Rigid Plastic Balls as Environmental Enrichment: A Novel Presentation

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INTRODUCTION

Indestructible objects are useful enrichment for nonhuman primates (Bayne et al. 1993; Bloomsmith et al. 1990; Fritz and Howell 1993; Sanz et al. 1999; Shefferly et al. 1993). They reduce time spent in abnormal behavior patterns, including repetitive locomotion, and increase time spent in positive behaviors, including exploration, manipulation and play (Bayne et al. 1993; Shefferly et al. 1993). Bloomsmith et al. (1990) found that rigid plastic balls were utilized by socially-housed chimpanzees even three weeks after continual exposure. Sanz et al. (1999) found that rotating indestructible objects throughout the day increased the use of the toys. At the Primate Foundation of Arizona (PFA), we provide many different types of both destructible and indestructible objects, but seldom provide rigid plastic balls. They are frequently thrown about the enclosure during displays and have damaged the cage mesh. We sought a solution to avoid this problem and still use the rigid plastic balls for environmental enrichment.

PFA outdoor cages have a 23cm alley-way between them to prevent possible wounding among members of adjacent groups, especially newcomers to these groups. We placed a rigid plastic ball in this alley-way area between two groups. Both groups of animals were able to manipulate (roll) the ball up and down the alley-way through the mesh. However, the chimpanzees were unable to toss the ball about during active displays. We hoped that the rigid plastic ball placed between cages would increase time spent in positive behaviors within social groups and increase affiliative behavior between adjacent social groups.

METHODS

Data collection was initiated as soon as the balls were in place. Subjects included 10 chimpanzees (Pan troglodytes) divided into two social groups and housed in two adjacent outdoor enclosures at the PFA (Group #1: 1 male, 3 females, 9 - 32 years; Group #2: 6 females, 2 - 46 years). Enclosures measured 712.8m3(146.97m2 floor space and 4.85m vertical height), and included a variety of cage furnishings and enrichments (see Fritz and Howell 1993 for detail). A rigid plastic ball (15.2 cm in diameter and approximately 0.9 kg in weight) was placed between the two adjacent cages where it could be manipulated by animals housed in both adjacent cages by reaching an arm or hand through the cage mesh.

Observation data were collected using both focal animal and ad libitum sampling methods. Each focal animal was observed at 15-second intervals for 10-minute trials two days a week for a total of 100 minutes (50 minutes pre- and 50 minutes post-provision of the ball). Ad libitum observations were conducted for the first 40 minutes both groups had contact with the rigid plastic ball, and were collected simultaneously with all focal animal observations. For focal animal observations, we recorded affiliative and play behaviors (social play, solitary play, groom, tandem walk or embrace), agonistic behaviors (aggression, avoidance or apprehension or fear, dominance, frustration or temper tantrum), abnormal behaviors (rocking, stereotypy, attachment to object), and 'other' behaviors (attention to non-conspecific, stationary, locomotion, forage/eat, and object manipulation). Any contact and manipulation of the ball was specifically noted. Wilcoxon

signed rank tests were used to compare focal animal data collected prior to and after the provision of the rigid plastic ball to determine if the presence of the ball had a significant effect on behavior ($p < 0.01$) . Ad libitum data were summarized by focal subject to offer additional qualitative information.

RESULTS

Wilcoxon signed rank tests on the focal animal data indicated no significant effect of the ball on behavior (p-values ranged between 0.039 and 1.0 for the behaviors tested). However, ad libitum data revealed that subjects did use the rigid plastic ball and it was successful in promoting positive social activity (primarily social play) between animals housed in adjacent social groups. Seven out of the 10 subjects were observed contacting the ball during the initial ad libitum observations collected for the first 40 minutes following initial introduction of the rigid plastic ball. During the course of focal animal observations, four animals consistently manipulated the ball and on more than one occasion, the ball was used to facilitate social interaction between animals housed in adjacent social groups (particularly adolescent and adult females). While most adjacent social interactions were between two individuals, there was one occurrence of a triadic interaction between an adult-female, infant-female, and an adjacent adolescent-female who simultaneously manipulated the ball.

Infant and juvenile chimpanzees manipulated the ball more often than adult animals. Ad libitum observations also suggest chimpanzees used the ball more frequently during the initial presentation. However, over time use of the ball did not stop altogether. Three months after the initial introduction of the ball, the chimpanzees were still observed using it in both solitary and social contexts with individuals housed in the adjacent cage.

DISCUSSION

The results of this study suggest a rigid plastic ball placed between adjacent social groups can be an effective environmental enrichment for captive chimpanzees. While behavioral observation data suggest the addition of the ball had no significant effect on behavior, ad libitum data suggest the ball was used by most individuals and was effective in initiating positive social interactions between adjacent cagemates. In addition, behavioral results are similar to that of Bloomsmith et al. (1990) in that there was no increase in antagonistic behaviors with the use of a rigid plastic ball as environmental enrichment.

In conclusion, the rigid plastic ball proved to be an effective enrichment device to encourage positive social interaction between adjacent animals. Not only were there positive social interactions between the adjacent animals using the rigid plastic ball, but it continued to be used months after the initial introduction. The way in which the ball was placed between the cages may not be feasible for all facilities. However, with a little creativity, adapting it to specific cage configurations may prove to be a beneficial environmental enrichment.

ACKNOWLEDGMENTS

This project was supported by the National Institutes of Health, Division of Research Resources, Grant U42 RR03602. We also thank the volunteer, care, and research staff for assisting in providing this device to the chimpanzees.

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It is published in: *The Newsletter of the Primate Foundation of Arizona*, Vol. 11 No. 2, April 15, 2000. p. 1-2.