

## EARLY HUMAN LANGUAGE WAS ISOLATING-MONOCATEGORIAL-ASSOCIATIONAL

DAVID GIL

*Max Planck Institute for Evolutionary Anthropology  
Leipzig, 04103, Germany*

Isolating-Monocategorial-Associational (IMA) Language is language with the following three properties: (a) *morphologically isolating*, without word-internal morphological structure; (b) *syntactically monocategorial*, without distinct syntactic categories; and (c) *semantically associational*, without distinct construction-specific semantic rules, compositional semantics relying instead on the association operator, which says that the meaning of a composite expression is associated with the meanings of its constituents in an underspecified fashion. IMA Language is present in the following five domains: (a) *phylogeny*: at some stage in evolution, early language was IMA Language; (b) *ontogeny*: at some stage in acquisition, early child language is IMA Language; (c) *semiotics*: some artificial languages are IMA Language; (d) *typology*: some languages are closer than others to IMA Language; and (e) *cognition*: IMA Language is a feature of general human cognition. This paper presents arguments pertaining to the first of these domains, namely phylogeny, citing evidence from the linguistic behaviour of captive apes which points towards the conclusion that early human language was IMA Language.

Imagine a hypothetical language, either natural or artificial, with the following three properties:

- (1) (a) *Morphologically Isolating*  
No word-internal morphological structure;
- (b) *Syntactically Monocategorial*  
No distinct syntactic categories;
- (c) *Semantically Associational*  
No distinct construction-specific rules of semantic interpretation  
(instead, compositional semantics relies exclusively on the Association Operator, defined in (2) below).

Such a language may be referred to as *Isolating-Monocategorial-Associational*, or for short, *IMA*.

Does IMA Language exist? Obviously, English is not an IMA Language, nor, to the best of my knowledge, has any other natural language been proposed to be in complete possession of the three defining properties in (1) above. However, in Gil (2005) it is argued that the notion of IMA Language is of relevance to a variety of domains: phylogeny, ontogeny, semiotics, typology and cognition. The present paper focusses on the first of these domains, suggesting that IMA Language represents an earlier stage in the evolution of modern human language.

The three defining properties of IMA Language pertain to three different linguistic domains, morphology, syntax and semantics; logically, they are thus independent of each other. Accordingly, one may imagine various other kinds of hypothetical languages with different subsets of the three properties, for example a language that is isolating but not monocategorial or associational.

The defining properties of IMA Language represent the limiting points of maximal simplicity within each of the three domains, morphology, syntax and semantics. Hence, for each domain, one may imagine languages approaching these end points along a scale of decreasing complexity. Accordingly, a language is increasingly isolating as it has less and less morphological structure, increasingly monocategorial as its syntactic categories decrease in number and importance, and increasingly associational as its construction-specific rules of semantic interpretation become fewer and less distinct. Alongside *Pure IMA Language*, as in (1) above, one may thus entertain the possibility of a range of *Relative IMA Languages*, approaching Pure IMA Language to various degrees within each of the three domains. Thus, for example, in Gil (2005) it is argued that Riau Indonesian is one such Relative IMA Language.

The first defining property, *morphologically isolating*, is the one that is most familiar, since it pertains to a typology that has been the focus of considerable attention in the linguistic literature. As is well known, isolating languages such as Vietnamese have considerably less word-internal morphological structure than synthetic languages such as Russian, which in turn have considerably less morphology than polysynthetic languages such as Mohawk. However, no natural language is purely isolating, as per (1a); all known isolating languages still have *some* morphology — affixation, compounding, or other kinds of processes such as reduplication, stem alternation, and so forth.

The second defining property, *syntactically monocategorial*, pertains to a domain within which the presence of cross-linguistic variation has only recently, and still only partially, been recognized. In the past, syntactic categories have generally been presumed to be universal, often in accordance with the eight parts of speech of traditional Latin grammar. Indeed, the assumption that syntactic categories must be the same in all languages has lingered on into much current linguistic work, in schools as diverse as linguistic typology and generative grammar; this assumption is in evidence whenever a linguist analyzing a language says that one word must be a noun because it means 'chicken' while another word must be a verb because it means 'eat'.

