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A New Language Arises, and Scientists Watch It Evolve



Photographs courtesy of Shai Davidi/Sign Language Research Lab, University of Haifa

Men tell a story using Al Sayyid Bedouin Sign Language, a system used by about 150 people in a village of about 3,500 in the Negev desert of Israel.

By **NICHOLAS WADE**

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Linguists studying a signing system that spontaneously developed in an isolated Bedouin village say they have captured a new language being generated from scratch. They believe its features may reflect the innate neural circuitry that governs the brain's faculty for language.

The language, known as Al Sayyid Bedouin Sign Language, is used in a village of some 3,500 people in the Negev desert of Israel. They are descendants of a single founder, who arrived 200 years ago from Egypt and married a local woman. Two of the couple's five sons were deaf, as are about 150 members of the community today.

The clan has long been known to geneticists, but only now have linguists studied its sign language. A team led by Dr. Wendy Sandler of the University of Haifa says in The Proceedings of the National Academy of Sciences today that the Bedouin sign language developed spontaneously and without outside influence. It is not related to Israeli or Jordanian sign languages, and its word order differs from that of the spoken languages of the region.

Linguists have long disputed whether language is transmitted just through culture, as part of the brain's general learning ability or is internally generated with the help of

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genetically specified neural circuits that prescribe the elements of grammar. Since children learn to speak from those around them, there is no obvious way of separating what is learned from what is innate except by observing a new language being developed from scratch, something that happens very rarely.

Two special opportunities to study a new language and identify its innate elements have recently come to light. One is Nicaraguan sign language, a signing system developed spontaneously by children at a school for the deaf founded in 1977 in Nicaragua. The other is the Bedouin sign language being described today. Sign languages can possess all the properties of spoken language, including grammar, and differ only in the channel through which meaning is conveyed.

Two features of the Bedouin sign language that look as if they come from some innate grammatical machinery are a distinction between subject and object, and the preference for a specific word order, said Dr. Mark Aronoff of Stony Brook University, an author of today's report. The word order is subject-object-verb, the most common in other languages. Dr. Aronoff said that the emergence of a preferred order was the critical feature, and that it was too early to tell if subject-object-verb is the particular order favored by the brain's neural circuitry.

Linguists hope to learn more about the brain's language machinery by identifying the features that the Bedouin and Nicaraguan sign languages hold in common.

Dr. Ann Senghas, who has studied Nicaraguan sign language for 15 years, said she agreed with Dr. Aronoff that the subject-object distinction and word order could be innate features.

Dr. Senghas, who is at Barnard College in New York, said the preferred word order in Nicaraguan sign language kept changing with each cohort of children. The language has now acquired the signed equivalents of case endings, the changes used in languages like Latin to show if a word is the subject or object of a sentence. Word order can be less rigorous in languages that use case endings.

The Bedouin sign language, which has not yet acquired case endings, is also under development. The third generation is signing twice as fast as the first and is using longer sentences, said Dr. Carol Padden of the University of California, San Diego, another author of the new report.

Dr. Steven Pinker, a cognitive scientist at Harvard, said the Bedouin sign language was "unquestionably an important finding." Together with the work on Nicaraguan sign language and other studies, he said, it "suggests that the human mind has the motive and means to create an expressive grammatical language without requiring many generations of fine tuning, trial and error, and accumulation of cultural traditions."

The absence of case endings, or inflection, in the clan's language was not surprising, Dr. Pinker said, because this form of change, known as morphology to linguists, often takes many generations to develop. Both morphology and syntax, the ordering of words in phrases, may use "fundamentally the same mental machinery, which operates inside a word in the case of morphology and inside a phrase in the case of syntax," he said.

Some researchers have speculated that language evolved first in the form of a system of gestures, with sound taking over only later as the preferred channel of communication. Evidence that gesture is still deeply embedded in language can be seen in the fact that people gesticulate even when on the phone.

Does the vigor and spontaneity of Bedouin and Nicaraguan sign languages support the idea that a gesture-based language evolved first? Dr. Senghas said the two languages "are

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not evidence about what came first" but confirm that gesture is an integral part of language.

The clan sign language, which started only 70 years ago, is unusual in being understood by the whole community, not just the deaf, since hearing people use it to communicate with their deaf relatives. The signs have already become symbolic: the sign for "man" is the twirl of a finger to indicate a moustache, although men no longer wear them.

The Bedouin village is not geographically remote - it is near a large McDonald's - but is socially isolated from other Bedouin who look down on its origins. There are now more contacts with the outside world, and the deaf children are being exposed to Israeli sign language in school. The Bedouin sign language may not withstand modernization and marriage outside the community. "This is a pretty short flowering," Dr. Aronoff said.

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