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PRESS RELEASE

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Flexible vocalisations in wild bonobos show similarities to development of human speech

From an early age, human infants are able to produce vocalisations in a wide range of emotional states and situations – an ability felt to be one of the factors required for the development of language. Researchers have found that wild bonobos (our closest living relatives) are able to vocalize in a similar manner. Their findings challenge how we think about the evolution of communication and potentially move the dividing line between humans and other apes.

Animal vocalisations are usually made in relatively narrow behavioural contexts linked to emotional states, such as to express aggressive motivation or to warn about potential predators. In contrast, humans exhibit 'functional flexibility' when vocalizing in a variety of situations.

Researchers from the University of Birmingham, UK and the University of Neuchatel, Switzerland, conducted research on wild bonobos and found that in this species individuals produce a call type, known as the 'peep', across a range of positive, negative and neutral situations, such as during feeding, travel, rest, aggression, alarm, nesting and grooming. Peeps are high-pitched vocalisations which are short in duration and produced with a closed mouth.

They found broad similarity in the acoustic structure across different contexts suggesting contextual flexibility in this call. Similar to human infants, recipients therefore have to make pragmatic inferences about the meaning of this call across contexts.

Author Zanna Clay said that the findings show that "more research needs to be done on our great ape relatives before we can make conclusions about human uniqueness. The more we look, the more continuity we find among animals and humans"

The type of functional flexibility they observed in bonobos could represent an important evolutionary transition from functionally fixed animal vocalisations towards flexible human vocalisations, which seems to have appeared some 6-10 million years ago in the shared common ancestor between humans and great apes. It appears that many of the core features of human language have deep roots in the primate lineage.

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Media:

Zip file of high resolution images, video clip and audio clip:
http://static.peerj.com/pressReleases/2015/1124_media.zip

Video Title: Video of wild bonobos peeping while feeding
License: CC-BY.
Credit: Zanna Clay/Lui Kotale Bonobo Project

Audio Clip Title: Audio clip featuring bonobo 'peeps'
License: CC-BY.
Credit: Zanna Clay/Lui Kotale Bonobo Project