However, in recent years an increasing body of literature has begun to examine the ways in which the inventories of syntactic categories may vary across languages. One important issue that has attracted considerable attention has been the viability and nature of the category of adjective, the extent to which words denoting properties such as 'big', 'red', 'good' and so forth exhibit distinct adjectival behaviour, or, alternatively, are subsumed within larger categories of

noun or verb. Another major focus has been on the universality of what is generally considered to be the most fundamental categorial distinction, namely that between noun and verb; such work has typically dealt with languages which seem, *prima facie*, to lack a noun/verb distinction, from families such as Munda, Austronesian, Salish and Wakashan. It is of course languages lacking a noun/verb distinction which come closest to being syntactically monocategorial. However, to the best of my knowledge, no language has ever actually been proposed to be purely monocategorial. In particular, most or all descriptions of languages without a noun/verb distinction still involve, at the very least, a distinction between a single open syntactic category (encompassing the equivalents of both nouns and verbs) and one or more closed syntactic categories containing various "grammatical" or "functional" items.

The third defining property, *semantically associational*, although rooted in various common-place observations concerning the ways in which expressions derive their meanings, is nevertheless of a more novel nature. Consider the best translation of a basic transitive sentence such as 'Mary hit John' into the language of your choice. How do you know who hit whom? If you chose Mandarin, then, like in English, the agent is differentiated from the patient by linear order: the agent precedes the verb while the patient follows it. However, if you chose Russian, then linear order provides no semantic information; instead, the agent is differentiated from the patient by its case marking, nominative as opposed to accusative, and by the fact that it triggers gender agreement on the past-tense form of the verb. The various rules according to which agents and patients are differentiated in English, Mandarin, Russian and other languages constitute examples of *construction-specific rules of semantic interpretation*, as specified in (1c) above, in that they apply specifically to active transitive clauses. Most languages contain many such construction-specific rules, which, together, govern the compositional semantics of clauses, phrases, and other, more specific constructions, accounting for semantic features such as thematic roles, tense, aspect, number, definiteness, and numerous others.

Now imagine you are confronted with a three-word sentence in an unfamiliar language, armed only with a rudimentary dictionary. Somehow, you identify three word stems, meaning 'Mary', 'hit' and 'John'; however, these three word stems bear rich additional morphological structure, and you know nothing about the grammar of the language. Can you figure out the meaning of the sentence? At first blush, the answer would seem to be no. With no information on thematic roles, tense, aspect, number, definiteness, and other such features, the sentence could mean anything from 'Mary hit John' through 'John will repeatedly try to hit Mary' to 'John and Mary aren't hitting anybody' and so on and so forth. Still, the meaning of the sentence is hardly unconstrained: it is not very likely to mean 'The rain in Spain falls mainly in the plains'. Thus, although you have no knowledge of the grammar of the language, it is a safe bet, in fact a

near certainty, that the meaning of the sentence, whatever it is, *has to do in some way with 'Mary', 'hit' and 'John'*.

The semantic relationship of "having to do with" may be formally represented by means of the *Association Operator*, defined as follows:

(2) *The Association Operator A:*

Given a set of  $n$  meanings  $M^1 \dots M^n$ , the Association Operator  $A$  derives a meaning  $A(M^1 \dots M^n)$  read as 'entity associated with  $M^1$  and ... and  $M^n$ '.

Two subtypes of the Association Operator may be distinguished, the *Monadic Association Operator*, in which  $n$  equals 1, and the *Polyadic Association Operator*, for  $n$  greater than 1.

In its monadic variant, the Association Operator is familiar from a wide variety of constructions in probably all languages. Without overt morphosyntactic expression, it is manifest in cases of metonymy such as the often cited *The chicken left without paying*, where the unfortunate waiter uses the expression *the chicken* to denote the person who ordered the chicken. More commonly, the Monadic Association Operator is overtly expressed via a specific form, which is commonly referred to as a *genitive, possessive or associative* marker. Some idea of how unconstrained the association is can be obtained by comparing the obvious meanings of the English enclitic possessive marker 's in phrases such as *John's father, John's nose, John's shirt, John's birthday, John's suggestion* and so forth, or by considering the range of meanings of a single phrase such as *John's book*, which could denote the book that John owns, the book that John wrote, the book that's about John, or, in more specific contexts, the book that John was assigned to write a review of, and so forth.

In its polyadic variant, the Association Operator provides for a basic mechanism of compositional semantics in which the meaning of a complex expression is derived from the meanings of its constituent parts. In accordance with the Polyadic Association Operator, whenever two or more expressions group together to form a larger expression, the meaning of the combined expression is associated with, or has to do with, the meanings of each of the individual expressions. Obviously, polyadic association applies in a default manner throughout language; it is hard to imagine how things could be otherwise. Thus, in the little thought experiment described above, it is what made it possible to be sure that in an unfamiliar language, in the absence of any specific grammatical information, in a sentence with three words whose meanings were based on 'Mary', 'hit' and 'John', the meaning of the sentence would still be associated in some way with 'Mary', 'hit' and 'John', or 'entity associated with Mary, hitting and John'.

