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Biolinguistics, the 'Magnetic' Mechanism of Language Faculty and Language Acquisition

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Abstract: Linguists, language teachers and educators are most of the time confronted with questions as to what knowledge of language is, how it develops in children, how they acquire it, etc. If the assumption that children are innately, genetically and biologically endowed with a language faculty is correct, then, again several other questions are imposed. The latter include questions such as what this language faculty is, what it contains that allows children to acquire any language, in addition to their L1, how this "containment" looks like, and more importantly, how it works. This paper, thus, addresses these issues from biological and physical perspectives, hence, correlating both aspects with language acquisition process. It proposes a novel theory of human language faculty working mechanism, arguing that there is a 'magnetic mechanism' underlying the biological architecture that makes it able to "attract" all and only human languages. This mechanism enables both children and adults to acquire any language(s), controlled by distance (i.e. nearness/farness) of such language(s) from the language faculty, and velocity of attraction. The theory has pedagogical implications for language acquisition of L1, L2, L3… L_n, and in both cases, viz. child as well as adult language acquisition.

Keywords: biolinguistics, physics, language faculty, knowledge of language, Universal Grammar, magneticity, language acquisition

1. INTRODUCTION

Linguists, language teachers and educators are much overwhelmingly puzzled by questions as to what knowledge of language is, how it grows, how it is acquired, what sort of "capacity" humans have that makes them acquire language, how this "capacity" looks like, and overall, how it works, among many others. Given this, then, we need to start thinking of developing a theory, even a subpart of a theory, as Epstein&Seely (2002, p.1) have put it:

> Anyone seeking to understand how humans acquire the knowledge they have, and interested in explicitly characterizing what the knowledge is, must engage in the development of a theory. Whenever asking "What exactly is X?" and "How does it develop?" and seeking an explanatory answer, the only way to proceed is to construct a theory, however preliminary or undetailed.

Given this, it seems that the *only* tenet a linguist needs to understand knowledge of language and its acquisition process is to hypothesize rules, deeply probe these rules by testing them against actual data, and hence come up with a theory, leaving aside how 'perfect' this theory might be. In fact, the 'perfectness' of such a theory may not be ultimately achieved because knowledge of language is one of the most complicated and abstracted concepts human research has come across; so many facts have been discovered, yet, more are still mysterious about it up to date (Shormani, 2014a).

The issue of studying human language and how it is acquired started several centuries back and those "caring" for such an issue include many philosophers, beginning with Plato and ending with Quine, psychologists beginning with Mendel and ending with Pinker; linguists beginning with Siibawayh, and ending with Chomsky, evolutionists beginning with Darwin and ending with Dennett, biologists beginning with Beddoes and ending with Gould, and many other scientists. Knowledge of language and its acquisition has also been the concern of several approaches such as behaviorism advocated by Skinner, structuralism advocated by Saussure, cognitivism, advocated by Paiget, mentalism advocated by Chomsky, etc.

However, the views these theories and approaches have come up with were not satisfactory. For example, Chomsky (1959) severely criticizes Skinner's views and assumptions on language acquisition. In fact, Chomsky was puzzled by Skinner's ideas and assumptions of how

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language is acquired. The latter 'equalizes' learning simple tasks by animals, a chimpanzee, for instance, with simple mental capabilities (if any), to learning language by human, a child, for example, who is a very sophisticated creature, with very high mental abilities and capacities. Skinner's hypothesis, viz. *Stimulus>Response>Reinforcement* was rejected by Chomsky.

The latter provides imprinting as the most striking evidence that there is an innate disposition in bees, for example, when they learn how to point to a particular direction by means of a special dance, or birds when they respond appropriately to a special song. He also stresses that all these patterns of animals' behavior can be learned without the need to be rewarded. However, though menatlism accounts for several facts involved in language acquisition process, it also fails to account for certain phenomena (for criticism on mentalism, see, for example, Shormani, 2014a; Pinker, 1995, 1997).

Though much has been said about how human language faculty (LF) looks like, how it grows in children and what it contains, the issue of how this faculty works is still very far from being settled. This paper, therefore, develops a theory of human language faculty, arguing that there is some sort of 'magenticity' underling its biological architecture. This magneticity gives LF the attracting mechanism by which it works. Thus, the remaining part of the paper goes as follows. Section 2 discusses the biological bases underlying the study of language, and its relation to other scientific phenomena. In particular, it provides answers to the questions outlined in (1) below. This section will be the basis on which the theoretical foundations of section 3 are built. Section 3 tackles the human language faculty, focusing on its nature, structure and containment. In this section, some notions from physics like 'magnetic attraction,' distance and velocity will be adopted to account for LF working mechanism, and section 4 concludes the paper.

2. BIOLOGY, BIOLINGUISTICS AND THE STUDY OF LANGUAGE

The study of mind, and language and its biological bases marked the "second cognitive revolution" in the last five decades or so (Jenkins, 2000). Much concern of such revolution has also been devoted to investigating language acquisition and revealing its hidden secrets that remained uncovered for long time. For example, Lenneberg (1967) crystalizes the biological bases of the language faculty. In the seventies, building on Lenneberg's (among some other's) ideas, Chomsky revolutionized the study of language, attributing much of it to biological bases.

In fact, Chomsky's revolutionary ideas started much before that, specifically with his *Standard Theory*. He has brought to language acquisition scene a very important conclusion, i.e. the fact that children of whatever origin acquire language with "remarkable rapidity" and "to a large extent independently of intelligence," proposing that "human beings are somehow specially designed to do this, with data-handling or 'hypothesis-formulating' ability" (Chomsky, 1959, p. 20). Given this, formal generative theories and approaches to language acquisition have been overwhelmingly puzzled by many questions, the most important of which are presented in (1) below (see also Chomsky, 1991; Shormani, 2015; Jenkins, 2000; Stroik&Putnam, 2013; Hornstein, 2009):

(1)

a. What constitutes knowledge of language?
b. How does this knowledge grow/evolve)?
c. How is this knowledge acquired?
d. What are the relevant brain mechanisms?
e. How is this knowledge put to use?

Within biolinguistic ontogeny, answering these questions has been one of the major issues in linguistic inquiry, attracting a considerable number of linguists and researchers in the generative line of thought, starting from the early 1950s up to the present time. From a biological perspective, (1a) represents substantial importance to the study of language, what was traditionally known as *Humboldt's problem*. Humboldt was confined by what constitutes *knowledge of language* (Hornstein, 2009). It also concerns the knowledge or the faculty of language (Stroik&Putnam, 2013; Jenkins, 2000). For example, Jenkins, (2000, p.64-69) argues that it lies in the biological structure of the brain "as a set of interacting modules, including the language faculty, the number faculty, the visual system." This is due to the fact that, from a neurolinguistic perspective, the brain is considered 'a *tabula rasa'* consisting "of highly specialized language areas and/or circuits." The modules constituting the brain are what innately, genetically and tacitly every child is endowed with.

As for (1b), it is referred to as *Darwin's Problem*. This question is concerned with the basic notion of how language evolves in human beings alone (i.e. species-specific). Regarding (1c), the question addresses what has been known as *Plato's Problem* (see e.g. Chomsky, 1986). The latter is relating to the question as to how children build 'perfect grammar' from the unsystematized and unprincipled input they have experienced (Shormani, 2012, p. 54, see also Lightfoot 1982). To explain such a phenomenon, Chomsky (1987) holds that children have an innate faculty in their brain, which is responsible for, and guide them to master these complex linguistic rules in an early age. (1d) has been

referred to as *Broca's Problem*, concerning the structure of the language faculty from a Neurolinguistic perspective: what is there in the brain that makes humans produce and perceive language. In fact, Broca studies the language disorder some children are suffering from, and has concluded that there is an area in the brain, which is located in the frontal lobe of the left hemisphere, responsible for speech production and that if it is damaged, it causes a language disorder. This area has been given his name, i.e. Broca.

