I-Language, E-Language and RI-Language

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Abstract

In his minimalist design of the Faculty of Language, Chomsky contends with a process of mapping I-language to E-language, and in passing, a process of re-internalizing E-language to I-language. This paper attempts to address the question of how and in what ways E-language contributes to the inner working and re-shaping of I-language by mainly referring to Pirahã, English and Chinese for illustrative exemplification.

Keywords: I-language, E-language, re-internalized language, Pirahã

1. Introduction

Internalized Language (I-Language) or Mentalese, LOTH (Language of Thought) is a language for thinking, which can be characterized as follows: (a) it is universal within and unique to human species, (b) it is innate, and (c) it is perfect. In the MP (Minimalist Program) biolinguistic syntax, I-language is related to Conceptual-Intentional System (CI), which contains (a) a universal inventory of lexical features, a universal lexicon, (b) numeration from the universal lexicon to list lexical arrays, (c) a universal syntax of cyclic set Merge (recursion), generating hierarchical structures for meaning, and (d) spell-out turning the hierarchical meaning structure into linear ordered sequence of Externalized Language.

Externalized Language (E-Language) is the linerarized I-language, a specific human language in sound, which is related to Sensory-Motor System (SM). It is imperfect since it contains dislocation and other uninterpretable φ-features.

Then, the question is: if syntax is a theory of mapping I-language to E-language, and language acquisition is a process of parameterizing UG into E-language, are there any contributions of E-language to I-language? Or is there really a process of 're-internalized' external speech as the real 'inner speech' as mentioned in passing in Chomsky (2012). The present short paper attempts to address such a tough problem or a mystery.

2. Some Clues

The MP syntax starts with a universal lexicon. However, nobody knows what it is like. In the popular MP syntax of Merge, we see the initial merging elements are lexical roots, i.e. words without phonetic content as expressed in the form of {√like, √Mary} or {√Mary, √like}. To include √like/*xihuan* in the lexicon, the phonetic features /laɪk/ in an E-language like English or /*xihuan*/ in Chinese are deprived of in syntax. Then, we may encounter a circularity: from lexical items in E-language with phonetic content to semantic universal lexical roots without phonetic content for set Merge and then (spell out, linearize) back to lexical items with phonetic content in E-language.

If we start from a language-specific lexicon, the lexical items selected for Merge would have phonetic content and then they should be ordered tuple (ordered set) rather than set as in the following:

(1) {like, Mary} for V-O languages like English and Chinese
(2) {Mary, like,} for O-V languages like Japanese

Thus, the primitive units for Merge are not universal semantic roots but lexical items with phonetic content from a language-specific lexicon. The question is we do not know where and when in syntax a language-specific lexicon is formed. Maybe, the formation of a language-specific lexicon is dependent on a dual mechanism for phonemes and morphemes based on Hockett's (1960) hypothesis of duality of patterning.

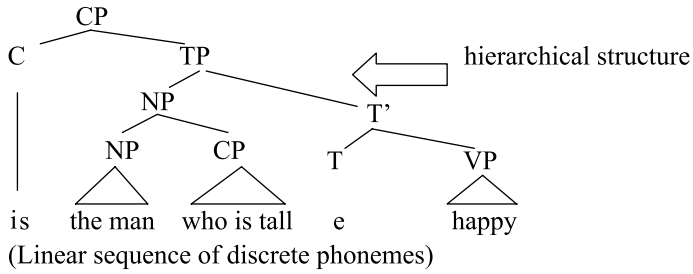
In terms of child language acquisition, we have to assume that children are born with (a) cyclic Merge in addition to the universal lexicon, and (b) chances to be exposed to PLD (Primary Linguistic Data) in an E-language which has been already decomposed into discrete phonemes and morphemes. Then how do children analyze the discrete phonemes and relate them to discrete morphemes? This has to do with the decomposability of the signals used in E-language. The physical symbols in the medium for communication in human language must be physically decomposable into discrete elements.

