, linguistic communication, in some ways lacking some and even most of the grammatical details postulated by the generative paradigm and thus determined to be deficient by these standards, is not only possible but empirically demonstrated by Piraha, Riau and other languages, suggesting that more often than not, some, and in many cases most, of the cognitive resources of the language faculty have been bypassed and unused. And given that processing of complex grammar has high energy demands from the brain and long time (10-12 years as per Pinker 1994, Friederici, 2017) and efforts to attain, an evolutionary explanation of such instinct is unjustified.

Importantly, language systems of lesser grammatical detail than Universal Grammar are fully capable of verbalizing the same meanings with the same precision, as empirical studies in language diversity demonstrates, which makes complex grammar redundant. The communicative function of sentential recursion, deemed to be one of the hallmarks of language by the generative paradigm, is alternatively fulfilled by juxtaposition of single-clause sentences with no loss of semantic details or expressive power, as demonstrated by Piraha, Riau and others.

On the other hand, a language faculty as a biological form and as such, a product of evolution, must be explicable with adaptive advantages for its bearers for life in the circumstances it has evolved, i.e. in which the early humans were living. In this sense one must take as a given that the communicative needs of the first speakers were minimal compared to those of modern civilized humans, e.g. solving ecological problems in the wild as well as interpersonal and inter-tribal conflicts , situations in which our ancestors as members of small groups of individuals usually united by family ties. The close relations among communicators in a small isolated community implies that a significant portion of the knowledge is shared by all members and thus, assumed implicitly in communicative acts , or shared by non-linguistic means e.g. songs, rituals, gesticulations, etc. So, the information encoded in linguistic means is a small portion of the sum total of information shared. The simplest , most primitive forms of linguistic communication are fully capable of fulfilling these demands.

Thus, it seems that the elaborate complexities of modern syntax in pre-civilization context would be superfluous as they lack adaptive advantage for the early language speakers in their natural habitats.

In short, although the biolinguistic argument for innate UG still retains some influence, many linguists now are convinced that there is no instinct for UG even in the simplified form postulated by the Minimalist Program (Chomsky 1995).

Nevertheless, language is a unique human behaviour suggesting that there must be some form of innate facilitation for its learning and use and some role for phylogenesis in that. In this sense a plausible argument can be made for an innate language capacity consisting of innate, i.e. instinctive, predispositions for learning and processing of the most primitive/rudimentary, protolanguage-like systems.

Rudimentary systems share a universal set of characteristics, listed above. They appear early in life and in adulthood are used by normal human adults as a communicative solution of last

resort, ex. in highly unusual communicative circumstances of communicative emergencies , where speakers of mutually unintelligible languages must interact, resulting in the formation of pidgins. The speakers of Basic Variety (Klein, Perdue 1997) are in a similar situation, i.e. native speakers of a modern language , being transplanted into a new community, attempt to learn the basics of a second language to cover the limited scope of their communicative interactions with the local population, while maintaining the use of their native tongue within the close circle of family and fellow linguistic transplants. The case of aphasics demonstrates that the most essential and robust components of language are able to withstand serious injuries to the brain and the impressive linguistic achievements of some non-human individuals suggest cognitive continuity.

One could anticipate that the language capacity would include at a minimum the following indispensable characteristics:

- * some guiding principles for word formation (Bloom 2000) participating in the formation of a small lexicon of predominantly content words in their basic form as labels for concepts of human, animal, tree, sky, place, fire, stone, etc. organized around semantic principles
- * primitive grammatical categories encoding dichotomies of animate vs. inanimate, human vs. non-human, singular vs. multiple, close vs. distant , presence vs. absence, instantaneous events vs. processes of long duration, measurable vs. unmeasurable substances, etc.,
- * a form of theory of mind which allows ostensive communication , i.e. participation in dialogues by Gricean principles of conversation.
- * Importantly all rudimentary systems are externalized as spoken dialogues, which at a minimum require capacities for speech production and perception.

A language capacity with such features would be vital for the survival of its users in pre-civilization environments which would suggest a role of Darwinian evolution. Moreover, rudimentary language systems must be easy to process, learn and pronounce, i.e must be energy-efficient for an organism to cope with the high energy demands of life in prehistoric contexts. Such form of communication must be communicatively functional in its ability to rapidly and precisely process and articulate a limited but crucial amount of information especially in situations of life and death, and efficient in terms of energy costs. Protolanguage-like rudimentary language systems comply with these requirements. Biological and cognitive resources supporting such forms of communication will be highly adaptive.

Thus, a bio-cognitive assembly for the very essential and indispensable, although specific properties, which determine the difference between language and non-language is the best candidate to be identified as the human language capacity from evolutionary, processing and learning perspectives.

4.1. Unique human behaviours and innateness

Language is a unique human trait, although one among various others such as dance, tool use, music, abstract thought, art , etc. Given that, it is logical to speculate that they all may rely on some form of instinct-like innate intuitions which emerge very early in life spontaneously triggered by very limited exposure to environment. To take an example, all humans are capable of some rudimentary ability to participate in cultural activities , e.g. singing, dancing,

etc. and display these abilities very early in life. Infants display sensitivity to rhythm, which indicates some rudimentary predisposition for music and dance. Similarly to language, with this minimum innate support any child can presumably learn any song or dance reflective of any cultural tradition. In addition, infants display sensitivity to visual symmetry which indicates innate potential for appreciation of beauty and visual arts and any person can learn to draw at some elementary level. Infants also display basic ability to manipulate tools, suggesting some biological foundations of tool manipulation in everyday manual tasks which, after persistence and dedication, develop into professional skills of a master craftsman . Moreover, pre-linguistic infants are known to form abstract categories, e.g. animate /inanimate , singular/plural, and make inferences, which is the beginning of abstract thought, later developed as argumentation in everyday decision-making and further mastered as a professional tool in scientific argumentation, mathematics, law, philosophy, etc. The average human achieves a minimum proficiency in these activities with little instruction very early in life and with little effort indicating some innate, instinct-like potential.