Regarding (1e), it has been referred to as *Descartes' problem*. Descartes' problem may be a special case of the problem of explaining how it is that the human science forming capacity sometimes yields a "partial convergence" with "our ideas and the truth about the world" (Chomsky, 1988,p.158). In fact, *Descartes' problem* was mainly based on a logical/pragmatic perspective, i.e. how we understand a piece of language differently in different contexts. Exemplifying such phenomena, Shormani (2013, p20f, 2014a, p. 78) provides several examples as follows. When you ask someone to lift a heavy table but they could not, then you will say: "Oh, you are *very strong*!" while what you really mean is that he/she is *very weak*. This means that language is a rule-governed system, controlled by contextualization: any piece of language may mean something in one context but something else in some other context. For example, the word "Hello" may be used to draw someone's attention, to ask who is there, to greet someone, to express dislike among other uses and meanings accompanied with linguistic factors, i.e. vocal but non-verbal factors like *intonation*, *stress*, etc. and non-linguistic factors, paralanguage factors like the tone of voice. This is just for the word, or more specifically the utterance, "Hello", let alone a complete sentence.

What makes the biolinguistic approach different from other approaches like the psycholinguistic (behaviorist) one (known in the literature as Skinnerian), structural linguistics (Saussurian), etc. is the fact that the study of language seems to enter a "new world" of inquiry as a scientific discipline, resembling any other natural phenomenon like physics, mathematics, chemistry, etc. The generative approach to language acquisition has been viewed as biological in nature, and neurological in orientation, thus resembling natural phenomena. One piece of evidence for this is the structure of the brain, and those approaches of nature have been of much help to understanding language (Adger, 2002). Based on this assumption of human language, it has been assumed that some of the linguistic structures belong to nature, and that natural theories could be made use of in describing language as a natural phenomenon.

As is noted above, the questions presented in (1) and answering them revolutionize the study of language, and lead to the emergence of biolinguistics. Of these questions, in particular, are (1a), i.e. knowledge of language, (1c), viz. acquisition of language, and (1d), namely use of language. (1b) and (1e) then follow from the nature of the former three (Jenkins, 2000). Biolinguistics shapes and paves the way to studying language as a scientific discipline like other natural phenomena, as noted above. In addition, these questions have also been answered by several philosophers, biologists, acquisition specialists, evolutionists, linguists and other scientists for the purpose of understanding the nature of language, and how it is acquired.

Many geneticists and molecular biologists note that attempts to answer such questions began with the advent of generative grammar in the early 1950s. For example, the geneticist and molecular biologist Monod (1974, p.129) argues that there is no surprise that "the linguistic capacity revealed in the course of the brain's epigenetic development is today part of 'human nature', itself defined within the genome in the radically different language of the genetic code" (see also Jenkins, 2000). Along these lines, Jacob (1976, p.322) asserts that "there is a basic grammar common to all languages; this uniformity would reflect a framework imposed by heredity on the organization of the brain." Jacob adds that language is part of the human nature, like any other trait, which could be "inserted in the framework established by the twenty-three pairs of chromosomes that make up the common inheritance of man."

The same also holds true concerning the efforts devoted by linguists to the study of language. For example, Chomsky (1991, p.6) seeks answers to questions as to how to integrate appropriate answers to the questions in (1) 'within the existing natural sciences' like physics, chemistry, mathematics among others, even if they need to be modified. In fact, this era marks the beginning of biolinguistics which was considered part of the "second cognitive revolution." Chomsky and his followers have been mainly concerned with a general theory of language that is concerned not only with characterizing native speaker's knowledge of language, but also how this knowledge is put to use in concrete situations. The former is so-called competence and the latter performance, the former is manifested by the set of rules of specifications characterizing UG (= Universal Grammar) or the *Initial State* of the language faculty every human is genetically predisposed with. Competence is often referred to as *I-language*, i.e. the internal language, and performance is referred to as *E-language*, i.e. the external language. UG verifies the actual status of the *Initial State* as "an ideal speaker-

listener in a completely homogenous speech community who knows its language perfectly" (Chomsky, 1965, p. 3) and not his/her E-language, i.e. what he/she says, i.e. performance. Human language has been investigated as a biological phenomenon, and "[e]mbedding the study of I-language in the biolinguistic framework is entirely natural; an individual's language capacity is, after all, an internal property" which still persists. However, UG, as an internal and integrated part of human language faculty, and in its 'technical sense' should "not be confused with descriptive generalizations" like those advocated in Greenberg's universals (Chomsky, 2013, p. 36).

3. LANGUAGE FACULTY

In the biolinguistic approach to the study of language, there are several proposals (see among many others Chomsky, 1959, et seq; Shormani, 2012, et seq; Jenkins, 2000; Cook, 1983; Fodor&Piattelli-Palmarini, 2010; Jacob, 1967; Jackendoff 2003; Stroik&Putnam, 2013; Lightfoot, 1982; Hornstein, 2009; Boeckx, 2009) which all ascribe the knowledge of language humans possess to a faculty in the brain called *language faculty* every human is genetically, innately and biologically endowed with. In fact, the assumption that language faculty is the source (or the "black box") of language was articulated several centuries back by an Arab linguist and philosopher, called *Ibn Khaldoun* (1332-1406). This section, thus, addresses such issues as to how this faculty looks like, how it grows, what 'things' it contains, and most importantly how it works, correlating both biology and physics with language acquisition process (thanks to a *JTTE* anonymous reviewer).

3.1. *What LF looks like*

This section provides as clear a picture of language faculty as possible. Recall that the biological theory has been considered a theory that tries to characterize the innate human 'language faculty,' which is viewed as any other performance modular system in terms of its behavior. Biologically, language faculty is considered to be an "organ of the body," along with other cognitive systems. The idea of the biological nature of the human faculty of language comes from linguistics. Following Chomsky's early ideas, some linguists (see e.g. Stroik&Putnam, 2013; Boeckx, 2009; Jenkins, 2000) hold that linguistics suggests "core internal properties of the language faculty, that in turn posed important questions for biology," and that the biological properties are related to UG, and "the syntactic computations of the language faculty are the biological evidence" (Jenkins, 2000, p. 3).

Human language faculty has also been viewed as part of the overall architecture of the human mind/brain, interacting with other systems. It has also been regarded as part of the sensorimotor apparatus and the systems that enter into thought, imagination, and other mental processes, as well as, their expression and interpretation. This explicitly suggests that language faculty does not work independently of other components of the brain, but rather interacts with them. To Chomsky (1996), the interaction between language faculty and other modules (i.e. cognitive and neurological systems) is imposed by interface properties such as linearization and sound-meaning relations. In that sense, language faculty is embedded among other systems, which 'set constraints' on what this faculty must be if it is to function within the mind/brain. For example, systems like articulatory and perceptual "require that expressions of the language have a linear (temporal, "left-to-right") order at the interface; sensorimotor systems that operated in parallel would allow richer modes of expression of higher dimensionality (Chomsky, 1996, p. 29). Language faculty has also been seen as a biological module consisting of "a number of submodules; e.g., the lexicon, the computational component, semantics, morphology, the phonological component, and phonetics" (Jenkins, 2000, p.145).

Furthermore, language faculty is sometimes equated with language (Chomsky, 2005). In fact, biolinguistics in general views a person's language as a state of some component of the mind/brain. Following the common assumption in biolinguistics approaches to language study, Chomsky (2005, et seq) holds that language faculty resembles or is part of human intellectual capacity, arguing that "whatever the human intellectual capacity is, the faculty of language is essential to it" (Chomsky 2005,p.3). If the faculty of language, as assumed by Chomsky, possesses "the general properties of other biological systems, we should, therefore, be seeking three factors that enter into the growth of language in the individual:

i. Genetic endowment, apparently nearly uniform for the species, which interprets part of the environment as linguistic experience, a nontrivial task that the infant carries out reflexively, and which determines the general course of the development of the language faculty. Among the genetic elements, some may impose computational limitations that disappear in a regular way through genetically timed maturation.

ii. Experience, which leads to variation, within a fairly narrow range, as in the case of other subsystems of the human capacity and the organism generally.

iii. Principles not specific to the faculty of language.

These three factors, Chomsky argues, are the cornerstones of not only the language faculty but also of language itself. In (i), for instance, genetic endowment of language is species-specific. This genetic endowment may also contain the computational system which is responsible for computing the linguistic objects, i.e. lexical items *selected* from the lexicon. (ii) seems to suggest a relation between the language faculty and other systems of human capacity. The third factor, Chomsky holds, "falls into several subtypes: (a) principles of data analysis that might be used in language acquisition and other domains; (b) principles of structural architecture and developmental constraints that enter into canalization, organic form…including principles of efficient computation" (Chomsky, 2005, p. 6).

