

Singing for survival

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It is well known that animals use song as a way of attracting mates, but researchers have found that gibbons have developed an unusual way of scaring off predators – by singing to them.

The primatologists at the University of St Andrews discovered that wild gibbons in Thailand have developed a unique song as a natural defence to predators. Literally singing for survival, the gibbons appear to use the song not just to warn their own group members but those in neighbouring areas.

They said, "We are interested in gibbon songs because, apart from human speech, these vocalisations provide a remarkable case of acoustic sophistication and versatility in primate communication. Our study has demonstrated that gibbons not only use unique songs as a response to predators, but that fellow gibbons understand them."

"This work is a really good indicator that non-human primates are able to use combinations of calls given in other contexts to relay new, and in this case, potentially life-saving information to one another. This type of referential communication is commonplace in human language, but has yet to be widely demonstrated in some of our closest living relatives - the apes."

Gibbons are renowned amongst non-human primates for their loud and impressive songs that transmit over long distances and are commonly used in their daily routine when mating pairs 'duet' every morning. Songs in response to predators – mostly large cats, snakes and birds of prey –



have been previously noted, but no extensive research into its purpose or understanding by other gibbons has been done until now.

The team, Esther Clarke, Klaus Zuberbuhler (both St Andrews) and Ulrich Reichard (Max Planck Institute, Germany) observed the singing behaviour of white-handed gibbons in Khao Yai National Park, Thailand. They were able to identify individual gibbons according to their voice and describe gibbon songs as a 'crescendo of notes', formed by combining up to seven notes – including 'wa', 'hoo', 'sharp wow' and 'waoo' – into more complex structures or 'phrases'.

The researchers wanted to establish whether there were any differences between the typical duetting morning song and that delivered in response to a predator. They noted subtle differences between the two songs, particularly in the early stages (first ten notes) of the song, which would be important in the case of predator encounters. Songs usually begun with a series of very soft notes, audible only at close range, but which rapidly changed into louder notes heard over long distances.

They said, "We found that gibbons produce loud and conspicuous songs in response to predators to alert kin, both near and far – since gibbons frequently change group compositions, neighbouring groups often consist of close relatives. We found that gibbons appear to use loud 'longdistance' calls to warn relatives in neighbouring areas and that those groups responded by joining in the singing, matching the correct predator song, demonstrating that they understood the difference between calls."

The researchers also observed the singing behaviour of gibbons spending time away from their home group. They noted that during predator songs within the group setting, the absent individual responded with his own song, before reappearing to join the group again.



Because gibbons are unusually monogamous, it is thought that sexual selection is the main evolutionary mechanism for the evolution of gibbon song.

The researchers concluded, "Vocal behaviour appears to function as a powerful tool to deal with immense sexual competition under which these primates operate, and it may not be surprising that they have evolved unusually complex vocal skills to deal with these social challenges.

"Not unlike humans, gibbons assemble a finite number of call units into more complex structures to convey different messages, and our data show that distant individuals are able to distinguish between different song types and understand what they mean. This study offers the first evidence of a functionally referential communication system in a freeranging ape species."

"Finding this ability among ape species, especially gibbons who in a sense bridge the evolutionary gap between great apes and monkeys, could shed light on when this ability developed in the primate lineage."

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