

Linguistics 415: Evolution of the Human Language Capacity

A flexible syllabus – Fall, 2010

Professor Ken Safir

What it's all about

Although many animals have the potential to communicate with others of their species, no animal communication system remotely approaches the expressiveness of human language. Humans can speak of times past and potential events, preserving history and technology through oral tradition and planning future acts in detail as a group. This obviously provides human beings with an enormous adaptive advantage over any similar species that can neither benefit from past collective experience, nor coordinate the actions of groups with great precision in response to changing circumstances.

The theory of natural selection tells us that individuals with traits that permit them to adapt to their environment better than their competitors are more likely to survive and produce offspring. Those individuals will transmit their traits to their offspring (by means of their genes, a concept not available in Darwin's day). Thus primates with the human language faculty (HLF) would thus likely reproduce faster than those without human language, other things being equal, because such individuals would belong to communities more successful at exploiting a wide range of environments and circumstances. There is little, if any, debate about this.

This leaves us with a mystery, however. Evolutionary theory, and its central mechanism of natural selection, is an interesting theory precisely because it explains, on the basis of simple and consistent principles, how complex biological structures could arise from small advantages accumulating in populations adapting to environments over long periods of time. But human grammar, the means by which we store our knowledge of language, appears to be a highly complex structure that includes features that do not appear to offer selective advantage.

When we consider what linguists actually know about the grammars present day humans can learn, however, the structure of a natural selection argument becomes even more muddy. For example, a natural selection argument only insures that primate+HLF will outcompete primate-HLF; it does not entail that the internal structure of HLF is itself determined by natural selection. It does not necessarily insure that a hypothetical HLF, HLF#1, which has all the other natural language properties except one linguistic construction K, would fail to compete successfully against HLF#2, which is an HLF that permits K like those found in the world today. It would have to be argued that primates with HLF#1 without K would fail to mate successfully, and so their traits would gradually lose out to the primates with HLF#2. This form of argument about why HLF has the properties it does seems quite dubious. On the basis of what we know about linguistic constructions, it does not seem plausible that human languages have verb agreement because verb agreement has an evolutionary advantage, especially since there are many languages that lack verb agreement altogether, such as Chinese, which is spoken as a first language by more of the world's people than any other language. So verb-agreement, found in most human languages, cannot have developed because people who have verb-agreement in their language have a better chance of producing healthy and fertile offspring. There are even well-known cases of Specific Language Impairment which

involve a hereditary inability to process or correctly produce agreement relations in natural language speech (although the details of the effect are debated). The fact that this impairment runs in families, including families where the parent has SLI, show that this linguistic glitch is not being weeded out by selectional pressure, even when it involves an innate genetically heritable component that leads to sub-normative communication. If the human language capacity is inborn (a big 'if' for some) and if it is complex in its internal structure (also a big 'if' for some), then it poses an interesting problem for evolutionary theory: How can this form of biologically based mental complexity be a product of evolution without the incremental pressure exerted by natural selection? This is an inquiry that cannot be solved without an interdisciplinary approach, and, fortunately, researchers in a wide variety of fields are currently interested in these questions. Using your background in linguistics as a point of departure, we will explore a number of neighboring fields and disciplines from which researchers have staked out positions as to how the languages capacity emerged and has been shaped by evolution. We will then evaluate whether or not these proposals establish what they claim to from our perspective as linguists. We will try to develop a perspective on what such studies must establish to truly address the relevant aspects of the capacity that linguists know humans to have.

Interesting answers to this question are just beginning to emerge, because evolutionary biology has only recently and spottily taken into account what is actually known about the structure of HLF (in class we will discuss why this is so). In addition, much more sophisticated, fine-grained accounts of other human capacities and the capacities of other primates have led to a reassessment of what it exactly is that humans have - and other species do not. The connection between the latter factors and the design of the language faculty are currently quite speculative, but some interesting hypotheses have emerged that we will begin to explore.

The work of the course will begin with a thorough review of evolutionary reasoning about how complexity arises by natural selection and why the application of a natural selection account of certain aspects of human intelligence may not have the right properties to be successful. As we explore the issues that seem problematic for natural selection, we will be led into discussion of the evidence that has been brought to bear on the central question from a variety of other disciplines. For example, students will need to know some basics of brain and vocal tract anatomy, function and pathology and the paleontological record of primate origins. Students will need to know something of the comparative cognition of non-human species, including their communicative practices and abilities. Genetic explanations of behavioral traits will be considered, and measured against social constructions of knowledge. Just how much we explore in any one area will be determined in part by the issues students choose as research topics.