The above three factors, specifically the third one, provide answer to "The general question … How far can we progress in showing that all language-specific technology is reducible to principled explanation, thus isolating the core properties that are essential to the language faculty, a basic problem of linguistics?" (Chomsky, 2005, p. 11, see also Stroik&Putnam, 2013, p. 5). In his own words: "language independent principles of data processing, structural architecture, and computational efficiency… [answer] the fundamental questions of biology of language, its nature, use, and perhaps even its evolution" (Chomsky, 2005, p. 9). Along these lines, Stroik&Putnam (2013, p.6) argue that "the evolution of organisms is not primarily governed by extrinsic forces, but rather is driven by the design properties internal to the organism in question."

3.2. *How LF grows*

Suppose there is a question like "If … every human innately possesses a UG in his brain, and since sounds constitute part of UG, why can't an infant [at least] produce the sounds of its language?" Given the biological nature and structure of LF, discussed in the previous sections, an answer to this question would be as follows.

If human language faculty is an organ, like any other organ of the body, as assumed so far, then it is possible that it grows like these organs or performance systems. Up to six months, a child cannot *walk, eat* a piece of bread, and so on. The mere explanation of the fact that children, on average, cannot *walk* by birth to six months is that their 'walking system' is not matured enough. The same thing can be said about other functions like eating. That a child at the age of six months, for instance, cannot *eat* a piece of bread comes from the fact that his/her *digestive system* is not matured enough. Take, for example, the teeth, at the age of six months, a child does not have teeth, and therefore, he cannot bite/grind a piece of bread. Thus, a child can *walk* and/or *eat* only when his/her systems responsible for *walking* and *eating* are matured enough to perform these functions.

Considering the 'maturity' of these systems a crucial factor for *walking* and *eating*, and considering language faculty a biological system, it, then, follows that from birth to about one-word stage, the child's language faculty is not matured enough to produce adult's sounds/speech. Children allover the world, pass through similar stages in their acquisition of their L1s regardless of the languages to be acquired. These stages start from crying at birth to Mature speech attainment around ten years (see Aitchison 1989, p.75; Shormani, 2014b, p. 28, see also Mitchell&Myles, 2004, p. 34ff). The stages children go through suggest that language faculty 'grows' like any other organic system.

To elaborate, the coincidence of age and language acquisition stages indicates that the growth of language faculty could be equated with the growth of language in children. The child's language growth could be divided into three major stages, which in turn can be divided into several substages. These two major stages are: i) sound stage, ii) word/phrase stage, iii) sentence stage. It has also been noted that each stage is coincided with certain age. The sound stage, for instance, starts from birth and extends approximately to eight months. This stage includes the crying stage, the cooing stage and the bubbling stage. The word stage starts from 12 months and extends approximately to five years. The word stage includes the one-word stage, the two-word stage and the three-word stage. In this stage, the child acquires word inflection and rare or complex constructions. The final stage, i.e. the sentence stage, starts from six years and extends approximately to twelve years. In this stage, the child acquires mature speech. These stages in fact mark the usual cases, leaving aside some rare cases like early or late acquisition.

Regarding the language faculty as a mental property, Chomsky (1988, p. 168) addresses the issue of how the number faculty develops, and whether there may be some sort of correlation between it and language faculty. He concludes that number faculty cannot be assumed to be 'specifically selected.' Along these lines, Atkins (1994, p.119) argues that human mathematical capacity "did not evolve because there were selective advantages in being able to solve quadratic equations or to write tensor field equations." However, the assumption that the human mathematical capacity does not evolve poses a real problem for biological theories, and the question is "[w]hy do we have the mathematical ability, since it was never a factor in evolution?" Chomsky concludes that "the mathematical ability is just a reflection of some other ability." This "other ability," Chomsky argues, may

be the language faculty. In other words, Chomsky proposes that "the number faculty developed as a by-product of the language faculty" (Chomsky. 1988, p. 169). Along these lines, Fodor&Piattelli-Palmarini (2010, p. 27) argue that "the whole process of development, from the fertilized egg to the adult, modulates the phenotypic effects of genotypic changes, and thus 'filters' the phenotypic options that ecological variables ever have a chance to select from."

One interesting fact about language faculty is the rapidity of the growth of the language in children (Chomsky, 1965). In this aspect, Boeckx (2009, p. 46) observes that "everyone who has thought about the evolution of language seems to agree that it… happened within a very short space of time" (see also Stroik&Putnam, 2013). In the generative stream of thought and syntax theorization, the rapidity of language growth and development has been a focus of Chomsky starting from his *Standard Theory* in the sixties up to his *Minimalism*, which extends from 1993 up to date. In *Standard Theory*, for example, his *Syntactic Structures* marks the beginning of generative tradition of syntax. This theory has witnessed several developments and modifications. So has UG. The modifications can be traced through the names it has been given along the years such as *Standard Theory, Extended Standard Theory, Revised Extended Standard Theory, Government and Binding, Principles and parameters* and finally *Minimalism.*

In these developments and modifications, Chomsky (1957-2013) employs several assumptions, hypotheses, laws and theories that have been made use of in natural sciences like biology, physics, mathematics, chemistry, etc. For example, Chomsky (1994, p. 564) refers to Lenneberg's biological thoughts as crucial ingredients in describing the role played by UG in understanding the study of language, and how it is acquired, stating that Lenneberg "presents a very interesting discussion of the part that biological structure may play in the acquisition of language, and the dangers in neglecting this possibility."

In fact, UG has passed through several stages, and what was true in its early stages may not be so now. In Chomsky's own words:

> The field is changing rapidly under the impact of new empirical materials and theoretical ideas. What looks reasonable today is likely to take a different form tomorrow. That process is reflected in the material that follows. Though the general framework remains, the medications at each point are substantial. Concepts and principles regarded as fundamental in one chapter are challenged and eliminated in those that follow. These include the basic ideas of the Extended Standard Theory that were adopted in the [Principles and Parameters] approaches: D-Structure; S-Structure; government; the Projection Principle and the ϴ-Criterion; other conditions held to apply at D- and S-Structure; the Empty Category Principle; X-bar theory generally; the operation *Move a*; the split-I[Infl] hypothesis; and others. Whether these steps are on the right track or not, of course, only time will tell. Chomsky (1993, p. 10)

As could be understood from the quote above, UG as a theory of language acquisition has undergone radical changes. In fact, much of the work on the role of UG in language acquisition, be it L1 or L2, has been formulated under the GB (=*Government and Binding*, sometimes referred to as *Principles and Parameters* (P&P), these two terminologies will be made use of interchangeably) in the 80s. However, changes have been recurrent in linguistic theory since then. Those properties, where P&P accounts for them in terms of principles, have been reduced under minimalism. Parameters get more constrained, more than they are in GB due to their association with variation in the lexicon. In minimalism, the computational system (C_{HL}) is 'given' by UG and is invariant. What varies is properties of the items that enter into the computation, their feature composition and feature strength, for example. Such changes in linguistic theory concerning UG should be seen as a matter of major concern. What makes minimalism different from previous approaches to generative syntax is the fact that it eliminates complexities (see the quote above, where DS, SS, government; the Projection Principle, etc. have been eliminated from the grammar) and defines linguistic pieces of language as optimal realizations. The latter result from interaction between LF and PF levels of representation, where the derivational economy principles determine their optimality. This, in principle, enables the C_{HL} to select from a set of derivations the optimal ones (Chomsky, 2001; Hornstein, 1995; Kremers, 2003; Shormani, forthcoming). The fact that there are constant revisions to theoretical analyses of these properties is tangential being a reflection of normal development and growth within linguistic theory. What does not change, to some extent, is theoreticians' view of what the problematic data are that require postulation of innate principles and parameters in the first place (Chomsky, 1993, et seq).