Detailed studies of the biological foundations of singing or dance, or other uniquely human behaviours are not known to me with the noteworthy exception of Ph. Liebermann's study (2016) of the basal ganglia and the cerebellum which in concert make possible dance, language and other structured behaviours, suggesting some innate potential for these activities.

Thus, humans have demonstrated some rudimentary , instinct-like propensities for unique behaviours, language being one of them, suggesting some role of nature. On these biological foundations the average human regardless of culture, levels of education, profession etc. builds upon to reach an average level of proficiency with minimum training, sufficient for conducting daily communicative interactions with fellow humans.

Further a small number of individuals in contemporary highly industrialized societies, defined by mass literacy under the influence of writing systems achieve the highest levels of mastery only after extensive, conscious and rigorous training and education which the innate flexibility of the human mind and body makes possible.

Importantly, the linguistic output of the average human has proven to be far from displaying the most abstract and complex aspects of language outlined in UG, e.g. extensive use of recursion of phrases and sentences and the grammatical machinery designed to support it, demonstrated by literate individuals, and assumed by the generative/biolinguistic approach to be universal and instinctive. And given that the mass proliferation of writing is from evolutionary perspective a recent phenomenon, made possible by the invention of the printing press in the 14th century and that the majority of languages attested today exist only in spoken form (e.g. in Africa alone there are about 2,000 languages, most spoken by small communities) the linguistic achievements of the literate human are an exception, demonstrating the extent of learning abilities, rather than innate specialization.

In this context, if one is to look for innate predispositions for unique human behaviours, one is to focus on the behaviour of the average human individual and not extrapolate or confuse the innate potential to sing , draw or manipulate tools from the achievements of Pavarotti,

Michelangelo or some other master of the respective trade, comparable to the mastery of language demonstrated by literate language speakers.

In this sense, given that for any other unique behaviour the innate potential would be estimated by the abilities of the average human individual, estimating the role of nature in human linguistic abilities from results clearly achieved by nurture is ill-conceived .

5. Phylogenesis of the universal human language capacity

5.1. Phylogenesis of the human language capacity , a multidimensional co-evolutionary process

Encyclopedia Britannica defines co-evolution as a process of “ reciprocal evolutionary change” which occurs in entities (species, groups of species) as a result of their interaction and interdependence. The same process of mutual adjustment based on co-dependence is proven to be at work between organs and systems within an organism as well as between biological/cognitive entities and behaviours. In both cases the co-evolving entities form part of each other's environment as a case of mutual adaptation. Co-evolution is also characterized by the metaphor of ' arms race' .

The concept of co-evolution is relevant to matters of language evolution primarily as it helps explain the unique natural propensities of the human organism to rapidly learn and process language. These are co-evolutionary processes of two types: one as co-evolution among the multiple and diverse bio-cognitive resources of the human organism participating in language processing . This perspective on evolution as co-evolution of interconnected and interdependent elements of the individual organism can provide the clarity of understanding not achievable by the standard methods applied by the evolutionary synthesis where the evolutions of the individual components (genes) in isolation are in focus. Additionally, human natural predispositions for learning and use of language are resulting from co-evolution of linguistic communication as a behaviour and the biological resources of the human organism through evolution of learning , i.e. the Baldwin effect.

5.1.1. From learning to biology: the language capacity and Baldwinian evolution

The evolution of an organism is a complex process of interactions and interdependencies at multiple levels. Lewontin (2002) describes it as “ triple helix ”, i.e. a coordination of evolutions Lewontin (2002), i.e. interrelation of three components, the genotype, the phenotype and the environment, acts as a complex eco-system which influence each other as they change. Species with extensive capacities for learning also adapt by internalizing some aspects of learned behaviours, a process known as Baldwin effect. M. Baldwin (1896) argues that a behaviour , which initially consumes much effort and time to learn, can gradually become easier to master with every new generation to the point when very little or no learning is required and the behaviour essentially becomes instinctive. Baldwinian evolution is an intelligent solution nature has found in order to successfully respond to unpredictable

environmental challenges (Jablonka, Lamb, 2005).

In the case of language at the onset of linguistic communication all aspects of the rudimentary language system are expected to be learned just like any other behaviour by using available bio-cognitive resources. With the passing of time, given the adaptive advantages of rudimentary linguistic communication in pre-civilization environments, one would expect that the human body and mind would have internalized some of the most basic and universal aspects of language, making the learning of these instinct-like by Baldwinian processes.

5.2. Phylogenesis of a language capacity for (proto)language

To reiterate, I have argued earlier that a language capacity as innate predispositions for leaning and processing of the very essentials of language is most likely explicable with phylogenetic adaptations. Given that a language capacity must necessarily be a combination of multiple properties, functioning in coordination each with their individual evolutionary history, one is to expect coordination of evolutionary processes, i.e. co-evolution at various contexts and timeframes. The idea that language as a multifaceted phenomenon has evolved by co-evolutionary processes among the human organism, learning mechanisms and cultural practices is not new, it was suggested by S. Kirby (2007 and elsewhere).

A Baldwinian process is a type of co-evolution, i.e. a processes of translating crucial aspects of learned behaviours into innately predetermined bio-cognitive properties.

T. Deacon (1997) argues that the hallmark of humanity is a capacity for symbolization. He attributes the evolution of language to the evolution of capacity for symbolization, i.e., a capacity for symbolic reference, a complex combination and interdependence of various types of referential relationships:

- a. the internally organized system of symbolic signs,
- b. the structured nature of reality represented by typified relations of objects as perceived by the human mind,
- c. a symbol and its referent, recognized by the human mind and used in communication.

In Deacon both words and grammatical rules are symbols. Deacon locates the symbolic capacity at the frontal lobe and provides empirical evidence that this portion of the brain has contributed most significantly to the brain enlargement during human evolution by increasing in volume about three-fold, compared to the ape brain.

In addition, he argues that the human organism is uniquely equipped to process spoken language by having evolved a capacity for symbolization and speech. The brain has evolved increasing memory capacity, sequential learning of symbols, and precision of vocal control which co-evolved.