The olfactory, tactile (grooming), electrical, magnetic signals and chemical pheromones in animal communication are holistic, physically indecomposable. Only auditory and visual signals are decomposable either in production or in perception. Even though animals like chimps do produce both auditory and visual signals in communication, they are not capable of vocal learning as we are and their gestures are qualitatively different from human sign languages. Their Sensory-Motor (SM) systems are not genetically well-developed for discrete elements. Human sounds are decomposable into phonemes because we have consonants for segmenting a sound sequence into discrete syllables (Zhang, 2010). No human language lacks consonants. Of the 11 phonemes in Rotokas, 6 are consonants. Of the 83 phonemes in Ubyx, 81 are consonants, 2 vowels. Human SM with the lowering of larynx, upright standing, enlarged brain size and the hearing system are able to produce and comprehend discrete phonemes. Other animals cannot. However, discrete phonemes

and human SM are not enough for human language. Suppose we implant human speech organs (including the nerve systems, the sensory-motor system) onto a chimp. I don't think the chimps would be able to use our human language. Smart computers can perform the same perceptional behaviors in recognizing and producing phonemes as we do. But they cannot use language to 'think'. What they lack is what we have, that is, we can have our thoughts decomposed into morphemes and phrases in hierarchical meaning structures. But animals cannot. They are holistic in sound and holistic in "meaning". That's why animals do not ask *wh*-questions, which depend on hierarchical phrasal constituents, and that is also why no part of animal signals can be identified as pronouns as in our languages. Animal communication is asymmetric (Dawkins & Krebs, 1978; Krebs & Dawkins, 1984) while human communication is symmetric. That means, animal communication is just a one-way traffic, without parity (the role exchange between "speaker" and "listener"). Their communications are not real communication, but mere instinctive manipulations to control, for mating, for territory declaration. Even in highly social animals, their calls are not communicative or interactive, like our football players in their games. The team work is instinctively manipulated. A cat may run away at the barking of a dog. It is like the bouncing back of a ball when it hits the wall. A male bird calling for mating is not like our verbal marriage proposal exchanged between two lovers. Animal signals are produced to target not only their conspecifics but also their potential predators, threatening objects from the environment. There is no turn taking in animal communications. All these must be genetically programmed as such. It took over one hundred million years before the symmetric communication in human languages is reached (as compared with the mutation result of Merge in about 50-100 thousand years) (Kitchen, Seyfarth, & Cheney, 2003), which means SM for human language was there long before CI, the Thought System.

In human language, sounds and signs are decomposable into discrete elements. No human language is without consonants (at least 6). And we humans have what is called the "theory of mind", the ability to mind-read our conspecifics, whereas animals do not. To say that animals have 'theory of mind" is a pseudo-science (Harris, 2005). Animals can infer. But they are only interested in what others do, not what others are thinking of. Humans are genetically endowed with *Mitteilungsbedurfnis* (MtB), a German word meaning the desire to share and exchange information among human conspecifics (Fitch, 2010). The core knowledge of human language rests in the syntax of Merge, the ability to assign a hierarchical meaning structure to a discrete sound sequence (see (3)).

(3)



This mapping ability can be attributed to the peripheral organ of SM, which makes human language possible (Darwin, 1871; Lieberman & Hall, 2007). The reconstruction of human larynx causes the emergence of other components of the Faculty of Language (including syntax and even semantics) (Carstairs-McCarthy, 1999). And also, it is equally important to note that the symbolic language LOTH posits is not equivalent to any particular spoken language but is the common linguistic structure in all human thought. Part of Fodor's (1975) original argument for LOTH is that learning a spoken language requires already possessing an internal mental language, the latter being common to all members of the species. Thus, SM and CI are equally important for human languages. E-language is a contributor to I-language.

3. Evidence

Evidence from Pirahã. Based on Everett (2007, 2009), Pirahã exhibits the following traits: (a) there are no color words as in most of the known languages but only words that can be glossed as *light* and *dark* in English; (b) there are no words corresponding to *father* and *mother* as in English, but only a word corresponding to *parent*; (c) pronouns are limited to three with no morphological distinction between singularity and plurality; (d) there are no verb conjugations for tense/aspect, and there is no numeracy, only one and many; (e) they cannot learn numeracy in Portuguese; and (f) there is no recursion as illustrated in (6) (also found in Istmul (Karlsson, 2007) and Bininj Gun-Wok (Evans, 2003)). To express the recursive idea in (4), they rephrase it into two non-recursive sentences in (5).

