from the presentations that quantitative assessments of risk for single species are often prevented by a lack of data. And, as David Asdaw stressed, the utility of risk assessment decreases as the level of taxonomic resolution decreases. Indeed, participants frequently remarked on the lack of data on the tempo and mode of biotic invasion and the consequences of biological invasions. Invasive species, rates of invasion and ecological impacts are almost certainly much greater. Barring significant increases in effort, for most ecosystems we have little ability to detect changes from the presentations that quantitative assessments of risk for single species are often prevented by a lack of data. And, as David Asdaw stressed, the utility of risk assessment decreases as the level of taxonomic resolution decreases. Indeed, participants frequently remarked on the lack of data on the tempo and mode of biotic invasion and the consequences of biological invasions. Invasive species, rates of invasion and ecological impacts are almost certainly much greater. Barring significant increases in effort, for most ecosystems we have little ability to detect changes in invasion rates that might follow from prevention and control efforts.

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References

In Humboldt’s footsteps

There are a few important transitions in evolution that seem to have occurred several times, whereas others appear to be unique. The former includes the emergence of multicellular (plants, animals and fungi) and eusocial animals (hymenopterans, termites and naked mole rats); the latter category includes the origin of the genetic code, the appearance of eukaryotic sex (meiosis and syngamy) and, significantly for our topic, human language. Unique in this context is something specific: that all known lineages possessing the trait in question can be traced back to a common ancestor. Of course, this allows for the possibility that the trait did appear in other lineages, but these have all died out. Uniqueness of a transition might be a result of genuine difficulty (the required variation, or series of variations, is very rare), might be attributable to pre-emption (the first lineage to have ‘made it’ competitively prohibits a second trial) or might be caused by lack of sufficient time. Because the human language capacity originated sometime in the past five million years, the last option is oddly enough a valid possibility for language. Recently, several linguists and biologists set out to take stock of the status of our knowledge (or ignorance, if you are a pessimist) of the origins of language.

Syntactic and semantics

An important obstacle to our understanding of this problem is the poor characterization of the trait whose origin we wish to trace back. The evolution of the eye is a relatively easy problem, because we know of several ‘independent’ origins of it – evolution has discovered approximately 40 ways of making an eye. By contrast, even the phenomenonological characterization of language by linguistic theories is far from agreed upon by linguists. Some would still speak about a monolithic universal grammar and, therefore, argue for the impossibility of evolution by natural selection (the Chomskyan line, as spelt out by Martin Bierwisch from the Working Group for Structural Grammar of the Max Planck Society in Berlin, Germany), whereas others argue that grammar must be broken down into multiple generative components (such as phonology, syntax and semantics) each of which could have evolved in a mosaic manner (Ray Jackendoff, Institute for Advanced Study, Berlin, Germany).

The latter approach allows one to suggest a stepwise scenario for the origin of language, from simple symbols to symbols for abstract semantic relations, a system of grammatical relations and a system of inferences. Although such a bold attempt venturing into an evolutionary realm is welcome, problems nonetheless abound. It remains entirely phenomenonological without hints for the underlying neural computations and the selective forces. Moreover, a rigorous transition analysis should be applied to such cases, requiring the formulation of a set of alternative hypotheses from among which one can then choose on the basis of various plausibility criteria. We are far from such a scenario for language.

Nature and nurture

It is still a matter of debate how much of our linguistic capacity is truly innate. When we think of the neural basis for language we think of the neocortex (such as the classic Broca and Wernicke areas), but, in fact, there are many brain areas, including the basal ganglia, might have partly been recruited for linguistic processing (Philip Lieberman, Brown University, Providence, Rhode Island, USA). And there is enormous epigenetic complexity in the brain; therefore, the amount of hard wiring that goes


**NEWS & COMMENT**

**Acknowledgements**

We would like to thank Gregory M. Ruiz (SERCO and James T. Carlton (Williams College, Mystic Seaport Maritime Studies Program, Mystic, CT, USA) for organizing this meeting.

**References**


**In Humboldt’s footsteps**

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Another point of view is that many aspects of grammar might, in fact, be constrained by a ‘special kind’ of semantics (Daniel Dot, Tel-Aviv University, Israel; and Eva Jablonska, The Con Institute for the History and Philosophy of Science and Ideas, Tel-Aviv, Israel). Given such a setting, many grammatical features could have gone to fixation through a process of genetic assimilation (Baldwin effect). In a sense, this concept is the antithesis to the Chomskyan theory that syntax is independent from semantics (‘colourless green ideas sleep furiously’). Although I suspect that the truth lies between the two extremes, I also endorse a clear formulation contrary to the common view, because it can be taken as a manifesto for a research programme. However, one must add a word of caution: there is some danger of circularity in the re-course to a ‘special kind of semantics’ underlying syntax. The other snag might be with demanding too much from genetic assimilation; the latter requires a rather universal (across individuals) and constant (across many generations) manifestation of the trait to be assimilated.

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Weaving together insights from evolutionary biology and linguistics, this study explores the evolution of language faculty within animals, including birds. The researchers identify mechanisms that allow the inheritance of acquired characteristics across generations, a concept previously considered taboo in traditional neodarwinian thinking. This includes the potential for learning mechanisms to affect evolutionary processes, particularly in the context of avian brood parasites.

**How learning mechanisms might affect evolutionary processes**

**Radiation and speciation by colonization?**

Asian brood parasites lay their eggs in the nests of other species (the host), thus exploiting the other species' parental care to their own reproductive benefit. Some parasitic species are generalists, such as the brown-headed cowbird (Molothrus ater), laying their eggs in the nests of several host species. Others are closely linked to one particular host. Most of the broad-parasitic vixiid finches (inhibirds and whydahs – Estrildidae) belong to the latter category. Vixiid finches parasitize estrildid finch species. The young of various vixiid finches show an astonishing similarity to young of the host species in morphological traits (which stimulate parental feeding behaviour) and plumage characteristics. In addition, male parasites sing a species-specific song that resembles the song of the host. Female parasites are attracted to that particular songtype over others. The song of the host species stimulates ovarian development and attracts females to the nest of the host. The morphological similarities in the offspring of the two species and the host-oriented behaviour of the parasites suggest a long history of coevolution.

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