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Science & Technology

**The evolution of language
Gestures of intent**

May 3rd 2007
From *The Economist* print edition

Evidence that the first words were movements, not sounds



IN 1966 Allen and Beatrice Gardner, two psychologists at the University of Nevada in Reno, had a bright idea. They were interested in the evolution of language and, in particular, in the linguistic capabilities of great apes. Previous attempts to teach chimpanzees to talk had ended in failure and the matter was considered by most people to be closed. But the Gardners realised that speech and language are not the same thing. Many deaf people, for example, are unable to speak but are perfectly able to communicate by gestures that have all the attributes and sophistication of spoken language. Given the very different anatomies of the human and chimpanzee larynx, the Gardners suspected that previous experiments had failed because chimps are physically incapable of speech.

They therefore decided to try teaching a chimpanzee to sign in the way that deaf people do. And their chosen subject, a female chimp named Washoe after the county in which the university campus is located, proved an adept pupil. Though there is still debate about whether what Washoe learned was really equivalent to human language (for example, whether it had true syntax in which a change in word order changes meaning), there is no doubt that she learned a lot of words. She now has a vocabulary of about 200.

All of this, however, raises a second question. If Washoe

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second question. If Washoe and her successors can learn a complex and arbitrary vocabulary of gestures from people, do they have such vocabularies naturally? To examine that possibility Amy Pollick and Frans de Waal, of Emory University in Atlanta, Georgia, have looked at gestures and expressions in chimpanzees and their cousins, bonobos. In doing so they have added to the evidence that speech is a linguistic Johnny-come-lately. Language, it seems, started with gestures.

Aping others

Dr Pollick and Dr de Waal studied four groups of apes held in captivity. Two were groups of chimpanzees, and two were bonobos. As they report in the *Proceedings of the National Academy of Sciences*, they videotaped the animals' behaviour for several hundred hours over the course of 16 months in order to record three things: facial and vocal expressions, hand and foot gestures, and the behavioural context in which these expressions and gestures took place (eg, grooming, play, sex and aggression). Altogether, they identified 18 expressions, 31 gestures and seven sorts of behavioural context.

Signalling by facial and vocal expression is ubiquitous among primates. Signalling by gesture is confined to the great apes (who, in this context, include mankind). The researchers' hypothesis was that the meaning of expressions has been hard-wired by evolution whereas the meaning of gestures is learnt and, at least to some extent, is arbitrary. If that were true, particular sorts of facial and vocal expression would occur only in particular contexts, and that this would be consistent across groups and even species. The same gestures, by contrast, would be used in different contexts.

The researchers found exactly what they expected. Expressions ("silent bared teeth", "relaxed open mouth", "pant hoot" and so on) almost always occurred in the same contexts in different groups and different species. Gestures ("hard touch", "reach out side", "slap ground" etc) did not. Half of the gestures Dr Pollick and Dr de Waal regularly observed seemed to have completely different meanings in the two species. Moreover, even within a single group, the meaning of a gesture could vary with context, almost as tone of voice can vary the meaning of a human's spoken word. If a chimpanzee is involved in a fight, for example, "reach out side" means he is requesting support. If he makes this gesture to an acquaintance who is eating, he is asking to share the meal.

Lest such distinctions sound trite and obvious to humans—who are, after all, the animal kingdom's premier communicators—it is worth remembering that even monkeys cannot manage this sort of thing. It is also worth remembering that gesture is still a crucial part of human language, even for those with normal hearing. The old joke that the way to render an Italian speechless is to tie his hands together has a kernel of truth in it. Evolution does not come up with complicated structures in a single leap. They are built up step by step. This study suggests that the step of speech may have been built on mental attributes that were acquired millions of years ago when the ancestors of apes and men began to wave meaningfully at each other.

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