Evolinguistics Symposium

Concepts and Categories

Date : Oct 29, 2019

Venue: KOMCEE West, B1, Lecture Hall, Komaba 1 Campus, The University of Tokyo

Program (Moderator: Harumi Kobyaashi)

13:30 Opening Remarks & Introduction (Koji Fujita)

13:50 Toshitaka Suzuki

Imagery in wild birds? Retrieval of visual information from referential alarm calls

14:30 Mutsumi Imai

Abductive inference in symbol grounding and system construction in lexical acquisition

15:10 - 15:30 Coffee Break

15:30 W. Tecumseh Fitch

Animal concepts, animal communication, and human cognition

16:20 Dedre Gentner

Metaphor, abstraction and language change

17:10 General Discussion (Kazuo Okanoya)

17:30 Closing Remarks & Reception

Organizers:

Harumi Kobayashi (Tokyo Denki University)

Kazuo Okanoya (University of Tokyo)

Koji Fujita (Kyoto University)

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Imagery in wild birds? Retrieval of visual information from referential alarm calls

Toshitaka Suzuki
The Hakubi Center for Advanced Research, Kyoto University

One of the core features of human speech is that words cause listeners to retrieve visual mental images of target referents. However, although some animals produce specific vocalizations for specific object categories, such as predators or food (i.e., functionally referential systems), whether these signals evoke visual mental images in receivers is surprisingly unknown. In this talk, I review previous studies on functionally referential communication in nonhuman animals and introduce my recent study on vocal communication in a wild bird, the Japanese tit (*Parus minor*). Japanese tits produce specific (i.e., functionally referential) alarm calls when and only when encountering a predatory snake. Field experiments reveal that simply hearing these calls causes tits to become more visually perceptive to objects resembling snakes (moving sticks). However, tits do not respond to the same stick when hearing other call types or if the stick's movement is dissimilar to that of a snake. These results indicate that before having detected a real snake, tits retrieve its visual image from snake-specific alarm calls and uses this to search out snakes. This new approach may help to reveal cognitive basis for referential communication, opening a new avenue for the comparative studies on concepts and semantics in animals.

Abductive inference in symbol grounding and system construction in lexical acquisition

Mutsumi Imai
Keio University

Although Harnad (1990) raised the well-known "symbol-grounding problem" as the problem for AI assuming symbolic systems, this problem may be seen as one faced by young children learning their first language, who have to learn thousands of words to build up their lexicon. I extend and reformulate the original symbol grounding problem (Harnad, 1990) to address the problems children need to solve in the process of lexical acquisition, which include symbol emergence, embodiment, and construction of a system of symbols. Here, the real problem for children is how to learn the meaning of a word without knowing the semantic domain that the word belongs to, as well as without knowing the words surrounding that word. In considering the reformulated version of the symbol grounding problem, I argue that one should specify at least the following three problems in re-thinking "the symbol grounding problem": (1) how children make creative yet reasonably constrained abductive inferences about meanings of words, (2) how they discover subsystems of language, and (3) what is the cognitive function that makes this possible.

Animal concepts, animal communication, and human cognition

W Tecumseh Fitch
University of Vienna

When some characteristic feature of human language is lacking in systems of animal communication (e.g. recursion or learning), that it represents a crucial gap in evolution, and evidence for an evolutionary discontinuity. Here I argue that we should reverse this logic: because a defining feature of human language is its ability to flexibly represent and recombine concepts, precursors for many important components of language should be sought in animal cognition rather than animal communication. Animal communication systems typically only permit expression of a small subset of the concepts that can be represented and manipulated by that species, and this is a crucial fact in understanding our own cognition and communication.

Metaphor, abstraction and language change

Dedre Gentner
Northwestern University

Many of our abstract concepts have their origins in concrete domains. For example, sanctuary once meant a house of worship, but now it can encompass any situation in which a person feels safe (e.g., 'her work is a sanctuary'). How do these abstract relational concepts come about—what are the processes that lead to abstraction?

I will make the case for the Career of Metaphor theory, which states

- Metaphors and similes are typically understood via a process of structure-mapping from a base concept—which is often concrete and embodied—to a target concept.
- This process naturally leads to gradual abstraction over use, resulting in conventionalized metaphoric meanings. Over time, these can come to serve as established concepts.
- Because the structure-mapping process favors relational mappings, these metaphoric concepts are often relational abstractions.

This account suggests an intimate connection between metaphoric extension processes and the evolution of abstract concepts in language. Further, this account sheds light on the nature of relational concepts and suggests a connection between relationality and abstractness.