One grammatical domain in which the Polyadic Association Operator is overtly visible is in genitive constructions. In many languages, genitive

constructions are formed by the bare juxtaposition of the two expressions, in which case the derived meaning may be represented by means of the Polyadic Association Operator applying without any overt morphosyntactic expression. More generally, the Polyadic Association Operator may be considered as a universal default mechanism for semantic interpretation, but one that is in most cases overridden and narrowed down substantially by the application of additional construction-specific rules. A purely associational language would be one in which there were no such further construction-specific rules of semantic interpretation, and in which, therefore, the compositional semantics were effected exclusively by the Polyadic Association Operator. It is almost certainly the case that no natural language is purely associational; however, as argued in Gil (2005), some languages, such as Riau Indonesian, may come closer to being purely associational than is generally assumed.

In general, then, Pure IMA Language represents a limiting case of maximal simplicity within the domains of morphology, syntax and semantics. One may indeed wonder whether IMA Language is capable of fulfilling the multifarious functions associated with human language in the diverse contexts in which it is used. Nevertheless, IMA Language is in fact more widespread than might be expected, and can indeed fulfil a wider range of functions than might seem, *prima facie*, to be the case.

IMA Language, or a system that comes close to IMA Language, is manifest in the following five distinct ontological realms:

- (3) (a) *Phylogeny*  
At some stage in evolution, early language was IMA Language;
- (b) *Ontogeny*  
At some stage in acquisition, early child language is IMA Language;
- (c) *Semiotics*  
Some artificial languages are IMA Language;
- (d) *Typology*  
Some languages come closer than others to IMA Language;
- (e) *Cognition*  
IMA Language is a feature of general human cognition.

This paper focusses on the first of these domains, namely phylogeny; the remaining four domains are discussed in more detail in Gil (2005).

Although we have precious little direct evidence of any kind concerning the evolution of natural language, it is reasonable to suppose that early human language was IMA Language. More precisely, the following two logically distinct hypotheses may be formulated:

- (4) (a) *Evolution of Linguistic Abilities*

- At some stage in evolution, the cognitive abilities of humans or pre-humans were limited to the representation of IMA Language;
- (b) *Evolution of Actual Languages*  
At some stage in evolution, all natural languages were IMA Language.

While hypothesis (4a) is about the evolution of cognition, or, more specifically, mental grammar, sometimes referred to as I-language, hypothesis (4b) is about the evolution of actual languages, also known as E-languages.

A commonly held position, most often associated with Chomsky and his followers, is that contemporary human linguistic abilities emerged ex nihilo in a single gigantic leap, presumably associated with a unique genetic mutation. Such a view is clearly inconsistent with hypothesis (4a); however it is agnostic with respect to hypothesis (4b), since even if human linguistic abilities went straight from nothing to what they are now, actual languages might have taken a variety of incremental paths over the course of time in order to make use of such abilities (indeed this process may still be far from complete); and one of those possible paths could easily have involved IMA Language as an evolutionary way station.

A more refined position is put forward by Bickerton (1990), who argues that man's linguistic abilities evolved into their contemporary shape through an intermediate stage which he refers to as *protolanguage*. Structurally, Bickerton's protolanguage is a form of IMA Language; however, it embodies at least one significant further restriction that is not part of IMA Language, namely that it does not permit syntactic recursion. Ontologically, too, Bickerton's protolanguage is akin to IMA Language, in that he considers it to be manifest in a variety of realms, including three of the five listed in (3) above: phylogeny, ontogeny, and cognition. Notably, however, Bickerton has nothing to say about the other two domains, semiotics and typology. Moreover, he expressly denies the existence of any "interlanguage" between protolanguage and contemporary linguistic abilities; thus, like Chomsky, his position is inconsistent with hypothesis (4a), though in the case at hand, what is at issue is a single, albeit very important structural feature, namely, syntactic recursion. Conversely, hypothesis (4a) is consistent with, but does not necessarily entail, the existence of a stage, prior to IMA Language and the evolution of recursion, corresponding to Bickerton's protolanguage.

So how might we seek support for the two evolutionary hypotheses in (4)? Although we cannot go back in time, we can jump across the branches of our evolutionary tree to see what our nearest relatives, the various primates, have accomplished in the realm of language. Many species have a lexicon of predator cries; however, since these usually involve individual cries in isolation, there is no compositionality, and hence nothing near the possible richnesses of IMA Language. A somewhat more interesting case, reported recently by Zuberbuhler

(2002), is that of the male Campbell's monkeys, who appear to be able to juxtapose two different calls, a predator cry preceded by a "boom" sound, to produce a complex cry whose meaning seems to involve some kind of attenuation or even negation of the predator-cry meaning. However, to this point at least, no clear examples of productive compositionality of meaning-bearing signs have been attested in the naturally-occurring repertoire of non-human primates, or any other animals.

