AnS 490-H: Part II; How to Educate the Public While Providing a Portable Environmentally Enriched Wagon to a North American Porcupine

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Summary and Implications

The objective of this project was to determine if a portable environmentally enriched wagon provided a North American Porcupine with the ability to express natural behaviors during a formal educational presentation at the Omaha Henry Doorly Zoo and Aquarium. The study was broken up into three phases: ***baseline***, ***habituation***, ***and public***. One researcher recorded all phases on a video camera in color at 30 frames per second. All information will be presented descriptively. ***Time on educational presentation:*** The average time during ***baseline*** was ~13 minutes. Once the wagon was introduced, the average formal educational presentation length increased to ~19 minutes (***public***). In conclusion, the portable environmentally enriched wagon maintained Clover's interest and it resulted in a richer behavioral repertoire that the general public were able to see during the finalized education presentations.

Introduction

Zoo animal presentations play a significant role in educating guests about the animal, conservation efforts, and how their lives are enriched. One concern that zookeepers express is that animals may habituate to their home and presentation environments. ***Habituation*** is defined as a lack of response by the animal when exposed to the same stimulus for an extended period of time and the animal either decreases or completely ceases to respond to that stimuli. In an effort to manage or mitigate ***habituation***, zookeepers are constantly rotating enrichment items in the home pen, but little attention has been paid to enrichment during formal educational presentations. Therefore, the objective of this project was to determine if a portable environmentally enriched wagon provided a North American Porcupine with the ability to express natural behaviors during a formal educational presentation at the Omaha Henry Doorly Zoo and Aquarium.

Materials and Methods

The project was approved by Alysia Hess and Omaha's Henry Doorly Zoo and Aquarium.

Animal: One North American Porcupine (*Erethizon dorsatum*), identified as "Clover" was used. Clover (BW 7.3 kg) was five years of age at the time of testing (born April 2011). Clover was examined by the attending veterinarian and was classified as healthy prior to study enrollment.

Wagon: A portable environmentally enriched wagon was used (Figure 1).

Figure 1: Portable environmentally enriched wagon

Training ethical notation: The Association of Zoos and Aquariums categorized the project under moderate handling and training techniques with the general public near. Neither human nor animal health, safety nor welfare were compromised.

Training: The study was broken up into three phases: ***baseline***, ***habituation***, and ***public***. The ***baseline*** and ***public*** were both recorded in the same room within the Wild Kingdom Pavilion, with zookeeper, researcher, and the general public present (Figure 2). ***Habituation*** was conducted in the back room of the Wild Kingdom Pavilion with the zookeeper and researcher present. Clover was given one training session on the portable environmentally enriched wagon with the aim of (a) increasing her activity level and (b) solidify the zookeeper animal relationship.

Figure 2: Formal presentation area within the Wild Kingdom Pavilion

Baseline (B): Clover was presented to the general public using the zoo's standard operating protocol. This protocol was defined as follows; Clover was either brought out in a crate with a cart or walked out to the center of the stage and target trained to touch her nose onto a whiffle ball at the end of a stick. The zookeeper presented information about the North American Porcupine species.

Habituation (H): Clover's primary zookeeper watched her posture, such as exposing her stomach, one of the most vulnerable locations, and willingness to explore by getting on the wagon without being lured, and climbing up the trunk and along the branch to determine when Clover could be presented to the general public with the portable environmentally enriched wagon.

Public (P): The wagon was placed on the stage while the general public was present. Clover would either walk to the wagon, or be placed inside her travel crate and carried to the wagon by the zookeeper.

Through all phases, the same five keepers did the formal educational presentation (Table 1). Clover was also given her favorite foods as a reward, which included lettuce, apples, strawberries, sunflower seeds, browse biscuits, along with other fruits and dry food for each phase.