(4) Daniel ate the meat that Keren grilled.
(5) Daniel ate the meat. Keren grilled the meat. (English glosses for Pirahã)
(6) * Daniel ate the meat that Keren grilled. (English glosses for Pirahã)

Why no recursion? Is it because Pirahã people do not have a recursive mind? Everett (2007) and Corballis (2011) say they have a recursive mind. Chomsky (2006) says that they have a recursive mind (I-language), but they do not use it, and do not manifest it in the E-language of Pirahã (Piatelli-Palmarini et al., 2009). Now let us see what is going on in the E-language of Pirahã: (a) it contains only 7 consonants and 3 vowels and uses a complex array of tones, stresses, and syllable lengths containing no vowels and consonants in whistles, hums, or singing; consonants and vowels may be omitted altogether and the meaning is conveyed solely through variations in pitch, stress, and rhythm; Pirahã mothers teach their children the language through constantly singing the same musical patterns; (b) it lacks specialized words for clause-formation, and so it, instead, makes tonal distinctions in the use of *-sai* to provide evidence for the existence of complex clauses; and (c) these two phonetic limitations give Pirahã sentences an imposed length limit that disallows nested recursive sentences like *Mary said that John thought that Henry was fired*. All these phonetic features in some way resemble the music

language of the Neanderthal, which completely lacks linguistic recursion. If these facts are accurate and true, we may conclude that the lack of recursion in this language is attributed to the phonetic system (the SM system) of the E-language.

Evidence from Chinese. In Chinese, we may ask a *wh*-question about part of the relative clause in a complex NP construction as in (7) to get the LF Operator-Variable construction in (8).

(7) Baba chi-le shui kao de rou?
Dad eat-ASP who grill DE meat
'*Dad ate the meat who grilled?'

(8) LF: which x, x=person, such that Dad ate the meat x grilled.

But in English, we cannot derive this LF since the Subjacency Principle prohibits long distance extraction of *who* out of the complex NP as shown in (9):

(9) *who did Dad eat the meat t grilled?

English speakers have to express the recursive idea conveyed in Chinese (7) in two non-recursive sentences as in (10) in the same way as Pirahã speakers do in (5).

(10) Dad ate the meat. Who grilled the meat? (like Pirahã)

The un-derivable LF in (10) in English is called Missing LF in Ning (2014). If LF is the semantic representation at the interface with the CI System as has been well established ever since Huang (1982), the LF in (8) must be available universally in I-language. The question is: how come is it missing in the E-language of English? Is it because the E-language of English is not equipped with the instrument capable of deriving the LF Operator-Variable construction or is it because English speakers are not endowed with LF conceptual structure in I-language in the first place?

If our answer to the second question is no, which is to say if we think English speakers are not endowed with LF conceptual structure in I-language, we will run into the risk of making the entire MP edifice collapse and fall back into the Sapir-Whorf Hypothesis of Linguistic Relativism.

To make our discussion more friendly, let us metaphorically say I-language contains a pool of sleeping innate ideas or concepts waiting for wake-up calls to awake them before they can get dressed in an E-language. Thus, all human speakers, be it English speakers or Chinese speakers or Pirahã speakers, are all endowed with the same amount of sleeping concepts, a universal list of sleeping words and conceptual structures including OP-VAR constructions. The sleeping LF in (8) will be woken up to get dressed in different E-languages and the sleeping conceptual structure will be woken up (spelled out, linearized) in different E-languages. The missing LF in English does not mean English speakers are not genetically

endowed with the sleeping LF but means the E-language of English is not able to awake the missing LF due to the violation of the Subjacency Principle at the S-S (Surface-Structure) level of the E-language. However, the sleeping ideas can only be awoken by the E-language they are exposed to in the initial period time of acquisition. When the initial acquisition time is over, that is when an E-language is acquired, those un-awoken LF in (8) will not be awoken in other E-languages. That's why Everett spent 8 months teaching Pirahã people to count but failed since it is too late to wake them up. And that's why we cannot teach English speakers to ask a *wh*-question in English like "*who did Dad eat the meat t grilled*" as we do in Chinese. Neither can we teach English people to think with classifiers like "*san ben shu*" (three CL books), unless they are able to think in Chinese, that is, their I-language after externalization in English is re-internalized as in the head of a native Chinese speaker. And it follows that the number of wake-up calls for sleeping ideas would be the same as those that have been externalized in E-language. LF in I-language derived from syntax can vary, depending on the S-S in E-language. This indicates that there is interaction going on between I-language and E-language as argued in the literature (Fitch, 2010; Keller, 1995; Deacon, 1997; Kirby, 1999; Kirby et al., 2004), which may be identical to the re-internalization process for inner-speech in Chomsky (2012).

