COMMUNICATION

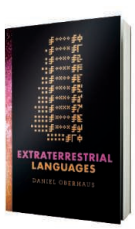
Seeking shared ground in space

Efforts to communicate with extraterrestrials call into question the universality of language, math, and culture

By **Andrea Ravignani**

The Allen Telescope Array in California scans the skies for alien transmissions.

They shared hits of LSD with dolphins to enhance mutual communication capacities. They suggested that we detonate all existing nuclear bombs on the Moon to create a far-reaching message. They claimed to have received communications from Mars. These individuals, who sound more like characters in a B movie than real people, populate a few of the many fascinating (and true) anecdotes recounted by Daniel Oberhaus in his new book, *Extraterrestrial Languages*, which chronicles the adventures of scientists who have sought to communicate with extraterrestrial life.



Extraterrestrial Languages
Daniel Oberhaus
MIT Press, 2019. 264 pp.

Oberhaus delivers an engaging read, striking a good balance between "hard" and "popular" science. He reviews centuries of initiatives, combining science with anecdotes, and using linguistics, mathematics, astrophysics, cognition, and art as feedstock. Focusing on practicalities of extraterrestrial communication, he asks: Is it more convenient to send a plaque on a spacecraft or to radio broadcast a mathematical message?

Presented with these scenarios, the reader realizes a key feature of traditional human communication: It happens in real time. Space messages, on the other hand, might take hundreds of years to reach their intended audience, so they must be self-explanatory.

A space message should have three features: First, it should be clearly distinguishable from random noise. This could mean sending a signal at specific frequencies and with a character count equaling one prime number times another, so that there is only one possible way to visualize the characters. Second, the message should start by establishing common ground. But choosing universal truths is no obvious task: One overarching question addressed in the book is whether what we call "mathematics," "language," and "culture" are absolute or human-relative. Finally, the message should contain information about our planet and us.

Oberhaus's discussions of mathematics and computer science are quite balanced, but his treatment of biology, language, and cognition will likely polarize readers. He defines language as a tool for thinking, not for communicating, borrowing from Noam Chomsky's theory of generative linguistics. According to this view, humans are the only species with language, a by-product of our language-adapted brains. This all-or-nothing stance sets the bar high, leading him to dismiss, perhaps prematurely, the relevance of animal communication to the discussion.

Oberhaus's theory of language also clashes with the main framework he introduces with regard to human behavior: embodied cognition. If Chomsky's linguistics assert that our brain has constraints that shape our behavior, embodied cognition claims the opposite, leading Oberhaus to argue that "It's quite unlikely that we would be able to converse with an extraterrestrial whose language is not structured by the same universal grammar." Such statements are sure to ruffle feathers.

The fields of anthropology, developmental psychology, and animal cognition—all relevant to the multidisciplinary challenge of extraterrestrial communication—are mostly absent from this book. This is not an unintentional omission: As Oberhaus reveals, those who have sought to contact extraterrestrials have traditionally come from backgrounds in physics, computer science, and mathematics. Biology-inclined readers should watch Arik Kershenbaum's 2019 TED talk (*1*), aptly titled "What Your Dog Can Teach You About Aliens," and stay tuned for his upcoming book (*2*), which will likely make a good companion to *Extraterrestrial Languages*. ■

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REFERENCES AND NOTES

1. https://youtu.be/F0xzr96l5sQ.
2. A. Kershenbaum, *The Zoologist's Guide to the Galaxy* (Penguin, 2020).

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