

Female-led infanticide in wild chimpanzees

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Male chimpanzees are well known for their violent behaviour towards conspecifics [1,2]. In contrast, females are rarely aggressive and lead relatively secluded lives. We report here observations of lethal aggression in the form of infanticide perpetrated by resident females of the Sonso community, Budongo Forest, Uganda [3]. One observed and two inferred cases demonstrate that sex differences in aggressive propensities in our closest living primate relative may be much less pronounced than originally thought.

Infanticide has been documented in many primate species, but is overwhelmingly a male behaviour, presumed to be an outcome of sexual selection [4]. In chimpanzees, infanticide by males has been documented at all long-term study sites [5]. Female involvement is rare with the exception of cannibalisations of at least three infants by Gombe females Passion and Pom in 1975–1976 [1]. Initial speculations were that this was pathological behaviour or a way of obtaining nutritional advantage [1]. More recent observations of intense aggression by high-ranking Gombe females, including apparent attempts at infanticide, led to the hypothesis that increased competition for resources can lead to violent behaviour among females [6]. Our observations provide the first direct evidence for this hypothesis.

On 3 February 2006, KS and ST observed an attack by six resident females on an unknown female with a one-week-old infant. When observers encountered the mother, she was screaming and had a bleeding wound on her genital region. As she fled, she was pursued by the attackers; five of which had clinging infants

themselves. The females caught the stranger female and pounded her back while she crouched, shielding her infant. During the attack, three adult males from the community displayed, buttress drumming and screaming. They did not join the attack; in fact one old male (Maani) repeatedly attempted to force the females apart. After approximately 10 minutes, the attackers removed the infant from the mother (who has not been seen since) and the alpha female (Nambi) gained possession. After competition over the infant, a second resident female (Zimba) held it and delivered a bite spanning its head and neck, likely the killing wound (see video in the Supplemental data available on-line with this issue). A resident male (Bwoba) immediately charged Zimba and hit her in the face, then Maani chased her away, while she was still holding the infant. We later recovered the infant carcass; it showed significant injuries to the side of the head and neck but no sign of attempted consumption.

We have strong circumstantial evidence for two similar events within the Sonso community. On 12 March 2004, KS heard prolonged screaming and found females competing over a carcass of an approximately one-week old infant. At first, adult female Zimba had possession of the carcass, but then the alpha female Nambi took and retained it for one hour, allowing three other females to inspect it. Again, the carcass was not consumed but had four significant punctures to the head. Ongoing endocrine study ruled out all resident chimpanzees as mothers of the infant [7]. Instead, we observed a recent immigrant female, the presumed mother, crouching near the attackers with a 5–8 cm gash to her upper arm. We concurrently observed one resident male displaying about 20 metres from the fighting females, but he showed no interest in the infant.

On 2 July 2006, field-assistants responded to chimpanzees' screaming consistent with another attack. After arrival, they identified the presumed victim, the female Mukwano, who was known to be

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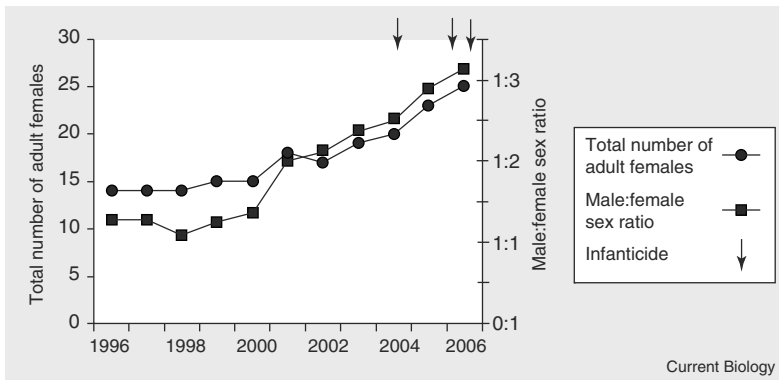


Figure 1. Demographic changes in the Sonso community of wild chimpanzees and the occurrence of infanticides.

We plot the total number of adult females in the community and the male:female sex ratio over the last 10 years. Sex ratio indicates the power of the community males to acquire and defend territory relative to the number of females competing for resources within the home range.

pregnant with signs of recent birth. After following a blood trail, they recovered part of an infant's hand and a chunk of maxilla with cheek flesh attached. Concurrently, MET documented the presence of all mature males of the community 800 m away from the attack, ruling out male involvement. As the event occurred in the centre of the home range, attack by a non-habituated neighbouring community could also be ruled out, suggesting that the community females were again responsible for killing of the infant and/or destroying its carcass.

These observations document a systematic pattern of lethal aggression in female chimpanzees. Such infanticidal attacks are neither isolated events by pathological individuals nor mere biproducts of male aggression; they seem to be part of the female behavioural repertoire. In all cases, the remains showed significant bites to the head, almost certainly fatal in two cases, indicating that these were purposeful, not accidental, killings. Equally remarkable, at least one, but possibly more, cases were the result of coalitionary attacks by resident females. While male cooperation in aggressive attacks is well documented for chimpanzees [1,2], coalitionary aggression by unrelated females is not.

What could be driving this striking female social behaviour? Our observations test and provide support for the hypothesis that

increased pressure on resources precipitate severe female aggression, as females compete for limited foraging areas [6,8]. Recent demographic shifts at Sonso may have produced such socioecological pressures, which may explain the concentration of three infanticides within only 28 months. Since 2001, Sonso has had an influx of at least 13 female immigrants, many with dependent offspring [9]. The community size has increased from 42 in 1996 to 75 in 2006, with an abrupt shift to a highly female-skewed sex ratio of 1:3, as compared to 1:1 in 1996 (Figure 1). Because of the relatively low number of adult males, the community has not been able to increase their home range, so immigrants are likely to challenge the resident females' access to food resources and mates. Notably, two of the three attacks involved severe aggression by residents towards offspring of an unknown or immigrant female. Unusually, the resident males have not shown any serious aggression towards the offspring of these immigrant females and, in at least one case, the males attempted to intervene and prevent an infanticide. This active protection of an unfamiliar female suggests female immigration is advantageous for the Sonso males and that they may have previously copulated with her. Although male intervention during female aggression has been observed in wild gorillas [10], such mediation

has never been documented in wild chimpanzees.

In sum, while low levels of daily aggression between female chimpanzees suggest that intra-sexual competition in females is relatively unimportant, our observations indicate that under certain socio-ecological circumstances, female competition may have deadly consequences: lethal aggression in these apes is not a gender-specific trait.

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Supplemental data

Supplemental data including methods (the study site description) and a video of infanticide are available at <http://www.current-biology.com/cgi/content/full/17/10/R355/DC1>

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