

THE USE OF BEHAVIORAL MANAGEMENT TECHNIQUES TO REDUCE OR ELIMINATE ABNORMAL BEHAVIOR

by

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In the continuing quest to provide optimal care for animals in captivity, the issue of abnormal behaviors is a cause for concern. Whether we call them stereotypic, neurotic, nonadaptive, or atypical, behaviors of this kind are problematic. The consequences of abnormal behaviors range from unpleasant sights for the zoo visitor, as in the case of coprophagy in a resident gorilla, to serious health problems for the animals themselves, such as self-biting in a singly housed rhesus macaque. Animals exhibit abnormal behaviors in a variety of social and environmental contexts: naturalistic and purely functional; large social groupings and singly housed; enriched and sterile. No zoo, laboratory, or breeding facility, it would seem, is exempt. Neither is any species. One approach to dealing with abnormal behavior is through the use of behavioral management techniques. Behavioral management refers to the combined use of positive reinforcement training and environmental enrichment techniques and strategies.

A variety of strategies to address abnormal behavior have been reported, and they tend to fall into three main categories: feeding manipulations including types of food and methods of feeding (Ruempler, 1991; Bloomsmith, 1988); enrichment strategies including environmental manipulations and provisioning of toys and apparatus (Bryant et al, 1988; Fried et al, 1993); and social manipulations (Reinhardt, 1987). These various strategies have produced mixed results. Unfortunately, even in the best-case scenarios, abnormal behaviors are most often reduced, not eliminated. References to the use of training as an intervention for abnormal behavioral problems are still fairly rare (Morgan et al, 1993; Kirtland ed., 1993).

There are good reasons why efforts to reduce or eliminate abnormal behavior have limited success. First, the causes of abnormal behavior are often subtle and complex, and tracking down how and why the problem began can be a task worthy of a private investigator. Second, the relationship between real or perceived stressors and abnormal behavior can result in the behavior evolving into a functional coping strategy for the animal (Gould and Bres, 1986). Once utilized as a coping strategy, these behaviors are self-reinforcing and extremely tenacious in nature. Finally, problem behaviors often occur when people are not present, limiting the opportunity for direct intervention.

So, given these caveats, what benefits can a behavioral management approach offer personnel dealing with abnormal behavior? The biggest benefit is that behavioral management includes a problem solving process based on the scientific method. That provides a means to systematically identify the causes of abnormal behavior, and the tools and techniques to then address those specific causes. The following steps illustrate the process.

1. Collect data.

This is the question-asking phase of the process. Discovering when, where, and how a behavior occurs, and in relation to what, will ultimately lead you to a best guess as to why it occurs, and provide the basis for effective intervention. Relevant information includes: When does the behavior occur? Under what circumstances? Is there a pattern? What outside factors impact the behavior such as feeding or cleaning schedules; medical procedures; the presence of unfamiliar people; activities involving

animals other than the target animal; the presence or absence of cage or exhibit furniture; and so on? What impact do social dynamics have on the behavior such as the social status of the target animal; the lack of compatible conspecifics; the presence or absence of specific group members; and the level of positive and agonistic interactions within the group?

The more objective the data, the better. Formal behavioral studies are ideal, but simple charts for when and how a behavior occurs, filled out by keepers or caregivers as they go about their daily activities, improve the quality of the information.

2. Develop a hypothesis.

After a careful discovery process, a list of potential causes and contributing factors should be developed. Then, it's possible to make a guess as to why the abnormal behavior is occurring. For example, we could hypothesize that disruptive behavior by a chimpanzee like throwing feces or trying to grab caregivers is an attention seeking behavior, whether the resulting attention is positive or negative. Or we could guess that social pressure by the dominant male coupled with a predictable feeding routine are the underlying causes for a low-ranking sea lion regurgitating for extended periods of time after regularly scheduled feeds. The importance of a well-developed hypothesis cannot be overstated. It is the point from which your intervention plan is developed.

3. Identify specific behavioral goals and initiate training and enrichment strategies.

With a clear hypothesis, you can design and implement an intervention plan to address targeted behaviors. The best way to do that, is from a behavioral management perspective. For example, by definition, reinforcement increases the likelihood that a behavior will occur again. In the case of the primate that utilizes disruptive behavior as an attention-seeking measure, look at the situation and determine where the reinforcement is occurring. More than likely, when the animal utilizes the disruptive behavior it receives a great deal of attention, probably negative, but attention none-the-less. Indeed, "displays" put on by frustrated humans who have just been "had", can be quite entertaining. But what is equally relevant is what happens when the animal is not disruptive. Chances are the human walks right by.

