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# Male social behaviour and human presence: Implications for improving the welfare and stability of ex-situ Western Lowland Gorilla communities

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## Introduction

The Western Lowland Gorilla (*Gorilla gorilla gorilla*) is currently listed on the IUCN red-list as a species in danger of becoming extinct in the wild in the next 10-15 years (IUCN 2004; Pullen 2005). As a result, the establishment of self-sustaining, socially cohesive ex-situ gorilla populations is becoming critical not only as a genetic safety net, but also for research and educational purposes. However, in recent years, a number of significant management issues have arisen. These include the surplus of gorilla males in the global captive population (Pullen 2005, Stoinski et al. 2004a), and, in addition, the finding by Birke (2002) that the sight, sound, and scent of human visitors may be having detrimental effects on some primates. Consequently, a number of studies in the past year have focused on the management and welfare implications of these issues.

## Discussion

Following on from Birkes' research, Blaney and Wells (2004) began a study exploring the behavioural effects of placing a visual barrier between zoo-housed western lowland gorillas and the public. The study involved observing the behaviour of six gorillas for two hours a day, five days a week for two months. In the first month, baseline information was collected on the gorillas' behaviour to serve as a control. In the second month, behavioural data were collected in the same way, with the addition of camouflage netting covering the viewing area. The study showed that while the barrier had no effect on normal gorilla behaviours (such as standing), the gorillas did show significantly less aggressive behaviour (i.e., hitting and charging), and less abnormal behaviour (such as teeth clenching) after the barrier was put up. While these results suggest that the netting had a positive effect on gorilla behaviour, it is not certain what the long-term effect of habituation would have on the effectiveness of the barrier. Despite this factor, it seems likely that the introduction of a visual barrier between visitors and captive gorillas would decrease the stress captive gorillas undergo (Blaney and Wells, 2004).

Studies conducted on the social systems of eastern lowland gorillas (*Gorilla beringei graueri*), and mountain gorillas (*Gorilla beringei beringei*) in the wild have shown that males form all-male bachelor groups. However, there have been no such observations in studies of wild western lowland gorillas (*Gorilla gorilla gorilla*) (Parnell 2002). Despite this, research has shown that for a number of primate species, the nature of male/male relationships varies according to the sex ratios of the group. Specifically, male relationships are aggressive in mixed-sex groups, but affiliative in bachelor groups. This may reflect the likelihood that male reproductive success is determined by access to females. Consequently, the presence of females leads to male/male competition, a factor thought to place limits on inter-male tolerance (Stoinski et al. 2004b).

Pullen (2005) and Stoinski et al. (2004b) undertook research into this issue, comparing male/male interactions within groups of western lowland gorillas to gain more insight into the social dynamics and maintenance of all-male groups in captivity. Both studies collected behavioural data from G.g gorillas in three age classes, silverback, blackback and sub-adult, focussing on the frequencies of certain agonistic and affiliative behaviours. Pullen's study involved a comparison of male/male behaviours between a bachelor group n=5 and a breeding group n=6. Her method of data collection involved continuous focal sampling for three sessions per male per day, as well as instantaneous scan sampling of all males every 15 minutes. Stoinski et al. (2004b) focused entirely on all-male groups. In their study, behavioural data were collected on 25 G.g gorillas housed in nine social units in one-hour intervals over a period of 18 months. This involved collecting scan data every five minutes on

the proximity of gorillas to each other, and the collection of all-occurrence data on the frequency of aggressive or affiliative behaviours. Both studies revealed similar variations in patterns of aggression across the different age classes within bachelor groups. Pullens' study also showed the same to be true within the captive breeding group. In particular, silverbacks and blackbacks were shown to express higher levels of non-contact aggression than sub-adults (Pullen 2005; Stoinski et al. 2004b).

Results of the comparison between breeding and bachelor groups in Pullens' research revealed that there were several differences in rates of aggressive behaviours between gorillas in the same age-class, between both groups. Most significantly, the breeding group silverback expressed significantly higher levels of non-escalated aggression, than the bachelor group silverback. This behaviour was taken by the researchers to be reflective of the need for adult males to assert dominance as a means of ensuring access to females. These findings suggest that bachelor groups may be a feasible management option for male G.g gorilla groups (Pullen 2005). However, the value of this study is limited by its small sample size and, as acknowledged by the author, further research is needed.

Findings in the research by Stoinski et al. (2004b) not supported by Pullen (2005) included an increase in affiliative behaviour between sub-adults in all-male groups. This is thought to be important for increasing social cohesion in bachelor groups. Their study also found an association between visual and olfactory contact with females, and increased non-contact aggression between males (Stoinski et al. 2004b). However, this research was limited by the relatively short time-span of the data collection period. Due to the longevity of gorillas, a longer-term study needs to be undertaken to document the changing dynamics of all-male gorilla groups as they age and adapt to new members.

## Conclusion

As we have seen, high levels of stress, due to factors such as human presence or male competition, can lead to an increase in the aggressive behaviours expressed by members of ex-situ gorilla groups. These negative behaviours affect both the social stability of the group and the welfare of its members. However, as this research suggests, the creation of bachelor groups, and the introduction of visual barriers between gorillas and human visitors, will potentially decrease these unwelcome behaviours, thereby improving the welfare of western lowland gorillas in the captive environment.

## References

- Birke, J.K. (2002) Effects of browse, human visitors and noise on the behaviour of captive orang-utans. *Animal Welfare* 11:189-202.
- Blaney, E.C. and Wells, D.L. (2004) The influence of a camouflage net barrier on the behaviour, welfare and public perceptions of zoo-housed gorillas. *Animal Welfare* 13:111-118.
- IUCN (2004) 2004 IUCN Red List of Threatened Species. <http://www.redlist.org/>
- Parnell, R.J. (2002) Group size and structure in Western Lowland Gorillas (*Gorilla gorilla gorilla*) at Mbeli Bai, Republic of Congo. *American Journal of Primatology* 56:193-206.
- Pullen, P.K. (2005) Preliminary comparisons of male/male interactions within bachelor and breeding groups of western lowland gorillas (*Gorilla gorilla gorilla*) *Applied Animal Behaviour Science*. 90:143-153.
- Stoinski, T.S., Lukas, K.E., Kuhar, C.W. and Maple, T.L. (2004a) Factors influencing the formation and maintenance of All-Male gorilla groups in captivity. *Zoo Biology* 23:189-203.

Stoinski, T.S., Lukas, K.E., Kuhar, C.W. and Maple, T.L. (2004b) Social dynamics of captive Western Lowland Gorillas living in all-male groups. *Behaviour* 141:169-195.