3.3. *What LF contains: UG*

The fact that young children easily acquire any language spoken in the environment around them has been viewed as a miracle (Jenkins, 2000). From a mentalist perspective, unlike behaviorist one, "this is only explicable if certain deep, universal features of this competence are innate characteristics of the human brain." If this is true, then, it must be that this ability or the "inheritable capability to learn any language means that it must somehow be encoded in the DNA of our chromosomes" (Jenkins, 2000, p.4). This, in principle, explicitly implies the universality of language. However, a question arises here, i.e. what is this universality of language all about? This section addresses this particular question.

It has been hypothesized that human language faculty is wired with particular rules. These rules are of two types: i) universal rules called principles, which are characteristic to all languages, and ii) specific rules called parameters of only two choices, each language chooses either of them. The rules specified in (i) can be represented by *Subject Principle* as outlined in (2).

(2) Every sentence must have a subject

(2) is, in fact, a modified version or a subpart of Chomsky's (1982) *Extended Projection Principle* (EPP, which states that *every clause must have a subject*, regardless of whether the clause is finite or nonfinite). It simply basically states that in all languages a sentence having a finite verb must have a subject. This has in fact been proved true cross-linguistically (see Frascarelli, 2007; Rizzi, 2006, for Italian, Chomsky, 1982, et seq; Radford, 2009, for English; Fassi Fehri, 1993, 2012, Shormani, forthcoming; Benmamoun 2000, Platzack, 2003; Aoun et al, 2010, for Arabic; Shlonsky, 1997, for Hebrew, among other authors and languages). If this is on the right track, then, it must be that the rules in (i) need not be learned by children, simply because these rules are wired in their DNA. To put it differently, principles of UG "need not be learned just as universal phonetics need not be learned; it is part of the genetically-determined language faculty. The functional explanation then holds, if at all, at the level of evolution of the species" (Jenkins, 2000, p. 7; Chomsky&Lasnik, 1977, p. 436f).

There is also a parameter related to the behavior of the subject in (2) called *Subject Parameter*, which 'regulates' such behavior. *Subject Parameter* is a two-value 'regulator,' determining the subject as either overt or covert cross-linguistically. In that some languages like English are parameterized to always select overt subjects in finite clauses. Some other languages like Arabic, Turkey, Italian, however, choose the subject to be covert in such clauses. The latter case is called *Null Subject Parameter* (NSP) or pro-drop property, which is allowed in these languages. NSP is briefly discussed in the section to follow.

3.3.1. *Null Subject Parameter*

As alluded to above, pro-drop property is characteristic to null subject languages (NSLs) like Arabic, Italian, Spanish, Turkish, etc. in which a subject of a finite clause/verb can be dropped. That a subject pronoun can be dropped in these languages is assumed to be associated with the 'richness' of agreement inflection attached to the verb. This 'richness' of inflection is deemed to be an ingredient playing an important role in the licensing and interpretation of the dropped pronoun (see e.g. Chomsky, 1982; Fassi Fehri, 1993, 2012; Rizzi, 1986; Gilligan, 1987; Huang, 1984; Holmberg, 2005, 2010; Roberts, 2010). Consider (3a, from Italian, slightly modified from Holmberg (2010, p. 99)) and (3b) from Arabic and (3c, from Hebrew, adopted from Shlonsky, 2009, p.134).

(4) a. Verra` pro
come-FUT-3MS
'He will come.'

b. sa-t-a?ti pro
FUT-3FS-come
'She will come.'

c. (lo) ma'arixim et ha truma s˘el-a.
neg appreciate.PRES.MPL ACC the contribution of-3FS
'People (don't) appreciate her contribution.

The unpronounced pronoun or *pro* is interpreted as 'He' in (4a) and as 'She' in (4b). In (4b), for example, *pro* is interpreted as 3rd person singular feminine. This interpretation is said to be associated with the agreement inflection infix *–t-* attached to the verb, because *–t-* carries these features. However, in (4c) *pro* is interpreted as 'people.' It should be noted that NSLs like Arabic and Italian differ from languages like Hebrew. The latter languages are called inconsistent NSLs in which *pro* subjects are allowed only in strict environments, according to person and tense. As for person, referential pros are allowed only "with first and second person inflection; third person covert subjects are only possible in contexts of (non-standard) binding and/or Control" (Shlonsky, 2009,p.133). Regarding tense, referential pros are only allowed "in past and future tense clauses. They are ruled-out in present tense clauses."

If the linguistic rules, i.e. principles in (i) above, are not supposed to be acquired by children, the fact that children acquire their L1 gradually has merely possibly

one interpretation. This interpretation is that what children have to learn is perhaps these parameters *per se*. This assumption is evidenced cross-linguistically. The evidence comes from child language acquisition process in its early stages. Children tend to make use of null categories, and of different types, be they subjects, verbs, prepositions, etc. The evidence of children's use of null categories comes from comparing their early language to that of adults' though it is sometimes very hard (if not impossible) to exactly determine what a child wants to say, or, better, mean. This is so because of what children want to say being somehow different from what they mean, as has been proved true in many longtitdunal studies (see e.g. Clark, 2009; Brown, 1973, Brown 1994, among many others). The difference between what the child wants to say and what he/she means is referred to as "disjunction" between what is intended and what is said (see also Shormani, forthcoming).

In fact, there are two approaches in child language acquisition that try to account for such a disjunction: the first approach proposes that the child's syntactic system is different from that of the adults in their speech community. This may mean either that the child does not have a complete adult syntactic structures (e.g. they only have a verb phrase) or it may mean that they have a complete adult syntax, but some part of their grammar contains a structure that does not occur in the language they are acquiring, but does occur in other languages (e.g. V-raising when learning English). The second approach proposes that limits in general cognitive processes cause the disjunction between intention and production (Aronoff, 2003, p. 43f). For instance, when a native child of English produces sentences like *Daddy home* whose adult form is *Dad is at home* (as far as Standard English is concerned, for there is another form but not standard like *Dad is home*). What we notice in the child's utterance is that the child does not articulate the verb *is*, and hence, the null category is V, in the sense that the verb *is* is "absent" (see also Shormani, forthcoming).

Another parameter relating to EPP in (2) is *Word Order Parameter*. For example, languages like English, French, etc. choose to have a SVO (i.e. subject-verb-object) order, while languages like Arabic, Irish, etc. a VSO one. This is exemplified in (5), (5a) represents VSO in Arabic and (5b) represents this word order in English. The former is grammatical while the latter is not (as indicated by *).

(5) a. ʔakala ʕaliyy-un tuffaaħat-an
ate Ali-NOM apple-ACC
'Ali ate an apple.'

b. *ate Ali an apple

In this sense, when a child acquires his/her first language, the environment activates both principles and parameters of that language (see Shormani, 2014a,b&c, 2015). Thus, words aside, the grammar of a ***L*** seems to be composed of a sum of these parameters. Along these lines, Jenkins (2000, p. 77) argues that "[t]he grammar of English is the collection of choices:" in SVO, but not VSO, NSP is not allowed, etc. and so Arabic could be considered the other way around. UG seems to provide the child with a "menu of grammatical options. And of course there are all the lexical facts. You just have to learn your language's vocabulary. The universal grammar doesn't tell you that *tree* means "tree" in English."

Thus, once a child has acquired the vocabulary of any language, say, English, "and fixed the grammatical parameters for English, the whole system is in place. And the general principles genetically programmed into the language organ just churn away to yield all the particular facts about English grammar (Chomsky, 1983, p.412; see also Jenkins, 2000, p. 77). This suggests that principles and parameters are wired in our DNA, underlying the biological structure of the language faculty, on the one hand, and that they are concerned mainly with the computational system, on the other hand. It also implies that words are not included within the responsibility of the computational system, but rather of something else. This 'something else' might be what is so-called 'lexicon' which constitutes another subfaculty within the human language faculty. Given this, it may well be argued that the role played by principles and parameters in language study "is much like that undertaken by the developmental biologist, who seeks to find the mechanisms of gene control or other cellular mechanisms in an effort to explain the differentiation of the zygote (fertilized egg) into its final state" (Jenkins, 2000, p. 77; Chomsky, 1983). Jenkins (2000, p 77) adds that "the choice of one parameter may have an effect on the operation of parameters that are fixed later." Chomsky (1983, p. 412) points out that "a slight change in just one of the universal grammar's parameters can have enormous repercussions throughout the language. It can produce an entirely different language." As Chomsky (1983, p.407) puts it, "[t]he gene-control problem is conceptually similar to the problem of accounting for language growth. In fact, language development really ought to be called *language growth*, because the language organ grows like any other body organ."

