

The primate roots of human language

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What communication abilities do we share with our primate relatives?

Exhibitors:

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Background

One key aspect of what it means to be human concerns our extraordinary ability to communicate about events, thoughts and emotions. Human communication is without doubt one of the most intricate and complex behaviours known to date, and among the few that clearly distinguishes us from the rest of the living world. For communication, we rely heavily on speech, a unique motor skill that affords rapid assembly of simple vocal units into complex acoustic utterances, the carriers of meaning. However, there is recent evidence that our ancestors probably did not possess the same sort of sophisticated vocal skills until very recently, perhaps as little as 200,000 years ago, the equivalent of less than 10,000 generations.



Figure 1: Diana monkeys of Tai Forest, Ivory Coast, produce acoustically different alarm calls to two of their predators, leopards and eagles, which are meaningful to other monkeys. Credit: Dr Klaus Zuberbuhler.

How exactly hominids communicated before this time remains uncertain. Gestural communication may have been important, or communication may have been based primarily on simple vocalisations, not unlike the ones found in modern monkeys and apes. Whatever the correct answer, one implication is that many of the communicative skills and cognitive abilities underlying human communication must be significantly older than modern speech itself, rooted

deeply in the primate lineage. The building blocks of human communication, in other words, must have evolved long before the advent of speech in modern humans.

Methodology and results

Our research is based on this premise. It aims to describe the natural communication in different primates, as well as their underlying cognitive abilities. We are interested in the communication skills and social cognition of monkeys and apes in their natural habitats. For this purpose, we observe wild groups in Africa and Asia during their daily activities in order to understand what communication signals they are able to produce, under what

circumstances they produce them, and what sorts of responses they elicit from listeners.

Once we have gathered enough information to suspect a relationship between a particular call type, a set of events, and a typical response, we usually conduct a field playback experiment to determine the call's meaning. During such an experiment we play back a recorded example of a particular call to a naïve receiver in order to study its response. For example, chimpanzees produce different types of food grunts depending on the type of food they find, such as apples or bread. We found that these calls were indeed meaningful to other chimpanzees. For instance, if we played back recordings of 'apple grunts' listeners were more likely to look for food in places where they previously found apples, but not bread, and vice versa. In another study, we found that some monkeys are able to combine some of their vocalisations in systematic ways to create different combinations with separate meanings. Our playback experiments showed that it was the combinations of calls, rather than the individual calls themselves, which carried the meaning, an example of simple primate 'grammar'.



Figure 2: Putty-nosed monkeys combine some of their calls into different combinations. Meaning is conveyed by the combination of calls, rather than the individual calls themselves, providing evidence for a simple primate grammar. Credit: Dr Kate Arnold.

Further information

School of Psychology, University of St Andrews

<http://psy.st-andrews.ac.uk/>

Budongo Forest Conservation Station

www.budongo.org/

Scottish Primate Research Group

<http://psy.st-andrews.ac.uk/research/sprg/>

Primate Gesture Centre

www.primate-gesture-center.eu/

Budongo Conservation Field Station

Playback experiments are only suitable for vocal signals, and in a separate line of research we also investigated the gestural signals produced by our closest living relatives. One remarkable feature of gestures is that individuals use these signals much more flexibly than vocalisations, which tend to be much more hard-wired. For example, like all primates chimpanzees regularly groom other group members, a reliable sign of their mutual friendship. In one study, we have found that individuals use a rudimentary pointing gesture to indicate to their partners where exactly they want to be groomed. Other types of primate gestures serve as attention getters, as invitations to play, or as indicators of high social status. These and other results have revealed a number of key communicative and social capacities of non-human primates that were already present in our ancestors and that must have played a role during language evolution. Our exhibit illustrates the various ways in which non-human primates produce signals that are meaningful for recipients, how they combine some of their signals in rule-governed ways, and how many of their communications are the result of their understanding of others as social beings that play unique roles in their societies.



Figure 3: Chimpanzees produce different call types to different foods, providing other group members with important information about the kind of food encountered. Credit: Florian Moellers.



Figure 4: Chimpanzees use gestural signals to indicate to others where exactly they want to be groomed. Credit: Florian Moellers.

Applications

Our research is of a fundamental nature and has no direct applications. However, we are very concerned with the conservation status of our study animals, most of which will not be able to survive as species if action is not taken immediately. For this reason, we collaborate closely with organisations like Edinburgh Zoo, whose primary mission is to secure the survival of primate populations in the wild. For example, the Budongo Forest, one of the largest blocks of forest in Uganda, is home to about 650 chimpanzees, and their survival is severely threatened by human economic activities.

Biologically, we are just another primate species, part of an order that contains about 200 species. In describing the behavioural complexity of our closest living relatives we hope to raise awareness of the intrinsic beauty of these animals and their minds, and their key importance in understanding our own current behaviour and evolutionary past. Our direct ancestors may have all but disappeared and they only left behind a very sketchy fossil record. Our living relatives, however, are still here and they are able to tell us, with unprecedented details, about the ways in which we are uniquely human, the ways in which we are simply primates, and where our humanity came from.