4. From Discrete Phonemes to Discrete Morphemes: A Type-Token Account

The philosophical notion of Type-Token of C. S. Peirce may give us an alternative account of how discrete phonemes in E-language give rise to discrete morphemes or words in I-language, a process of re-internalizing the external physical objects of sound into inner-speech. This can be achieved by referring to the recursive definition of Type-Token as stated below:

(11) Recursive definition of type-token

i. Let X and Y be two distinctive utterances (sequences of sounds); a, b, c, d, … are discrete segments (tokens) in X, and A, B, C, D, … are discrete segments (tokens) in Y;

ii. If a member α in X, co-occurs with a member β in Y, then α and β are two types.

For example, when X=*boys hate roses*, Y=*girls love roses*, the two occurrences of *roses* render *rose* into a type of *rose*; when X=*boys love roses*, Y=*girls love lotus*, the two occurrences of *love* render it into a type of *love*. It is only under such a circumstance that *rose* and *love* become words in the inner speech or the sleeping ideas of *rose* and *love* are awakened in the dress of English words. Words are nothing but types, and types constitute the natural biological force for displacement in human language. The example above also suggests that types do not appear in isolation but in a manner of mutual inclusion:

(12) Mutual Inclusion:

i. A {a, b, c, d, …}, A is a type;

ii. a {A, B, C, D, …}, a is a type.

In (12), *A* is a member of Set (12ii) and *a* is a member of Set (12i). We call this mutual inclusion. This mutual inclusion formally defines the meaning of lexical items, an attempt to formally define meanings for Chomsky's internalistic view on semantics. Intuitively speaking, the meaning of an argument is defined in its semantic associates of predicates, and the meaning of a predicate is defined in its semantic associates of arguments. In human languages, a noun is not a noun if it is free from being associated with verbs or adjectives, and a verb is not a verb if it is free from association with nouns. Dogs do not perceive bones as nominal, but predicates (properties) manifested in the bones. In dogs' mind, there are no 'nouns'. They can not cognize properties which are disassociated from entities. Thus there is no word meaning at all in animals. When a young child utters a single word like *Mom* in the one-word stage, the word *Mom* they utter is not the word *Mom* in adult language. It can be interpreted as a request call or a sign for comfort. It is a holophrase like the miaowing of a cat.

The semantic relation and the φ-feature agreement between two elements is held between two physical objects (sounds, morphological markers, tokens). The relations themselves are not real objects just as a couple is not real but the husband and the wife who form the social relationship of a couple are real. The semantic relation, and the agreement relation is like what Newton called long distance attraction, force, and gravity—"ghost". Relations or types are not ontological entities, but tokens are.

The further task is to find out how type-token distinction is ultimately realized in the neurons and our genetic make-ups. Concepts or meanings are types resulting from physical tokens. Concepts are the thinking units. Thinking is only possible in concepts, in types. If animals can think, they must have types; if they have types, they must be able to type tokens and form mutual inclusion. Thus, the bottom line question is: can they type tokens? Can they segment their calls into tokens? The answer is no, given the physical constraints imposed on tokening. The following remarks from Uriagereka (2009) may give some clues to this answer.

> ... the tamarins failed to acquire anything that involved relevant synaptic type, and I mean by that simple context-free grammars. They only succeeded in acquiring simpler finite-state tasks, with no "type/token" distinctions….
>
> ... such a type/token distinction must be significant in the evolution of our line of language…. could the tamarins—or other apes, or sapiens other than ourselves in evolutionary history—have been capable of real type/token distinctions in thought, but not in sharing that thought through a unidimensional channel that depends on the motor system? (Uriagereka, 2009, pp. 173-174)

5. Conclusive Remarks

Concept and conceptual structures are innate, like sleeping ideas. We share the same amount of innate concepts and conceptual structures or sleeping ideas. Children do not acquire word meaning and conceptual structure in an ostensive-inferential manner.

Learning a spoken language requires already possessing an internal mental language, the latter being common to all members of the species. Pirahã people are endowed with the same recursive ideas about relatives as English and Chinese people are. English speakers are endowed with the same sleeping ideas about the LF derived from Chinese *Baba chi-le shui kao de rou?* (*Dad ate the meat who grilled?). The peripheral organ of SM makes human language possible. Sleeping ideas can only be woken up by E-language wake-up calls at an early age in the time course of language acquisition. That is why Pirahã adults cannot learn numbers in Portuguese, *father* and *mother* based on English, and English adults cannot learn *Baba chi-le shui kao de rou?* and classifiers based on Chinese. Once the I-language is externalized it becomes a re-internalized language with which we think and talk.

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