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Applied Animal Behaviour Science 110 (2008) 377–385
APPLIED ANIMAL BEHAVIOUR SCIENCE
www.elsevier.com/locate/applanim

Group differences in captive gorillas' reaction to large crowds

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Accepted 10 April 2007
Available online 18 May 2007

Abstract

The impact of visitor crowd size on captive animal behaviour can be difficult to interpret in many institutions due to the lack of variation in crowd size over short periods of time. In attempts to compare greater variation in crowd size, animal behaviour is often compared over conditions that create additional confounds, such as day of week or season. Fluctuations in attendance over the holiday season at Disney's Animal Kingdom® Theme Park provided an opportunity to examine the impact of variation in crowd size on gorilla behaviour without the confounds found in many other studies. Ten western lowland gorillas (*Gorilla g. gorilla*) in a bachelor group ($n = 4$) and a family group ($n = 6$) were observed over a period of 8 weeks in late 2005. Observations were classified into Large Crowd and Small Crowd days and a repeated-measures ANOVA procedure was conducted to determine the effects of crowd size and social group on gorilla behaviour patterns. Few overall differences were found in behaviour during the Large Crowd and Small Crowd conditions. However, similar to previous research, gorillas were less visible during the Large Crowd condition ($F_{1,8} = 14.15$, $P = 0.01$). There was also an interaction of crowd size and group ($F_{1,8} = 7.58$, $P = 0.01$), indicating the bachelor group of gorillas was more aggressive during the Large Crowd condition, whereas the family group showed no increase in aggression with large crowds. These results indicate the importance of providing complex enclosures with visual barriers to allow animals to move away from large crowds if they choose. Future research should focus on the individual characteristics of animals and enclosures that may contribute to behavioural differences in visitor–animal interaction research, as well as the proximate cues associated with behaviour change when exposed to large crowds.

Keywords: Gorilla; Human–animal relationships; Bachelor groups; Agonistic behaviour; Social behaviour; Zoo animals

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0168-1591/$ – see front matter
doi:10.1016/j.applanim.2007.04.011

1. Introduction

Along with the growing concern for animal welfare in zoological parks, over the past several decades has come increasing interest in the impact of zoo visitors on the behaviour and welfare of zoo animals. Despite the assumption that visitors may impact animal behaviour in some manner, the research results are somewhat ambiguous. The impact of visitors has been alternatively viewed as stressful, enriching, and of no consequence to zoo-housed animals (see Hosey, 2000 for review). Additionally, the presence of visitors has been argued to be more of a condition than a variable and that some other specific factor (e.g. visitor activity or noise) is the proximate factor affecting animal behaviour (Hosey, 2005).

Hosey (2000) has discussed the major hypotheses associated with the visitor effect. Despite this commentary, two factors are under-explored in the visitor-effect literature. The first is individual differences of the animals being studied. While some studies have indicated differences in aggression based on age or sex (e.g. Mitchell et al., 1991), these are rarely factored into summative discussions of the impact of zoo visitors on the behaviour of a species. Thus, significant results, or the lack thereof, may be driven by the demographic makeup of the group, as individual animals may be more or less susceptible to the effects of visitors.

The second factor that may impact studies of the visitor effect is research methodology. Research on the visitor effect can be broadly divided into two classes: (1) instantaneous evaluation and (2) daily evaluation. In instantaneous evaluation, both animal behaviour and visitor characteristics (e.g. density and intensity) are evaluated throughout the day using an interval sampling technique (Martin and Bateson, 1993). This method allows for the assessment of current crowd size at an exhibit and provides a variable measure of crowd size throughout the day. However, this method does not allow for analysis of cumulative effects. Using instantaneous evaluation, an interval of low visitor density that was preceded by several hours of high visitor density is weighted equally to an interval of low visitor density that has followed several hours without a single visitor. Successive intervals are not independent of one another, and interval evaluation methods do not account for this lack of independence.

Additionally, the instantaneous method is subject to a confound of visitor effect and visitor attraction (Hosey, 2000). Large crowds may be attracted to aggressive behaviour displayed in an exhibit, as opposed to the large crowds causing the behaviour, as many visitor-effect studies assume. When instantaneous evaluation is used it can be difficult, if not impossible, to completely separate the cause and effect relationship of crowd size and behaviour.

Alternatively, daily evaluation uses the number of individuals to enter the park or pass in front of an exhibit throughout the day as the independent variable in the analysis. This methodology controls for cumulative effects and can be used to avoid the visitor-effect/visitor-attraction confound. However, the daily evaluation technique does not provide any information on specific causes of behavioural change related to crowds or specific aspects of the animal–visitor interaction. Using this methodology one cannot determine if it is, for example, visitor numbers, noise, activity, or the increased chance of a single harassing visitor that causes behavioural change.

Given these advantages and limitations, daily evaluations are desirable to determine whether crowd size is related to behavioural change and instantaneous evaluations provide more in-depth information on the relationship between visitors and animals. Unfortunately, many zoos do not have sufficient variation in daily attendance over a short period of time to adequately assess the impact of crowd size. As a result, researchers are forced to compare weekdays with weekends or summer versus winter attendance figures (e.g. Wells, 2005), thereby ignoring the potential confounds of work schedule or weather/season.