What is expected of you

The core readings for the course will already be in the resources on the sakai site, although some of the papers on the site will not be read by the class as a whole, but are there for those who might be interested. What we do read will be influenced by class discussion and interests, so papers will be added to the sakai as needed. Two books are required for purchase: *Talking Hands* by Margalit Fox, ISBN# 0-7432-4713-2, from Simon and Schuster, published 2007 and *The Evolution of Language* by Tecumseh Fitch,

2010, ISBN#978-0-521-85993-3, from Cambridge University Press, published 2010. Because there is so much ground to cover, there will be a lot of reading for this course.

Students will pair up to lead discussion of papers that we all will read (every student should be involved at least once). Students are also required to write three 400 word abstracts of papers read in class and two 400 word abstracts for papers read outside of class. Every student will be part of a collaborative group that will make a presentation in class in the last week on a topic to be arranged with me (I will provide a number of potential topics as exemplars). There will be no final exam, but students will be expected to write a paper based on their portion of the class presentation (which will be due about a week after classes end). Thus the final paper, even if it is based on a collaborative project, must consist of a part each student must write separately.

Learning goals

The course will be designed to expose students to the reasoning and mechanisms that the theory of evolution has given rise to, on the one hand, and the special challenges that the application of these principles poses with respect to the human grammar capacity, on the other. Students who complete the course should be familiar with the advantages and limits of evolutionary reasoning about biological phenomena, familiar with the form of argumentation in linguistic science, and capable of synthesizing the logic of the two while addressing linguistic or language related phenomena.

Grading

Students will be graded on class participation (quality, not volume), particularly the discussion of readings (roughly 20%), on your paper abstracts (25%) on your final presentation (roughly 20%), and on your final paper (40%), but the instructor retains the discretion to adjust these percentages if he or she thinks it is appropriate to do so, either generally or in a particular case.

Course semester plan

As mentioned in the course description, the level of student interest may influence which topics are given the most attention, with possible effects on ordering of units as well after week 6. Student presentations of class reading will be interspersed in this schedule. The final two weeks are reserved for project presentations.

Week 1-2 - The logical problem of language acquisition and the logical problem of language evolution. The fundamentals of evolutionary theory and a bit of its history. Gradualism, saltation, exaptation and emergent properties. The structure of genetic explanation - complex gene interaction in determining genotype and phenotype. Reading: Chapters 1-6 of Ridley (2005), How to read Darwin (on sakai). Chapters 1-3 of Fitch (2010). Pinker (2003) 'Language as an adaptation to a cognitive niche'. Gould (1991) 'Exaptation: A crucial tool for evolutionary psychology.'

Week 3 - Faculty of language broad and faculty of language narrow. The foundations of an interdisciplinary approach. The status of evidence on the history of cognition. Reading: Hauser, Chomsky and Fitch (2002) 'The language faculty: What is it, who has it

and how did it evolve', Lewontin (1990) 'The evolution of cognition'.

Week 4 - The comparative method. Cognition in primates and other animals.

Reading: Chapter 4 of Fitch (2010), Pepperberg (2007) 'Grey parrots do not always 'parrot': The roles of imitation and phonological awareness in the creation of new labels from existing vocalizations.' Further reading to be determined.

Week 5 - The history of primate evolution and the hominid line. The nature of paleontological evidence. Development of the human vocal tract.

Reading: Chapters 5-8 of Fitch (2010).

Week 6 - A proposal for discussion: Bickerton's protolanguage and the great leap.

Reading: Selections from Bickerton (1991) Language and Species. Bickerton (2000) 'Resolving Discontinuity: A minimalist distinction between human and non-human minds.' Chapter 12 of Fitch (2010).

Week 7 - The role of modality in linguistic knowledge.

Reading: Fox (2007).

Week 8 - A proposal for discussion: Corballis's sign-before-speech hypothesis. Mirror neurons. Brain anatomy and wiring.

Reading: Corballis (2003) 'From hand to mouth: The gestural origins of language.' Arbib (2003) 'The evolving mirror system'. Further reading to be determined.

Week 9-10 - Learning strategies as precursors or determiners of linguistic capacity.

Linguistic diversity. First and second language acquisition.

Reading: Pinker and Bloom (1990) 'Natural language and natural selection.' Christiansen and Chater (2008) 'Language as shaped by the brain'. Pettito (2009) 'New discoveries from the bilingual brain and mind across the life span: Implications for education.'

Week 10-11 - The role of social organization on learning, cognition and linguistic development. The role of theory of mind.

Reading: Dunbar (2003) 'The social brain.' Selections from Tomasello (2008) Origins of Human Communication.

Week 12 - Not planned - will probably be absorbed by extensions of topics that provoke the most student interest.

Week 13-14 Student presentations. Students will read material selected by presenters with the approval of the instructor.