Evolution of Language Takes Unexpected Turn

By Brandon Keim  April 14, 2011  4:39 pm  Categories: Anthropology, Brains and Behavior

It’s widely thought that human language evolved in universally similar ways, following trajectories common across place and culture, and possibly reflecting common linguistic structures in our brains. But a massive, millennium-spanning analysis of humanity’s major language families suggests otherwise.

Instead, language seems to have evolved along varied, complicated paths, guided less by neurological settings than cultural circumstance. If our minds do shape the evolution of language, it’s likely at levels deeper and more nuanced than many researchers anticipated.

“It’s terribly important to understand human cognition, and how the human mind is put together,” said Michael Dunn, an evolutionary linguist at Germany’s Max Planck Institute and co-author of the new study, published April 14 in Nature. The findings “do not support simple ideas of the mind as a computer, with a language processor plugged in. They support much-more complex ideas of how language arises.”

How languages have emerged and changed through human history is a subject of ongoing fascination. Language is, after all, the greatest of all social tools: It’s what lets people share and cooperate, divide labor, make plans, preserve knowledge, tell stories. In short, it lets humans be sophisticated social creatures.

One school of thought, pioneered by linguist Noam Chomsky, holds that language is a product of dedicated mechanisms in the human brain. These can be imagined as a series of switches, each corresponding to particular forms of grammar and syntax and structure.

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Such a system would account for why, of the nearly infinite number of languages that are possible — imagine, for instance, a language in which verb conjugation changes randomly; it is possible — relatively few actually exist. Our brains have adapted to contain a limited, universal set of switches.

A limited set of linguistic universals is exactly what was described by the late, great comparative linguist Joseph Greenberg, who empirically tabulated features common to language. He made no claims as to neurological origin, but the essential claim overlapped with Chomsky’s: Language has universals.

If you speak a subject-verb-object language, one in which “I kick the ball,” then you likely use prepositions — “over the fence.” If you speak a subject-object-verb language, one in which “I the ball kicked,” then you almost certainly use postpositions — “the fence over.” And so on.

“What both these views predict is that languages should evolve according to the same set of rules,” said Dunn. “No matter what the language, no matter what the family, if there are two features of language that are somehow linked together structurally, they should be linked together the same way in all languages.”

That’s what Dunn, along with University of Auckland (New Zealand) computational linguist Russell Gray, set out to test.

Unlike earlier linguists, however, Dunn and Gray had access to powerful computational tools that, when set to work on sets of data, calculate the most likely relationships between the data. Such tools are well known in evolutionary biology, where they’re used to create trees of descent from genetic readings, but they can be applied to most anything that changes over time, including language.

In the new study, Dunn and Gray’s team created evolutionary trees for eight word-order features in humanity’s best-described language groups — Austronesian, Indo-European, Bantu and Uto-Aztecan. Together they contain more than one-third of humanity’s 7,000 languages, and span thousands of years. If there are universal trends, say Dunn and Gray, they should be visible, with each language family evolving along similar lines.

That’s not what they found.

“Each language family is evolving according to its own set of rules. Some were similar, but none were the same,” said Dunn. “There is much more diversity, in terms of evolutionary processes, than anybody ever expected.”
In one representative example of divergence (diagram above), both Austronesian and Indo-European languages that linked prepositions and object-verb structures (“over the fence, ball kicked”) tended to evolve preposition and verb-object structures (“over the fence, kicked ball.”) That’s exactly what universalism would predict.

But when Austronesian and Indo-European languages both started from postposition, verb-object arrangements (“the fence over, kicked ball”), they ended up in different places. Austronesian tended towards preposition, verb-object (“over the fence, kicked ball”) but Indo-European tended towards postposition, object-verb (“the fence over, ball kicked.”)

Such differences might be eye-glazing to people unaccustomed to diagramming sentences, but the upshot is that the two language families took opposite trajectories. Many other comparisons followed suit. “The things specific to language families trumped any kind of universals we could look for,” said Dunn.

“We see that there isn’t any sort of rigid” progression of changes, said University of Reading (England) evolutionary linguist Mark Pagel, who wasn’t involved in the study. “There seems to be quite a lot of fluidity. That leads me to believe this isn’t something where you’re throwing a lot of parameter switches.”

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Instead of a simple set of brain switches steering language evolution, cultural circumstance played a role. Changes were the product of chance, or perhaps fulfilled as-yet-unknown needs. For whatever reason, “the fence over, ball kicked” might have been especially useful to Indo-European speakers, but not Austronesians.

There is, however, still room for universals, said Pagel. After all, even if culture and circumstance shapes language evolution, it’s still working with a limited set of possibilities. Of the six possible combinations of subject, verb and object, for example, just two — “I kicked the ball” and “I the ball kicked” — are found in more than 90 percent of all languages, with Yoda-style “Kicked I the ball” exceedingly rare. People do seem to prefer some structures.

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What those capacities may be is a new frontier for investigation. As for Dunn, his team next plans to conduct similar analyses on other features of language, searching for further evolutionary differences or those deeper levels of universality.

“This can be applied to every level of language structure,” he said.
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