Applied Problem Solving to Diminish Abnormal Behavior

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ABSTRACT

All too often, captive animals exhibit abnormal behaviors that are often the result of either an over or under abundance of stimuli in the captive environment (Rushen, et al, 1993, Mason, 1993). These behaviors are of concern for two primary reasons. First, they are seen as indicators of well-being, and second, they may diminish the value of the animal's purpose in captivity. Modern institutions maintain sound well-being as a part of their mission. Whether the animal is in a zoo or research setting, abnormal behaviors can compromise the ability of that individual to serve the purpose at hand. The problem solving process provides a framework to examine behavioral problems, assess associated circumstances, and develop strategies to mitigate and diminsh the occurance of abnormal behavior. This presentation will provide examples of the application of this process and use the techniques of behavioral management to demonstrate appropriate methods to mitigate abnormal behaviors. When abnormal behaviors can be addressed, the result will be psychologically and physically healthier animals that are able to express species' typical behaviors and function within the parameters of their environments.

INTRODUCTION

Abnormal behavior has been linked to a reduction in welfare of captive animals (Duncan et al, 1993). Therefore, it is reasonable to suggest that the absence of abnormal behavior would be one indication of positive welfare. Of course, other factors have been used to describe a working definition of welfare and include “a state of complete mental and physical health, where the animal is in harmony with its environment” (Hughes, 1976); “a state of condition of physical and psychological harmony between the organism and its surroundings” (Hurnik et al, 1985), and the ability to adapt to changes in the environment without suffering (Duncan & Dawkins, 1983). This paper will emphasize the importance of the problem solving process as it applies to the reduction of abnormal behaviors, and thus contributes to the overall enhancement of welfare in captive animals.

Behavioral management is a pro-active approach to animal care that through the synergy of facility design, operations, environmental enrichment, and positive reinforcement training yields a versatile, effective, and responsive means to provide optimal care for captive animals (Desmond, 1994). Carefully applied behavioral management techniques may eliminate the occurrence of abnormal behaviors (Laule & Desmond, 1998). However, should they arise, the problem solving process, in conjunction with behavioral management techniques, offers animal managers a means to assess and address these undesirable behaviors.

All too often, when animal managers, keepers, and caregivers attempt to address undesirable behaviors, assumptions are made about how to solve the problem prior to a thorough examination of the situation. Underlying causes of the behavior are not determined, which often yields inappropriate solutions. This real example involves a ‘rogue sea turtle’, or so it was presumed. He’s housed in a 900,000 gallon Caribbean reef tank with two species of shark and many fish. The presenting problem was his stealing of fish from the sharks during their feeding time. This situation could have resulted in injury to the turtle as he tried to steal the sharks’ food, and it was difficult to deliver the proper amount of food to all animals. Initial efforts to resolve the situation resulted the solution of one person per shark per feed (= 9 people); the turtle fed at same time as sharks at a different location, and the target training was initiated for the turtle during the feeds. In spite of these efforts, the problem persisted, staff time

investment in shark feeding was 12 man hours per feed, the turtle was still at risk, animals weren't receiving their food, and the turtle's target training was not progressing.

We held a problem solving session to look for another solution that was more feasible, took less staff time, and would keep all animals safe and insure they received the proper diet. Fish and non-fish staff were involved in the session, and following detailed information gathering, it was determined that the animal was just hungry, which led him to steal food wherever he could. Overlooking the simple hypotheses that he needed an increase in his diet was understandable given the complicated and disruptive feeding regimen, and could have only been determined by our thorough examination of all the evidence. This example illustrates the importance of information gathering in the development of appropriate methods for addressing undesirable behavior.

THE PROBLEM SOLVING PROCESS

Through the problem solving process, we can develop an understanding of the presenting problem and its specific set of circumstances, develop educated guesses as to why it is occurring, and then develop solutions that address these underlying causes. Once this step is reached, a behavioral management system offers the tools to address the problem. The following shortened outline demonstrates steps used in the problem solving process:

1. Identify behavioral objectives -
   What do you want the outcome to be? Be specific.

2. Assess the situation
   Gather as much information as possible by asking questions regarding:
   a) Environmental factors
   b) Human factors
   c) Impact of operational and management policies
   d) Social dynamics
   e) Animal health issues
   f) Animal's psychological state
   g) Appropriateness of behavior

3. Develop hypotheses
   Based on the assessment, develop educated guesses as to why this problem is occurring.

4. Identify methods
   Address the underlying causes reflected in the hypotheses.
   a) Identify specific strategies using enrichment, training, and operations
   b) Planning considerations such as animal issues, human related concerns (time available, expertise, safety), facility issues, and financial considerations
   c) Develop final game plan