This suggests that what the child has to learn is parameters, on the one hand, and that the parametric choice is what signals variation among languages, on the other hand. In this latter aspect, Chomsky (2013, p.34ff) makes it clear that the conception of "variation with few

limits" has virtually been disregarded in general biology. However, there remains what Chomsky calls "non-existence" thesis in relation to language, and that "language is entirely grounded in a constellation of cognitive capacities." It exists in the same way that *weather* exists. In this way, generative grammar in general has abstracted away from the conceptions of *structural linguistics* and paid much attention to the fact that "each language determines an infinite array of hierarchically structured expressions that are transferred for interpretation to two interfaces:" the PF and LF. This has been then called *sound-meaning* interaction, which is what language is all about (see also Shormani, 2015, forthcoming).

Given this, we could say that each language has a generative system by which it derives from the finite set of rules and lexical items the infinite linguistic expressions (i.e. phrases, clauses and/or sentences) in addition to providing appropriate "instructions" for the interfaces, via the *transfer procedure* it incorporates, where UG sets conditions on what counts as a *generalized system* (GS) for a language *L*. Chomsky then makes it clear that it is possible to consider this GS itself a *language* in the sense of *I-language* (internal language; the properties of our mental capacities) and possibly not *E-language* (what we actually say in actual situations). The latter is considered an *imperfect mirror* of the former. In this sense, UG as a biolinguistic necessity has to be considered something different from the descriptive generalizations about language such as *Greenberg's universals.*

If every human has this UG, and suppose a person named *John* of an English origin (i.e. having English as a mother tongue), it follows that *John* is innately, genetically and biologically predisposed with mental properties or UG that enables him to produce a sentence like (6).

(6) Ali likes Alia.

As far as interpretation is concerned, John is able to figure out that the sentence in (7a) involves ambiguity while (7b) does not.

(7) a. Ali asked Alia to leave.
b. Ali asked Alia not to leave.

(7a) is ambiguous in the sense that it has two meanings, viz. either *Ali* or *Alia* is supposed to *leave*. However, (7b) has only one meaning, viz. it is only *Alia* who was about *to leave* and *Ali* asked *her* not to do so.

Another aspect of John's knowledge of English can be elicited from (8).

(8) a. Alia: Could you please give me a lift?
b. Ali: I am going to work.

The answer in (8b) to the question in (8a) does not say anything regarding what has been asked for. There is no even relation between the question and the answer. The expected answer is either "yes" or "no." However, Alia in (8a) could understand that Ali is making some kind of refusal to her request but Ali does not state or declare that obviously. Now, if John is exposed to such a situation, he will understand that Ali is not going to give Alia a lift. Though it depends on the situation in which both the question and the answer are said, John is able to get the right message because he knows the discourse of the conversation. It is the discourse which determines John's inference because there is a clear answer to Ali's question. In other words, in the case of acceptance, Ali should have said "*Please, get in*." Moreover, John tacitly knows that *Jane* in (9) did not pass the exam.

(9) Jane tried to pass the exam.

The failure in *the exam* is implied by the verb *tried* because such a verb implies "the failure" of the action to be carried out. This is so because if somebody *tried* to do something, it means that he/she *failed* to do it. John tacitly knows such-and-such. The kind of inference John is able to make is beyond his ability to state why (9), for example, is to be interpreted as such.

In addition, John's knowledge of the grammar of his language (i.e. English) is not confined to syntax and semantics, but also covers all other modules, i.e. phonology, morphology, etc. As far as the former is concerned, for instance, he tacitly knows the phonology of his language. In other words, he tacitly knows that the number of words that could be formed from the sequence of the three sounds /p-t-æ/ are six, three of which belong to English, namely, *æpt, pæt* and *tæp*, and three of which, namely *ptæ, tpæ* and *ætp* do not. Note that the fact that the words *ptæ, tpæ* and *ætp* do not exist in English does not entail that they do not exist in or belong to any other language (see also Shormani, 2013).

John's tacit knowledge also extends to morphology, for instance, he knows that *happiness* is a grammatical noun of the adjective *happy* in English, while **happity*, **happiation* or **happiment* is not (see also Ouhalla 1999). Further, John knows that his English morphology is concatenative. In other words, John knows that word formation in English is done by concatenating (combining) morphemes, and that English morphology is not nonconcatenative like that of Arabic or Agglutinative like that of Mongolian or Japanese.

In addition to being predisposed with all these modules of the grammar, there is some kind of encyclopedic knowledge which John knows, tacitly, too. This knowledge is based on the world around us. This is illustrated in (10) (cf. Ouhalla, 1999, p. 3).

(10) a. Alia: Could I bring you a cup of tea?
b. Ali: Tea keeps me awake.

Ali's answer in (10b) may have more than one interpretation. First, it may mean that *Ali actually wants tea* to stay awake, or second, *Ali does not want tea* because *tea* keeps him awake and he does not want to stay awake. Thus, Ali's answer to Alia's question depends in its very response on Ali's plans and intentions, and hence it is difficult to say one of the answers stated above as the only answer to Alia's question. We may also think that the only answer to Alia's question is: either "*yes*" or "*no*," but the issue sounds something different. It is left open to the hearer to decide. It is the mutual understanding feature of the conversation between Alia and Ali that makes Alia respond to Ali's answer either to bring "the cup of tea" she offers to him or not. Further, one also could infer, from such a conversation, that it took place in evening time. The fact that the conversation between Alia and Ali takes place in evening time comes from the opposite of *awake* which is *asleep* (see also Ouhalla, 1999; Adger, 2002; Shormani, forthcoming).

However mysterious, John is tacitly able to infer what Alia means by saying so. In fact, John's inference of such-and-such depends on his knowledge of Ali's intentions and plans in addition to crucial knowledge about encyclopedic information about *tea*. He knows that *tea* keeps us awake because it contains a substance that makes *Ali awake at night*. Thus, John's ability (and ours, too, in case of our L1), to interpret the meaning of an expression in a **L** (English in John's case) does not merely depend on John's knowledge of language. There is also knowledge of the world around us, and plans and intentions of the speakers/writers which make us able to interpret what a particular piece of language means in a particular context. To put it the other way around, our ability to interpret pieces of language has two characteristics: linguistic and nonlinguistic. Linguistic knowledge could be understood in terms of John's knowledge of the linguistic modules, viz. phonology, morphology, syntax and semantics. Nonlinguistic knowledge lies in knowing the discourse, plans, intentions, contexts, etc. For example, a part of encyclopedic knowledge is that John knows that *tea* contains a *caffeine* substance which keeps us awake (cf. Ouhalla, 1999).

Now, taking John's tacit and innate knowledge of the linguistic modules (of English), it is clear that, as far as syntax is concerned, John's knowledge could be characterized in his ability to know how phrases, clauses and sentences are structured. His knowledge of semantics lies in his ability to interpret the meaning of such pieces of language. His phonological knowledge consists in his ability to determine what sounds, phonemes, syllables, etc. belong to English, and how these phonological units are structured in words (see also Ouhalla 1999). Finally, his ability to determine which words belong to English and which do not reflects his knowledge of morphology.

Thus, recalling what has been stated right now, we could assume that John's knowledge is nothing more than knowing the rules of English morphology, phonology, syntax and semantics of English according to which he (and any native speaker of English) is able *not only to produce grammatical pieces of language but also to judge whether a particular piece of language is grammatical or not.* Since John tacitly, innately, genetically and biologically knows such rules, and since these rules constitute the grammar of English, we assume that John (and every normal native having the biological organism essential to child) possesses his/her L1 grammar, and since every child can acquire any language in the world, (provided that he is exposed to that language linguistic input), such a grammar could be extended to all human Ls, and hence *we assume that every* (normal) *child possesses UG*.

As far as L1 is concerned, not only does UG provide us with the ability to produce any piece of language we want, but also it provides us with the ability to judge whether a piece of language is grammatical or not. Consider (11).

