

## How did language evolve?

by Geoffrey Miller

Published as:

Miller, G. F. (2002). How did language evolve? In H. Swain (Ed.), *Big questions in science*, pp. 79-90. London: Jonathan Cape.

We can speak; chimps can't. Why? Explaining language remains the Big Question in human evolution, and a key challenge in my field of evolutionary psychology. Yet the more we learn about animal communication, the more mysterious human language looks.

Twenty-five years ago language seemed easier to explain. John Pfeiffer argued in the late 1960s that language must have evolved with that the 'Upper Paleolithic revolution' – the sudden appearance of cave art, carved figurines, burial rites, and more complex tools in Europe 40,000 years ago. Philip Lieberman claimed in the early 1970s that Neanderthals couldn't have spoken, given the fossil evidence about their throat anatomy. And animal behavior researchers such as Konrad Lorenz still had a naïve view that many animals communicate to share useful information about the world.

This made a tidy story: Language didn't evolve at all in any other species of human-like primate; it only evolved in our species 40,000 years ago; and it evolved to share knowledge within groups. Once it evolved, we quickly invented culture, civilization, and the Research Assessment Exercise.

The problem is that, in the light of new evidence, none of these arguments work any more. If language evolved 40,000 years ago in Europe, how can we explain the fact that Africans and Australian aborigines can also speak – given the genetic evidence that they diverged from Europeans at least 40,000 years ago? Steven Pinker showed in *The language instinct* that language is a universal part of human nature, and since humans evolved at least 100,000 years ago in Africa, language must be at least that old. Paleontologists have also overturned Lieberman's claims about mute Neanderthals. At most, the fossils suggest they might not have been able to produce the whole range of vowel sounds that modern humans do. That doesn't mean they couldn't speak.

Most importantly, Richard Dawkins and John Krebs revolutionized the study of animal communication in 1978. They argued that it would be very odd for animals to evolve ways of giving away useful information to their evolutionary rivals. Communication in that sense would be altruistic, and it is very difficult for altruistic behaviors to evolve.

Since the Dawkins/Krebs revolution, biologists have discovered that most signals that animals send to each other are not messages about the world, but messages about the signaller. Many animal signals simply reveal the signaller's species, sex, age, or location. Others reveal the signaller's needs, as when baby birds beg with open mouths to advertise their hunger to their parents. Most common of all, signals reveal the signaller's fitness – their health, energy level, good brains, or good genes – to deter predators from chasing them, to deter rivals from fighting them, or to attract sexual partners who are seeking fit mates. Many animal signals, from bird song to whale song, from fruit-fly dances to the voltage surges from electric fish, say nothing more than "I'm

here, I'm male, I'm healthy, copulate with me." The signal's form may be complex, but the signal's message is vanishingly simple.

Animals very rarely tell each other anything about the world. A few social insects such as bees inform their sisters about food sources; a few mammals warn their relatives about dangers from predators. Even these signals about food and predators are simple, stereotyped, and lazy: the bare minimum necessary to help the survival of their blood kin. Otherwise, most animals keep their knowledge, quite selfishly, to themselves.

This makes human language look puzzling from a Darwinian viewpoint. Why do we bother to say anything remotely true, interesting, or relevant to anybody who is not closely related to us? In answering this question, we have to play by the evolutionary rules. We can't just say language is for the good of the group or the species. No trait in any other species has even been shown to be for the benefit of unrelated group members. Nor can we say language just popped up because of a single big mutation – if speaking is altruistic, that mutation for speaking would have been eliminated very quickly by selection.

The evidence from psychology, linguistics, and genetics shows that human language is a complex biological adaptation, and adaptations can only evolve gradually, over thousands of generations. They evolve because their evolutionary benefits consistently out-weigh their costs. The evolutionary cost for language was telling useful things to non-relatives, which would allow their genes to prosper at the expense of one's own genes. But what were the survival or reproductive benefits of speaking?

