María Ester Moreno

Language Processing: Is Language an Organ?

Introduction

After having gone through the dialogue cited below, we can undoubtedly affirm that such an interaction can only and exclusively be associated with *human beings*:

> Child: Want other one spoon, Daddy.
> Father: You mean, you want the other spoon.
> Child: Yes, I want other one spoon, please Daddy.
> Father: Can you say "the other spoon"?
> Child: Other…one…spoon.
> Father: Say "other."
> Child: Other.
> Father: "Spoon."
> Child: Spoon.
> Father: "Other spoon."
> Child: Other…spoon. Now give me other one spoon?[1]

All creatures—apes, dolphins, ants, zebras, bulls, etc—are capable of communicating with other members of their species, or they can at any rate make one another active, or feel interested in or excited about something by means of cries.

Some birds utter warning calls when in the presence of danger; some others have mating calls; apes utter different cries by means of which anger, fear, pleasure can be expressed. But all these communication systems, though rather staggering, differ in many important ways from human language. Animals' systems lack structure since they are not articulate—they do not show, for example, the sort of structure revealed by the contrast between vowels and consonants, or the sort of structure that allows us to divide our human utterances into words; instead, a bird has just a single indivisible alarm cry meaning "Danger!" So then, the number of signals an animal can produce is limited, whereas the number of possible, potential human utterances is infinite.

It has also been said that the behaviour of primates, which seem to be our closest "relatives" in nature, involves certain language capabilities, though they only *look* like language. It would be inappropriate to describe animal communicative behaviour applying terms used for describing human linguistic activity, since great care should be taken if talking about an animal's "intentions" or about something supposed to be going on in its "mind," or about its "intelligence." On the contrary, it is possible to talk about fixed instinctual patterns of behaviour in some animals since they are obviously demonstrable, meanwhile linguistic and cognitive resources constantly let human beings go beyond the limits of instinct. Human beings are the product of culture and nature, and their "intelligent" behaviour as well as their linguistic resources—i.e. language—allow them modify and even change their lot, their circumstances.

On acquisition: some considerations

By the time when the child is around five, he has already become the successful user of a rather advanced and complicated *linguistic system,* a user who operates a system of communication that no other living animal—or even computer—can come near to match. At that moment children are able to conjoin sentences, ask questions, select appropriate pronouns, negate sentences and use the semantic, syntactic, phonological and morphological rules of the grammar. However,

[1] Braine, Martin. "The acquisition of language in infant and child."

they have not been taught these rules since their parents are no more aware of them than are the children. A person may remember his early years, but he will never remember anyone telling him how to construe a sentence. Regarding this fact St. Augustine's words—in his *Confessions*, written about 400 AD—illustrate quite clearly how he learned to speak: "for I was no longer a speechless infant; but a speaking boy. This I remember; and have since observed how I learned to speak. It was not that my elders taught me words … in any set method; but I … did myself … practise the sounds in my memory… And thus by constantly hearing words, as they occurred in various sentences … I thereby gave utterance to my will."

What's more, the speed of acquisition, the lack of overt instruction and the fact that all children achieve it regardless of whether they share different cultural and social factors or not, have led linguists to think that there is some "innate" predisposition in humans to acquire, to develop language—i.e. that humans are endowed with the "language-faculty."

The normal child is physically well equipped to send and receive sound signals in a language. Unexceptionally, all children go over the "cooing" and "babbling" stages during their first few months of life, and only congenitally deaf children stop after it. This means that for a child to speak a language, he must be able to hear it as well. But only hearing language sounds is not enough by itself. Interaction with other speakers of the language, especially adults, is required to bring the "language faculty" into operation.

This *linguistic capacity* is what definitely characterises mankind and humans are the only ones that seem to have this capacity, to such an extent that it may certainly be defined as species-specific. All languages are similar in certain points, all of them are "acquired" in very much the same way and with more or less the same range of easiness or difficulty, and they are used in much the same way for much the same purposes. In this respect, language is not inherently the same as any other kind of communication system that has been found in other species. However the *universality of the linguistic phenomenon* does not necessarily mean that all aspects of language are universally affected since some of them are not intrinsically related to internal principles of organization obtained in the core of a highly complex linguistic system. If we take into account, for example, the aspect of movement and gesture, it is easy to conclude that facial expressions, stances, movements, gestures are not universal since none of them has the same communicative significance all over the world. They are *learned behaviours* which vary in their communicative weight—meanings—according to the socio-cultural groups in which they get manifested. Nevertheless, there is an underlying inherent superordinate *linguistic system* that involves and defines the unique linguistic capacity from which *language* is developed.