(11) a. John is really a good person
b. *John is really good a person.

Suppose that John hears someone say (11a), he will say nothing about it. If, however, he hears (11b), he would say "no" because it is ill-formed. (11b) is ungrammatical simply because in English the D (or article) *a* cannot come after the adjective *good*. This could be accounted for in terms of syntax in the sense that (11b) is syntactically incorrect.

It seems that the knowledge we possess about our L1s does not merely enable us to produce grammatical and meaningful pieces of language, but also it enables us to judge whether a piece of language is grammatical or not. The issue changes in (12), however.

(12) a. John eats a full chicken.
b. *John eats a full book.

It is clear that (12a) is grammatical, but (12b) is not. That (12b) is ungrammatical comes from the fact that from a semantic point of view, it is deviant from a normal English sentence (because *a book* cannot be eaten). However, consider (13)

(13) Last night, I ate the whole book.

The question then is: why is it that (12b) is ungrammatical while (13) is not? The fact that (13) is grammatical stems from its acceptable meaning. (13) is akin to saying *Yesterday, I didn't sleep. I spent the whole night studying, and I understood the whole book*. In this sense, then the verb *ate* in (13) does not express physical *eating*, but rather *studying* and *understanding the whole book*. Another even further mysterious question is: why is (14b) ungrammatical? (see also Adger, 2002).

(14) a. John is rather easy to please.
b. *John is rather difficult to be pleased.

A native speaker, let him be John (in our example), knows well that (14b) is ungrammatical. The question is: how does a native speaker of English (in general and John in particular) know that? It is not possible for *John to know why he knows* that such sentences as (14b) are ungrammatical. This is simply because the knowledge John possesses is *tacit* and *innate*. Further, if John is educated, he may know that a sentence consists of subject, verb (and object), but what the terms *subject*, *verb* (and (object) really *are* or mean is beyond his ability to state. However, if interpretation is to be taken into account, we can still get some meaning from (14b). In other words, suppose who utters (14b) is a nonnative speaker of English; a native speaker could get some kind of message that *it is not easy to please*, though the sentence is ungrammatical (Adger, 2002).

Our above discussion clearly shows that our knowledge of language is tacit and innate. This is perhaps in line with Chomsky's (2013, p. 35) proposal of the Innateness Hypothesis. He maintains that there is "a generative procedure [(GP])" which:

> provides the appropriate "instructions" for the interfaces, by means of its transfer mechanisms. UG sets conditions on what qualifies as a GP for some human language. We can think of a GP as itself a language in the sense of *I-language*: language understood as internal, individual, and intensional (the actual procedure of generation, not the class of expressions it generates). Among the many notions of language, this one is central, in that all others that seek to capture core properties of language presuppose some version of it, at least tacitly.

Thus, what remains for Chomsky to describe is perhaps language variation and typology, say, in word order, for instance. He argues that word order is a result of applying the operation *Move* or *Move a* in different stages of the derivation either in overt/narrow syntax (i.e. before spell-out) or in the spell-out itself (in covert syntax). Covert syntax is required for thematic/logic mappings of relations determined by the interfaces. To Chomsky, thematic relations are basic and syntactic ones are periphery. This is also true of economy of derivation, a concept at the heart of minimalism. As alluded to above, minimalism seeks to reduce the computational/derivational load placed on language faculty to the minimum. In fact, economy of the grammar plays a crucial role in the derivation, and hence, "favoring local relations and simple structures, and prohibiting superfluous steps and superfluous symbols" (Zwart, 1998, p. 215).

3.4. *The magnetic nature of language faculty*

The assumption that language faculty provides a child with a mental ability, i.e. UG or the *Initial State*, to acquire his/her first language has almost been accounted for in our previous discussion. Given this, we are now in a position to proceed a step further to tackle the basic tenet of this study: how LF works, thus: i) enabling the child to acquire (his/her) L1 and L2, L3, etc. and ii) enabling the adult to acquire L2, L3, etc. This section addresses these two issues, adopting some notions from physics like 'magnetic attraction,' distance and velocity. The first issue is tackled first, and is then followed by the second one.

Let us restate the first issue in the form of a question, i.e. how is it that a child of, say, a Yemeni origin, acquires more than one language in addition to his/her L1 at the same time? The assumption that a child is genetically, innately endowed with a UG 'instilled' in his/her brain may explain his/her acquisition of L1, but what about L2, L3, etc.?

Following Shormani (2014a), it is assumed here that environment provides a child with linguistic input which activates the principles (of all languages) and triggers the parameters specific to this child's L1. It follows then that language faculty 'attracts' the language spoken around the child, perhaps like 'magnet' when attracting a piece of iron. The magnetic nature of the language faculty proposed here perhaps accounts for and gains support from the fact that a child can easily and with "remarkable rapidity" acquire any language around him/her regardless

of the origin, place and/or ethnic group this child belongs to, and regardless of the language to be acquired. Put differently, suppose a child born in Yemen, if this child is taken to China, Japan or Russia, he/she will acquire Chinese, Japanese or Russian exactly the same way a Chinese, Japanese or Russian child does. This explicitly suggests that there is some sort of "magnetic attracting" power underlying the composition and structure of the language faculty that makes it able to attract language(s) spoken around it.

There are several cases that add strong support to the fact that a child (at the age of puberty, see below) can acquire more than one language in addition to his/her L1. One such case was that of an Arab scholar, doing his Ph.D degree in India, with his family. His child, *Munt* (not her real name), was 16 months. She was starting speaking Arabic, his and his wife's mother tongue. By about 20 months or so, she started speaking Telugu as she was playing with Telugu peers. By almost 30 months, she started picking up Hindi and English, i.e. after about 6 months of joining school. To repeat the question stated above, but in other way around, how could *Munt* (or any other child) acquire more than one language at the same time. Thus, given that UG enables the child to acquire any language, it is proposed that there is a magnetic property underlying the acquisition process. Given also that a child is born having an underlying, genetic and biologic language faculty, it is also proposed that the environment or the language(s) spoken in the surrounding provides the language faculty with the linguistic input, necessarily required for the acquisition process to take place.

Let us now elaborate on how the magnetic nature of language faculty works in attracting the language(s) spoken around the child. Given a piece of magnet, and given also the 'attracting' nature of magnet, it attracts (only) anything made of iron. It follows that any piece of iron whatever form it takes will be attracted by this piece of magnet. Suppose that this piece of magnet is put among a few pins, the magnet automatically attracts these pins. Suppose also that it is put among a few keys, the magnet will attract these keys. Again, suppose this piece of magnet is put among iron flings, it will attract these iron flings. Finally, suppose that this piece of magnet is put among these iron pins, keys, flings, (and possibly I_n (where I=iron and n= the number of pieces)), all these pieces will be attracted by this piece of magnet.

Let us assume that this type of 'magneticity' is wired in the biological architecture of the human language faculty. And let the pins be L1, keys L2, iron fling L3…I_n= L_n, it follows that LF can attract L_n. Now, let the setting be the environment (the setting could be understood as the place or the one (i.e. human) who brings the piece of magnet and the pieces of iron and put them together, etc.). This is, in fact, the only possible way to account for how *Munt* (or any other child) acquires more than one language at the same time, where L_n =4 languages, namely Arabic, Telugu, Hindi and English, and the setting, i.e. the environment, is home (parents), neighborhood (peers) and school (teachers/media of instruction). In fact, acquiring more than one language is evidenced worldwide. An example of such evidence is an eight-year Korean girl who can speak eight languages. Another example is recently observed, where a teen speaks over twenty languages (the videos are placed on youtube.com, see https://www.youtube.com/watch?v=2996a4gXjw8, https://www.youtube.com/watch?v=Km9-DiFaxpU).