The ability to correctly detect and anticipate the thoughts, desires, aspirations, of fellow humans known as social intelligence, or “theory of mind” M Donald (1993,1999), a specialized cognitive capacity of every normal human being which allows him/her to instinctively detect the mental states (beliefs, intentions, etc.) Givon and Malle (2002) argue for a co-evolutionary scenario where components of language and theory of mind co-evolved and mutually encouraged each other’s further evolution.

“ A plausible model of co-evolution will have to include the specification of elementary components of both language and theory of mind, because it is likely that those components influenced one another in a gradual escalation.” (Givon, Malle, *ibid.* p.272).

Similarly, Scott-Philips (2014 and elsewhere) argues for ostensive-inferential capacities as an ingredient to the language faculty since the very initial stages of its evolution.

In addition, it is argued that language learning and human ontogeny are coordinated and interdependent and human ontogeny has been altered by evolution to facilitate language learning in the form of a “ critical period” as for language learning /acquisition as a universal property of human development. Language development during the critical period happens in close co-ordination with other biological and cognitive aspects of the human organism. (Hurford, 1991, Hurford, Kirby 1999).

Adaptations for the learning of the lexicon is demonstrated by the instinctive predispositions for formation of lexical items in young children as outlined by Bloom P. (2000).

The formation of vocabulary must be coordinated with adequate speech capacities.

“It seems likely that a capacity for finer tuning of the articulators and more precise coordination of their interaction evolved biologically as the benefits of well articulated speech emerged. This would have been a case of gene-culture, more specifically gene-language, co-evolution.”(Hurford, 2011, p. 488).

Innate predisposition to babble in infants is a demonstration of the adaptation of human development to faster and easier development of speech capacities.

The argument that evolution has prioritized the evolution of speech capacities is supported by modern human anatomy and physiology, e.g. the human tongue has a unique shape and position in the mouth, the vocal organs have unique physiology, allowing for great flexibility of movement and coordination, making possible the rapid production of maximally distinct speech sounds . In addition the human body as a whole has participated in the process as humans have evolved species' specific breathing control, coordination between brain connectivity and vocal tract anatomy, tied to speech production (Lieberman , Ph. 2008, p. 219 and elsewhere).

A similar argument is advanced by Davis, MacNeilage (2004) MacNeilage (1998)in the frame-content hypothesis of speech evolution where they argued that lip smacking gestures in primates were co-opted for the formation of the syllable and its most basic structure as CV. Moreover, the connection between the brain regions responsible for motor control of the vocal tract and those responsible for structural aspects of language, provides convincing evidence that this connection evolved for no other reason but for supporting spoken language. (Liebermann, Ph, 2000, 2006).

In short, a language capacity for the most primitive, protolanguage-like language systems are represented in the human body by multiple interconnected and interacting aspects of the body's physiology and cognition coordinated in a language capacity, a human specific and universal aspect of the human organism. Its presence is attributed to multiple co-evolutionary processes involving human anatomy, physiology, cognition, development, i.e. a product of phylogenesis.

6. Evolution of language diversity by glossogenesis

Language exists in many versions, in both space and time dimensions, a fact which cannot be ignored by linguistic theory in understanding what language is, the language capacity and language evolution.

Evans V., Levinson, S. (2009) explain language diversity as different languages emerging as local solutions to pressures from a combination of natural limitations of human biology combined with cultural and historical factors. As the local cultural and historical factors vary across communities, languages find diverse ways to achieve the right balance mediating these pressures differently at different time periods. In this context grammatical categories are understood as idiosyncratic and emergent generalizations resulting from convergent patterns of language use.

Haspelmath (2007) finds that the diversity of grammatical categories is a universal phenomenon. Moreover, grammatical categories, postulated by formal theories not only are not identical in different languages, but languages have categories unique to their specific grammars. Even categories like “word” and “sentence” appear to be language-particular. The picture is parallel in phonology.

Moreover, idiosyncrasies are noticed also in semantics, as the Predicate Calculus or the algorithm computing the meaning of a sentence in the Logical Form i.e. the semantic component of the architecture of language, argued by the generative perspective to be a language universal, has been shown by Zaefferer to be a generalization from studying European languages and does not describe most world languages.

“the same fact or event is not only expressed differently, but also structured semantically in a different way, in different languages” (Zaefferer, 1991, p. 46).

Thus, on the universal bio-cognitive foundations of the language faculty, identified above, language diversity is built both in meaning and structure.

6.1. Glossogenesis as evolutionary process

To remind, the original theory of evolution by Darwin identifies the process of gradual changes in life forms. The basic principles of Darwinian evolution are as follows: a. replication by which biological organisms multiply, b. variation produced by copying errors during the replication (Darwin's descent with modification) c. competition among the variants fulfilling the same function, d. Selection leading to differential retention of some variants and the elimination of others based on superior survivability under current circumstances.

A modern interpretation of Darwin's theory by D. Hull attempts to extrapolate the fundamental concepts and principles of the original theory into a generalized theory of evolutionary change, or Universal Darwinism, i.e. an abstract model purported to describe change in any ontological context. The theory is applied for explaining changes in various spheres: cultural practices from technology, farming, fashion, to institutions, language. A detailed analysis of Hull's theory can be found in Croft 2013, p. 11-).

In modern linguistics the abstract model of Universal Darwinism is adopted to understand the process of periodical changes in language systems. Glossogenesis is a label for change in linguistic forms by principles of Universal Darwinism where diversity of species as well as of languages is explained with Darwinian processes of adaptation for a function.

That said, although Universal Darwinism purports to define a universal process divorced from the original context, it nevertheless is based on transplanting directly concepts and principles borrowed from Darwin's theory.

In linguistics there is a long tradition in defining language diversity in biological terms as diversification of languages from a common ancestor going as far as Darwin himself whose writings about the analogy of languages to species are continued by 19th century European linguists. (Darwin, 1871, referenced by M. Studdert-Kennedy, 1990). With the discovery of the genome Darwin's theory of evolution was reinterpreted in terms of genetic evolution as Mendelian genetics, the tradition of defining language in biological terms has been reinterpreted by adopting terminology from the Modern Synthesis, e.g. gene genotype, phenotype, etc. In the domain of evolutionary linguistics these theoretical changes are reflected in the population theory of Croft (2000), Mufwene's model (2014) of languages as species, etc.