Human language consists of a number of linked systems in which structure can be seen at all levels. First of all, every language selects a small number of vocal sounds out of all those human beings are capable of producing. This selection differs from language to language and the selected items are then used as the building bricks of the linguistic continuum. System is also found at the level of morphology, taking into account that words are constructed from smaller parts in different ways. System is also present at the level of semantics where meaning plays the central role. And it can also be said that system is shown at the level of syntax regarding the rules involved in combining words into utterances. It is clear then that what most certainly distinguishes human beings from all other creatures on the Earth is language. And language is what makes human beings what they are—human.

Moreover, language is unique—it constitutes

a truly unique phenomenon. This human *faculty of language* is, on the one hand, normally taken for granted—to such an extent that it is impossible to imagine our world without language, and on the other hand, it is the faculty that helps us to achieve cognition, communication, and to cooperate communicatively with the other members of the social group, and most relevant of all, it enables us to identify as individuals and social beings when acquired during our childhood.

Children seem to act as if they were very efficient linguists equipped with a perfect theory of language and they use this theory to construct the grammar of the language they hear. In this respect, it is worth taking into account that they are supposed to acquire two different kinds of competence: (1) linguistic competence that has to do with the complex rules of the grammar of their language, and which involves the accurate use of words and structures; and (2) communicative competence that has to do with the complex rules of the appropriate social use of language. It involves the process of cultural transmission by means of which the child acquires the particular social rules of his native language within the limits of his natural environment.

There is a period during which language can be learnt easily, swiftly and without teaching. This is the period when the brain is most ready to receive and learn a particular language—and even more than one language. This period is known as the "critical period or age"; it starts in childhood and it ends in puberty. It seems that this "critical age" for first language acquisition coincides with the period when lateralization or one-sidedness—the apparent specialization of the left hemisphere for language—is taking place and ends when it is complete. Language learning and lateralization may go hand in hand, but it is not known whether language is a prerequisite for the development of lateralization or whether lateralization precedes language acquisition.

It is not that children wake up one morning with a grammar fully formed in their heads, instead they are born with an innate capacity to speak. This capacity involves a series of principles called linguistic universals. These principles imply the concept that every language without exception, is based on the same universal principles of semantics, syntax and phonology.

According to John Lyons, these principles are universal in the sense "that they are necessarily present in all languages, but in the somewhat different, and perhaps less usual sense of the term 'universal', that they can be defined independently of their occurrence in any particular language and can be identified, when they do occur in particular languages, on the basis of their definition within the general theory."[2] For example, at the level of semantics and syntax, the syntactic categories of Noun, Verb or Present Tense; and components or features of the meaning of words such as "male," "animate," "physical object"; and at the level of phonology, the set of distinctive features (for example, voicing) of phonology constitute instances of linguistic universals. This common set of principles form a universal grammar or UG. According to Chomsky, universal grammar is the endowment, genetically transmitted, that makes it possible for every human being to speak and learn human languages. And this innate predisposition is just one of the components of the total system of intellectual structures. In this connection the role played by the brain becomes more and more relevant. As it is well-known, the two hemispheres of the brain, which are functionally asymmetrical after childhood are absolutely involved in language processing—the left hemisphere being dominant in: (a) the processing of language-signals, (b) the processing of speech-sounds.

[2] Lyons, John. *Chomsky*, p. 128.

Language Acquisition Device

The linguistic universals form part of what Chomsky calls LAD (Language Acquisition Device), [3] i.e. a genetic mechanism for the acquisition of language. It is an innate faculty by means of which children can make complex guesses about what they hear around them with the help of an in-built evaluation measure which enables them to "select" or to "pick out" the best grammar in accordance with the evidence they receive from the environment.

Thus, the Chomskyan posture places against behaviourism and in favour of a mentalistic description of language—and consequently of language acquisition—providing evidence for the rationalist approach. On the one hand, behaviourists maintain that everything—including language use and all that which may be referred to as mental activity—can be explained in terms of habits (i.e. patterns of stimulus and response) which have been built up through conditioning. On the other hand, rationalists favour the view that true knowledge is obtained through the exercise of pure reason without reliance on the senses. So, in accordance with this latter trend, human beings should have "something" available for them to reason from, i. e. some starting point other than sense experience: *innate ideas* which constitute a form of knowledge. Chomsky's theory places under rationalist linguistics since he puts the emphasis on *innateness*. Besides, his theory could certainly be referred to as mentalist since Chomsky claims that the structure of language in some way mirrors the structure of the human mind, and that there is a close relation between language and mind.