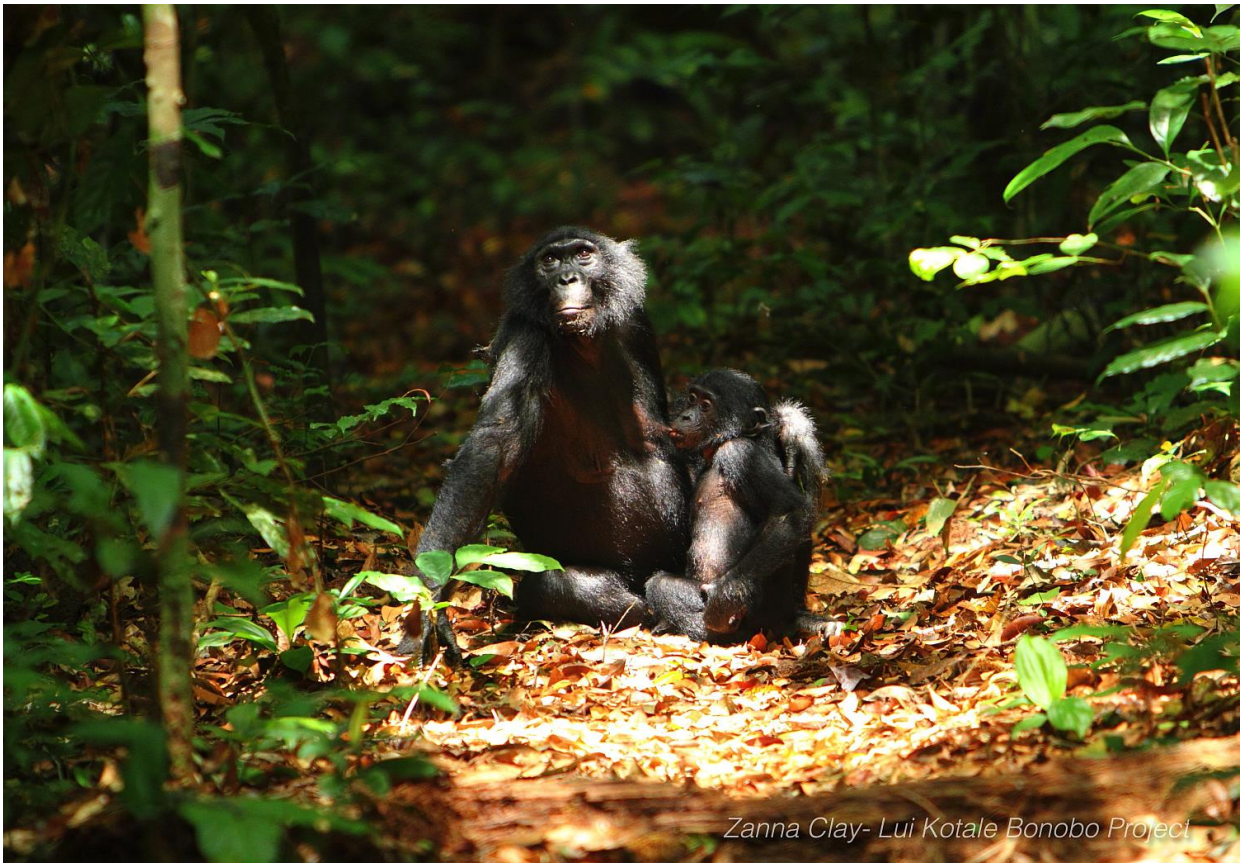
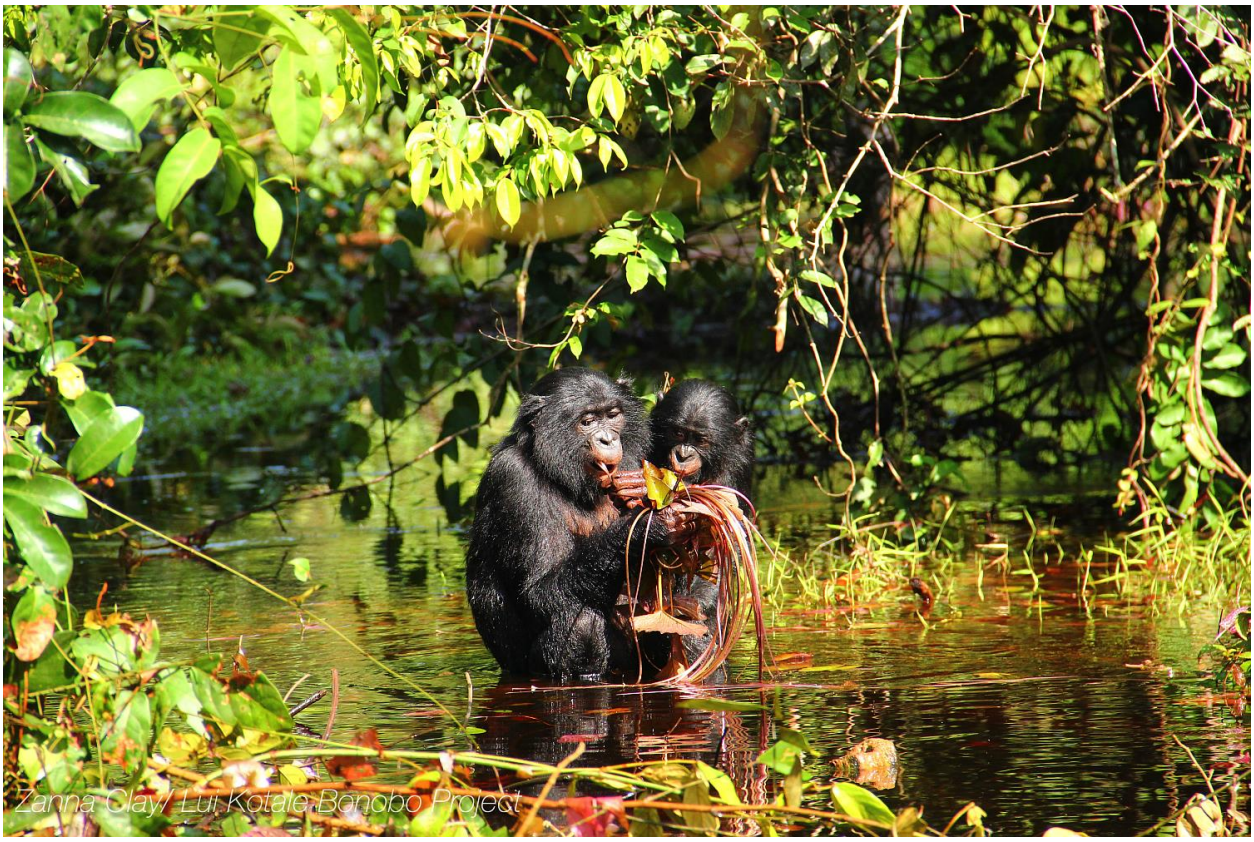


Image Title: During resting, bonobos produce peep vocalisations. Photo taken by Zanna Clay at Lui Kotale Bonobo Project
License: CC-BY.
Credit: Zanna Clay/Lui Kotale Bonobo Project



<u>Image</u> Title: Wild bonobos feeding on lillypads. During feeding, bonobos frequently produce peep vocalisations as well as in other contexts. Photo taken by at Lui Kotale Bonobo Project by Zanna Clay
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Credit: Zanna Clay/Lui Kotale Bonobo Project