Table 1: Zookeeper demographics

Zookeeper	Sex	Time[1]
1	Female	3
2	Female	3
3	Female	1
4	Female	2
5	Female	1

Time[1] defined as the amount of time in years that the zookeeper has been working with Clover during the formal educational presentations.

Behavioral acquisition: One researcher recorded all phases on a video camera in color at 30 frames per second. The researcher stood in the back of the room behind the general public, stage centered during ***baseline*** and ***public***. During the ***habituation*** recording, the researcher stood directly in front of the portable environmentally enriched wagon.

Video review: Collected video was reviewed at Iowa State University. For ***baseline*** and ***public*** a total of five videos were collected in each phase. Due to Clover responding exceptionally well, ***habituation*** only needed one video. Videos ranged from 9 to 23 minutes in duration. Due to the video length variation, the first 10-minutes (600 seconds) were reviewed to standardize the overall time. All videos were reviewed in real time, continually for nine locations, two behaviors, one posture, one "other" and one "unknown" category. (Table 2). All data will be presented as duration of time (seconds) and is descriptive.

Table 2: Ethogram of behaviors, postures, and location of the North American Porcupine

Baseline*, *Habituation*, and *Public	
Location	
Floor	Walking on carpet
Boxes	Contact with boxes
Stage	Contact with stage
Crate	Contact with crate
Hide	Contact with hide
Behaviors	
Eating	Eating food given by zookeeper
Target training	Whiffle ball target
Posture	
Standing	Cue given to rise on back legs
Other	Climbing, walking without target
Unknown	When videos did not record 600 seconds
Habituation* and *Public	
Location	
Wagon	On the wagon
Wagon base	Found on floor of wagon
Tree interaction	Contact with tree trunk
Branch interaction	Contact with branches

Results and Discussion

Baseline: Clover spent the majority of time located on the stage or floor, and was observed to be eating. In addition, the zookeeper spent 117.4 seconds engaged in target training with Clover.

Habituation: Floor time decreased by 36.6 seconds and the time spent on the wagon was 464.0 seconds. Clover spent about the same amount of time eating compared to ***baseline***, but target training decreased by 36.4 seconds.

Public: Clover spent 473.4 seconds on the wagon, which was similar to ***habituation***. Time spent on the stage and floor decreased by 344.4 seconds, and she only spent 55.4 seconds target training. Finally, eating time increased 97.6 seconds between ***baseline*** and ***public*** (Table 3).

Table 3: Average duration of behaviors in seconds

Phase	B	H	P
Location			
Floor	133.6	97.0	72.2
Boxes	65.6	---	---
Stage	342.4	---	39.4
Crate	43.0	---	15
Hide	---	112.0	71.2
Wagon	---	464.0	473.4
Wagon base	---	94.0	134.2
Tree trunk	---	46.0	236.8
Tree branch	---	212.0	31.2
Behavior			
Eating	257.8	252.0	355.4
Target training	117.4	81.0	55.4
Posture			
Standing	11.0	---	6.2
Other	212.2	267.0	183.0
Unknown	37.0	39.0	---

Time on educational presentation: The average time Clover was involved in educational presentations during ***baseline*** was ~13 minutes. Once the wagon was introduced, the average formal educational presentation length increased to ~19 minutes (***public***).

During ***habituation*** and the ***public*** phases, Clover preferred the portable environmentally enriched wagon. Whilst on the wagon, Clover engaged in a richer behavioral repertoire (climbing up the trunk, across the branch, and investigating around the hide). Clover learned that the zookeepers gave her food if she sat on top of the tree stump. This is important because if Clover was stressed, her motivation could be to freeze, flee, or fight instead of eating. Having the portable environmentally enriched wagon also extended the length of the formal educational presentations. The increased length was attributed to the zookeepers having the ability to engage with the general public while Clover explored. In conclusion, the portable environmentally enriched wagon maintained Clover's interest and it resulted in a richer behavioral repertoire that the general public were able to see during the finalized educational presentations.

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