Nevertheless, glossogenesis is a process, markedly different from phylogenesis.

* The mechanisms of inheritance in linguistic and biological contexts differ significantly. In phylogenesis acquired characteristics are not transmitted to the next generation, while in glossogenesis such transmission is the norm, since linguistic innovations of predecessors are perpetuated by the new generation. Thus, biological evolution is Darwinian-Mendelian, glossogenesis is Lamarckian.

* In phylogenesis the genomes of the parents are inherited in their entirety at the single point of conception, while linguistic items are learned piece-meal at different points of the learning process.

* Linguistic entities are transmitted (inherited) via language use, that is, mediated by conscious behaviour of communicative interaction, while genes are inherited directly, by instinctive urge to produce offsprings.

* In genetic transmission the offspring has no active role in the production of the new genotype, while in the formation of the idiolect the learner is active participant by making choices in reflection of one's individuality.

* In life forms an organism inherits characteristics of two parents, while in the formation of the idiolect multiple community members, e.g. parents, extended family, neighbours, teachers etc. make linguistic contributions. Moreover, in biological organisms the offspring inherits the totality of the parents' genomes, while in the idiolect the contribution of the parents' idiolects is partial.

* In biology genetic variation is produced by recombination of the same pool of parental genes, while in the formation of the idiolect the learner can introduce his/her own innovations, although these are restricted by what would be considered acceptable by the community. The formation of the idiolect, then, is a highly creative process.

* In phylogenesis copying errors are rare and the genome is highly conservative, while

languages display a much higher intra-lingual diversity of idiolects and sociolects which amplifies the potential choices for selection.

* The selection factors in phylogenesis and glossogenesis are very different. Although biological factors play a role in both processes, in glossogenesis the social and cultural environment is of primary importance.

* The number of species of flora and fauna is in the millions, while diversity of languages is highly constrained at about 7000.

In sum, linguistic entities are very different from biological forms and processes of change in languages, i.e. glossogenesis should not be equated with a biological process of phylogenesis.

6.2. Glossogenesis as increase of semantic complexity

And although direct transplant of terminology from biology to linguistics is inaccurate, the formation of languages of today can be described in terms of adaptations.

The evolution of modern language from earlier, simpler forms is usually understood in biolinguistic terms as imposition of grammatical rules on protolanguage, i.e. evolution of form as increase of grammatical detail and sophistication.

From a usage-based perspective the increase of grammatical sophistication is understood by some scholars as adaptation to increase of semantic content, triggering internal reorganization of the system by creating hierarchical structures which are easier to remember, learn and process, i.e. “syntax grows out of semantics” (Schoenemann, 1999 p.311). Here the hierarchical structure of sentences is a direct reflection of the way conceptual structure is organized and that phrase structures are groupings based on meaning relations (Schoenemann, 2005).

Historical linguistics provides abundant examples for the formation of new lexical categories, ex. adjective from noun: an orange (N) – orange (Adj.) hat; adpositions are formed from verbs, e.g. to concern (V) oneself with smth. – concerning (Adp.) the announcement.

More examples can be found in Heine, B. Kuteva T. 2007.

A general tendency of formation of abstract categories to label relations between concepts, from lexical categories on a cline content word > grammatical word > clitic > inflectional affix, is articulated by the theory of grammaticalization (P. Hopper, E. Traugott. 2003; B. Heine, T. Kuteva, 2007).

On the other hand, the conceptual complexity of modern civilization is not necessarily verbalized in complex grammar. Research papers, literary works of art and philosophy are written in languages with complex grammars, i.e. with more grammatical irregularities, e.g. Latin, Russian, or with sophisticated and highly abstract syntactic categories e.g. English, etc. as well as in languages with lesser grammatical complexities and a prominent role of pragmatic factors, e.g. Chinese. Moreover, industrial revolutions in the past and, recently in information technology, have triggered the influx of new terminology as a reflection of increased semantic content. That said, new concepts are encoded overwhelmingly in nouns and verbs, e.g. laptop, motherboard, compute, upload, delete, etc. without triggering the formation

of new grammatical categories. Given that, the difference between earlier, more primitive stages in language evolution and modern languages is better understood as resulting from increased semantic complexity, i.e. as increase in the number of concepts encoded in linguistic forms, predominantly nouns and verbs, not necessarily as increased grammatical sophistication.

One way of expanding the number of lexical items is through metaphorical extension of literal meanings of nouns and verbs (G. Lakoff, M. Johnson 1980). In addition, names of human body parts are used to name concepts for emotional and intellectual states and space vocabulary is extended to name time concepts. In short, lexical words for concrete meanings are extended to name abstract concepts with no change in grammatical categories.

Thus, from the very essentials of meanings and forms in primitive language systems further evolutionary transformations of the language system leading to the formation of modern language systems is better understood in terms of augmentation of the proportion of human semiosis encoded in linguistic forms. The process is termed “ expansion of the expressive envelope” of language (D. Dor ,E. Jablonka 2001), although I prefer the label “semanticization” as more descriptive.

In sum, the formation of modern language systems is better understood as evolution of semantic complexity, or the increase of the number of concepts encapsulated in linguistic forms.

6.2 .1. Bio-cognitive adaptations for extended semantics

Given the central role of lexical words in language as a system for transfer of meaning, various scholars have argued that evolution has favoured capacities for fast and effective learning of a large lexicon. Ph. Liebermann argues that components of the human brain most enlarged in comparison with the ape brain are areas engaged in word memorizing and recall. Thus, the most significant language-relevant alterations in the human brain are those facilitating word learning and use.

