

# Responses toward a trapped animal by wild bonobos at Wamba

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**Abstract** Chimpanzees and bonobos are the closest living relatives of humans and diverged relatively recently in their phylogenetic history. However, a number of reports have suggested behavioral discrepancies between the two *Pan* species, such as more cooperative and tolerant social interaction and poorer tool-using repertoires in bonobos. Concerning hunting behavior and meat consumption, recent studies from the field have confirmed both behaviors not only in chimpanzees but also in bonobos. The present study reports an encounter by wild bonobos at Wamba with a duiker trapped in a snare. Bonobos interacted with the live duiker for about 10 min but did not eventually kill the animal. They showed fear responses when the duiker moved and exhibited behaviors related to anxiety and stress such as branch-drag displays and self-scratching. Although bonobos manipulated nearby saplings and parts of the snare, they did not use detached objects to make indirect contact with the duiker. Juveniles and adults of both sexes engaged in active interactions with the trapped duiker. Overall, bonobos' behavioral responses indicated species-specific cognitive characteristics largely different from those of chimpanzees.

**Keywords** Bonobos · Snare · Interspecific interaction

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## Introduction

Chimpanzees and bonobos are the closest living relatives of humans. In spite of the close genetic distance between chimpanzees and bonobos, several reports document behavioral differences between the two species of genus *Pan* (Boesch et al. 2002; Kuroda 1980; Furuichi and Thompson 2008). Comparative studies have revealed cooperative and tolerant social interaction (Hare et al. 2007), female feeding priority (White and Wood 2007), and poorer diversities in tool-using repertoires and context (Hohmann and Fruth 2003; Gruber et al. 2010) in bonobos. A recent study in captivity indicated that the behavioral differences may derive from underlying cognitive characteristics of the two species (Herrmann et al. 2010). Herrmann et al. (2010) applied a cognitive test battery and revealed that bonobos performed better on tasks related to theory of mind while chimpanzees were more skilled at tasks requiring the use of tools. Theory of mind is a key issue in social cognition, and a study with humans has shown that a lack of aggressiveness and a shy-withdrawn stance are clear predictors of more advanced theory-of-mind understanding during development (Wellman et al. 2011).

Chimpanzees exhibit tool-use in a variety of contexts, indicating high levels of behavioral flexibility and intelligence. Tools are used in contexts such as hunting or probing for animals (Nakamura and Itoh 2008; Ohashi 2006; Pruettz and Bertolani 2007). Hunting behavior and meat consumption have been widely reported in wild chimpanzees (Boesch and Boesch 1989; Goodall 1986; Nishida et al. 1979). Although bonobos are said to be more “peaceful” than chimpanzees (Furuichi 2011), reports of meat eating in wild bonobos have been accumulating (Hirata et al. 2010; Hohmann and Fruth 2008; Surbeck and Hohmann 2008; Tashiro 2001). The hunting of an animal is not

always directly linked to meat consumption, at least in a community of chimpanzees. Wild chimpanzees at Bossou, Guinea, West Africa, capture animals but they rarely eat meat even after the death of the prey resulted from severe treatments (Hirata et al. 2001; Ohashi 2006). Instead, they occasionally treat the carcass as a toy and transport it with them for some period (Carvalho et al. 2010; Hirata and Mizuno 2011). Similar toying behavior directed toward captured animals has been observed in bonobos at Lilungu (Sabater Pi et al. 1993).

Both chimpanzees and bonobos are under threat in their natural habitats from poaching by humans. Considerable numbers of chimpanzees have been confirmed to have sustained injuries from human-made snares scattered in the forest (Hashimoto et al. 2007; Quiatt et al. 2002). Interestingly, chimpanzees at Bossou are known to deactivate snares by breaking the connection between the components, potentially indicating that they recognize the functional/dangerous parts of snares (Ohashi and Matsuzawa 2011). This may in turn explain the low rate of snare-related injuries in this community.

