

# Tracing the evolution of sign languages using computer modeling

February 2 2024, by Bob Yirka

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Example of recurrent change. Still images from video dictionary entries that illustrate the phonological pattern of thumb extension. Both signs are produced with four fingers extended, but the sign for "work" in New Zealand SL (left) is produced without thumb extension, whereas the sign for "work" in British SL (right) displays thumb extension. Credit: *Science* (2024). DOI: 10.1126/science.add7766 [From: [www.spreadthesign.com](http://www.spreadthesign.com)].

An international team of linguistics experts has traced the origins of the most common modern sign languages using a computer model to compare them against one another. The [research](#) is published in the journal *Science*.

In this new effort, the research team noted that while studies have traced the linguistic history of written languages, little work has been done on the [origin](#) of sign languages. They state that there are more than 300 sign languages used by hearing-impaired people around the globe, and little is known about their origins or how they might have impacted one another.

Sign languages, like spoken and written languages, are unique to groups or cultures, with many corresponding to their written counterparts—there is a Spanish sign language, for example, and French, Spanish and Japanese.

For this new study, the research team sought to learn more about their origins by dissecting the way words in languages are formed using the hands. They first focused their efforts on 19 major sign languages, sorting words into what they describe as core vocabulary attributes—zeroing in on the hand shape for "tree," for example, as opposed to "oak tree." They then entered the core words into a database to conduct a computational analysis of the glossaries for all the languages under study.

As part of that analysis, the modeling took into account physical attributes used to form words and concepts, such as whether they were formed using one or two hands, handshape, hand location and movement of hands and arms. The researchers also programmed their model to conduct a [phylogenetic analysis](#) as part of the comparisons between languages to investigate shared traits or similarities in word expression.

The research team was able to build family trees of sign languages, with a major split between European and Asian sign languages. They were also able to associate changes or additions to sign languages based on known [historical events](#). For example, they determined that when leaders in France greatly expanded the country's deaf education system in the 18th century, French sign language matured and became a strong

influence on other [sign languages](#). The model also allowed the team to discover previously unknown associations, such as those between British and Western English sign language varieties.

**More information:** Natasha Abner et al, Computational phylogenetics reveal histories of sign languages, *Science* (2024). [DOI: 10.1126/science.add7766](#)

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