Chomsky firmly believes that language, together with most other human abilities, depends on *genetically programmed* mental structures. There is a preprogrammed pattern of growth of which language learning during childhood constitutes one of its parts. Human beings are endowed with, for example, a heart and lungs which continue to develop after birth. In the same way, they are endowed with a highly complex language "organ." Accordingly, language development ought to be called *language growth* rather, since the language "organ" grows in the same way as any other body organ does. Chomsky says that the language organ interacts with early experience and comes to full development—i.e. matures—into the grammar of the language that the child speaks. Therefore, if a child provided with this fixed endowment is reared—rather, grows—in Chicago, knowledge of the Chicago dialect of English will be encoded by his brain. And, had the "brain" grown up in Lyons, it would have encoded the Lyons dialect of French. The brain's different linguistic experience plays an outstanding role in the development of language since it shapes the structure of the language organ.

To illustrate the growth of the language "organ," Chomsky draws a parallel between language growth and the growth that occurs in human beings after birth, say the onset of puberty. It is absurd to think that children are "trained to undergo puberty because they see other people." Instead, and more reasonably, it is assumed that puberty is genetically transmitted. Undoubtedly, it is also assumed that the onset of puberty may "vary over quite a range depending on childhood diet and on all kinds of other environmental influences." Nevertheless everybody understands and takes it for granted that the basic and underlying factors involved in the processes that control puberty are unequivocally genetically programmed. Human beings pass through a series of genetically programmed changes from birth to death, language growth being simply one of these predetermined changes.

[3] Chomsky, Noam. *Aspects of the Theory of Syntax*.

Thus, human beings are furnished with an "innate predisposition" (*Aspects of the Theory of Syntax*, p. 24), or "innate schema" (ibid, p. 27), or "language forming capacity" or "language acquisition device" (ibid, p. 32). The Language Acquisition Device is "only one of the components of the total system of intellectual structures" (ibid, p. 56). It becomes functional—i.e. capable of serving its purpose, capable of operating or functioning—only during a certain period that is known as "critical age." This is the period during which language can be learned easily, swiftly and without teaching. Eric H. Lenneberg[4] claims that the "critical age" period for first language acquisition coincides with the period when "lateralization" (the asymmetrical development of the two hemispheres of the brain, some parts of the dominant hemisphere resulting specialized or dominant in particular functions, under normal environmental and developmental conditions in early childhood) is taking place and ends when it is complete: at puberty.

Two main factors may be mentioned in connection with the Language Acquisition Device, which paves the way for the universal and seemingly rapid language "acquisition": (1) the brain maturation and cognitive development; (2) the favourable environment in which language is "acquired."

The child is *exposed* to the language of the community in which he is inserted. Being exposed to the "primary linguistic data" constitutes one of the essential and central steps in the development of language. Nevertheless, it should be remarked that the rich and "exotic" grammatical knowledge that everybody seems to possess by the time everybody reaches the age of five or six is *built in*. Chomsky states that everybody can learn English, Spanish, Chinese or any other language with all its richness since absolutely all human beings are designed to learn languages based upon a common set of principles that constitute the *universal grammar*.

Universal grammar is the sum total of all the immutable principles which comprise grammar, speech sounds and meaning, and which have been built into the language organ by heredity. In other words, and quoting Chomsky, it can be said that *universal grammar* is "the inherited genetic endowment that makes it possible for us to speak and learn human languages" equally well.

Anyhow, it is extremely surprising that though the evidence available is so meager, the child comes to have, little by little, a linguistic system incredibly intricate, complex and abstract, which presupposes other systems of belief and understanding. Chomsky calls this central issue "Plato's problem." Despite the fact that our knowledge of language is so complex and abstract, we receive a experience of language certainly limited. It is believed that "our minds could not create such complex knowledge on the basis of such sparse information."[5] And according to Cook (ibid, p. 55): "It must therefore come from somewhere other than the evidence we encounter; Plato's solution is from *memories of prior existence*, Chomsky's from *innate properties of the mind*." This "poverty of the stimulus" argument has a clear and simple form: on the one hand there is the complexity of language knowledge, on the other the impoverished data available to the learner; "if the child's mind could not create language knowledge from the data in the surrounding environment, given plausible conditions on the type of language evidence available, the source must be within the mind itself" (ibid, p. 55).

Equally remarkable is the fact that native children "acquire" language so uniformly, easily and quickly. It is due to this fact that many

[4] Lenneberg, E.H. *Biological Foundations of Language*.