Here, we present a case report of bonobos' encounter with a trapped animal in the forest. Behavioral responses toward the animal—still alive but not able to escape—may shed new light on bonobo cognition.

## Methods

A group of bonobos (E1) has been the subject of scientific research at Wamba, in the Luo Scientific Reserve, Democratic Republic of Congo, since 1973 (Furuichi et al. 1998; Idani 1991; Kano 1982; Kuroda 1979). At the time of present observation, the E1 group comprises 6 adult males, 9 adult females, 3 juvenile males, 1 juvenile female, 2 infant males, and 5 infant females (26 individuals in total). So far, the only prey animal known to be captured and consumed by bonobos at Wamba is the flying squirrel (Ihobe 1992).

The present episode occurred in the morning of August 24, 2011, while the three authors and two local guides (Batsindelia Luunga and Nkoy Isoluka) were following members of the E1 group during daily ranging activities. The behavior of the bonobos was recorded with two video cameras and used in further analysis.

## Results

At 7:43 AM on August 24, 2011, bonobos vocalized upon finding a trapped blue duiker (*Philantomba monticola*) in the forest. We began filming at this point. The duiker (around 30–40 cm in body length) was still alive and, although trapped, was able to jump up repeatedly. The left

forelimb of the duiker was caught and hanging in a vine loop attached to the arched part of the snare (a stick around 2.5 m in length). The vine (around 1.7 m in length) was tangled together with a nearby sapling and restricted the duiker's movement range.

Although all members of the E1 group were observed at the site over the course of the day, only eight bonobos were identified as actively engaging in interactions with the duiker: an adult male (GC), a young adult male (JR), two young adult females with dependent infants (Fk and Ot), three juvenile males (JO, KT, and SB), and one juvenile female (Nc). Active engagement with the trapped duiker continued for about 10 min after the first encounter. Thereafter, the bonobos simply left it behind, while the duiker was still alive. Some of the bonobos stayed within 10 m of the duiker until 8:22 AM, although they remained quiet, did not approach the duiker again, and left one by one to join the other members of the E1 group feeding in an adjacent tree.

During our observations, bonobos did not perform any severe attacks such as biting, slapping, pushing, or banging toward the duiker. We categorized the behaviors observed into five main classes: direct contact, indirect contact, approach and peer, anxiety- or stress-related behaviors, and other behaviors. These involved the following. (1) Direct contact: reaching to touch the duiker with the hands or feet. These behaviors were observed five times (by an adult male, two juvenile males, and an adult female for two times) but the duration was very short in each case, and the actual touch was not always visible from videos. (2) Indirect contact: reaching to touch the duiker using objects. The shaking of nearby saplings occurred 17 times (two of them were accompanied by a brief vocalization of the duiker), while the manipulation of the arched stick, the vine, or the tangled sapling was observed six times. (3) A combination of approaching and peering at the duiker within 2 m was observed 12 times, peering occurred in either bipedal, quadrupedal, or sitting posture (Fig. 1). (4) Behaviors related to anxiety or stress included branch-drag displays (four times), mounting displays between males followed by scream of the recipient (once), self-scratch (three times), and yawning (once). The latter two behaviors have been used in previous studies as indicators of anxiety, stress, or tension in both old-world monkeys and chimpanzees (Koski et al. 2007; Kutsukake 2003; Maestripietri et al. 1992). (5) Other behaviors included loud vocalization by multiple individuals (twice in total; once near the beginning, at 7:43 AM, and once at the end of active engagement, at 7:54 AM), subtle vocalizations by a bonobo (eight times), and escape or avoidance responses by bonobos elicited by the duiker jumping (five times).

Most of the actions performed by bonobos occurred sporadically, although some occurred simultaneously without



**Fig. 1** A young adult female bonobo (Fk) and her infant (Fa) observe a trapped duiker from close range (from video taken by GO)

apparent intention for achieving organized actions or cooperation. However, bonobos watched the actions of conspecifics and the reactions of the duiker intently and sometimes produced subtle vocalizations in response.

