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## Hand-clapping as a communicative gesture by wild female swamp gorillas

Ammie K. Kalan · Hugo J. Rainey

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**Abstract** Hand-clapping is a form of gestural communication commonly observed in captive great apes yet only isolated instances of this behaviour have been documented in the wild. Nearly 20 years ago Fay recorded the first observations of hand-clapping in western lowland gorillas (*Gorilla gorilla gorilla*) in the Central African Republic. Here we present observations of Likouala swamp gorillas using hand-clapping as a form of gestural communication in previously undocumented contexts in the wild. We observed hand-clapping on four different occasions in four different groups. The hand-clap was always exhibited by an adult female and always consisted of two consecutive claps conducted in front of the body. We suggest the functional significance of the behaviour was to maintain and enforce group cohesiveness during instances of alarm. These observations suggest western lowland gorillas have a means of communicating that is thus far absent in their

eastern counterparts (*Gorilla beringei* ssp.). This could be a gestural culture found only in western lowland gorillas which should be investigated further to shed light on the evolution of communication among hominoids.

**Keywords** Hand-clapping · Lac Télé · Non-verbal communication · Western gorilla

### Introduction

Cultural variants of communication have not been described for free-living gorilla populations but are often observed amongst chimpanzees (Pika et al. 2005; Whiten et al. 1999) and bonobos (King and Shanker 2003; Pollick and de Waal 2007). New observations from the Lac Télé Community Reserve, Republic of Congo, may show support for cultural behaviour manifested in hand-clapping within the genus *Gorilla*. Hand-clapping is a form of gestural communication observed among captive great apes, often in context with enthusiasm or to attract attention from humans (Fletcher 2006; Pollick and de Waal 2007; Poss et al. 2006). Recently, a wild female chimpanzee was recorded hand-clapping and hand-to-foot clapping (Koops and Matsuzawa 2006). Fossey (1983) observed hand-clapping in a wild female mountain gorilla (*Gorilla beringei beringei*) but the gorilla acquired and lost the behaviour within the span of four years. The behaviour has only been previously described once for wild western lowland gorillas in the Central African Republic where it was primarily described as an alert response to human observers (Fay 1989). Numerous field studies have been carried out on wild populations of *Gorilla gorilla gorilla* throughout Central Africa but the focus of research is often ecological or social in nature. Thus, gorillas are believed to

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be quiet in comparison with other great apes, perhaps because of the more limited availability of information on their repertoire of vocal and gestural communication (Byrne 1996).

The abundance of gorillas inhabiting the Likouala swamps was recently highlighted (Poulsen and Clark 2004; Rainey et al. 2008) yet primates and other wildlife inhabiting swamp forest have been little studied, because of the lack of field work in such a strenuous forest habitat (Poulsen and Clark 2004). The purpose of our study at the Lac Télé Community Reserve, Republic of Congo, was to provide the first feeding and nesting ecology data for a large population of gorillas living primarily in swamp forest.

## Methods

The study was conducted in the field from May to July 2008 during the low-water season. Temperature averaged a maximum of 28.8°C and rainfall averaged 24 mm ranging from 0 to 207 mm. Data were collected on either side of a natural ecotone separating inundated swamp forest and *terra firma* mixed forest.

During data collection along fresh gorilla trails we encountered ten groups and/or lone adult males; eight of these encounters included visual and auditory observation. During the other two encounters the group was hidden within an herbaceous thicket limiting visual observation. Instances of hand-clapping were recorded ad libitum after it was initially noticed during the first group encounter. In total, the behaviour was observed on four separate occasions. A non-parametric Pearson's  $\chi^2$  was run to test for an association between hand-clapping and sex.

