

24.93 “The search for meaning”

Kai von Fintel

<https://kvf.me/fyd>

Lecture 7

Animal communication and human language



REAL DOCTORS TREAT
MORE THAN ONE SPECIES

The variety of animal communication systems

- modality
- complexity
- purpose

How do animal communication systems differ from human language?

How did human language evolve?

The Integration Hypothesis



A movie about Shigeru Miyagawa's theories

<https://www.youtube.com/watch?v=BKw64R0r1BU>

Not enough

- a large lexicon (made feasible by duality of patterning)
- higher order semantic glue
 - negation
 - disjunction
 - conditionals
 - modality
 - attitudes

Mysteries

The danger of anthropocentrism



The danger of anthropocentrism



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Some systems that we do not understand

- elephants
- cetaceans (dolphins, whales)

A sperm whale conversation

Click to listen

Project CETI

The Cetacean Translation Initiative (<https://www.projectceti.org>)

- with some involvement from CSAIL





Perspective

Toward understanding the communication in sperm whales

Jacob Andreas,^{1,16} Gašper Beguš,^{2,16} Michael M. Bronstein,^{3,4,5,16,*} Roee Diamant,^{6,16} Denley Delaney,^{7,16} Shane Gero,^{8,9,16} Shafi Goldwasser,¹⁰ David F. Gruber,^{11,16} Sarah de Haas,^{12,16} Peter Malkin,^{12,16} Nikolay Pavlov,¹⁶ Roger Payne,¹⁶ Giovanni Petri,^{13,16} Daniela Rus,^{1,16} Pratyusha Sharma,^{1,16} Dan Tchernov,^{6,16} Pernille Tønnesen,^{14,16} Antonio Torralba,^{1,16} Daniel Vogt,^{15,16} and Robert J. Wood^{15,16}

SUMMARY

Machine learning has been advancing dramatically over the past decade. Most strides are human-based applications due to the availability of large-scale datasets; however, opportunities are ripe to apply this technology to more deeply understand non-human communication. We detail a scientific roadmap for advancing the understanding of communication of whales that can be built further upon as a template to decipher other forms of animal and non-human communication. Sperm whales, with their highly developed neuroanatomical features, cognitive abilities, social structures, and discrete click-based encoding make for an excellent model for advanced tools that can be applied to other animals in the future. We outline the key elements required for the collection and processing of massive datasets, detecting basic communication units and language-like higher-level structures, and validating models through interactive playback experiments. The technological capabilities developed by such an undertaking hold potential for cross-applications in broader communities investigating non-human communication and behavioral research.

INTRODUCTION

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The Project CETI plan

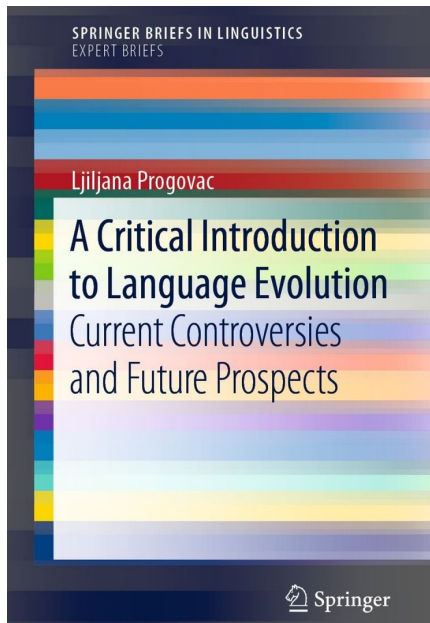
Click to watch animation

What hope would we have to figure out the language of visiting aliens?

Jessica Coon (MIT PhD, consultant for *Arrival*)

how would we get to work deciphering an alien language when the time comes? How hard would this be? While our knowledge of human language will only get us so far, the tools we have developed for linguistic fieldwork and analysis will be critical. At least I hope this is true, because if aliens have just showed up and someone at the FBI is googling “alien linguistics,” my name comes up pretty high on the list.

Some books I recommend



OTHER
MINDS

THE OCTOPUS.
THE SEA. AND
THE DEEP ORIGINS
of CONSCIOUSNESS



PETER GODFREY-SMITH

"A stunning achievement, steeped in science but suffused with magic."

—SIDDHARTHA MUKHERJEE, author of *THE GENE*

HOW ANIMAL SENSES REVEAL
THE HIDDEN REALMS AROUND US

AN IMMENSE WORLD

ED YONG

PULITZER PRIZE-winning author of
I CONTAIN MULTITUDES



Next time

Language & Thought