## Discussion

Bonobos at Wamba did not eventually kill the trapped duiker they discovered, even though they had opportunities to do so: the animal was unable to escape. Ihobe (1992) suggested the existence of a highly specialized “prey image” among this community, with bonobos at Wamba eating the meat of flying squirrels only. This may explain why they did not attack and kill the trapped duiker: duikers are not a customary target species in Wamba community although bonobos in Lomako are known to capture, consume, and share duikers (Fruth and Hohmann 2002; Hohmann and Fruth 1996; White 1994). However, reports exist of both chimpanzees and bonobos capturing animals and then not consuming them as meat. On occasion, these captured animals remain alive until released or succeed to escape. Nonetheless, even in such cases, chimpanzees often show direct or indirect attacks toward the animal, which is then weakened by the continuous severe treatment. In contrast, bonobos at Wamba never attacked the duiker. They performed direct touches fearfully and retracted their hand quickly after the simple contacts. These behavioral tendencies support the findings of a relatively nonaggressive nature of bonobos compared to chimpanzees.

Moreover, bonobos showed behaviors related to anxiety and stress during the present episode. Since bonobos actively manipulated parts of the snare but frequently fled

after sudden jumps by the duiker, they seemed to have been more fearful of the live duiker than of the snare itself.

Chimpanzees often use tools, and they do so in a variety of contexts. One of the prerequisites of tool-using behavior is the use of “detached objects” (movable objects that are separated and detached from the environmental substrate) in making combinations among objects (Hayashi and Matsuzawa 2003). Interestingly, bonobos never used a detached object during their interactions with the trapped duiker. They shook and bent nearby saplings and parts of the snare, but they did not break off branches in order to use them as tools for indirect contact with the duiker.

In contrast to chimpanzees, female bonobos (even those with dependent offspring) were actively involved in the interactions with the duiker. Most hunting in chimpanzees is performed exclusively by males, while in bonobos females also hunt and eat meat (Fruth and Hohmann 2002). The reasons for this have been suggested to relate to bonobos’ higher reliance on opportunistic hunting of dispersed animals, in comparison with chimpanzees’ organized group hunting of prey species (in particular, primates) that live in social groups. In the present case, bonobos encountered an ideal, easy target that was unable to escape. Thus, every bonobos of the E1 group had ample opportunity and freedom to interact with the animal. Juveniles and adults of both sexes participated in the interactions individually. Although the bonobos did observe the behaviors of conspecifics and of the duiker intently, there was no clear sign of organized or cooperative actions by multiple individuals. The present finding is in line with the absence of report on collective hunting in bonobos (Hohmann and Fruth 2002).

Data from zoos have shown that captive bonobos are more aggressive toward local wildlife than expected, and

the rate of their aggressive interactions is almost the same as that of chimpanzees (Ross et al. 2009). Ross et al. (2009) reported that all facilities keeping captive bonobos have experienced the capturing of wildlife by bonobos. The accumulation of reports on hunting or interspecific interaction in wild bonobos may lead to a novel understanding of the aggressive nature of bonobos toward sympatric animals including primates. However, there might be regional or “cultural” differences in the attitudes toward sympatric animals among bonobo communities at different research sites. Bonobos at Wamba hunt and consume flying squirrels but do not attack red colobus, a frequent prey species at some chimpanzee sites and also confirmed to be consumed by bonobos at LuiKotale (Surbeck and Hohmann 2008). In fact, colobus have been reported to groom and initiate playful interactions with bonobos at Wamba (Ihobe 1990). Duiiker is a target species for hunt in bonobos at Lomako (Fruth and Hohmann 2002), although the present observation in bonobos at Wamba illustrated the different attitude even under an ideal setting for interacting with the inescapable animal. More field data and site comparisons are needed to gain a fuller picture of wild bonobos’ behavioral characteristics and the underlying cognitive mechanism to be further tested through experimental settings in captivity.