However, remember that a child will acquire the language(s) spoken around (i.e. near) him/her, but not those spoken in far places. This suggests that language acquisition is controlled by distance (D), where D is understood here to be the 'nearness/farness' of the language(s) from LF/child. For example, a child born in Mandarin Chinese environment will acquire Mandarin Chinese, but will not be able to acquire Cantonese Chinese, though they are two dialects of the same language (but without intelligibility, i.e. a speaker of Mandarin Chinese does not understand Cantonese Chinese), let alone Hindi, Arabic, etc. which are very far from him/her. Take a Yemeni child as an extra example. A child born in Ibb will acquire Ibbi dialect but not Sana'ani or Taizi, let alone Omani or Egyptian dialect which is very far from him/her, though these dialects are varieties of the same language, i.e. Arabic. But, this is, in fact, straightforwardly accounted for if we just relate this phenomenon to the behavior of the magnet piece in our example. In other words, the 'magneticity/attracting' effect of a magnet is also controlled by D.

To elaborate, we all know that one substantial feature of 'magnetic attracting' is the nearness of a piece of iron from a piece of magnet. A piece of magnet (weighing, say, fifty grams) attracts I_n if and only if they are placed in an approximate D, say, five cms (=centimeters), but not those, say, ten cms far from it. In this sense, D features the nearness or the farness required for the piece of magnet to attract iron pieces. Analogizing, the distance between LF and the language(s) spoken in the surrounding is controlled by how near or far the language(s) spoken around the child. Thus, if the distance between the child and a L to be learned is far, this L or (even a dialect) will not be acquired. If this analysis is on the right track, (15) could then be hypothesized.

(15) LF can attract L1, L2, L3… L_n; D between L_n and LF is respected.

If we take a physics notion, viz. velocity into account, it is widely known that velocity effect is tied to D. In that the nearer the piece of iron from a magnet, the more the velocity of attraction. If we take this physics notion and incorporate it into (15), L1 will be more attracted than L2, which will in turn be more attracted than L3, and so on. Analogizing, thus, the nearer the L to LF, the stronger the attraction, hence the stronger the acquisition of L. If this is on the right track, (15) gives us the required space to account for language acquisition process in general and *Munt's* acquisition of Arabic, Telugu, Hindi and English without any further ado. It also elegantly accounts for the Korean girl's case, where eight languages are acquired, and that of the twenty languages acquired by the teen, noted above.

Note that magnet attracts only iron. It never attracts other materials/substances like plastic, wood, paper, glass, etc. This is, in fact, a crucial factor in support of our proposal coming from the fact that LF attracts all and only languages. In other words, children acquire language; they never acquire animals' "languages/sounds" like the sounds produced by pets, viz. dogs, cats, or birds like hens, though we are living with these creatures. One more interesting thing to be addressed here is that children play with their pets more than humans around, and they even communicate with them, but again using human language, and not by "sounds" produced by these pets: a child coming back from a five-day trip would say to its dog, named Kokie, "Hello Kokie, I miss you… I will never leave you alone next time…" Language is species-specific; humans and only humans acquire language, and only language, but not, say, animals' communication systems.

One crucial factor to be highlighted and stressed here is the fact that the languages, i.e. L_n, *must* be practiced in the form of a two-skill manner: speaking and listening (writing and reading are also relatively important). The fact that an acquired language must be practiced as rituals has indeed been emphasized by all linguists and language educators. In this very aspect, I would like to point out what has been said by an *Arab thinker, linguist and philosopher called Ibn Khaldoun*. Ibn Khaldoun (2001 [last *Edition*]) declares that language faculty should be enriched by several and various practices. For example, he emphasizes that one should memorize (some lines of) poems, listen to speeches, be trained to deliver speeches, participate in discussion and argumentation, among other related linguistic activities, to get his/her language (faculty) stronger, avoid hesitation, recall language when necessary, and so on. In fact, the ideas emphasized by Ibn Khaldoun were stated many centuries ago, even before any (modern) linguist like Saussure, Lenneberg, Chomsky, Cook, Pinker, just to name a few. *Ibn Khaldoun may be considered the first to identify and coin the Arabic term almalaka alluγawia* (exactly: the language faculty) and *assaliiqa* (innateness/tacitness), and he may be *the first to realize that it is this language faculty that is the only mechanism responsible for language acquisition.*

The practice of L1 a native speaker makes can also be extended to L2, L3, etc. Suppose a child or even an adult has acquired four languages, and suppose these languages are of the same D from the LF. According to our proposal, if this child/adult speaks and practices these four languages equally, then his/her ability to speak these four languages will be L1 = L2 = L3 = L4. This is further visualized in Figure 1 below.

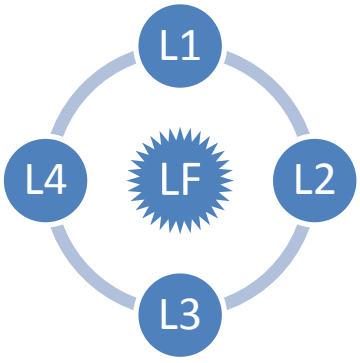

Figure 1: Equal Practice and Equal Distance

As Figure 1 shows, L1's D from LF equals that from L2, L3 and L4. The practice the speaker exerts may be equated with the size of the language acquired, regardless of the language being acquired. This is manifested in the size of L1-L4, i.e. they are of the same size.

However, if the speaker's practice and contact with these four languages differ from one language to the other(s), his/her ability to use/speak these languages will automatically differ/vary. This is further visualized in Figure 2 below.

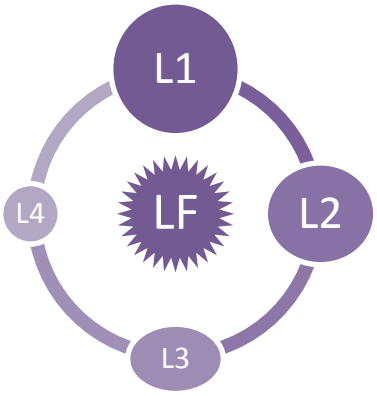

Figure 2: Different practice/contact entails varied competences

As for D, Figure 2 shows clearly that L1 is the nearest to LF. This, otherwise, means that practice and contact with L1 is greater than that with L2, L3 and L4. Strength is also reflected where L1 is the strongest in competence compared to others in Figure 2 above. This is also shown by color. L1 is the darkest, which is gradually lessened in L2, and the lightest is L4.

Let us now turn to the issue of how language acquisition takes place in the case of adults. Adults acquire a language, be it L2, L3, etc. when their language faculty is not 'empty' as in the case of children acquiring their L1. What really happens here is that adult's UG has been accessed by L1, hence activating the universal set of rules, i.e. principles, and triggering the language-specific set of rules, i.e. parameters, of his/her L1 (Shormani, 2014a,b, 2015, see also Gass&Selinker, 2008; White, 2003; Han, 2004, among other related works). Taking the activation and triggering processes of these two sets of rules into consideration, acquiring L2, L3, etc. is now possible to be accounted for. To account for this phenomenon, Shormani's (2014a) assumption is adopted here. In fact, Shormani (2014a) proposes that the principles and parameters of L2, L3, etc. are reactivated and retriggered by L2, L3, etc. linguistic input the adult is exposed to. The setting of this linguistic input (the adult is exposed to) may be a school classroom, a university hall, and the source of this input may well be the teacher, or even a video, a movie, among many others.

In the sense just discussed, (15) can also be applied to adult language acquisition. In that an adult can acquire L_n provided that he/she is exposed to sufficient linguistic input of L_n, regardless of where such exposition takes place, on the one hand. On the other hand, there *must* be strong motivation, love to the language being learned and its native speakers, among other factors. The same mechanisms of distance and velocity assumed in child language acquisition can also be hypothesized in the case of adult language acquisition.

If this analysis is on the right track, it is perhaps possible to argue that the magnetic nature of the language faculty manifested in adult language acquisition suggests that adult's language faculty is still able to attract language(s). It also improves on some assumptions in the literature that UG in adults is still accessible to subsequent language(s) (see e.g. White, 2003; Shormani, 2012, 2014a; Han, 2004; Long 2003, and related works cited therein). Given this, it may be possible now to account for how some adults acquire more than two languages, and how they speak them fluently in a native or native-like fashion.