“ the almost three fold increase in the volume of these structures (prefrontal cortex and cerebellum) and the basal ganglia, compared to chimpanzees, could have yielded the computational base and memory size necessary to rapidly learn and store the meanings of new words... .the posterior human brain, which current studies suggest is critical for accessing words from the lexicon ...is disproportionately large in humans compared to apes.” (Liebermann, Ph. 2002, p. 52).

Significantly, in the vast majority of languages a lexicon implies speech. And because , as per Saussure, phonemic distinction is a marker of semantic distinction, extended speech capacities are suggestive of increased number of phonemes demanded by an enlarged lexicon, which, in turn is suggestive of the semantic complexity of language. Thus, the species' linguistic capacities can be estimated by the capacities for speech reflected in species' anatomy. For example, Neanderthal, although likely were language-capable species, their speech abilities were likely quite rudimentary as, as Liebermann finds, their articulatory organs were not

capable of producing the so called quantal vowels /i,o,u /, uniquely attributed to the humans (Liebermann, Ph. 2006, 2007 and elsewhere).

Thus, bio-cognitive adaptations for extended semantics and a large lexicon are the most significant alteration facilitating the learning and use of modern languages. On the other hand, limitations of Neanderthal speech capacities, detected by Liebermann, point at limitations in physiological and cognitive capacities reflected in the limitations in size of the lexicon.

6. 3. Glossogenesis as adaptation to information transfer

Given that language is defined as a communication system, the shape of language systems is explicable with adaptation to the demands for accurate and efficient information sharing grammatical regularities are understood in terms of patterns formation in adaptation of language to the rich semiosis (Schoemenann, 1999, 2005) i.e. grammar is understood as adaptation to semantic complexity.

That said, David Gil (2009) argues that Riau Indonesian, a modern language and a colloquial variety of Malay/Indonesian, spoken by many millions of people as their first language , has a very basic grammar. It is described as 1. morphologically isolating. 2. syntactically monocategorial, 3. semantically associational. There is no reason to suppose that the speakers of Riau are cognitively deficient humans , thus, deficient in conceptualization . Thus, the speakers of Riau Indonesian encode their conceptual universe in simple grammar. In short, there is no clear pattern of correspondence between conceptual complexity and grammatical complexity .

In a similar vain the formation of grammatical regularities is attributed to adaptation of the language systems to the learning limitations of youngsters, proposing the Iterated Learning hypothesis which explains the emergence of compositionality (Hurford, J. 2000 ; Kirby, S.1998). That said, a universal process of regularization resulting from language learning and repeated over many thousands of generations of language learners would inevitably result in elimination of irregular forms in all languages, which would make the persistence of irregular forms in modern languages inexplicable.

Others argue for adaptation of language to the social structure of the communities. Hurford (in 2012) reveals that languages spoken by small isolated communities tend to develop complex morphologies and simple syntax. They also develop less complex deictic systems explicable with great reliance on shared knowledge , assumed implicitly, about details of social norms and patterns of communicative interactions which precludes the need to make these explicit by linguistic forms. The lexicons and grammars of small communities are also less transparent : they contain more irregular forms explicable by the fact that social norms, and linguistic norms as one of them, are easily enforceable in a small closed group.

In contrast, languages spoken by large communities open to migration develop simpler morphology and complex syntax, transparency of word formation as adaptation to the needs of newcomers who are adult second-language speakers with limitations in their language-learning aptitudes .

The argument for the role of community size and social structure is confronted by multiple

examples to the contrary as small and closed communities of Piraha (Everett, 2005), Hawaiian etc. have extremely simple languages, while Quechua, spoken by millions of Incas was highly complex as is Georgian spoken by millions. (see Campbell 2008 for more examples.) In addition, Latin, Russian, etc. are known for abundance of grammatical intricacies and irregularities.

Similarly, T. Givon, (1979, 2002) argues for adaptation of the language system in response to changing spheres of use e.g from the limitations of linguistic communication within the immediate circle of individuals, i.e. “ society of intimates”, based on information principles, i.e. topic-focus, or “pragmatic mode” known for loose word order, topic and focus marked by stress, little to no morphology , to a “ syntactic mode”, with focus on structure with subject-predicate structure , strict word order, morphology in a “ society of strangers”. He argues that languages historically change from inferential communication/pragmatic mode to code-like /syntactic mode is an adaptation to the elevated information demands of a large and informationally diverse society.

To note, code-like language systems are usually maintained by writing systems.

The argument is weakened by examples of languages, e.g. Chinese, a language functioning a large and diverse society with a long history of writing displays strong influence of pragmatic principles.

The fact of grammatical diversity suggests that its function is less about what information is encoded, but , crucially, about how it is presented as the same information can be presented both in simple morphology and mostly regular grammatical forms (for example by the grammar of modern English) as well as by complex grammars with abundant irregular forms and complex morphology (e.g. the grammar of Latin, Russian, etc.).

In sum, although communication of information is the primary function of language in all its diverse manifestations and social settings, this function is not concentrated in grammar.

6. 4. Languages as banners of group identity

It is well known that various aspects of grammar in modern languages make no semantic contribution to the message. A clear example of grammatical forms with no informative value is the category of grammatical gender marked on nouns for inanimate objects. For example, the fact that in many European languages the noun for SUN is classified as masculine gender and the noun for MOON as feminine gender is worthless as a source of information about the real world. Moreover, the gender marker of the head noun is redundantly repeated on the adjacent adjective members of the NP. Multiple redundant gender and number markings on the subject NP, object NP and the verb are also found in many languages. The double marking of negation is another example. In fact, the same semantic content can be expressed equally successfully in languages with complex grammars with multiple redundancies, e.g. Russian, as in languages with less such forms, e.g. English, which makes translation possible. Such grammatical complexities, irrelevant or even detrimental to the informative function, exist in every language while information is mainly concentrated in lexical words. In addition, as per Comrie, Kuteva (2007) almost all meanings encoded in grammatical forms can alternatively be encoded in lexical words, making the argument for a communicative function of grammar

difficult to maintain.

In this sense the fact that many aspects of language are not explicable with adaptation to disseminating factual information as a benefit to survival does not imply that the functionalist argument must be dismissed.