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**Conflict of interest** The authors declare that they have no conflict of interest.

## References

- Boesch C, Boesch H (1989) Hunting behavior of wild chimpanzees in the Tai National Park. *Am J Primatol* 78:547–573
- Boesch C, Hohmann G, Marchant LF (eds) (2002) Behavioural diversities in chimpanzees and bonobos. Cambridge University Press, Cambridge
- Carvalho S, Yamanashi Y, Yamakoshi G, Matsuzawa T (2010) Bird in the hand: Bossou chimpanzees (*Pan troglodytes*) capture West African wood-owls (*Ciccaba woodfordi*) but not to eat. *Pan Afr News* 17:6–9
- Fruth B, Hohmann G (2002) How bonobos handle hunts and harvests: why share food? In: Boesch C, Hohmann G, Marchant LF (eds) Behavioural diversity in chimpanzees and bonobos. Cambridge University Press, Cambridge, pp 231–243
- Furuichi T (2011) Female contribution to the peaceful nature of bonobo society. *Evol Anthropol* 20:131–142
- Furuichi T, Thompson J (eds) (2008) The bonobos: behavior, ecology, and conservation. Springer, New York
- Furuichi T, Idani G, Ihobe H, Kuroda S, Kitamura K, Mori A, Enomoto T, Okayasu N, Hashimoto C, Kano T (1998) Population dynamics of wild bonobos (*Pan paniscus*) at Wamba. *Int J Primatol* 19:1029–1043
- Goodall J (1986) The chimpanzees of Gombe: patterns of behavior. Harvard University Press, Cambridge
- Gruber T, Clay Z, Zuberbühler K (2010) A comparison of bonobo and chimpanzee tool use: evidence for a female bias in the *Pan* lineage. *Anim Behav* 80:1023–1033
- Hare B, Melis AP, Woods V, Hastings S, Wrangham R (2007) Tolerance allows bonobos to outperform chimpanzees on a cooperative task. *Curr Biol* 17:619–623
- Hashimoto C, Cox D, Furuichi T (2007) Snare removal for conservation of chimpanzees in the Kalinzu forest reserve, Uganda. *Pan Afr News* 14:8–11
- Hayashi M, Matsuzawa T (2003) Cognitive development in object manipulation by infant chimpanzees. *Anim Cogn* 6:225–233
- Herrmann E, Hare B, Call J, Tomasello M (2010) Difference in the cognitive skills of bonobos and chimpanzees. *PLoS ONE* 5(8):e12438
- Hirata S, Mizuno Y (2011) Animal toying. In: Matsuzawa T, Humle T, Sugiyama Y (eds) The chimpanzees of Bossou and Nimba. Springer, Tokyo, pp 137–141
- Hirata S, Yamakoshi G, Fujita S, Ohashi G, Matsuzawa T (2001) Capturing and toying with hyraxes (*Dendrohyrax dorsalis*) by wild chimpanzees (*Pan troglodytes*) at Bossou, Guinea. *Am J Primatol* 53:93–97
- Hirata S, Yamamoto S, Hiroyuki T, Matsuzawa T (2010) A case report of meat and fruit sharing in a pair of wild bonobos. *Pan Afr News* 17:21–23
- Hohmann G, Fruth B (1996) Food sharing and status in unprovisioned bonobos. In: Wiessner P, Schiefelhövel W (eds) Food and the status quest: an interdisciplinary perspective. Berghahn Books, Providence and Oxford, pp 47–67
- Hohmann G, Fruth B (2002) Dynamics in social organization of bonobos (*Pan paniscus*). In: Boesch C, Hohmann G, Marchant LF (eds) Behavioural diversity in chimpanzees and bonobos. Cambridge University Press, Cambridge, pp 138–150
- Hohmann G, Fruth B (2003) Culture in bonobos? Between-species and within-species variation in behavior. *Curr Anthropol* 44:563–571
- Hohmann G, Fruth B (2008) New records on prey capture and meat eating by bonobos at Lui Kotale, Salonga National Park, Democratic Republic of Congo. *Folia Primatol* 79:103–110
- Idani G (1991) Social relationships between immigrant and resident bonobo (*Pan paniscus*) females at Wamba. *Folia Primatol* 57:83–95
- Ihobe H (1990) Interspecific interaction between wild pygmy chimpanzees (*Pan paniscus*) and red colobus (*Colobus badius*). *Primates* 31:109–112
- Ihobe H (1992) Observations on the meat-eating behavior of wild bonobos (*Pan paniscus*) at Wamba, Republic of Zaire. *Primates* 33:247–250
- Kano T (1982) The social group of pygmy chimpanzees (*Pan paniscus*) of Wamba. *Primates* 23:171–188
- Koski SE, Koops K, Sterck EHM (2007) Reconciliation, relationship quality, and postconflict anxiety: testing the integrated hypothesis in captive chimpanzees. *Am J Primatol* 69:158–172

