

THE PROBLEM SOLVING PROCESS: AN INTEGRAL COMPONENT OF BEHAVIORAL MANAGEMENT SYSTEMS

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INTRODUCTION

Behavioral Management is a “comprehensive, pro-active approach to managing animal behavior” (Desmond, 1994). The fundamental objective of behavioral management is to provide optimal care for captive animals. Elements of enrichment, positive reinforcement training, facility designs, and operational procedures are used in combination to meet this objective. By combining these elements, a behavioral management system is far more versatile, effective, and responsive than the use of any single component. To meet an objective, one must be able to define it. So, what is optimum animal care? It is providing an environment that meets the physical and psychological needs of the animals. From a management perspective, this means having the ability to access animals daily for husbandry, gain voluntary cooperation in veterinary procedures, move animals between enclosures, and address safety and emergency concerns. To meet psychological needs, the issue of well-being must be addressed.

Captive animal management has changed dramatically over the years, especially with regard to what we now call “well-being”. Well-being can be described as “the ability to adapt - to respond and adjust to changing situations” (Novak and Suomi,1991). This seems like a straightforward phrase, but in actuality, is a complex, multi-dimensional concept that requires diligence to achieve and maintain. When we speak of well-being, we generally refer to addressing psychological, physical, and social needs of animals. Although captivity can never match the complexity of nature, we strive to approach natural environments and/or offer suitable substitutes. One of the most effective means of doing this is through the implementation of comprehensive behavioral management programs.

Bearing in mind that the objective of behavioral management is optimal care, and that behavior is dynamic, one must also be prepared to pro-actively address problems that will develop. In a behavioral management system, a formal problem solving process that is based on the scientific method is used. Through this process, we can develop an understanding of the 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 outline demonstrates the steps used in the problem solving process:

1. Assess the Situation

Gather as much information as possible by asking questions regarding:

- Environmental factors
- Human factors
- Impact of operational and management policies
- Social dynamics
- Animal health issues
- Animal’s psychological state
- Appropriateness of behavior

2. Identify Behavioral Objectives
What do you want the end result to be? Be specific.
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.
 - Identify specific strategies using enrichment, training, operational adjustments, etc.
 - Address any planning considerations
 - Develop final game plan
5. Implement Game Plan
 - Design protocol
 - Conduct training
 - Implement enrichment
 - Make any other adjustments, changes
 - Discuss and assess results
 - Amend protocols if necessary
6. Evaluate Short and Long-term Progress
 - Record keeping
 - Quantify what you can
 - Subjective impressions
7. Behavioral Maintenance
 - Maintenance schedule for enrichment
 - Re-training and regression
 - Transferring behavior to new trainers

In order to demonstrate the application of the problem solving process to virtually any situation with any species, I will illustrate the step by step process with two examples: problems shifting between enclosures; and aggressive behavior directed at conspecifics and humans.

THE PROBLEM- Bears refusing to shift between enclosures

Shifting animals on and off exhibit, between holding areas, and into transfer cages is a universal problem. The inability to quickly and reliably shift animals at any time of day can limit the staff's options for providing animals with optimal well-being, such as enrichment and training throughout the day, and can limit enclosure space during non-public hours. Additionally, staff time and exhibit flexibility will be impacted by the inability to move animals. In working through this problem, we will follow the problem solving process outline.

Step 1: Assess the situation

This step is frequently given the least time and attention even though it is the foundation upon which the rest of the process will be based. Ask questions to gather information to determine how, when, where, and why the problem behavior occurs.

In this example, we have a group of bears who will not reliably shift into holding areas at any time of day. Gathering relevant information revealed the following:

- the holding area is environmentally less desirable compared to the exhibit
- animals must spend the night, generally 14+ hours in holding, so the exhibit is ready for cleaning the next morning
- keepers offer bribes to coax the animals inside
- keepers stay in the area until the animals shift
- once the animals have shifted inside, the keepers rush off to other duties
- shifting occurs on a predictable schedule every day as animals must be on exhibit from 10am to 5pm (outside in the morning, inside in the afternoon)
- the dominant animal is arthritic and sits just outside the doorway

Step 2: Identify Behavior Objective

To have the bears shift inside quickly and reliably at any time of day.