One logical explanation for diversity of grammars as universal phenomenon has to do with a new function of language arising from a new stage of human history, the formation of communal identity. Language originated as primarily a tool for disseminating information for survival in brute nature. At a later stage in a more diverse and stratified society the need for self-determination brought the need for ethnic and cultural diversification of communities. Language responded to these new circumstances by evolving grammatical diversity, i.e. it became a tool for uniting and at the same time dividing people. Diversification in languages could be reasonably explained as adaptation to this new phenomenon by introducing linguistic forms, which, although superfluous in their purely informative function, assumed a new function of identity, ethnic, cultural, social.

This dual functionality of language facilitates and at the same time constrains language diversity. On the one hand, no human group can exist in absolute isolation as even communities isolated by geography on islands have contacts with neighbouring communities. Throughout the history of humanity contacts among neighbouring ethnic groups lead to exchange of goods, information, cultural values. Exchange is only possible if neighbours can understand one another. Exchange of experiences and ideas stimulated language contact and language borrowing, increasing similarities and reducing differences, in this way placing limitations on diversification of languages.

While pre-civilization communities lived in relative isolation from one another and developed their unique identities, linguistic and cultural, civilization brought the emergence of commerce and the formation of empires, which triggered mass migration as a result of wars, slavery, colonization, etc. bringing significant transformation of communities. This, on the one hand, lead to formation of new communities stimulating language diversity, but on the other, created the demand for intense cultural exchange which prompted the proliferation of the languages of the powerful and drove to extinction the languages of small communities, reducing language diversity. Further, the formation of new types of communities, e.g. in colonies, created the demand for cultural and linguistic identity and the formation of new languages, i.e. creoles, creating more language diversity as in the emergence of Canadian English, American English, Australian English as languages with distinct properties diverging from English of British islands can only be explained with the formation of independent nations from the former British colonies and their strive to establish national identity. The same principle explains Canadian French, Cuban Spanish, Brazilian Portuguese, etc.. This explains the differences in meaning-form mappings in all types of constructions, from lexical to grammatical. The diversity in grammatical categories across languages is documented by Haspelmath (2007).

So, diversity of languages is a balance between the two major functions of language, information and social identity. Thus, although information sharing is the primary function of language in all social settings, the function of a banner of group identity is a close second.

7. Language capacity, innate and emergent

In generative/biolinguistic context language diversity is explained by the principles and parameters approach with differences in choices of parameter settings. That said, there is no agreement on the exact number of parameters as additional parameters are continuously postulated. In addition, the location of each parameter in the brain and the brain mechanism by which the choice of parameter is reflected in the brain development is, to my knowledge, not known.

The emergentist paradigm argues that at birth learning mechanisms are simple and general, while specialized neuronal organization is emergent and experience-dependent. In this context a language faculty is an emergent property of the adult human mind a network of neuronal connections specialized for language -relevant functions as an aspect of the adult brain, formed during childhood from experience with language. For example, the learning of a lexicon is understood as emergent association of three types of neuronal maps in three areas of the cortex : concept map, articulatory map and auditory map (Ellis 1998, MacWinney 1998 p.7.) The emergence of a language faculty by coordination of relevant abilities in the individual presupposes synergistic activities in various contexts :

A. synergy among organs and systems in the individual organism:

a. synergy among the articulatory organs for the purpose of speech production

b. synergy among cognitive capacities :

*capacity for reference

*capacity for symbolic representation

*capacity to form categories (things and actions are universal categories)

capacity for mind-reading, or theory of mind

* capacity for self-monitoring, or metacognition

* consciousness

* intentionality

*capacity to learn , extended memory

* imagination, planning

* capacity for socialization

B. cognitive and behavioural synergies among the members of a group:

a. synergy in behaviours resulting in common cultural practices

b. synergy in conceptualization resulting in the so called “ common ground”, a standardized views of reality reflected in myths, folklore, etc.

At the same time some innate guidance for language prior to experience in the human organism must be undisputed given the species-specific nature of linguistic behaviour. That said, the emergentist argument, in my mind, cannot be viewed as alternative to the biolinguistic argument for innate UG. Instead, for the purposes of this paper, while acknowledging the contribution of each of the two currently rival paradigms, one could incorporate elements of both while avoiding the deficiencies of each, one could propose borrowing from the biolinguistic terminology but also reinventing it as follows. An innate language capacity as instinct-like predispositions for learning content words and essential grammatical categories at the earliest, currently associated with protolanguage, is most

accurately labeled as FLN, while the label FLB could be reinvented to refer to the bio-cognitive resources for learning idiosyncrasies of the local sociolect is formed during development.

To note, Friederici (2017, p. 229-) has demonstrated that children master the essentials of language by age of 5 years and processing of complex grammar is achieved much later, by 11 years, i.e after 11 years of experience with the local language and, in modern societies after years of schooling. And although Friederici attributes such facts to late development of the innate UG, a more plausible explanation is that the grammatical complexities of the local language are learned from experience.

Thus, language is attained and functions with the participation of a FLN, i.e. language capacity for learning and use of protolanguage -like systems in addition to FLB, i.e. an emergent association of general capacities which builds upon what is already innately available and makes possible the learning of the details of the local sociolect.

7.1. Diversity of individual language capacities

In generative/biolinguistic context the stipulation of innate uniform Language Capacity is at the heart of the generative argument. That said, although a human individual is a representative of the human species as each individual displays all the defining biological, cognitive, behavioural etc. traits differentiating us from other species, at the same time an individual displays unique characteristics as a genotype, phenotype and behaviour with a unique personality, product of unique circumstances of upbringing, suggesting pervasive variation at all these levels.

From neuro-scientific perspective variation is found in: 1. brain weight, 2. neuro-vascular organization, although not directly linked to cognitive abilities, differences in vascular patterns can lead to different outcomes in cases of brain damage. 3. individual brains are shaped differently, influenced by multiple factors, sex and hand preference being of primary importance (Mueller, R.A.1996). In addition to purely biological variation, diversity in experience is a significant contributor as variation in the structure of Wernicke's area corresponding to differences in sex, education and profession and Hurford and Dediu (2009) talk about the correspondence between biological and linguistic idiosyncrasies.

