

# Backs to the future: Aymara language and gesture point to mirror-image view of time

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The future is behind for the Aymara: The speaker, at right, indicates next year by pointing backwards over his left shoulder. Copyright Rafael Nunez, UC San Diego

New analysis of the language and gesture of South America's indigenous Aymara people indicates they have a concept of time opposite to all the world's studied cultures—so that the past is ahead of them and the future behind.

Tell an old Aymara speaker to "face the past!" and you just might get a blank stare in return—because he or she already does.

New analysis of the language and gesture of South America's indigenous Aymara people indicates a reverse concept of time.

Contrary to what had been thought a cognitive universal among humans—a spatial metaphor for chronology, based partly on our bodies' orientation and locomotion, that places the future ahead of oneself and the past behind—the Amerindian group locates this imaginary abstraction the other way around: with the past ahead and the future behind.

Appearing in the current issue of the journal *Cognitive Science*, the study is coauthored, with Berkeley linguistics professor Eve Sweetser, by Rafael Nunez, associate professor of cognitive science and director of the Embodied Cognition Laboratory at the University of California, San Diego.

"Until now, all the studied cultures and languages of the world—from European and Polynesian to Chinese, Japanese, Bantu and so on—have not only characterized time with properties of space, but also have all mapped the future as if it were in front of ego and the past in back. The Aymara case is the first documented to depart from the standard model," said Nunez.

The language of the Aymara, who live in the Andes highlands of Bolivia, Peru and Chile, has been noticed by Westerners since the earliest days of the Spanish conquest. A Jesuit wrote in the early 1600s that Aymara was particularly useful for abstract ideas, and in the 19th century it was dubbed the "language of Adam." More recently, Umberto Eco has praised its capacity for neologisms, and there have even been contemporary attempts to harness the so-called "Andean logic"—which adds a third option to the usual binary system of true/false or yes/no—to computer applications.

Yet, Nunez said, no one had previously detailed the Aymara's "radically different metaphoric mapping of time"—a super-fundamental concept, which, unlike the idea of "democracy," say, does not rely on formal

schooling and isn't an obvious product of culture.

Nunez had his first inkling of differences between "thinking in" Aymara and Spanish, when he went hitchhiking in the Andes as undergraduate in the early 1980s. More than a decade later, he returned to gather data.

For the study, Nunez collected about 20 hours of conversations with 30 ethnic Aymara adults from Northern Chile. The volunteer subjects ranged from a monolingual speaker of Aymara to monolingual speakers of Spanish, with a majority (like the population at large) being bilinguals whose skills covered a range of proficiencies and included the Spanish/Aymara creole called Castellano Andino.

The videotaped interviews were designed to include natural discussions of past and future events. These discussions, it was hoped, would elicit both the linguistic expressions for "past" and "future" and the subconscious gesturing that accompanies much of human speech and often acts out the metaphors being used.

The linguistic evidence seems, on the surface, clear: The Aymara language recruits "nayra," the basic word for "eye," "front" or "sight," to mean "past" and recruits "qhipa," the basic word for "back" or "behind," to mean "future." So, for example, the expression "nayra mara"—which translates in meaning to "last year"—can be literally glossed as "front year."

But, according to the researchers, linguistic analysis cannot reliably tell the whole story.

Take an "exotic" language like English: You can use the word "ahead" to signify an earlier point in time, saying "We are at 20 minutes ahead of 1 p.m." to mean "It's now 12:40 p.m." Based on this evidence alone, a Martian linguist could then justifiably decide that English speakers,

much like the Aymara, put the past in front.

There are also in English ambiguous expressions like "Wednesday's meeting was moved forward two days." Does that mean the new meeting time falls on Friday or Monday? Roughly half of polled English speakers will pick the former and the other half the latter. And that depends, it turns out, on whether they're picturing themselves as being in motion relative to time or time itself as moving. Both of these ideas are perfectly acceptable in English and grammatical too, as illustrated by "We're coming to the end of the year" vs. "The end of the year is approaching."

Analysis of the gestural data proved telling: The Aymara, especially the elderly who didn't command a grammatically correct Spanish, indicated space behind themselves when speaking of the future—by thumbing or waving over their shoulders—and indicated space in front of themselves when speaking of the past—by sweeping forward with their hands and arms, close to their bodies for now or the near past and farther out, to the full extent of the arm, for ancient times. In other words, they used gestures identical to the familiar ones—only exactly in reverse.

"These findings suggest that cognition of such everyday abstractions as time is at least partly a cultural phenomenon," Nunez said. "That we construe time on a front-back axis, treating future and past as though they were locations ahead and behind, is strongly influenced by the way we move, by our dorsoventral morphology, by our frontal binocular vision, etc. Ultimately, had we been blob-ish amoeba-like creatures, we wouldn't have had the means to create and bring forth these concepts.

"But the Aymara counter-example makes plain that there is room for cultural variation. With the same bodies—the same neuroanatomy, neurotransmitters and all—here we have a basic concept that is utterly different," he said.

Why, however, is not entirely certain. One possibility, Nunez and Sweetser argue, is that the Aymara place a great deal of significance on whether an event or action has been seen or not seen by the speaker.

A "simple" unqualified statement like "In 1492, Columbus sailed the ocean blue" is not possible in Aymara—the sentence would necessarily also have to specify whether the speaker had personally witnessed this or was reporting hearsay.

In a culture that privileges a distinction between seen/unseen—and known/unknown—to such an extent as to weave "evidential" requirements inextricably into its language, it makes sense to metaphorically place the known past in front of you, in your field of view, and the unknown and unknowable future behind your back.

Though that may be an initial explanation—and in line with the observation, the researchers write, that "often elderly Aymara speakers simply refused to talk about the future on the grounds that little or nothing sensible could be said about it"—it is not sufficient, because other cultures also make use of similar evidential systems and yet still have a future ahead.

The consequences, on the other hand, may have been profound. This cultural, cognitive-linguistic difference could have contributed, Nunez said, to the conquistadors' disdain of the Aymara as shiftless—uninterested in progress or going "forward."

Now, while the future of the Aymara language itself is not in jeopardy—it numbers some two to three million contemporary speakers—its particular way of thinking about time seems, at least in Northern Chile, to be on the way out.

The study's younger subjects, Aymara fluent in Spanish, tended to

gesture in the common fashion. It appears they have reoriented their thinking. Now along with the rest of the globe, their backs are to the past, and they are facing the future.

Provided by University of California, San Diego

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