- Kuroda S (1979) Grouping of the pygmy chimpanzees. *Primates* 20:161–183
- Kuroda S (1980) Social behavior of the pygmy chimpanzees. *Primates* 21:181–197
- Kutsukake N (2003) Assessing relationship quality and social anxiety among wild chimpanzees using self-directed behaviour. *Behaviour* 140:1153–1171
- Maestripieri D, Schino G, Aureli F, Troisi A (1992) A modest proposal: displacement activities as an indicator of emotions in primates. *Anim Behav* 44:967–979
- Nakamura M, Itoh N (2008) Hunting with tools by Mahale chimpanzees. *Pan Afr News* 15:3–6
- Nishida T, Uehara S, Nyundo R (1979) Predatory behavior among wild chimpanzees of the Mahale Mountains. *Primates* 20:1–20
- Ohashi G (2006) Behavioral repertoire of tool use in the wild chimpanzees at Bossou. In: Matsuzawa T, Tomonaga M, Tanaka M (eds) *Cognitive development in chimpanzees*. Springer, Tokyo, pp 439–451
- Ohashi G, Matsuzawa T (2011) Deactivation of snares by wild chimpanzees. *Primates* 52:1–5
- Pruetz JD, Bertolani P (2007) Savanna chimpanzees, *Pan troglodytes verus*, hunt with tools. *Curr Biol* 17:412–417
- Quiatt D, Reynolds V, Stokes EJ (2002) Snare injuries to chimpanzees (*Pan troglodytes*) at 10 study sites in east and west Africa. *Afr J Ecol* 40:303–305
- Ross SR, Holmes AN, Lonsdorf EV (2009) Interaction between zoo-housed great apes and local wildlife. *Am J Primatol* 71:458–465
- Sabater Pi J, Bermejo M, Illera G, Vea JJ (1993) Behavior of bonobos (*Pan paniscus*) following their capture of monkeys in Zaire. *Int J Primatol* 14:797–804
- Surbeck M, Hohmann G (2008) Primate hunting by bonobos at LuiKotale, Salonga National Park. *Curr Biol* 18:R906–R907
- Tashiro Y (2001) Newly observed cases of meat eating by bonobos at Wamba, DR Congo. *Primate Res* 17:271–275 (in Japanese with English summary)
- Wellman HM, Lane JD, LaBounty J, Olson SL (2011) Observant, non-aggressive temperament predicts theory-of-mind development. *Dev Sci* 14:319–326
- White FJ (1994) Food sharing in wild pygmy chimpanzees, *Pan paniscus*. In: Roeder JJ, Thierry B, Anderson JR, Herrenschmidt N (eds) *Current primatology volume II: social development, learning and behavior*. Universite Louis Pasteur, Strasbourg, pp 1–10
- White FJ, Wood KD (2007) Female feeding priority in bonobos, *Pan paniscus*, and the question of female dominance. *Am J Primatol* 69:837–850