

New sign languages hint at how all languages evolve

By Catherine Maticic | Apr. 22, 2016 , 3:00 AM

Simi Etedgi leans forward as she tells her story for the camera: The year was 1963, and she was just 15 as she left Morocco for Israel, one person among hundreds of thousands leaving for the new state. But her forward lean isn't a casual gesture. Etedgi, now 68, is one of about 10,000 signers of Israeli Sign Language (ISL), a language that emerged only 80 years ago. Her lean has a precise meaning, signaling that she wants to get in an aside before finishing her tale. Her eyes sparkle as she explains that the signs used in the Morocco of her childhood are very different from those she uses now in Israel.

In fact, younger signers of ISL use a different gesture to signal an aside—and they have different ways to express many other meanings as well. A new study presented at the Evolution of Language meeting here last month shows that the new generation has come up with richer, more grammatically complex utterances that use ever more parts of the body for different purposes.

Most intriguing for linguists: These changes seem to happen in a predictable order from one generation to the next. That same order has been seen in young sign languages around the world, showing in visible fashion how linguistic complexity unfolds. This leads some linguists to think that they may have found a new model for the evolution of language.

"This is a big hypothesis," says cognitive scientist Ann Senghas of Barnard College in New York City, who has spent her life studying Nicaraguan Sign Language (NSL). "It makes a lot of predictions and tries to pull a lot of facts together into a single framework." Although it's too early to know what the model will reveal, linguists say it already may have implications for understanding how quickly key elements of language, from complex words to grammar, have evolved.

Sign languages, like spoken ones, have established systems for combining stable words or signs into meaningful sentences. Because they evolved apart from spoken languages—often when previously isolated deaf individuals came together—they are more than just signed versions of their spoken counterparts. Most have been around for centuries. But a few, like ISL and NSL, have emerged only in recent decades, offering linguists a unique opportunity to watch how languages evolve in real time.

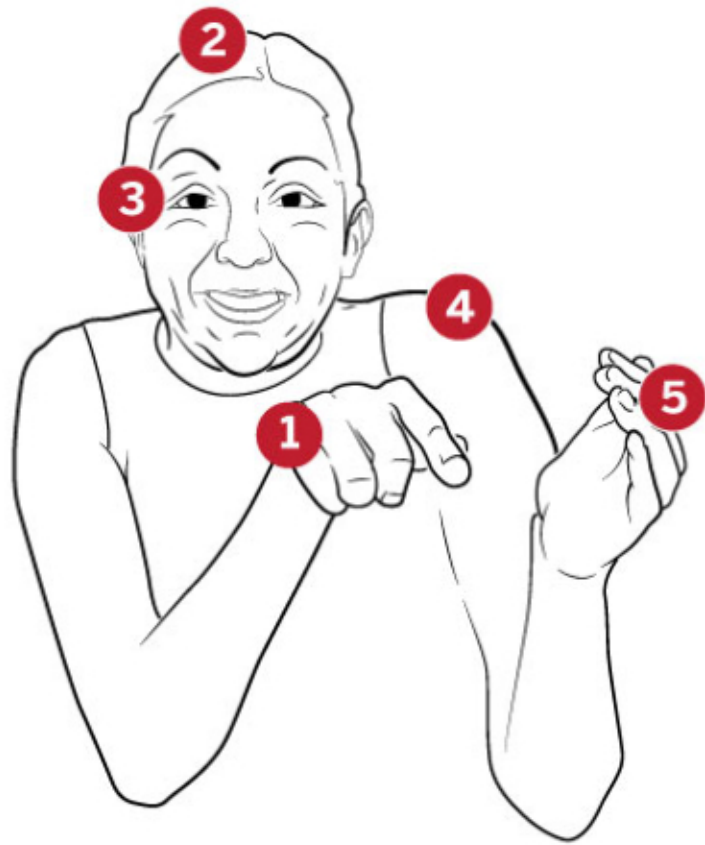
Linguist Wendy Sandler of the University of Haifa in Israel first explored this evolution while studying Al-Sayyid Bedouin Sign Language (ABSL) in the early 2000s. ABSL, used by roughly 150 villagers in Israel's Negev desert, was born in the 1930s, when several deaf descendants of the village's founder invented a system of signs to communicate with each other. Because their deafness was hereditary, soon almost everyone had at least one deaf relative and almost everyone was signing.

