

Insights

THE GENETICS OF SPEECH



How Do We Learn Language?

It is safe to say that most 4-year-olds know nothing about subjects and verbs, direct and indirect objects, gerunds, participles, and infinitives. Yet they can talk your ear off in complete, complex sentences. So how do children learn to speak language so easily and with almost no adult instruction? Do they absorb it, or is it inborn knowledge?

According to University of Alabama at Birmingham linguist David Basilico, PhD, it's simply human nature. "Having and acquiring language is a biological property of being human, like having opposable thumbs," he says. Fifty years ago, however, behaviorists theorized that children learn everything they need to know from their environments. The problem with that conclusion is the "poverty of stimulus," Basilico explains. "There's just not enough information in what children hear in ordinary conversation to generate a full knowledge of English." Basilico says that most linguists now agree that humans have some genetic knowledge that makes learning language easy and natural, much like learning to walk. Babies aren't born with the complete English lexicon, of course, but they have an intuitive understanding of the rules and principles that underlie language, a concept known as "universal grammar." Basilico describes universal grammar as a menu of language possibilities. It provides a variety of options for the logical construction of a language—but not an infinite variety.

"Language picks and chooses from that menu," Basilico says. The constrained variation means that children don't have to listen to many sentences before they figure out the grammar for the entire language.

Clock Ticking on Talking

This remarkable ability has a time limit, however. "To acquire a language as a native, you have to be exposed to it very early," Basilico explains. Linguists once considered puberty the time when the language-learning system would "sort of freeze up," but now many believe it happens at a younger age, Basilico says. "Beyond this window, known as the critical period, you cannot learn a language as a native." That is why adults often face difficulties in becoming fluent in a foreign language.

Universal grammar also implies that all of the world's languages share an underlying system of rules and principles. "All human societies have language, and all languages are of equal complexity," Basilico says. "The more you study languages, the more you realize they have much in common." He adds that languages seem different due to their unique vocabulary choices and other superficial differences, "but on a deeper level, there are many similarities."

Universal grammar also does not apply to written language, which doesn't exist in all societies, Basilico notes.

Plug and Say

The theory that spoken language springs from a genetic source could have broad ramifications. Basilico and many other linguists believe that our innate language knowledge is "modularized"—that is, that the brain has a built-in "language module" in the same way that it has specialized modules for visual perception and other functions. But others argue that our language abilities are "a property of an all-purpose, general cognitive mechanism," he says.

That raises new questions about the relationship between language and thought; for example, does the language we speak shape the way we think, and vice versa? Basilico is skeptical, but he says both the modular and general hypotheses present intriguing examples of how genes can shape behavior. "If we can answer questions about language," he muses, "who knows what that could lead to?"