An Investigation into What Influences Visitor Patterns at the Peterborough Zoo

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Abstract

Zoos all over the world are an integral part of species conservation, breeding new animals in captivity and learning more about how animals behave. Many studies have suggested that the body mass of animals at the zoo is positively correlated with visitor patterns. To test this theory we did observations of ten different animals at the Peterborough Riverview Park and Zoo for four Saturdays in a row, using a pen, paper and a stopwatch. The ten animals were divided into two groups, those that have a body mass over 15kg and those that have a body mass less than 15 kg. Attracting power was calculated as the number of individual visitors to each exhibit and holding power was the amount of time each person stopped to look at the exhibit. On the second and fourth Saturday questionnaires were given out to twenty random zoo patrons who ranked five animals based on their desirability to see them in a zoo, then they ranked the factors that would influence them to pick a certain exhibit over another. To analyze the results a one tailed t-test was used to see if there was any difference in the attracting or holding power of the animals with a body mass of more than 15kg and the animals with a body mass of less than 15 kg. There were no significant results for the holding power but the attracting power did show significant a difference between the two groups. A multiple stepwise regression was performed to determine which variables were predictive of visitor patterns and social behaviour/movement was the only variable that showed significance. The results of the questionnaire also showed a significant trend for social behaviour/movement being the most influential factor when choosing one animal exhibit over another and the results showed that body mass does not determine the most desirable animal to see in a zoo. These results indicate that body mass is not the best predictor of visitor patterns in a zoo, instead the social behaviour and movement of the animals in the exhibit seems to be the best predictor. Moving forward zoos should take into consideration the social

aspects of any new animals and consider incorporating more interactive aspects to draw in more visitors to the zoo.

Introduction

Over the past two decades zoo popularity has shown an overall decline, partially due to the increase in competing attractions(Whitworth 2012). Most individuals indicate that their primary motivation for visiting a zoo is for the pleasure and education of their children but zoos must also take into account their role in the conservation of species and their ability to breed certain species in captivity(Cain and Meritt Jr. 1998; Balmford 2000; Whitworth 2012). Historically, it has been larger animals that have been the main attractions at zoos, placed front and centre to draw in more visitors and to increase profit(Knegtering et al. 2010; Ward et al. 2011). A main objective of zoos is to have attractions that will draw in enough visitors to support the maintenance and upkeep of both the animals and the buildings, because of this many researchers have looked at visitor patterns of zoos trying to find factors that will help to predict and increase visitor numbers and thus allow zoos to make more money and to make more educated choices about which animals to adopt for new exhibits(Cain and Meritt Jr. 1998; Balmford 2000; Ward et al. 2011). The purpose of this research paper is to determine if the body size of animals at the Peterborough zoo influences visitor patters. There are some studies that have shown data that supports this idea and suggests that larger body mass will lead to more visitors while other studies, such as Balmford 2000, have contraindicated this suggestion and displayed data that does not support the hypothesis of larger animals drawing more visitors(Balmford 2000; Ward et al. 2011). The cost of adopting and maintaining larger animals is significantly more than that of smaller animals making the indications of this study important for zoos choosing new animals and new exhibits. Based on past studies larger animals, those

having a body mass over 15kg, will draw more interest represented as the number of visitors, compared to animals with a body mass of less than 15kg. Observing visitor patterns for a short period of time, exhibits with larger animals will receive more visitors and will hold the visitor's attention for longer periods of time. On a questionnaire given to zoo patrons this will be supported by there being a significant preference to see larger animals at a zoo. Using observation and questionnaires it will be determined if there is a preference for zoo animals based on their body size.

Materials and Methods

Popularity and Body Size

The data used to determine if body size correlates with popularity of zoo animals was gathered at the Riverview Park and Zoo in Peterborough Ontario during the months of October and November. For four Saturdays in a row beginning on October 17 and spanning through October 24, October 31 and November 7 observations were made for thirty minute periods outside of the exhibits of ten animals. The Peterborough zoo is home to 137 animals and 49 species, our ten animals were chosen from multiple taxa and families, the common and scientific names of the ten animals can be seen in Table 1 (Riverview Park and Zoo). Between one and three pm on the four Saturdays observations were made by three different observers for thirty minute intervals on a rotating schedule (Appendix A).The subjects being observed were patrons of the zoo of all ages and both genders, a total of 613 people were observed over the four days.