Once the community of signers reached a critical mass, the language started becoming more complex: People in the first generation could link words, but not in consistently meaningful ways, whereas people in the second and third generations had full systems for marking complex sentences, conversational asides, and clauses, as Sandler reported in *Gesture* in 2012.

Further, Sandler realized that as the speakers refined their language, they were slowly enlisting different parts of the body to express more and more complex thoughts. Whereas first generation signers relied primarily on their dominant hands, second generation signers added their heads and third generation signers added their faces, all for specific linguistic purposes. Those in the fourth generation recruited their nondominant hands and their upper bodies, tilting them to the right or left to convey additional meanings.

SIGNS OF COMPLEXITY

Sign languages around the world have evolved in strikingly similar ways.



1 Hands Signers start by making signs with their dominant hands.

2 Head They add the head for indicating topics and questions.

3 Facial expression
The face comes next. The squint here signals a relative clause.

4 Torso Signers then use their upper bodies to show whom or what they are talking about.

5 Nondominant hand
Finally, signers use their other hand for topic continuity and classification.

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Could the same thing be happening in other signed languages? To find out, Sandler and colleague Rose Stamp turned to ISL, a language born as deaf immigrants converged on what is now Israel before World War II. Sandler and Stamp divided 15 native ISL signers into three age groups: those 18–30 years old, those 31–50 years old, and those, like Etedgi, older than 50. Then the researchers video recorded their subjects narrating a short life story. The researchers analyzed 2-minute segments from each video, marking the movement of key body parts with special coding software. They collected more than 7000 data points and compared movements among signers.

The linguistic structures showed a clear trend: They became more complex from one generation to the next. To Sandler's surprise, the signers recruited body parts in the exact same order as the ABSL signers. "As I saw the relationship [unfold] between different parts of the body and linguistic complexity, I was thinking, 'I can't believe it!'" she says. For example, when younger signers wanted to signal an aside, they no longer leaned their entire bodies forward like Etedgi. Instead, they tilted their bodies to one side and then tilted their heads to the opposite side. A similar head tilt is used in ABSL. Even more intriguing, some of these changes also appear in NSL, a 40-year-old language from halfway around the world.

The use of new body parts and the increasingly detailed division of bodily labor “allow us to see [the addition of linguistic functions] with stunning clarity,” Sandler says. Spoken languages of course don’t involve the body. But, Sandler says, “it is reasonable to assume that the same [linguistic] functions would have emerged at the dawn of spoken language as well, because they are basic to communication.”

The use of new parts also makes language more efficient: The youngest ISL signers can express themselves much faster than the oldest—153.2 signs per minute compared with 103.5 signs per minute.

The findings also show that social interaction is essential for language evolution. When a new generation establishes a system for signing, Sandler says, it stays more or less the same as its members age. Her work has shown that when young signers enter a community, they add complexity through experimentation with their peers in what she calls “a social game.” The more players, the more innovations.

This evolution takes time, notes evolutionary linguist Marieke Schouwstra of the University of Edinburgh, and so “contradicts certain views of the emergence of language.” Some researchers have argued that a single mutation powered the “leap” from an animal-like communication system to something uniquely human (*Science*, 22 November 2002, p. **1569**), and that some level of complexity was necessary from the outset. “This work shows that that’s definitely not the case,” Schouwstra says.

The evolutionary process may also be inevitable, reflecting the workings of our brains, Senghas says. “If there are systematic ways that we see it happening across all languages,” she says, “that means there are similar ways of packaging information in all of our brains. That’s what language is.”

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