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Checking the Claim: A Device That Translates Dolphin Sounds Into English

Researchers used new technology to interpret a dolphin noise they say translates loosely to “seaweed”

Researchers say they've developed a system that allows them to use dolphins' own language to communicate with the animals. (Courtesy of Denise Herzing)

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It isn't too much of a stretch to think that dolphins, given their playful nature and charm, converse with each other much like we do. But is this really the case? And if so, to what extent do their seemingly random calls indicate a natural penchant for language?

Dolphin researcher Denise Herzing has spent nearly three decades listening in on such noises in hopes of deciphering what she suspects is actual dolphin chatter. But it wasn't until she tried to *teach* the dolphins calls for specific English words—and they responded—that she realized she may have hit on something big.

Since 1985, Herzing, with the Wild Dolphin Project, has used underwater video and sound equipment to study the natural communication system of an especially friendly pod of dolphins that lives along a stretch of the Bahamas near the southern tip of Florida, amassing a database that profiles their relationships, sounds and behavior, and how these things have changed over time.

The latest goal in that research has been to try to use the dolphins' own signals to communicate with the animals. Last August, the team had a breakthrough. Researchers, during a test run of a wearable translation device, captured a unique whistle that they had taught the dolphins, and the device instantly translated it into English.

The word? "Sargassum," a type of seaweed often used as a toy during divers' interactions with the dolphins.

"We know that dolphins in captivity are fast [and] spontaneous and [also] excellent acoustic mimics, and that they can associate sounds with objects," Herzing says. "Whether they do this in their 'natural' communication system we don't know. But we knew that they have the cognitive flexibility as a species, so we thought we would create a tool to see what they would do with it."

There's no shortage of research on the way that dolphins interact. The animal labels and identifies others in its group with

whistles. And in the 1970s, researchers found that Akeakamai, an especially bright bottlenose dolphin housed at the Kewalo Basin Marine Mammal Laboratory in Honolulu, could be taught, through a kind of sign language, to understand syntactic differences, or the manner in which re-shuffled arrangements of hand gestures can be used to convey a particular message.

But establishing two-way acoustic communication using a language's key building blocks—that is, specific sounds that can be recognized, understood and expressed mutually—was something that had long been beyond the scope of dolphin reseachers.

Herzing wanted to at least try to break that barrier. She started in the late 1990s teaching the dolphins how to recognize and request objects, along with the name of three researchers, by pairing them with artificial sounds and symbols on a keyboard. Ultimately, the approach didn't quite yield the kind of results she had hoped for.

Researcher Denise Herzing wears the Cetacean Hearing and Telemetry (CHAT) device, designed to teach dolphins the name of objects using distinct whistles and translate the animals' calls back into English. (Wild Dolphin Project)

But since last year, divers have been experimenting with Cetacean Hearing and Telemetry (CHAT), a chest-worn device about the size of a toaster oven. Developed in collaboration with artificial intelligence researcher and Google Glass project lead Thad Starner, the system was programmed to produce distinct whistles that corresponded to objects such as a scarf, a rope or sargassam, all of which researchers employed in their regular play time with the animals. Using a sophisticated algorithmic formula that takes into account variables like background noise and the direction and angle from which the sounds are produced, CHAT can also catch when the animals make these sounds (up to 100 feet away) and instantly play them back in English.

After each dive, the collected sound files are pulled off the device through WiFi and then reviewed for sound types and matches, Herzing says. The system also logs all the box activity, "including when sounds were played, when sound were received and what they matched," she says.

August was the first time the whistle for "seaweed" was caught and translated by Herzing and her team. She hopes the technology, while promising, can also be used to determine if dolphins' sounds are expressed as singular units of information or whether they may carry a more nuanced meaning.

"If you say FUN and SUN, the 'f' and 's' are unique units of sound that can be used with UN," Herzing told *Wired UK*. "The combinatorial power of these units is part of what makes human language powerful. We simply have not been able to look at these kinds of details of dolphins sounds in the past, but computer programs are now making this possible."

Justin Gregg, a researcher at the Dolphin Communication Project and author of *Are Dolphins Really Smart? The Mammal Behind the Myth,* doubts that dolphin-induced sounds are being used to communicate anything beyond names of objects and the dolphins' own emotional states.

In a *Wall Street Journal* editorial, he attributes what he calls the unsubstantiated notion that dolphins use language to the wild theories put forth by famed neuroscientist John Lilly, who contended that by cracking the "code of dolphinese," humans would be able to decode the languages of extraterrestrials.

"I think the past 50 years have shown us that it is unlikely their communication system functions like human language with words and grammar," he told the site *Txchnologist*. "But a lot of people hold out hope that they do have a language."

Herzing, however, argues that the difficulty in unraveling the meaning behind a dolphin's squeal has less to do with such assumptions being inherently flawed and more to do with the immense challenges that come with conducting studies in an aquatic environment.

"In my book, absence of evidence is not evidence of absence" she says. "I imagine that we will find that dolphins, and probably many other species, do many things we couldn't imagine before we started looking. So, instead of trying to undermine these studies, let's put some creative tools forward. I mean dolphins really are smart! Let's find out how smart."

In the meantime, Herzing, who has been described as the cetacean equivalent of famous chimpanzee researcher Jane Goodall, plans to tweak the device so that researchers can catch more whistles, particularly those at higher frequencies. Last year, she says, it appeared "the dolphins were attempting to mimic some whistles, but they placed them in frequencies that were higher than we anticipated."

She's also taking on a second project with the Georgia Institute of Technology using pattern recognition. "We might begin to incorporate some of their other sounds, besides signature whistles, into the CHAT system," she says. But that development is months, or years, away.

"We simply need more time in the field with the dolphins to expose them to the system and see what they do," she says. "It's about getting more on their bandwidth."

About Tuan C. Nguyen

Tuan C. Nguyen is a Silicon Valley-based journalist specializing in technology, health, design and innovation. His work has appeared in ABCNews.com, NBCNews.com, FoxNews.com, CBS' SmartPlanet and LiveScience.