Mammals	Reptiles
Bactrian Camel (*Camelus bactrianus*)	Burmese Python (*Python molurus bivittatus*)
Barbary Sheep (*Ammotragus lervia*)	
Bobcat (*Lynx rufus*)	
Domestic Yak (*Bos grunniens*)	
Slender-tailed Meerkat (*Suricata suricatta siricata*)	
North American River Otter (*Lontra canadensis*)	
Reindeer (*Rangifer tarandus*)	
Squirrel Monkey (*Saimiri sciureus sciureus*)	
Red-necked Wallaby (*Macropus rufogriseus*)	

Table 1: Common and scientific names of the species being observed at the Riverview Park and zoo and their respective classes.

Procedure

The procedure for this study was closely based on the procedure used in the study by Moss and Esson 2010. At one pm on each Saturday three observers arrived at the zoo where a general survey of the weather, time and any events occurring was conducted (Appendix C). Each observer then went to a pre-assigned exhibit with their observation sheet (Appendix C) a pen and a stop watch. The thirty minute time limit began as soon as the observer arrived at the exhibit. All visitors, including people only walking by, were recorded including their age, gender, the presence or absence of children and whether or not they were in a group this information helped determine the attracting power of each exhibit(Moss and Esson 2010). The timer was started as soon as a visitor was seen to be observing the animal in the exhibit. No contact was made with visitors at this time unless directly approached. At the end of the thirty minutes recording was completed for any observations that were already started and no new observations were started as

stated in the observing rules (Appendix C). All times were recorded in their proper columns to determine the holding power of each exhibit (Moss and Esson 2010). All potential factors that could bias the results were recorded including enclosure type, weather and the number of animals in the exhibit.

Questionnaire

On the second (October 24) and fourth (November 7) Saturdays questionnaires were handed out to twenty random zoo patrons of varying ages and genders (Appendix C). A total of thirty-nine people completed the questionnaire; twenty-seven females and twelve males. Four were under the age of five, nine were between the ages of five and twelve, six were between thirteen and twenty, nine were between twenty-one and forty, nine were between forty-one and seventy and two preferred not to disclose their age. The questionnaire had zoo patrons rank five pictures of animals based on their desirability to see them in a zoo, one being the most desirable and five being the least desirable. The animals were an elephant, a camel, an orangutan, an otter and a penguin which encompasses varying body masses as well as animals found at the Peterborough zoo and animals not found at the Peterborough zoo (Appendix C). The questionnaire also had patrons rank factors that influence them to see one exhibit over another with one being the strongest influence and four being the weakest influence. Factors listed included foreignness (rarely seen), size, multiple animals in the enclosure and social behaviour/movement.

Analysis

A one tailed t-test for two independent means was conducted using the Social science statistics website (Social Science Statistics). This was done to determine if there was a

significant difference between the holding power of animals above 15kg and below 15 kg. A multiple stepwise regression was also performed using the data analysis toolpak in excel. This was preformed to uncover any significant predictors of visitor patterns. Line graphs and bar graphs were also produced in excel to display the results of the questionnaire.

Results

Visitor patterns at the zoo were measured using attracting power, the number of visitors that stop by an exhibit and the holding power, how long they observe the animal in the exhibit measured in seconds. The one tailed t-test showed no significant difference in holding time between the body mass over 15kg or the body mass below 15kg (T value=1.163345, P value=0.139106). The one tailed t-test did show a significant difference between the body mass over 15kg and the body mass below 15 kg in their attracting power (T value= 2.124797, P value= 0.033164). The multiple stepwise regression allowed for multiple variables to be looked at for significance. The type of enclosure (Open or closed) the gender of the visitors, the time of day, the distance of the exhibit from the entrance (Appendix B) and the body mass (in kg) were all shown to not be significant. This left outdoor temperature, the number of animals and the social behaviour/movement of the animal as predictors of visitor patterns. The only factor shown to be a significant predictor of visitor patterns was social behaviour/movement (R^2=0.218095, P=0.002382). Social behaviour showed a significant prediction of the holding time at the exhibits. It was also shown that groups of three or more people or visitor groups containing children spent significantly larger amount of time viewing exhibits (approximately 30 seconds longer on average).

Questionnaire Results

Thirty-nine randomly selected zoo patrons completed the questionnaire. Twenty-seven females and twelve males of varying ages as seen in Figure 1.