Moreover, 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 individuals. Dabrowska (1997, 2006, 2012) demonstrates significant individual differences in levels of proficiency in individuals as a reflection of differences in education and training which result in different learning strategies. Studies by Slobin (1982), Tomasello (2000 and elsewhere) and others show that in addition to individual learning strategies learners tailor their learning strategies to the languages learned. That is, English, Italian and Turkish are learned by different strategies tailored to the specifics of the language learned. In sum, the human individual has universal properties which make him/her a human language speaker and unique properties which make him/her a speaker of a sociolect and idiolect.

7.2. Diversity of language capacities in idiolects and sociolects

Mufwene proposes a new dichotomy, the adoption of which I find instrumental for understanding the language faculty.

* idiolect, i.e. the abstract system in the individual mind, and sociolect, defined as extrapolation from the common features of idiolects in a community. The formation of an idiolect happens during language attainment at early age when the individual forms a unique language system comprised of a lexicon of constructions by extracting general patterns from exposure to samples of multiple idiolects (Mufwene, 2013 and elsewhere).

* sociolect, or communal language system, is defined as extrapolation from the idiolects . It is not the language of the ideal speaker and is not the sum total of the idiolects. It is an abstract system of rules for correspondence of form and meaning, reflecting the commonalities of individual I-languages. The communal language emerges through the communicative interactions of the individual speakers without a blueprint, plan or prototype . It is the “common core” which emerges through the interactions of the idiolects.

To remind, the outcome from self-organization processes is different for different ontological categories .In the case of idiolects the self-organization occurs among the neurons in the child's brain. The self-organization of the sociolect, on the other hand, results from input of multiple brains which interact in coordinated ways.

Given the variation in innate biological and cognitive as well as developmental aspects in addition to variation in experience with sociolects, variation in idiolects is to be expected.

Summary and conclusions

The two rival theoretical perspectives define language in their own terms: the generative/biolinguistic perspective defines language in biological terms as a language faculty, while the usage-based perspective defines language in terms of communicative behaviour.

This definitional controversy, naturally invites parallel controversy in the explanation of the language genesis. So, the main axis of the debates is on phylogenesis, that is, the history of a biological organ, vs. glossogenesis, that is the history of linguistic forms .

That said, claims of innate Universal Grammar have been refuted as studies in typology have demonstrated that successful communication is quite possible without or with the bare minimum of it, suggesting that grammatical intricacies of UG are largely a frill. In short, complex grammar could not be a product of phylogenesis.

On the other hand, the fact that language is a species-specific trait is a strong suggestion of some form of innate predispositions for language-relevant properties.

The present article argues for universal predispositions specified for the formation of the very essentials of language, exemplified by the rudimentary systems, shown to be indispensable and highly adaptive in pre-civilization environments. Phylogenetic processes of various types and contexts have participated in this evolutionary achievement.

The semantic detail and grammatical intricacies found in modern languages have emerged as reflection of the diverse preferences of individual communities in encoding the rich semiosis in linguistic terms demanded by civilizations. A diverse arsenal of cognitive resources shared by other behaviours is coordinated to make it possible. Glossogenetic adaptation to social and

cultural changes explains spacial and temporal diversity of modern languages.

In sum, the article challenges the current understanding of language evolution in terms of two mutually exclusive alternatives, either as phylogenesis of Universal Grammar or by glossogenesis of linguistic forms. It advocates for an alternative where the recognition of the participation and interaction of various types of processes in diverse contexts and time frames could have theoretical implications by furnishing a more comprehensive theory of language evolution.

References

Baldwin, M. 1896, A new factor in evolution, doi:10.1086/276408

Bickerton, D. 1984 The language bio-program hypothesis, BBS, 7 , p. 173-221

Bickerton, D. 1990, Language and species, University of Chicago Press

Bishop, D. 2009 Language impairment and the genetic basis of syntax, in Bickerton, Szathmari, eds. Biological foundation and origin of syntax, MIT, 185-207

Bloom, P. 2000, How children learn the meanings of words, MIT

Campbell, L. 2008, What can we learn about the earliest human language by comparing the languages of today, in Demoule et all. eds. Origin and Evolution of Languages, Approaches, Methods, Paradigms, Equinox Publishing Indonesia

Chomsky, N. 1995, The Minimalist Program, MIT

Comrie, B., T. Kuteva, 2007, The evolution of grammatical structures and “ functional need” explanations, in Tallerman, Language Origins, Perspectives on Evolution, Oxford Univ. Press, p. 185-208

Croft, W. 2000 , Evolutionary model of language change and structure, in Explaining language change, an evolutionary approach, Longman

Croft, W. 2003, Social Evolution and Language Change,
www.umn.edu/~wcroft/Papers/SocLing.pdf

Cysouw and B. Comrie , 2013, Some observations on the typological features of hunter-gatherer languages , in Bickel et all. Eds., Language typology and historical contingency, in honour of Johanna Nickols, John Benjamins p. 383-394
doi.org/10.1057/tsl.104.17cys

Dabrowska E. , 1997, The LAD goes to School, a cautionary tale for nativists, *Linguistics* 35 p. 735-766

Dabrowska, Ewa, James Street , 2006, Individual differences in native language attainment , Comprehension of passive sentences by native and non-native English speakers, *Language sciences* , 28, p. 604-615,

Dabrowska, Ewa (2012) Different speakers, different grammars: Individual differences in native language attainment. In *Linguistic Approaches to Bilingualism*, 2 (3). pp. 219-253

Davis, B.L., P. MacNeilage , 2004, The frame-content theory of speech evolution, from lip-smacks to syllables, *Primatologie*, vol 6 , p. 305-328

Dediu, Levinson, 2013, On the antiquity of language: the reinterpretation of Neanderthal linguistic capacities and its consequences, *Front. Psychol.* 05, July 2013, 4(397):397
doi:10.3389/fpsyg.2013.00397