## Results

Hand-clapping occurred independently in four different groups and was always elicited by an adult female (Table 1). There was a significant association between female gorillas and hand-clapping ( $\chi^2 = 11.57$ ,  $df = 1$ ,  $P = 0.001$ ) however this statistic should be regarded with caution, because of the small sample size. Of the five females observed to hand-clap, at least four were mothers with young present. In three of the four encounters of observed hand-clapping the gorillas were within our visual field and aware of our presence. All hand-clapping was conducted in front of the body, by adult females, and consisted of two rapidly successive hand claps. The time between hand-claps varied but was usually between 1 and 2 min. The gesture was observed in three different contexts and the general purpose was to attract the attention of group members.

**Table 1** Hand-clapping observations categorized by group composition and habitat

Habitat	Group size	SB	Adult ♂	Adult ♀	Young	Hand clapping
TF	9	1	2	6	2	2♀
TF	1	1	–	–	–	–
TF	5	1	–	4	1	1♀
TF	2	1	–	1	–	1♀
SF	1	–	1	–	–	–
TF	2	1	–	1	1	–
SF	1	1	–	–	–	–
SF	3	–	–	3	2	1♀+
TF	2	1	–	1	–	–
TF	2	1	–	1	–	–

Group size does not include young because they were all dependents *TF* terra firma, *SF* swamp forest, *SB* silverback, – absent, + more than one female may have hand clapped because not in visual contact when behaviour was observed

Similar to previous observations gorillas used hand-clapping to alert the group silverback to danger in the form of humans (Fay 1989). This occurred when infants were both present and absent. This behaviour occurred twice: once amongst a large group of nine, when the silverback fled after efforts to intimidate us. In the other encounter a single female in a tree hand-clapped and this elicited a response from her silverback hiding 10 m away behind a large *Terminalia* sp. tree. His response was a loud, single roar followed by drumming on the buttress roots and chest beating.

The second and previously undocumented context for hand-clapping occurred in the absence of a silverback when three females, two with young on their backs, were encountered in a tree. The gorillas were startled and fled through the canopy. Meanwhile we returned to our trail approximately 25 m away. After a few minutes had passed and we were out of their sight the gorillas were heard to hand-clap five times in succession with up to a minute between hand-claps. We believe they were attempting to contact their silverback as no sign of him, visual or auditory, was seen or heard in the area. Hence, the hand-clap was being used as a form of long distance communication in order to contact the silverback even after we were no longer posing an immediate threat to the gorillas.

The third and novel context in which the behaviour occurred was when a group of five gorillas and an infant were encountered on the ground. In this instance, the group seemed not to be aware of our presence. The group was foraging on the ground with an infant playing with a nearby tree while we observed less than 10 m away. The gorillas were foraging when one female, the mother of the infant, hand-clapped loudly, directing her face towards her infant and other group members. Instantly the infant stopped

playing with the tree and the adults halted foraging, directing their attention towards the female and where her gaze was held. All began to stare in our direction with the female who hand-clapped most intensely craning her neck. The group did not immediately flee but the suspicions of that one female created uneasiness in the group as they collectively moved on after approximately seven minutes had passed. The use of the hand-clap in this situation was visibly to gather the attention of the group, including the young silverback, while simultaneously exercising maternal authority over the infant.

## Discussion

Hand-clapping seems to be flexible in its functional significance, as has been suggested for captive apes exhibiting this behaviour (Pika et al. 2005, 2003; Pollick and de Waal 2007). As western lowland gorillas are observed to conduct this behaviour to some extent in captivity (Pika et al. 2003; Poss et al. 2006) it may be more common in the wild. The gorillas of the Lac Télé Community Reserve were observed to use the hand-clap to alert the silverback, as a form of long distance communication to contact the silverback and/or other group members, and to capture the attention of the whole group, including infants. The general absence of this behaviour in eastern gorillas (*G. beringei* ssp.) begs the question of its evolutionary emergence and the observation that only female *G. g. gorilla* seem to engage in this behaviour in the wild. Further studies are needed to clarify if this is a cultural phenomenon for western lowland gorillas and if variants exist among populations.

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