



At the origin of language structure



Natural languages aim to be efficient, but are also limited by cognitive load

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There are languages that place the verb between the subject and the object (SVO order—Subject/ Verb/ Object) while others place it at the end of the trio (SOV order). The order of these elements, far from being purely decorative, influences efficiency of expression. A team from SISSA's Language, Cognition and Development Lab (along with two Iranian institutions) studied the mechanism that controls the transition from the SOV form, considered the "basic" order by scientists, to the SVO order while the language is evolving, demonstrating that when the computational load on the brain is lightened, humans choose more efficient systems of communication which encourage the use of more complex grammatical structures.



Subject, verb, object: a triad that in spoken discourse (as well as written) can be arranged in different positions (six, in principle) although in the overwhelming majority of world languages, 86%, they occur in two forms: SVO ("Johnny eats the banana") and SOV ("Johnny the banana eats"). In particular, the latter is the most common and scientific literature supports the hypothesis that it is a basic form, perhaps the first to emerge when a new language or communication system is born. To back this up is the fact that over the course of history many languages have passed from SOV to SVO, but never the other way around.

What specifically determines the preference for SVO in a language over SOV? That was the question posed by Hanna Marno, a researcher at the International School for Advanced Studies in Trieste (SISSA). The study by Marno and other SISSA colleagues (Alan Langus and professor Marina Nespør), as well as colleagues from the Medical University of Tehran and the Institute for Research in Fundamental Sciences of Tehran has been published in the journal *Frontiers of Psychology*.

More in detail...

"We started from the hypothesis that as languages change, they move towards greater efficiency of expression and along the way tend to grammaticalize more and more, that is, sentences can contain more complex structures. However, there is an element that opposes this growth: the limit of computational load that our cognitive system is able to withstand," explains Marno. "It is the balance between these two opposing 'forces' which makes SOV languages less palatable when grammar becomes more complex."

In languages that use the SOV order, it is necessary to use "marks", i.e. small particles attached to nouns to clarify their function within the sentence. These particles add to the computational load, however, favoring transition to the SVO form, which does not use these marks.

Based on this hypothesis, and beginning with a series of experiments previously conducted at SISSA in 2010, Marno and colleagues prepared a series of new tests. In the original experiments (performed by Alan Langus and Marina Nespør), two groups of subjects (one speaking Italian, an SVO language, and another speaking Turkish, an SOV language) had to communicate messages using gestural language they invented. A clear preference for the SOV form emerged, regardless of the language of origin.

"We hypothesized that if we made the participants' task easier by lightening the cognitive load of the linguistic task, we would observe a preference for the SVO form." To do this, Marno and colleagues, rather than having the subjects invent their own gestures, taught them instead during a training period before the actual experiment (also using two groups, one speaking Italian, the other, Farsi). "Relieved of the job of having to invent their lexicon, the subjects were able to concentrate on spontaneous language expression and, as we expected, they chose the SVO



order.”

“This is a strong result” concludes Marno. “It explains an important aspect of the mechanisms of language change.”

USEFUL LINKS:

- Original paper in *Frontiers in Psychology*: <http://goo.gl/nBSnVG>

IMAGE:

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