Most popular books on language ignore the altruism problem and don't identify any specific evolutionary benefits of speaking. This is the weakness of Steven Pinker's *The language instinct*, Jean Aitchison's *The seeds of speech*, Derek Bickerton's *Language and human behavior*, and Terence Deacon's *The symbolic species*. This is also the weakness of so-called 'ape language research'. Chimps only learn visual symbols when human experimenters such as Sue Savage-Rumbaugh bribe them with food to do so. Where were the beneficent experimenters who rewarded our ancestors for speaking on the African savanna 200,000 years ago?

Robin Dunbar developed one of the few theories that solves the altruism problem. In *Grooming, gossip, and the evolution of language*, he argued that language evolved as an extension of primate grooming behavior. Social primates maintain their relationships with other group members by grooming each other, up to several hours per day. Dunbar pointed out that as group sizes increased during human evolution, the time-costs of grooming would have increased to unsustainable levels. Perhaps language, especially social gossip, evolved as a more efficient way of servicing our relationships. The social benefits would have translated into both survival and reproductive payoffs – as good relationships do, in primate social groups.

The trouble is, Dunbar's theory doesn't explain why language has content. Why couldn't we have serviced our relationships by singing meaningless tunes to each other – like the 'signature whistles' of dolphins, or the 'contact calls' between primates? Dunbar jokes that his theory explains why most of our gossip seems so vacuous – "Nice weather", "Did you see how much weight Geri lost?", "Isn't it a shame about those poor Californians running out of electricity?". Yet, what we consider trite, any other species

would consider astoundingly rich in meaning. If language is just verbal grooming, why is it about anything?

To solve the altruism problem and to explain why language has content, I think we need to update a theory proposed by anthropologist Robbins Burling in 1986. Burling noted that men in every society get social status for their public speaking ability, and social status cashes out as reproductive success by attracting women. So, perhaps language evolved through sexual selection, just like bird song, with females favoring the best male orators. Bill gives good speeches, so Monica falls in love with him. He would have had extra babies under prehistoric conditions, and she would have benefited by merging her genes with his good-language genes to produce silver-tongued offspring. Thus, there would be runaway sexual selection for male language ability, and for female abilities to understand and judge language.

One problem with Burling's theory is that it doesn't explain why women talk too. Most sexually-selected signals appear only in males, because in most species, males do all the courting and females do all the choosing. Female birds and whales don't sing; why do women speak if language evolved through sexual selection? In *The mating mind*, I tried to understand why both sexes try to say interesting things during courtship. Unlike most other primates, humans form long-term sexual relationships, and mostly have babies within relationships (though there is plenty of infidelity). Since male humans invest more in their relationships and their children than any other primate, they have more incentives to be choosy about their long-term sexual partners. If our male ancestors favored verbally fluent females over inarticulate or boring females, then sexual selection would have shaped female language abilities as well as male language abilities. The mutuality of human mate choice was crucial in giving us sexual equality in our adult language abilities.

Burling's theory also has the same trouble explaining content as Dunbar's theory. I think this problem can be solved by thinking about what a big-brained species would want to advertise during sexual courtship. If intelligence is important for survival and social life, then it would be a good idea to choose sexual partners for their intelligence. Language makes a particularly good intelligence-indicator precisely because it has rich content. We put our thoughts and feelings into words – so when we talk to a potential mate, they can assess our thoughts and feelings. We can read each other's minds through language, so we can choose mates for their minds, not just their bodies or songs. No other species can do this.

Language evolved because our ancestors favored sexual partners who could show off what they knew, remembered, and imagined. The prehistoric Cyranos reproduced more successfully than the Homer Simpsons; likewise the prehistoric Scheherzades. They didn't always speak the truth about the world, but their language abilities always told the truth about themselves – the qualities of their minds and personalities that really matter when sustaining relationships and raising children together. Language isn't used only for verbal courtship. Yet I suspect that the origin of language, like the origin of almost every other really complex animal signal, lies in the way that our ancestors fell in love.