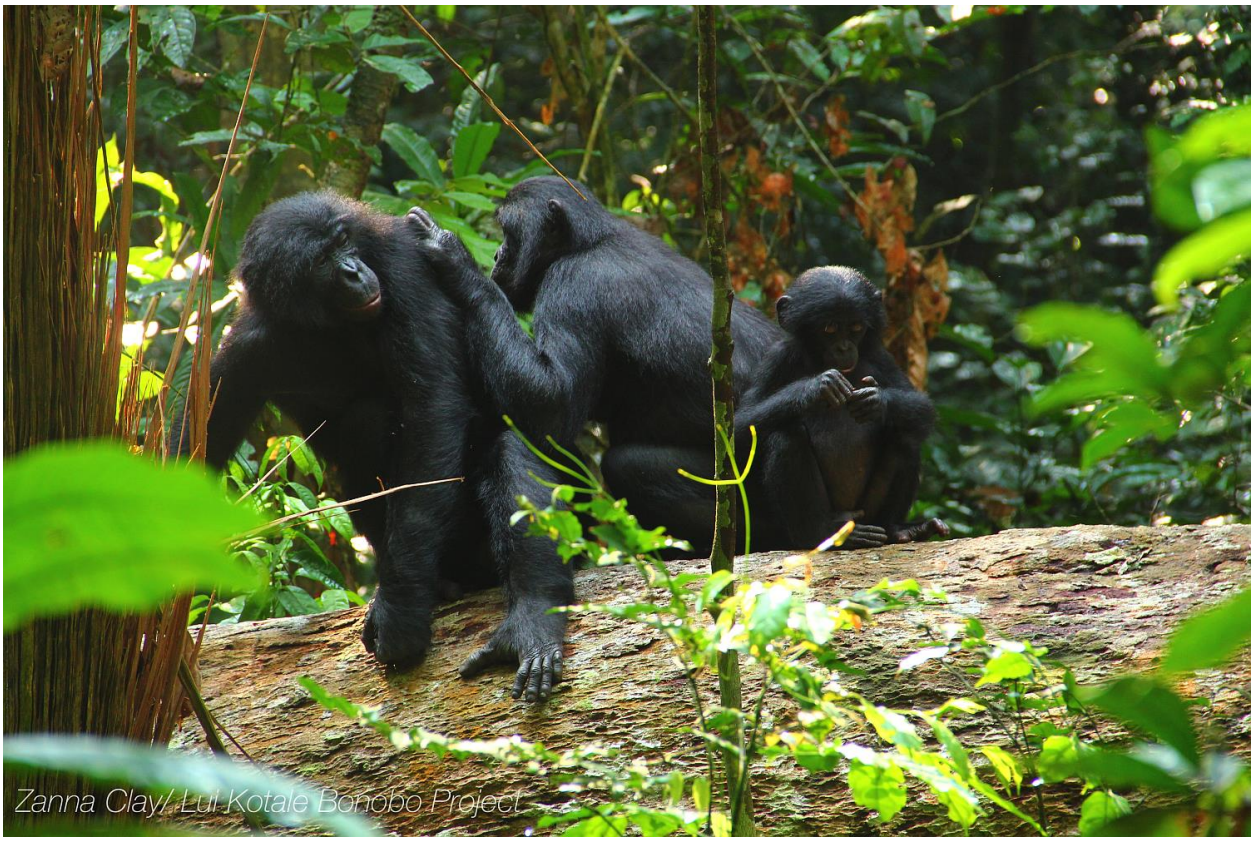

Image Title: Bonobos make peep vocalisations during grooming. Photo taken at Lui Kotale Bonobo Project by Zanna Clay.
Image: CC-BY.
Credit: Zanna Clay/Lui Kotale Bonobo Project

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Media Contacts

For the authors: Zanna Clay, email: z.clay@bham.ac.uk, Phone: +44 7967 567 111 (UK)

F*or PeerJ:* email: press@peerj.com , https://peerj.com/about/press/

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Abstract (from the article):

A shared principle in the evolution of language and the development of speech is the emergence of functional flexibility, the capacity of vocal signals to express a range of emotional states independently of context and biological function. Functional flexibility has recently been demonstrated in the vocalisations of pre-linguistic human infants, which has been contrasted to the functionally fixed vocal behaviour of non-human primates. Here, we revisited the presumed chasm in functional flexibility between human and non-human primate vocal behaviour, with a study on our closest living primate relatives, the bonobo (*Pan paniscus*). We found that wild bonobos use a specific call type ("peeps") across a range of contexts that cover the full valence range (positive-neutral-negative) in much of their daily activities, including feeding, travel, rest, aggression, alarm, nesting and grooming. Peeps were produced in functionally flexible ways in some contexts, but not others. Crucially, calls did not vary acoustically between neutral and positive contexts, suggesting that recipients take pragmatic

information into account to make inferences about call meaning. In comparison, peeps during negative contexts were acoustically distinct. Our data suggest that the capacity for functional flexibility has evolutionary roots that predate the evolution of human speech. We interpret this evidence as an example of an evolutionary early transition away from fixed vocal signalling towards functional flexibility.