5. Implement game plan
   a) Design training protocols
   b) Plan sessions
   c) Conduct training
   d) Implement enrichment

6. Evaluate progress
   a) Record keeping
   b) Quantify what you can
   c) Subjective impression
   d) Post session discussion

7. Amend plan
   a) Adjust plan following ample test period
   b) Use records

8. Program maintenance
   Training
   a) Re-training and regression
   b) Transferring behavior to new trainers
   Enrichment
   a) Novelty
   b) Efficacy
   c) Maintenance schedule for enrichment

Case Studies

To further illustrate the problem solving process, an abnormal behavior, excessive self-grooming, will be examined in two different situations, a zoo and a research facility. The presenting problem involves two male baboons who over-groom themselves. The desired result is to reduce the occurrence of this behavior. Working through the above outline offers the following.

Assessment of Zoo Situation

- Baboon male (Sam); 6 years old; hand raised
- Housed in multi-male/female group
- Two other males of similar age in group
- Exhibit is large open area with some rocks
- Locked on exhibit
- Holding area is large room with three smaller areas; only in for servicing exhibit, inclement weather, etc.
- Grooms more on high visitation days
- Mother is not high ranking
- Weather doesn't affect grooming
- Grooms during fights
- Focused on public; aggressive displays, then grooms
- When over-grooming, becomes so involved he's not attentive to surroundings

<u>Hypotheses</u>

Based on the above information, the over-grooming behavior could result from:

1) Public proximity and Sam's lack of opportunity to escape
2) He's a maturing male trying to find his place in the hierarchy, which is exacerbated by the presence of both adult and maturing males in a confined space
3) He's quite focused on people due to hand raising.

Methods to address each of the hypotheses

1) *Public Proximity*

The issue of public proximity could be mitigated by giving the baboon group access to the inside areas. 'Safe zones' or hiding zones provide escape from constant public observation. It has been demonstrated that by giving animals access to holding areas abnormal behavior were reduced, and the animals typically didn't spend excessive time off exhibit (Fulk, R., personal communication). Public proximity could be increased by the addition of features such as planters which set the visitors back from the exhibit perimeter. Providing multiple pieces of 'prime real estate' that would be used for resting, feeding, etc. prevents dominant animals from monopolizing popular locations that if not plentiful may force 'Sam' baboon closer to the visitors.

2) *Hierarchy and Social Pressure*

Before discussing methods to address this hypothesis, it's important to note that these social interactions may be normal. Aggression is a normal part of baboon behavior; therefore attempts to eliminate it are not appropriate. However, it should occur at levels that are not considered excessive. Environmental improvements that can meet the needs of the baboon, 'Sam' by providing him solace and escape will help to address the social situation. Exhibit features that create multiple levels, numerous pathways, and visual partitioning of the exhibit should be added. Resources such as enrichment, feeding stations, etc. should be broadly distributed in quantities that allow all animals to get their fair share. Cooperative feeding, a technique to enhance pro-social behavior, could be initiated between group members and 'Sam', or between other members of the group that may fight resulting in 'Sam' over-grooming. For further reading on cooperative feeding techniques, see References.

3) Hand rearing

Obviously the fact that 'Sam' was hand raised cannot be changed. But what can be addressed is the addition of exhibit enhancements to offer visual escape, operational adjustments like giving the group access to inside areas, and how he deals with crowds of strange people watching him. Desensitization, a technique to pro-actively and directly help an animal overcome fear, should be implemented to address Sam's discomfort with crowds of people

Assessment of Laboratory Situation

- Baboon male 'Frodo'; 6 years old; hand raised
- Single housed in room with 11 other male baboons, all similar age
- Not particularly dominant in room, but not too subordinate
- Mesh in front and one side of cage; can see several animals in room
- Housed in 'typical' silver baboon cage
- Others to play cage, but over-grooming worse following this, so not allowed
- On study protocol requiring monthly sedation
- Sedation via squeeze and injection
- Interaction with staff minimal
- Cannot see door; cage at far end of room
- He avoids interaction with staff, seems fearful
- Over-grooms when care staff is in room
- Over-grooming increases following monthly procedure
- Over-grooms when male across aisle displays

Hypotheses

Based on the information we gathered about 'Frodo', the following hypotheses may explain his over-grooming behavior.

1) Overall visual exposure and lack of hiding places within his cage.
2) Like the zoo example, vying for position in the group hierarchy is normal behavior. In this example, since Frodo isn't socially housed, he doesn't have the opportunity to 'work out' his relationship with other baboons, which is likely to lead to frustration and spark his over-grooming.
3) Lack of much affiliative interaction with the care staff. 4) The knock down procedure for the research protocol is a frightening and stressful experience.