Dediu, Levinson ,2018, Neanderthal language revisited, not only us, in *Current opinion in Behaviour and Brain Sciences*, 2018, 21: 49-55

De Graff, M. , 2001, On the origins of Creoles, A cartesian critique of Neo-Darwinian linguistics, *Linguistic Typology*, vol.5, no. 2-3, p. 213-310

Evans, V. Levinson, S. 2009, The myth of language universals: language diversity and its importance for cognitive science, *Behavioural and brain sciences*, (32), p.429-492, Cambridge University Press

Everett, D. 2005, Cultural constraints on grammar and cognition in Piraha: another look at the design features of human language, *Current anthropology*, 46(4), 621-634

Friederici, A. 2017, *Language in our brain, The origin of a uniquely human capacity*, MIT Press

Gil, David, 2009, How much grammar does it take to sail a boat? In G. Sampson, P. Trudgill, eds. *Language complexity as an evolving variable*, Oxford Univ. Press

Goldin-Meadow, S.,2002, Getting a handle on language creation, in Givon,T., Malle,B. eds. *The evolution of language out of pre-language*, John Benjamins,

Haspelmath, M. 2007, Pre-established categories don't exist, consequence for language description and typology, in *Linguistic Typology*, 11(1), p. 119-132

www.eva.mpg.de/fileadmin/content_files/staff/...Preestablished.pdf)

Heine, B. , T. Kuteva, 2007, The genesis of grammar, a reconstruction, Oxford Univ. Press

Hurford, J. 1991, The evolution of critical period for language acquisition, *Cognition*, 40 p. 159-201

Hurford, J. , S. Kirby , 1999, The co-evolution of language size and the critical period , in *Birdsong, Second language acquisition and the critical period hypothesis*, Lawrence Erlbaum Assoc.

Hurford, J, D. Dediu, 2009, Diversity in languages, genes and the language faculty, in Botha and Knight, *The Cradle of Language*, Oxford Univ. Press, chap.9, p. 163-184

Hurford, J. 2012, *The origins of grammar*, Oxford University Press

Jablonka, E., Lamb, M. 2005 *Evolution in four dimensions*, MIT Press

Kaan, E. 2009, Syntactic phenomena and their putative relation to the brain, in Bickerton Szathmari, eds. *Biological foundations and origin of syntax*, MIT 117-135

Kirby, S. 2007, The Evolution of Language, in Dunbar, Barret eds. *Oxford Handbook of Evolutionary Psychology*, p. 669-681, Oxford Univ. Press

Klein, W., Perdue, C.,1997, The Basic Variety or Couldn't natural languages be much more simpler?, in *Second Language Research*, vol.13, p. 301- 347

Lakoff, G., Johnson, M., 1980, *Metaphors we live by*, University of Chicago Press

Lenneberg, E. , 1967, *The Biological Foundations of Language*, Wiley and Sons

Liebermann, Ph. 2000, *Human Language and our reptilian brain*, Harvard Univ. Press

Lieberman, Ph., 2006, *Towards an Evolutionary Biology of Language* , Harvard Univ. Press

Liebermann, Ph. 2016, On the evolution of language and thought, in *Journal of Anthropological Sciences*, vol. 94, p. 127-146

MacNeilage, P. 1998, The Frame-Content Theory of Evolution of Speech Production, *BBS*, 21, p. 499-546

Maynar Smyth, J. Szathmary, E. 1995 *The major transitions in evolution*, Oxford University

Press

Mufwene, S. 2007, What do creoles and pidgins tell us about the evolution of language? In B. Laks et al. *The Origin and Evolution of Languages, Approaches, Models, Paradigms*, Equinox

Mufwene, S. 2013, *The origins and evolution of language*, in Allen, K. ed. *The Oxford Handbook of the History of linguistics*, chap. 1

Mufwene, S., 2014, *Language Ecology, Language Evolution and the actuation question*, in Tor Afarly, Brit Maelhum, *Language Contact and Change, Grammatical Structure encounters the Fluidity of Language*, John Benjamins, p. 13-35

Sandler, W, Meir, I. Padden. C. Aronoff, M., 2005, *The emergence of grammar, systematic structure in a new language*, PNAS, 102, (7), p. 2661- 2665

Schoenemann, T., 1999, *Syntax as an Emergent Characteristic of the evolution of semantic complexity*, , *Minds and Machines*, 9, p. 309-346

Schonemann, T. , 2005, *Conceptual Complexity and the Brain: Understanding Language Origins*, in J.W. Minett, SY William, *Language Acquisition, Change and Emergence, Essays in Evolutionary Linguistics*, Univ. of Hong Kong Press, chap. 3, p. 47-94

Scott-Philips, T. 2014, *Speaking our minds, why human communication is different and how language evolved to make it special*, Palgrave, MacMillan

Slobin, D. , 1982, *Universal and Particular in the acquisition of language*, in Wanner, Gleitman, eds. *Language Acquisition, The state of the Art*, Cambridge Univ. Press, p. 128-170

Slobin, , 2002, *Language evolution, acquisition, diachrony, probing the parallels*, in Givon, Malle, *The evolution of language out of pre-language*, p. 375-392,

Slobin, D. 2004, *From ontogenesis to phylogenesis, what can child language tell us about language evolution*, in Langer, Parker, Milbrath, eds. *Biology and knowledge revisited; From Neurogenesis to Psychogenesis*, Lawrence Erlbaum, Assoc. p. 255-285

Steels, L. 1995, *A self—organizing spacial vocabulary*, in *Artificial life*, 2(3), p. 319-332, MIT

Tomasello, M. , 2000, *First Steps Towards a Usage-Based theory of Language Acquisition*, *Cognitive Linguistics*, 11-1/2, p. 61-82, Walter de Gruyter

Tomasello, M. 2008, *Origins of Human Communication*, MIT Press

Zaefferer, 1991, *Semantic universals and universal semantics*, Foris Publications

◇ *Svetlana T. Davidova* is a linguist, unaffiliated researcher, based in Toronto, Canada
address for correspondence: svetlana.t.davidova@gmail.com
