

I n t e r v i s t e

CONVERSATION WITH MICHAEL C. CORBALLIS

by Marcello Ienca

1. Professor Corballis, you are part of that group of scientists who, in recent times, have tried to bring the question of the phylogenetic origin of language within the range of positive science. What do you think has changed today compared to 1866, and so at the time of the statutory veto of the Linguistics Society of Paris?

MC. I think it took a long time after the veto for scientists to address the problem of language evolution. Another more recent factor was the powerful influence of Noam Chomsky, the most prominent linguist of the past 50 years. Chomsky has argued that language could not have evolved through natural selection, but must have emerged as the result of a sudden, fortuitous “rewiring” of the brain, probably within the past 100,000

years. This was challenged by Steven Pinker and Paul Bloom in an influential article published in the *Behavioral and Brain Sciences* in 1990. While they agreed with most of Chomsky's ideas about language, they argued that it must have evolved gradually, through natural selection. I think this article was very influential in reviving interest in the evolution of language. It led to a series of biennial conferences on language evolution, in which many different disciplines were involved, and also led to a general increase in published articles and books on language evolution. Besides linguists, psychologists, anthropologists, archaeologists, philosophers, biologists, computer scientists, and neuroscientists all became involved. Inevitably this led to a more empirical, biological approach.

2. According to you, does this new approach depend only on the increase of empirical evidence or even on a “paradigm shift” within the sciences of the mind?

MC. I think it depends both on the increase of empirical evidence, as well as on a paradigm shift away from the Cartesian approach of Chomsky, with its dualistic undertones, toward a more monist, scientific approach.

3. Glottogenetic studies require, perhaps more than any other scientific problem, a multidisciplinary approach. With which research areas are you most in touch, and from which science do you expect more contributions?

MC. Language as a whole, and not just glottogenesis, now requires a multidisciplinary

approach. I expect more contributions from archaeology, with the discovery of new fossils, and from genetics – especially the analysis of ancient DNA from Neanderthal and other hominid fossils. Glottogenesis is important for the understanding of how speech might have evolved, but language is not simply a matter of speech. I think language evolved first as a gestural system.

4. Your hypothesis about the gestural origin of human language revises the intuition of an eighteenth century philosopher: the abbot of Condillac. Before you Noam Chomsky had developed his own language innateness theory through a re-reading of the modern thought father: René Descartes. Do you think it is a coincidence or do you believe that the history of scientific and philosophical thought is still a source for the production of new theories?

MC. I think historical sources are usually discovered in retrospect, rather than providing a source. If you have what you think is a new idea, it usually turns out that someone, perhaps a philosopher, has had the same idea already! When I decided that language probably evolved from manual gestures, I did not know that Condillac had already suggested the idea, and I had not read Hewes' paper.

5. Researchers in many areas of contemporary linguistics support the idea that in verbal language the semantic and the phonetic levels are inseparable. In other words the idea that abstract concepts (i.e. the pure semantic indexes) come before their corresponding phonetic representations has been rejected: in every word, therefore, the meaning would be one with its specific phonetic representation. Do you think this model could also be

applied to sign language? What would be the mental representation of a gesture?

MC. I do not believe that semantics and phonetics (or linguistics) are inseparable. This would mean that other animals, including the great apes, would have no semantics. I suspect that great apes, at least, probably have knowledge of the natural world that is very similar to our own. I think language is an invention to enable thoughts to be transmitted to others. In sign language, transmission was probably initially iconic – that is, one uses the hands to pantomime events. Over time, signs become conventionalized and lost much of their pictorial meaning. Spoken words are of course highly conventionalized, and sustained by culture. Having said that, I think that language can have an influence on our concepts. That is, concepts probably came first, and afterwards they were given verbal labels (either words or signs), which then could serve to sharpen our concepts.

6. Your hypothesis is fully inscribed in a Darwinian perspective of evolution of biological species and their adaptive characteristics. But which kind of Darwinism?

The so-called ultra-Darwinism, which assigns a fundamental role to natural selection in the evolutionary process, or the so-called naturalism, which considers natural selection as just one of the factors involved in evolution?

MC. In general, I lean toward ultra-Darwinism, because I think that natural selection is the most important determinant of evolution. Of course evolution may be influenced by spandrels, allometric relations, etc., but these are not sufficient. Natural selection is usually necessary, but may be aided by exaptation, spandrels and allometric relations. For instance I think that language evolved through natural selection, but also depended on exaptation,

since the hands were already adapted for reaching and manipulating (important for the evolution of gesture) and the mouth was already adapted for eating and breathing (important for the evolution of speech). Allometric relations are probably also important as a platform for evolution – speech could probably not evolve in a spider! Genetic drift might lead to evolutionary change without natural selection, but I suspect this is not a major component. Genetic drift is more likely to produce lasting change if it is also subject to nature selection (i.e., it results in increased fitness).