Step 3: Why is this problem occurring?

In this case, there is more than one hypothesis.

- 1) The shift area offers few behavioral opportunities, and therefore is less desirable than the exhibit area.
- 2) The shift area is physically uncomfortable.
- 3) The bears receive the most reinforcement in the form of keeper's time and attention, plus extra treats used as bribes when they refuse to shift.
- 4) The dominant animal prevents the subdominants from coming inside by sitting in the doorway.
- 5) The dominant animal's arthritis makes it difficult and painful to step up and down into holding.

Steps 4 and 5: Methods and Game Plan

Several behavioral management elements, including environmental enrichment, training, and operational adjustments provide potential solutions to this problem. Environmental enrichment strategies aimed at creating a more comfortable and desirable holding area may include, but certainly are not limited to:

- the addition of soft substrate, bedding and nest building materials
- various levels of props and cage furnishings to provide multiple perching, resting, and feeding locations
- the addition of visual barriers that give animals the sense of getting away from each other.

Enhancing the area's complexity and behavioral opportunities may be accomplished by providing browse, toys, and implementing complex feeding devices.

To meet the physical needs of the arthritic individual, a ramp or prop should be added to create much improved and easier access.

Training strategies that complement the above environmental enrichment strategies might include:

- formally training animals to shift on command
- desensitizing animals to the shift area, and to the doors opening and closing
- adjustment of the reinforcement pattern so greater reinforcement of time, attention, and food rewards are provided when the animals successfully shift and are withheld when they refuse.
- Social dynamics may also have an impact on compliance, and can be addressed by training individual animals to separate, and station while other animals enter the shift.

- The training program should then be expanded so that the animals shift at any time of day under various environmental conditions.

To truly address this problem from the behavioral management perspective, one cannot stop the problem solving process with the implementation of enrichment and training. Operational protocols and management practices should be reviewed, and where appropriate, adjusted. Operational adjustments might include allowing animals to be off exhibit during the day for brief periods of time so that training can be conducted at times other than the predictable afternoon shift routine. Once in the holding area, they will be reinforced, and before going back on exhibit, enrichment will be added to encourage activity and species typical behavior, and reduce boredom while on exhibit, especially at the end of the day. This type of flexibility in the schedule will allow for staff to shift animals into holding not only for enrichment and training purposes, but to address safety concerns regarding the inability to move animals in an emergency situation. Additionally, the visitor experience is improved by the animals' increased activity levels as a result of enrichment provided throughout the day rather than just first thing in the morning.

When shifting reliability improves, management options may become more flexible. For example, provided safety needs can be met, animals may spend non-visitor hours on exhibit, in holding, or with access to both.

The opportunity for greater choice and control is thought to be a critical component of psychological well-being (Clarke, et al, 1997). In captivity, the human caregivers limit animals' choices by dictating when, where, with whom they spend their time, and for what periods of time. Therefore, they must take the responsibility to offer animals alternative choices and control opportunities. The flexibility now available for animal management offers tremendous benefits to the animals and the staff that exceed the original issue of solving the problem of shifting.

PROBLEM 2- Primate Aggression

The expression of aggressive behavior is normal. While we would all agree that some aggression is healthy and expected, often in captivity it escalates to abnormal or harmful levels. Aggression between conspecifics can behaviorally limit reproductive potential, result in a decreased quality of life (for the recipient), and generally lead to a reduction of pro-social behaviors. Aggression directed at humans poses problems as well, including: increased risk of injury to the human, agonistic relationship between the human and animal, poor working environment for the human, negative impact on the visitor experience, and a decreased quality of life for the animal. The application of the problem solving process to this situation with an aggressive monkey might look like the following.

Step 1: Assess the situation - How, When, Where, With Whom

Gathering relevant information yielded the following:

- The hand raised alpha male monkey is highly aggressive towards conspecifics during feeding times, but has relatively normal behavior outside of feeds.
- Subordinates often do not get preferred food items, as alpha male dominates these items and chases others away.
- Subordinates will retreat if the male approaches, even during non-feeding times.
- When the male aggresses towards conspecifics, keepers will interfere by raising their voices, using a water hose, or making loud noises in an attempt to distract the male and decrease the aggression.