Methods to address each hypothesis

1) *Visual Exposure*

To address the issue of visual exposure, a panel could be added to a section of the front of the cage enabling him to escape from the line of site of care staff and other monkeys in the room. A mirror hung on the cage front would allow him to see the whole room if he chooses, which may alleviate his anxiety when there's activity in the room. Sometimes the simple solution of moving the cage to a different location in the room can result in a change in behavior. By giving him a different view of the room and different neighbors, the over-grooming behavior may be reduced.

2) *Competition in room*

Adding mirrors to the cage front will enable 'Frodo' to see his neighbors. Seeing what the competition is doing might reduce the anxiety of 'hearing but not seeing'. During times when not seeing or not being seen is a better choice for 'Frodo', a visual barrier to hide behind would be essential. And finally, incorporating cooperative feeding into the management of this room could help mitigate the social pressures of keeping a room of maturing male baboons together. Cooperative feeding is effective even when animals are not directly sharing the same space. It could be implemented between 'Frodo' and animals he can see. Although, the author is not aware of any studies that definitively show that training cooperative behaviors generalizes to pro-social behavior, it is reasonable to think this may be of some help in alleviating anxiety associated with a general lack of opportunities to affiliate.

3) Relationship with staff

Positive reinforcement training not only facilitates husbandry and veterinary procedures, but has also been shown to reduce abnormal behaviors (Laule and Desmond, 1998). Positive reinforcement training is also a powerful way to form a positive relationship with an animal (Laule & Whittaker, 1998; Bloomsmith et al, 1997). For our baboon, 'Frodo', a protocol for appropriate interaction should be developed to maximize consistency. Of course, the trainers should be provided with the resources and skills development opportunities to become effective trainers. The number of people involved in Frodo's training should be limited at first and then gradually expanded.

4) Research protocol

The fourth hypothesis suggests that over-grooming results from fear and anxiety associated with the monthly sedations for the research protocol. Positive reinforcement training offers an array of techniques that can directly reduce the stress associated with these procedures. Some basic training to teach 'Frodo' to move to the front of the cage, present body parts, etc. should be implemented. Even prior to the completion of these behaviors, he should be given the opportunity to cooperate by coming to the cage front, rather than immediate squeezing. Consistency in how the procedure is carried out each time will help him predict what is happening and how he might respond to cooperate. Positive reinforcement options should be exhausted prior to using any aversive techniques and if aversive

techniques are necessary, they should be carried out as quickly and consistently as possible. Ideally, Frodo would also be desensitized to the process of squeezing and to accept injections.

Implementation
In order to implement the above strategies to reduce both 'Sam's' and 'Frodo's' over-grooming, preparations such as staff skill development, role and responsibility assignments, and operational adjustments, just to name a few, must be in place.

Evaluation
Evaluation is essential to determine if efforts are effective. Records can be developed that allow trainers, keepers, and care staff to quickly document if the animals are responding as hoped. Short term records, such as one that might be used for the over-grooming, are an excellent tool to isolate and examine a particular situation or behavior. These records will become unnecessary as the situation is resolved.

Amending the plan may be necessary if the evaluation tools suggest that the problem does not improve; adjustments to the methods will be necessary and may require a repeat of the problem solving process.

Program maintenance
A program maintenance plan should prepare for both training and enrichment strategies. Training plans must provide a means to deal with regression, which may be of particular concern for 'Frodo' and research protocol behaviors. A plan should be developed to incorporate new trainers into the program; formally transferring behaviors to new trainers can lessen the chance of regression and inconsistency. Enrichment program maintenance must strive to insure that novelty, use of enrichment, and efficacy are achieved.

CONCLUSIONS

Both of the baboons expressed a similar abnormal behavior, over-grooming, even though they were housed in very different captive settings. Although the hypotheses developed had some similarities, the dissimilarities resulted in different methods to address the same presenting behavioral problem. It is quite possible that in the absence of the information gathering that yielded the hypotheses, this situation would not have been effectively mitigated. This step is crucial to problem solving, and is most often over-looked. The problem solving process provides a framework to examine behavioral problems, assess associated circumstances, and develop strategies to reduce the occurrence of abnormal behavior. Developing questioning skills that facilitate thorough evaluation, while having the discipline to avoid generating methods prior to the assessment, is imperative to successful problem solving. Recognizing the underlying causes of abnormal behavior will help yield appropriate methods to mitigate these. When abnormal behaviors can be diminished, animals are psychologically and physically healthier, and able to better express species' typical behaviors and function within the parameters of their environments.

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