7. Do you see a growing anti-Darwinian framework in cognitive science?

MC. No. I think there has been an implicit anti-Darwinian framework in the cognitive science that began in the late 1950s and led to artificial intelligence, Chomskyan theory, and cognitive psychology. But I think there has been a strong swing back toward a Darwinian framework, perhaps because of the influence of neuroscience, comparative psychology, and archaeology. (This may not be the case in Europe – my perception may be biased toward what has happened in the English-speaking world).

8. According to many, the major problem common to all linguistic theories of phylogeny run is the representation of the incipient stages of development. Do you think your assumptions prevent a criticism of this kind?

MC. I don't really see the problem. No one still believes the old adage that "phylogeny recapitulates ontogeny", but evolutionary theories now incorporate development (the evo-

devo movement). With respect to the gestural theory of language evolution, it is becoming clear that manual gestures also play a strong role in the development of language in infants. The work of Virginia Volterra in Rome is a very good example of this.

9. According to your gestural-origin-hypothesis, the organism's mechanical evolution (acquisition of bipedalism, hand's liberation, etc.) comes before the development of cognitive faculties from both a chronological and a methodological point of view. This hypothesis, previously advanced only by paleoanthropologists such as André Leroi-Gourhan and Richard Leakey and anthropologists such as Gordon W. Hewes, had never been supported by cognitive scientists. Why that?

MC. I think there has been a very strong commitment to speech as the primary medium of language, and to the idea that cognition is based on the manipulation of symbols. This arises partly from the development of digital computers, and attempts to model cognition computationally. Many modern cognitive scientists have abandoned this approach and have tried to understand cognition as an “embodied” system, in which ideas and concepts are related to bodily actions rather than to abstract symbols. Another influence may have been connectionism, which also abandoned symbolic processing as the basis of cognition.

10. Your hypothesis seems to finally solve the dilemma of paleontological data, which witnessed a huge discrepancy between the times of the development of the cerebral cortex and of the sag of the larynx. Do you think that the paleontological histories should be a starting point in research?

MC. The date of the lowering of the larynx is still very controversial, and it is still not clear whether the Neanderthals had a lowered larynx or not. Nevertheless it is almost certainly true that the brain increased in size well before speech emerged, and the gestural hypothesis does solve that problem. That is, gestural language probably evolved during the Pleistocene, when the cerebral cortex increased markedly, and speech probably came later. The switch to speech was probably not sudden; voicing was probably blended gradually with manual and facial gestures, and we still gesture as we speak (especially in Italy!).

11. Could you clarify what consequences may have in the study of mind and language, the discovery of "mirror neurons"? Do you think it can, so to speak, "revive" the imitative theories of the origin of language?

MC. The discovery of mirror neurons has been extremely important, but there is now a danger that their importance is exaggerated. I don't think they revive imitative theories of the origin of language in a strong sense, since mirror neurons are well documented in nonhuman primates, and primates are notoriously poor at imitating. I think mirror neurons are not much involved in imitating, but rather provide a way of understanding perceived action in terms of production. This leads to the idea of cognition as "embodied". Imitation probably does play a role in language development, but not the only one. Much of language development is not direct imitation, but is rather based on babbling, or on spontaneous vocalization (or gesture) that is gradually shaped into language.

12. Do you consider plausible the Chomsky's argument that language emerged abruptly in a single individual within the last 100,000 years or do you think that glottogenesis is a longer process?

MC. Chomsky is not completely wrong. Mutations do occur in single individuals, and can be propagated from there. But I think it is extremely unlikely that glottogenesis involved a single mutation. "Glottogenesis" also seems to imply that language is the same as speech. My guess is that the emergence of language and speech involved many changes, each perhaps dependent on one or more mutations. These might have included (1) more accurate cortical control of the hands and face (2) intentional control over movements of the vocal folds (3) anatomical changes in the vocal tract including the lowering of the larynx and the flattening of the face (4) changes in the control of breathing so that the timing of speech could be precisely regulated. Most of these changes probably occurred more than 100,000 years ago.

13. In your last presentation you introduced the expression "prelude to language". Which cognitive faculties may be regarded as the very "prelude"?*

MC. The most important, I think, is higher-order theory of mind, so that people are aware of each other's thoughts. Language is a way of sharing thoughts, and can only work if each speaker (or signer) knows what's in the other speaker's mind, and knows that the other speaker knows that she knows this. I also think mental time travel is important, since

* It refers to the presentation *Recursive cognition as a prelude to language* given by M.C. Corballis during the *International Conference on Language & Recursion* in Mons.

language is ideally adapted to describing events that are not immediately present. That is, we can talk about past or future events where the people and objects we talk about are not physically present. That's why we need words or signs to indicate absent things. There is evidence that our closest ape relatives, chimpanzees and bonobos, do not have higher-order theory of mind, and have very little ability to imagine themselves located in the past or future. For this reason they are not ready for language.

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