APPLIED ANIMAL BEHAVIOUR SCIENCE

Applied Animal Behaviour Science

Article in Press

Chimpanzees use multiple strategies to limit aggression and stress during spatial density changes

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Accepted 18 June 2013. published online 12 July 2013.
Corrected Proof

Abstract

The regulation of aggression in captive animals is an important welfare concern. Captive environments typically provide limited space for animals and many species exhibit heightened aggression in response to spatial restriction. However, primates appear to regulate aggression under these conditions. These findings have led to the proposal of three models for responses to spatial density changes: the density-intensity, tension-reduction and conflict-avoidance models. Our study aimed to investigate whether spatial restriction in two groups of captive chimpanzees at the Johannesburg Zoo, South Africa, supported the hypotheses of one or more of these models. In addition, a forth model based on the coping hypothesis of stereotypic behaviour was tested. Behavioural observations of both chimpanzee groups were conducted during the nine month reconstruction of the chimpanzee exhibit, and the associated variation in spatial limitation. Both chimpanzee groups used a tension-reduction tactic to limit aggression in the outdoor environments under high spatial density. In the indoor environments, the one (orphan) group of chimpanzees adopted a tension-reduction tactic to limit aggression while the other (family) group adopted a conflict-avoidance tactic. In both groups, indoor high-density conditions generated significant increases in abnormal behaviour. Our findings provide mixed support for the tension-reduction and conflict-avoidance models, while offering no clear evidence for the density-intensity model. The outcomes suggest that the chimpanzees may also have utilised abnormal behaviour as an outlet for the stress of spatial restriction. Together with evidence from other studies, our results suggest that chimpanzees are flexible in their response to the stress of spatial restriction and may employ aggression-mediation tactics in a context dependent manner. With regard to primate welfare, our findings suggest that aggression during spatial restriction may not necessarily be as prominent a welfare concern as previously thought but redirected and abnormal behaviour may still compromise animal wellbeing under spatial restriction.

Keywords: Chimpanzees, Spatial restriction, Aggression, Abnormal behaviour