- The male will often re-direct his aggressions towards the keeper by charging and attempting to grab the keeper.
- At times of agitation the male will exhibit self-directed behaviors such as biting his hand.
- He is at times aggressive towards all people including the public.
- The subordinate animals will not approach keepers when the male is nearby.
- The exhibit is a fairly sterile environment with limited behavioral opportunities.

Step 2: Identify Behavioral Objectives

Reduce aggression directed at conspecifics and humans.

Step 3: Develop Hypotheses

- 1) The male is receiving a high rate of reinforcement each time he successfully steals food.
- 2) The animals are all uncomfortable with keepers and express that discomfort through fear and/or aggression.
- 3) The animals are living in a sensory deprived environment and therefore competing with one another for limited stimulation which occurs during feeds.

Step 4 and 5: Methods and Game Plan

Both environmental enrichment and training strategies will be used to address this situation.

Enrichment within the exhibit would focus on adding visual barriers to give subordinate animals a place to retreat. The aggressive individual may be less likely to chase conspecifics if they are out of sight for periods of time. A schedule of daily and frequent enrichment in the exhibit would be developed and implemented to increase overall sensory stimulation.

Training strategies can be highly effective in reducing the aggression directed towards both conspecifics and humans. To address the aggression towards group members, a technique called cooperative feeding should be implemented. This technique has been successfully used with various taxa including: elephants, marine mammals, carnivores, antelope, primates, and great apes. Cooperative feeding involves the trainer reinforcing dominant animals for allowing subordinates to have access to food, attention, or other desirable resources. Initially, the dominant male will receive a more desirable reinforcer compared to subordinates. He will receive more reinforcement for not stealing food than for stealing it. Over time, the amount of reinforcement given to the male and subordinates will become more equal. Cooperative feeding has been shown to increase pro-social behaviors between socially housed animals, so this technique should be used with various combinations of group members.

The training of incompatible behaviors may be used as a compliment to the cooperative feeding; for example, training the male to sit during feeds is incompatible with chasing another animal. Pro-social and non-aggressive behaviors are also reinforced.

Aggression directed towards humans can be diminished using desensitization. First desensitize the male to the trainer, and then to additional people. Non-aggressive behavior from the male should be reinforced, while withholding attention and other reinforcement when he is aggressive. It is necessary to communicate to the male what in his behavior is unacceptable, and to teach him how to behave appropriately. This can be accomplished by training the concept of touching an object gently (the 'easy' command), first with something that if grabbed or bitten will not be harmful or harmed (like a target), and then generalize this to conspecifics and possibly to the trainer themselves.

Finally, the protocol for human behavior during the male's aggressive outbursts will need to be established. The reaction the male gets from the keepers may reinforce this behavior. Keepers should make all attempts to ignore mild aggression and chasing, interfering only if the subordinates are at risk of injury. The public may also reinforce aggressive behavior. Modifying the viewing area so: the distance between the monkeys and the public is increased, the monkey's view is broken by foliage or other partial visual barriers will help to create an environment where the monkeys are not surrounded by people staring at them, which is a threat to primates. Although the public's reaction and interaction with the animals is sometimes difficult to control, simple facility modifications can be of value.

The reduction of the male's aggression opens a new realm of options for managing this group of primates. The training program can be further developed to gain voluntary cooperation of all animals in the group for routine husbandry and veterinary procedures, to enhance the environmental enrichment program; and to continue to manage and improve social dynamics in the group.

CONCLUSION

The implementation of comprehensive behavioral management systems can fundamentally change the way we manage captive animals. This pro-active approach demands the assessment of animals for appropriate behavior and for the presence of problems. We must have the tools, skills, and knowledge base to not only determine that problems exist, but also to develop methodologies that effectively address them. A thorough understanding of the problem solving process enables us to assess a situation, determine why it is occurring, and develop strategies to address and resolve the issues. Problem solving is an integral and critical component of comprehensive behavioral management that provides us with the framework to accomplish the goals of optimal animal care and well-being.

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