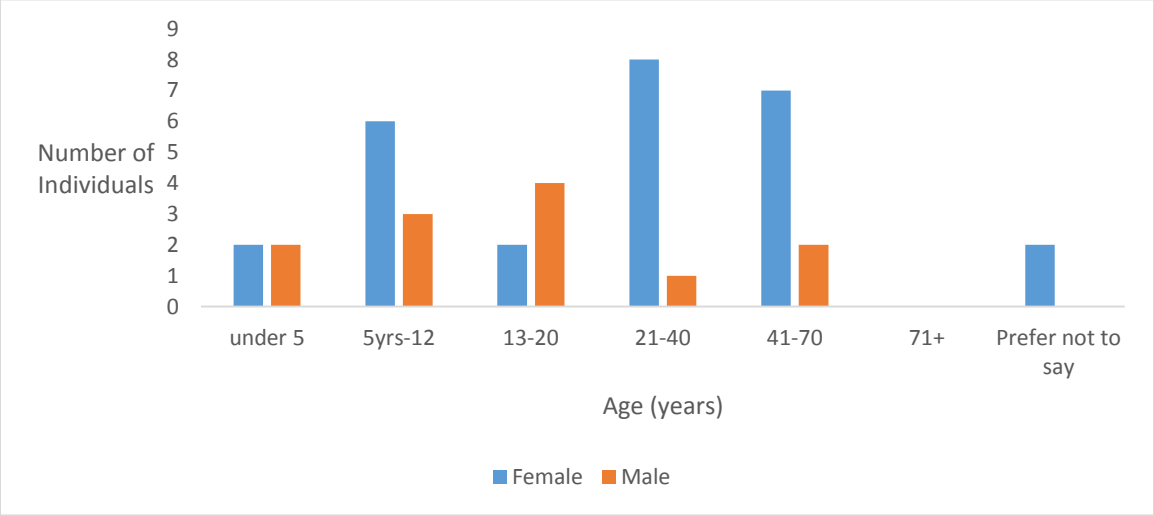

Figure 1: Bar graph made in Microsoft Office Excel displaying the distribution of gender and ages of the randomly selected zoo patrons who completed the questionnaire on both the second and fourth Saturday.

The first part of the questionnaire was ranking the desirability to see certain animals at the zoo. The penguin was ranked first fifteen times, the most of the five animals, followed by the otter with eleven first place votes, then the elephant with nine first place votes, the orangutan with four and the camel with no first place votes as displayed in Figure 2.

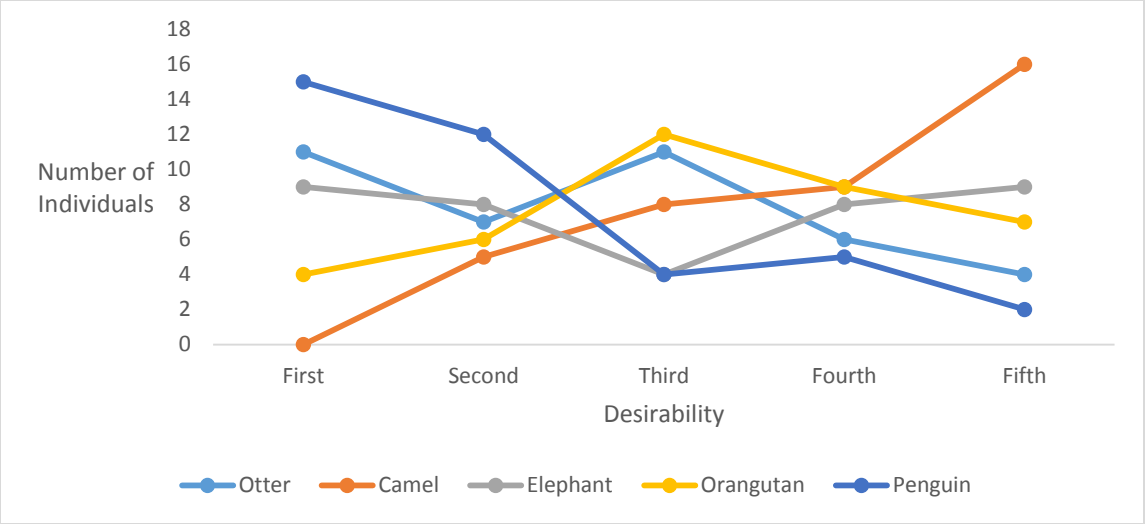

Figure 2: Line graph created in Microsoft Office Excel displaying the ranking of the five pictures of animals from the questionnaire on both the second and fourth Saturday.

The second part of the questionnaire was ranking four factors based on how much they would influence the individual to see one animal over another. The factor most commonly ranked first was social behaviour/movement with eighteen votes, followed by foreignness with thirteen and size and multiple animals tied with four votes each (Figure 3).