However, amongst primates in captivity, there is an increasing body of evidence suggesting that they can be taught to master compositionality, and concomitantly also IMA Language. Two of the more celebrated cases are those of the bonobo Kanzi (Greenfield and Savage-Rumbaugh 1990) using lexigrams, and the orangutan Chantek (Miles 1990) using American Sign Language. Some examples of Kanzi's spontaneous lexigram production are given below:

- |     |     |             |                       |
|-----|-----|-------------|-----------------------|
| (5) | (a) | LIZ HIDE    | <i>agent - HIDE</i>   |
|     | (b) | WATER HIDE  | <i>patient - HIDE</i> |
|     | (c) | HIDE AUSTIN | <i>HIDE - agent</i>   |
|     | (d) | HIDE PEANUT | <i>HIDE - patient</i> |

Kanzi's usage of lexigrams provides no evidence for morphological structure or for distinct syntactic categories; it is thus isolating and monocategorical. Moreover, as suggested by examples such as the above, it is also associational. The above examples form a miniature paradigm (schematized to the right) in which the same sign hide is either preceded or followed by a participant, which, as indicated by the context of the utterance given by the authors, may, in either position, be understood as either the agent or the patient. Thus, there would seem to be no evidence for any grammatical assignment of thematic roles in the lexigram usage of Kanzi. Rather, the semantic relationship between the two signs is vague. Like in the language of pictograms and example (4) above, the juxtaposition of lexigrams has a single general meaning that may be represented in terms of the Polyadic Association Operator as, for (5a), A (liz, hide), 'entity associated with Liz and with hiding'. Thus, the bonobo Kanzi's use of lexigrams satisfies the three properties of IMA Language. Similar observations hold also for the orangutan Chantek's usage of ASL.

It would seem, then, to be the case that both bonobos and orangutans are endowed with the cognitive abilities to represent IMA Language, even though they apparently have not made any use of these abilities to create any actual IMA Languages in the wild. Given that the common evolutionary ancestor of bonobos and orangutans is shared also by humans, it is thus likely that this common ancestor also had the cognitive abilities to represent IMA Language without having any actual IMA Languages. (The alternative, less parsimonious scenario would involve positing the independent development of IMA Language abilities in at least two separate evolutionary lineages.) Quite obviously,

however, no primates, even in captivity and with the dedicated efforts of their caregivers, are capable of acquiring the full-blown complexities of natural human language. Thus, the linguistic capabilities of captive apes support the reconstruction of a stage in human evolution, perhaps eight or ten million years ago, in which the abilities to represent IMA Language were already present, in accordance with hypothesis (4a). Alongside the above, the linguistic capabilities of captive apes also increase the plausibility of hypothesis (4b), though the alternative logical possibility remains that pre-human cognitive abilities may have developed past IMA Language before actual languages ever reached the IMA stage.

It should be noted, though, that since, to the best of my knowledge, the linguistic behaviour of captive apes does not provide any evidence for the mastery of syntactic recursion, the abilities of Kanzi, Chantek and other such captive apes may equally well be characterized in terms of the more restrictive protolanguage of Bickerton. In order to provide specific support for the existence of an evolutionary stage of IMA Language, either in addition to or instead of protolanguage, evidence of a different kind is called for: at present I am not familiar with any such evidence.

## References

- Bickerton, D. (1990) *Language and Species*, University of Chicago Press.
- Gil, D. (2005) "Isolating-Monocategorical-Associational Language", in H. Cohen and C. Lefebvre eds., *Categorization in Cognitive Science*, Elsevier, Oxford.
- Greenfield, P.M., & Savage-Rumbaugh S. (1990) "Grammatical Combination in Pan Paniscus: Processes of Learning and Invention in the Evolution and Development of Language", in S. T. Parker and K. R. Gibson eds., *"Language" and Intelligence in Monkeys and Apes, Comparative Developmental Perspectives*, Cambridge University Press, Cambridge, 540-578.
- Miles, H.L.W. (1990) "The Cognitive Foundations for Reference in a Signing Orangutan", in S. T. Parker and K. R. Gibson eds., *"Language" and Intelligence in Monkeys and Apes, Comparative Developmental Perspectives*, Cambridge University Press, Cambridge, 511-539.
- Zuberbuhler, K. (2002) "A Syntactic Rule in Forest Monkey Communication", *Animal Behaviour* 63:293-299.