[5] Cook, V. J. *Chomsky's Universal Grammar. An Introduction*.

linguists consider that language development involves some kind of "natural" development in the same way as physical growth does, that human beings are endowed with a specific capacity for language, and that language is innate in some sense. In this case, what must be innate could be just a specific ability to acquire language, or a quite more general ability or capacity to respond to the environment and then "to learn in carefully regulated ways through "conditioning" or through a general "cognitive" ability that also develops through experience."[6]

The acquisition programme

Since language makes use of a doubly articulated system, that is to say of two different systems (one of sounds and one of meanings), its mastery presupposes the "acquisition" and "development" of both equally well. Several different stages that seem to respond to universal principles may be distinguished in this connection.

The first period to be described is known as the *period of prelinguistic development* that takes place during the first year of the infant's life, during which he does not normally produce words. To start with a newborn baby is able to produce only crying sounds, besides possible sneezes, coughs, etc.

Then, when the infant is about two months, he begins *cooing,* that is he produces sounds or "noises" composed of velar consonants such as *g* and *k* and high vowels such as *i* and *u*.

When he is about three months he will be adding *babbling sounds*, which implies a kind of vocal play that involves different vowels and consonants such as fricatives and nasals and that is characterised by the production of repeated syllables such as *bababa, mamama, dadada, etc.* More often than not the child seems to be experimenting with his vocal tract when producing sounds which are not present in his surrounding linguistic environment, but then little by little, his babbling grows to be increasingly attuned to it.

From around nine to twelve months—i.e. in the later babbling stage—some intonation patterns and some imitation of others' speech are recognisable in his oral production to such an extent that it is frequently labelled as the *sound play period*. The child is now capable of using his vocalizations to express emotions and emphasis. It is at this exact moment that, normally, parents and caregivers react to him as if he were really speaking, though many of them (parents and caregivers) treat the baby as if he were talking much earlier. Some psychologists think this *prelinguistic stage* "gives children some experience of the social role of speech because parents tend to react to the babbling, however incoherent, as if it is, in fact, their child's contribution to social interaction."[7]

A linguistic phenomenon known as *motherese, baby talk, care-taker speech* or *care-giver speech* happens to take place at this moment that some adults—especially mothers—address infants in a peculiar way characterised by utterances which are typically clear and well-structured, with frequent rephrasings and repetitions, clear articulation and arresting intonation patterns (with an interesting range of highly varied intonation). The grammatically simple and short utterances contain words such as *pussy* and *quack-quack* and occur in active interactions whose topics relate directly to foci of interest relevant to the infants' world. Many forms associated with "baby-talk" are used, for example, simplified words such as *tummy* or *nana*, or other alternative forms involving the

[6] Wardhaugh, Ronald. *Investigating Language. Central problems in Linguistics*, p. 209.

[7] Yule, George. *The Study of Language*.

repetition of simple sounds and representing objects in the child's environment such as *choo-choo*, *poo-poo*, *pee-pee*, *wawa*. Moreover, mothers adjust their speech slightly and repeatedly to match the constantly changing level of competence of their babies and children. Therefore, the level of structural complexity of the linguistic forms provided varies according to the continuously increasing command of the language their children develop. However, this does not mean that absolutely all adults adopt this attitude; many others make use of normal pitch, frequency range, intonation patterns and ordinary lexical items; the selection of topics of conversation being the only manifested restriction.

Between twelve and sixteen or eighteen months the child gains access to the period known as the *one-word stage,* during which he, typically, starts to understand words fully—i.e. he shows *comprehension of lexical items*—and to produce single-unit utterances (realized by single words). The single terms uttered by the infant during this period refer to everyday objects such as "milk," "cookie," "cat," "cup."

As it may be the case that the child can produce a simplified version of, for instance, "what's that?," some linguists prefer to call this stage *holophrastic*—meaning that a single form functions as a phrase or sentence, in the belief that the infant is really using these forms as phrases or sentences. It is conventionally agreed then that it is at this point that the infant begins to speak. Noticeably, it is funny to point out that girls tend to start "speaking" earlier than boys.

