

Behavioral Enrichment of Captive Black Bears (*Ursus americanus*)

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Introduction

- The Association of Zoos and Aquariums (AZA) defines enrichment as "a dynamic process for enhancing animal environments within the context of the animals' behavioral biology and natural history." (Association of Zoos & Aquariums, 2009) There is consensus throughout the animal care community that enrichment is vital to ensuring an animals best possible care. Common goals of enrichment are to improve animal welfare, reduce potential sources of stress, enhance coping abilities of the animals and reduce/eliminate abnormal behaviors.
- Animal welfare is of the highest priority at any captive animal facility and as discoveries are made in the fields of psychology, ethology, and animal sciences support grows for the importance and effectiveness of enrichment for captive animals. An unfortunate trend, despite the wide spread knowledge of enrichment and its importance, is the lack of scientific studies on the effectiveness of specific types of enrichments on differing species. One of the goals of this study is to examine the effects of a specific enrichment item on the behaviors of a single species in captivity.
- Black bears are a unique species because, though they are technically part of the family Carnivora, they rarely hunt. Their time is usually split between foraging for food and sleeping. They thus require stimulus that greatly differs from their genus counterparts.
- Black bears are known to be very curious animals as well. Their motives for exploration go beyond the search for food and wild bears have been known to chew on signs and other obviously non-food items apparently in attempt to discover what they are. (Bacon, 1980) Studies have also found that in captivity the natural curiosity of black bears can be used as an advantage. When a new stimulus is introduced to the bear, even if they are not interested in the stimulus, they tend to show an increased curiosity towards their entire environment. (Carlstead, Seidensticker, & Baldwin, 1991)
- This study hypothesized that the bears would become significantly more active following the introduction of the novel stimulus. They will show greater interest in their overall environment. They will explore more and show a general higher activity level than they displayed previous to the introduction.

Method

Subjects

- 4 American Black Bears (*Ursus americanus*)
 - 2 Male 10 years old
 - 2 Females 5 years old

Materials

- Snak'n'Trim (Heavy Duty):** The snak'n'trim is a ball made of hard plastic, 10" in diameter. The inside of the ball is hollow and there is a 1" diameter hole on the side of the ball which allows for items to be placed in, and fall out of, the ball. Four balls were used in this study, one for each bear.
- Ultrak 440 Stopwatch Multimode Countdown Timer:** Specific use is explained further in the data collection procedure.
- Ethogram:** The behaviors of interest were coded to be used throughout the study during the observation periods.

Design

The independent variables are age, sex, time of year, time of day, and whether the bears receive the boomer balls as part of their daily enrichment. The dependent variables was the activity frequencies of the bears.

Procedure

Data Collection:

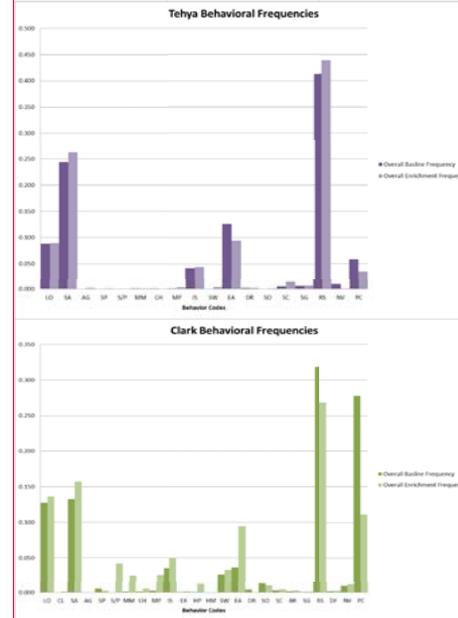
- 2 Observation periods
 - Summer- 6 weeks (June 19th-July 29th)
 - Winter- 4 weeks (Dec. 11th-Jan. 7th)
- Baseline and Enrichment phases during both periods
- Observation sessions 6 days a week
 - Alternating morning and afternoon sessions
- 1 hour sessions with focal scans every minute
- Snak'n'Trim enrichment given during second half of each observation period, filled with approved diet

Data Analysis:

- Behavior frequencies were calculated
- Chi-squared test conducted looking at select behaviors

Results

- Behavior frequencies differ greatly between all four bears, indicating the major influence of individual differences
 - There is a large difference in behavioral diversity between the males and the females, both before and after enrichment.
 - The behavioral frequencies changed more noticeably from baseline to enrichment for the males. The frequencies did not change that much for the females during the same time.
- Chi-squared tests indicate that all bears showed a significant ($p < .001$) difference in behavior from baseline to enrichment trials.
 - The most significant difference ($p < .0001$) was found with Clark's behavior.
- Examples of behavior frequencies and differences in diversity:



Discussion

- As hypothesized, the bears' behavior was majorly influenced by the introduction of the novel stimulus.
- Though age and sex are likely to influence behavior, in this particular study other factors such as individual preference for toy, commonality of environmental enrichments and personality also appeared to have an effect.
- Due to the limited number of subjects, further testing is required to better understand the variables affecting behavior.

References

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