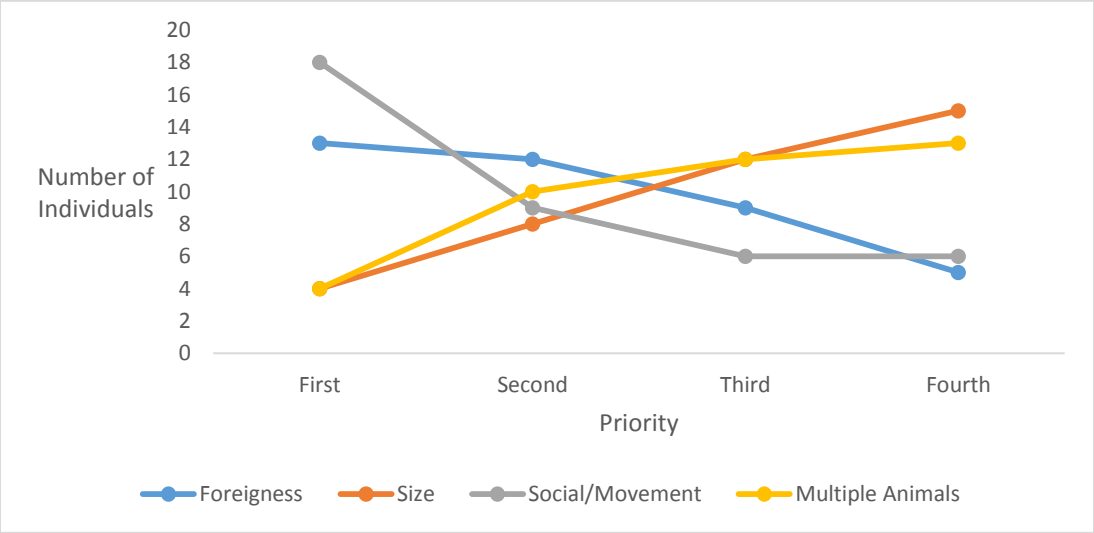

Figure 3: Line graph made in Microsoft Office Excel displaying the priority ranking of factors that would influence zoo patrons to choose seeing one animal over another.

Discussion

It can be clearly seen from these data that the strongest predictor of visitor interest was the social behaviour/movement of the animal. None of the other factors showed a significant predictive relationship with holding or attracting power for different exhibits. This information as well as the results of the questionnaires do not support our original hypothesis that the body mass of zoo animals predicts the visitor patterns. The relationship between body mass and holding power was non-significant showing that more visitors do no choose large animals over small animals. The relationship between the body mass and the attracting power was significant with a P value of P= 0.033164 with animals under 15kg attracting more visitors. This information also does not support our hypothesis that larger animals would be more popular. Similar results of body size not predicting visitor patterns has been found in other studies(Balmford 2000; da Silva and da Silva 2007). Some of the factors that, while not significant, did seem to have an effect on visitor patterns were the presence of children and the weather. Groups that had children tended to spend longer viewing exhibits than groups that did not have children with them. Another factor was weather, colder temperatures or rain decreased the total number of visitors at the zoo on that given day. The first Saturday (October 17) when it was eleven degrees out and sunny there were a total of two hundred and eighty-one visitors between 1 and 3pm compared to the second Saturday (October 24) when it was three degrees and raining and there were only sixty-nine visitors between 1 and 3pm. A similar pattern was found in the study by Aylen et al. 2014. In this study they show a relationship between warmer weather and significantly increased visitor numbers(Aylen et al. 2014). The findings from our data that social behaviour/movement significantly predicts visitor patterns has also been supported in other literature. Margulis et al. 2003 found that the behaviour of animals influences visitor's

preferences. They found that when animals were more active they drew significantly more visitors(Margulis et al. 2003) When animals are more active it is more interesting to stop and observe them, especially for children who then influence their parents which increases the attracting and holding power of different exhibits. It can be clearly seen from our questionnaires that the most important factor for people when choosing which exhibit to go see is social behaviour and that the body size of the animal does not equal desirability to see it in a zoo, the number one ranked animal to see in a zoo from our questionnaire was the penguin, the smallest out of the five.

Conclusions

The findings of our research show that larger animals do not draw significantly more visitors. This research paper did not look at the costs of exhibits but it is an important factor that need to be considered. Larger animals cost more to adopt and more to care for, and with potentially declining popularity of zoos over the last couple of decades, zoos need to work even harder to draw in more visitors. On top of participating in species conservation and breeding zoos do ultimately need to turn a profit to maintain their structures and their animals. Moving forward zoos should consider taking into account the social aspects of new animals they are acquiring in order to increase visitor interest. Considering the addition of more social animals and more interactive aspects will go a long way to increasing visitors coming to the zoo.

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