The child's vocabulary does not grow so swiftly, and it comprises various different classes of words, for example: *daddy, doggie, hot, cold, bath, bed, spoon, cup, bottle, eat, up, down,* and even *that*. But it does not comprise grammatical words of the following kind: *is, might, should, of, to, against, the,* etc. His productions lack inflectional suffixes, i.e. there is no grammatical marking for plurals or past tenses (in English). It is remarkable that the gap between production and comprehension appears to be rather great in this period, since the infant is capable of understanding about a hundred words before being able to produce such a lot. There is no evidence of any structural properties in the utterances produced at this point and their meanings seem to be mainly *functionally.* In this connection, Halliday presents a *socio-functional* approach to language "acquisition" when he states that language is a *system of meanings* and of *ways of expressing these meanings.* Language serves the child's purposes by means of all the different meanings which are related to different functions. The child learns these meanings by interacting with other people. According to Halliday, at this early stage, the infant's language lacks syntax since each linguistic element constitutes a content-expression pair. In this sort of production it is easy to distinguish certain semantic roles or categories such as Agent/Action and Object. For instance, an utterance such as just *car* may be interpreted as *look, a car* or *there's a car*; however, it may not be appropriate to adopt such a "translation" as the most suitable because it is impossible for us to be sure that the infant has in mind the accurate concepts implied in the adult's interpretation.

Nevertheless, many times the infant seems to be extending the use of the single forms produced to name objects. Seeing his brother's bed empty, he may even utter the name of his absent brother in such a simple structure as *Peter* and *bed*. But, in fact, he is still incapable of putting the two forms together to produce a more complex phrase.

When the child is between 16–18 and 24 months old, two-word-long utterances are produced. This period is well-known as the *two-word stage* since it is impossible for the child to produce utterances such as *mummy get ball*, which contains three words; instead he will utter, on the one hand, *mummy get,* and on the other one *get ball.* Examples of this instance

are: *mummy dress, want coke, gimme milk, baby chair, doggie bad*. The interpretation of such productions will depend on the context of their utterance; for instance, the phrase *baby chair* may be thought to mean: (a) an expression of possession, i.e. this is baby's chair; (b) a request, i.e. put baby in chair; or (c) a statement, i.e. baby is in the chair. Since adults behave as if communication is taking place, the infant receives feedback quite frequently confirming that his utterance "worked."

Hardly ever will the infant's utterances separate from the adult syntactic word order; it seems then that he is already acquiring some grammar—for example, the rules to obtain grammatical word order in English. Nevertheless, no morphological rules are applied since there is no inflectional marking—the expressions do not show any grammatical "endings."

When the child is between two and three years old, a large number of utterances of the type *multiple-word utterances* is produced. They are characterised by the variation in word-forms rather than the number of words. The appearance of the sequence of inflectional morphemes as well as of simple prepositions (in, on, under, etc.) is highly relevant. There is a stage called the *telegraphic speech* which shows strings of lexical morphemes in phrases of the type *Rose want doll, doggie drink milk,* or *this shoe all wet*.

It is easily seen now that the sentence-building capacities that the child has been developing by this stage show in the correct order he gives to the linguistic forms.

The two-word stage lasts for several months. Then, utterances become much longer, containing four, five, six, ten, and even more words. According to Trask, [8] "grammatical words and endings appear and, in a matter of months, the child is using almost the whole range of adult grammatical forms of words. All kinds of new constructions appear—negation, subordinate clauses, questions—and are quickly used more increasingly accuracy and conference.

Roughly speaking, between the ages of two and three infants "acquire" most of the grammar of his native language—or of any other language he might be learning. And when he is five, he masters practically everything with the exception of a few elaborate constructions that will be learnt later on. When the child is five, though he is still making the odd mistake ("three *womens,*" "he *goed* to the cinema"), he has already mastered practically everything except a few elaborate constructions that will be learnt later on.

Conclusion

Any child, provided he is not physically impaired, develops language at approximately the same time, along much the same programme. As the same can be said for other human activities such as sitting up, standing, walking, using the hands, jumping and many other physical activities, it is believed that the language acquisition programme has the same basis and is based on the same principles as the biologically determined development of motor skills. There is a close link, interdependence between the maturation of the child's brain and the lateralization process. This apparent biological schedule underlying the language acquisition process is definitely dependent upon an interplay with many social factors in the infant's environment. The child may be said to have the biological capacity to deal successfully with distinguishing certain aspects of linguistic input at different stages during his early childhood. And this acquisition capacity actually requires a sufficiently constant input from

[8] Trask, R.L. *Language: The Basics*.

which the basis of the regularities in the particular language (or languages) can be worked out.

On the other hand, though the early socio-cultural environment of a child differs considerably from culture to culture, there are constant and apparently invariable linguistic principles that apply in absolutely all cases indicating the existence of a genetically transmitted innate capacity. It is in this connection that the linguist Noam Chomsky has proposed the description of language development as "language growth" since the "language organ" simply grows and matures as any other body organ does.

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