A third factor that may be taken into account in adult language acquisition is age. The latter is referred to as puberty. Puberty is sometimes referred to as *Critical Period* for language acquisition to take place. It is estimated as a period extended from one to twelve years during which a normal child can acquire any language exactly like his/her L1 (see Birdsong, 1999; Shormani, 2014a&b). In other words, it is expected that unless UG's principles and parameters have been accessed by L1, and during puberty, L2, L3, or even L1 acquisition will not take place as expected: Genie's and Isabel's cases are just an example (see e.g. Curtiss, 1977; Han 2004). For example, Genie, who was discovered at the age of thirteen, hardly acquired words, but she almost could not acquire syntax. Other minor factors such as love to L_n, attitudes towards their speakers, identification with them, interest in acquiring these L_n, among other related factors should also be taken into account (for more about these among other related factors affecting ultimate second language acquisition, see Shormani, 2012, 2014a&b, 2015; Birdsong, 1992; Lardiere, 2007).

More specifically, let us now take L2 acquisition process in a foreign setting as an example, and see how (15) could be entertained. Assuming that this foreign setting is the university hall, L2 is English and the acquirer is a freshman (i.e. a student in the first year, majoring in English), the question is: how is it that such a student is able to produce the sentence in (16), specifically during the first semester.

(16) What I want to say is that who comes early to class should sit in the front bench, either short or tall.

The sentence in (16) is complex in the technical sense, and perhaps the student has never heard or come across before. It consists of a matrix clause and embedded clauses. The wh-word *what* is the object of the verb *say*, but it is fronted, i.e. it occurs before the subject, viz. the pronoun I. The embedded clause *who comes early to class* is the subject of the verb *should*. In addition to all this, the student in question may not have come across this sentence before, simply because he/she has

not studied syntax, poetry, novels, plays, etc. in which we may think that he/she may have come across similar constructions. The question imposed above, thus, repeats itself: how can the student in question produce (16)? It seems difficult (and perhaps impossible) to answer this question without relating (16) to UG. Put differently, the student in question cannot produce (16) unless the UG principles concerning wh-fronting, topicalization, embedding, phrase structure rules, etc. have been activated previously, namely by the student's L1. Consider (17) which is almost a similar (Yemeni) Arabic construction to (16).

(17) ?alli ?ašti ?aquuluh ?innuh man ya?ti mubakirran laazim yajlis fii ?awal ṣaf, sawaa (kaan) qassiir ?aw ṭawiil

(17) shows us that what the student has to do is just *reset* UG parameters he/she has acquired while acquiring his/her native language, i.e. Arabic, given the fact that UG principles have been activated by Arabic.

The assumption that the student has not heard, or come across, but is able to produce structures like (16) perhaps reveals the "poverty of the stimulus." In other words, the English spoken around him/her is "poor," which may not be enough to enable him/her to say (16). This is perhaps akin to the question asked by Chomsky in the case of child language acquisition, i.e. how difficult structures are acquired and perhaps judged by a child in an early age when his/her mind is not matured enough to cope with abstract concepts (Shormani, 2014a&b). For instance, as far as English is concerned, children may not be able to learn the distinction between structures like *John is eager to please* and *John is easy to please* as there is a difference between both structures. While the former implies that *someone is to be pleased by John*, the latter, however, specifies that *it is John who is to be pleased*. Children could have then learned the difference between such structures by means of some properties of their own minds, viz. properties ascribed to UG (Cook, 1983). This also supports the claim that it is UG which compensates for the "poverty of the stimulus" and explains pieces of language occurring in the child's language, though he/she has never heard or come across before.

The assumption that L1 parameters are reset in accordance with L2 in L2 acquisition context gives rise to assuming that parametric variation does exist. This parametric variation seems to be responsible for what makes L1 different from L2 (and even L3, L4, etc.). Some linguists (see e.g. Chomsky, 2001; Rizzi, 2005; Lardiere, 2009, see also Shormani, 2015) argue that this parametric variation is presumably a result of features and feature specification of lexical items and some functional categories. For example, Lardiere holds that since every human, if exposed in early childhood to "any human natural language" will acquire L2, L3, etc. in exactly the same way a native child of this language(s) does, it follows that "there is a universal set or inventory of linguistic Features" every human is biologically and innately endowed with "as part of the human genetic endowment, along with a species-uniform computational mechanism that combines and interprets the relevant features in a highly constrained way." Thus, since every language is in principle different from any other, "the child's acquisition task is to select only that subset of features actually detectably deployed in the particular language(s) being acquired," and that he/she disregards, discards or even forgets those which do not belong to his/her L1 because they are not in the linguistic input he/she is exposed to (Chomsky, 2001, p. 10; Rizzi, 2005, p. 74; Lardiere, 2009, p. 174; Shormani, 2015, p. 23). However, how the set of features and feature specification in Arabic determines linguistic/parametric variation between English and Arabic perhaps needs in-depth analyses, and I leave this for feature studies.

4. CONCLUSION AND PEDAGOGICAL IMPLICATIONS

The issue of what is knowledge of language and how it is acquired and grows has been one of the intriguing phenomena in the last five decades or so. So much has been discovered, and, yet, much is still unknown about it. In the second cognitive revolution, the study of language enters a 'new world' of discovery. In this era, language has been extensively subjected to several scientific experiments; empirical materials have been brought from across languages, and various branches of science and knowledge have also been employed in the study of language like physics, mathematics, biology, neurology, psychology among others. The core and ultimate aim of these attempts has been how to characterize human language and attribute to understanding its hidden secrets. One of the discovered phenomena is that there is a faculty in the brain, viz. language faculty which is responsible for acquiring language in species, i.e. humans alone. In fact, much has been said about how this language faculty looks like, how it grows in children, what it contains, etc. However, the issue of how language faculty works is still very far from being settled.

This paper has thus attempted to develop a theory of the working mechanism of the human language faculty, based on biology and physics notions. The 'magnetic attraction' of the language faculty enables it to attract any language spoken around it. The theory developed in this paper gives us enough space to account not only for acquiring L1, but also for L_n, in both spheres, viz. child

and adult, regardless of the setting. As for the former, it may take place in authentic and/or foreign settings. However, adult language acquisition usually takes place in foreign settings. What matters most in both cases is practice. Practicing our language, be it L1, L2…L_n is the crucial factor, strengthening it, and making it ready to recall whenever and wherever we want. Why our L1 is called a "mother tongue" is perhaps because of the strong relation between us and our language. L1 is our own identity, our culture, our privilege and our "mother" to and through whom we expose the ups and downs of life, create our own worlds when we are friends of our own shadow. It is the first and most strongly attracted by our language faculty. L2 (or even L_n) is our window to the "Other" to know their life, knowledge, experiments and sciences, to get benefit from them. It is often said that philosophy is the mother of all sciences, and it could be said that language is perhaps the mother of philosophy, which entails that language is the mother of all sciences.

Language starts as a child (or, say, a plant), the more we care about it, the more it gets stronger, and healthier. Take as an example English as a L2 acquired in a foreign setting, which is either a school or university classroom/hall. If it is practiced everyday as it should be, it grows like any other organism. In class, be it in a school, or a university, there are several contexts in which we can create authentic English with the help of modern technology such as videos, audios, movies, etc. At university, for instance, Spoken classes could be utilized for practicing and enhancing Speaking skills. Students could be asked to record their voices and listen to these recordings, and perhaps go in self- and peer-correction. Reading classes may be directed at reading aloud, hence practicing language under the teacher's monitoring. Writing skills may be practiced in Writing classes. Literature classes could be used for presentations. Linguistics classes could be utilized for comparing L1 to L2, L3, etc. to point out the parametric variation across languages. For example, Syntax classes could be devoted to comparing the syntactic phenomena, involving at least L2, i.e. English and the students' L1. The same thing can be said about Phonology classes, Morphology classes and semantics classes (see also Shormani, 2014b,c&d; Shormani&AlSohbani, 2015, for a comprehensive discussion on the utilization of these classes). Most importantly, a true teacher is someone who creates in his/her students love, interest and enjoyment in/for studying L2, L3, etc. Teachers interested in "teaching" would probably compensate the lack of anything missing like any teaching aid, by "instilling" in their students the want to learn, the want to pitch in, the want to be bi-/tri-lingual/linguists, etc. Only then could they harvest the fruits they have planted in their students.

Though the theory developed in this article has crucial importance in understanding the underlying mechanism of how human language faculty works, empirical/experimental research in support of its theoretical bases is needed, and I leave this for future research.

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