According to the hypothesis, human attention is the reinforcement the animal is seeking. So, when are the rewards occurring, and what are the results? Ironically, feces throwing and arm grabbing are being continuously reinforced, while non-aggressive cooperation is not being reinforced at all. The resultant behavior is consistent with the reinforcement pattern. The intervention strategy is then two-fold. First, reinforce the animal when he or she is not disruptive. Stop for a moment, say a few words, offer a small treat or favored toy, reinforce cooperative behavior. Secondly, do not reinforce the disruptive behavior. Turn around, count to ten, or walk away, and then look for any opportunity to reinforce the desirable behavior. This is a straightforward simplified example of a problem-solving strategy. However, it is amazing how successful this process can be in a variety of contexts and with an array of problematic behaviors.

In the case of the regurgitating sea lion, strategies must be devised to address both contributing factors identified in the hypothesis. First, the socialization problem can be dealt with by utilizing a training technique called "cooperative feeding". Operationally it entails reinforcing two events simultaneously: dominant animals are reinforced for allowing subdominant animals to work and receive food or attention, while the subdominant animals are reinforced for being "brave" enough to work and accept food or attention in the presence of these more aggressive animals. In this case, training would focus on the target animal and the dominant male. Second, the feeding schedule should be altered to make

it less predictable and perhaps adding more frequent feeds using the cooperative feeding technique. Finally, enrichment strategies should be implemented in-between and immediately following feeds to provide activity options other than regurgitation.

4. Check the results.

There are no pat answers or guarantees in dealing with behavior, problematic or otherwise. It is dynamic in nature, and so much of what we do is guesswork. However, there are two processes that increase the likelihood of making the right guesses. First, is the quality and extent of information gathered prior to initiating any work - the data collection phase. That, coupled with knowledge of the individual animal, makes a carefully developed hypothesis an educated guess. Second, is an on-going evaluation of information you get back from the activity. Is a particular strategy achieving the results that are anticipated? If the answer is yes, it's a good bet to stay with the current strategy. If the answer is no, it's time to reevaluate and perhaps try something else.

5. Adjust strategies if necessary.

It is critical to maintain a realistic expectation of results, so a strategy is not abandoned too quickly, or sustained too long. If that occurs, the result can be a great deal of frustration and confusion for the animal, which may worsen the problem. When one approach has been tried for a sufficient length of time (a critical judgement call) without the desired results, try something else. Then check results again and continue to adjust strategies as necessary. The bulk of behavioral work is comprised of steps 4 and 5. In tough cases, it may be necessary to try several different strategies before one works. Or often it will be a combination of strategies that finally achieves the desired results. That's why good behavioral management skills include a heavy dose of creativity, innovation, and most important, flexibility.

At this time, most of our work in this area has been conducted with marine mammals and primates. The following are some specific examples of how behavioral management strategies have been utilized to decrease or eliminate abnormal behaviors.

Over a period of seven months a pilot behavioral project was conducted at the Los Angeles Zoo with a resident group of drill baboons (Desmond et al, 1987). The primary goal of the project was to increase positive social interactions and reproduction among the group members (Fig. 3). There was also concern about a sub-adult male who had been introduced to the group six months previously and was shunned by them. He often appeared stressed and exhibited some abnormal behavior. Finally, due to the social dynamics within the group, he and other subdominant animals were inaccessible to the keepers for handling or husbandry purposes .

A thorough information-gathering process was conducted, which included interviews with relevant personnel and assessment of behavioral observation data conducted on the group for the previous two years. Based on this information a hypothesis was formulated. The hypothesis was that a long-term moderate state of sensory deprivation had existed in the exhibit. This shortage of stimulation had resulted in subtle competition among group members which, in turn, inhibited breeding, other positive social interactions, and interest in interacting with the environment. It also contributed to the presence of problematic behaviors by all group members including fence nibbling, self-biting, and examining and eating feces.

Based on this hypothesis, the following behavioral goals and strategies were developed:

1. Increase overall sensory stimulation of the group through regular training sessions.
2. Increase positive social interactions in the group by cooperatively feeding animals in different dyads and triads, reinforcing them for eating and relaxing in close proximity to one another.
3. Increase keeper access to individual animals by establishing feeding stations and targets to control food intake, the movement of animals, and achieve voluntary separation.

Although reducing abnormal behaviors was a goal, the training strategies were developed to address the underlying causes of these behaviors - insufficient sensory stimulation, and socialization problems. Operationally, the young male was often paired with an adult female for cooperative feeding sessions. She was reinforced for "staying" while he was given food and personal attention. He learned to gently touch the trainer's hand and arm, approximating grooming. He slowly became less nervous and agitated when eating with the female, and increasingly more relaxed. Prior to this project, he had been observed biting his leg in a manner and frequency that indicated the potential onset of neurotic behavior. Keepers familiar with the exhibit reported a significant reduction in the observance of the behavior throughout the training project.

Documented results showed significant increases in all forms of positive social interactions during and following the project (Cox, 1987). Reduction in all forms of abnormal behavior was also achieved.

Another project that illustrates the process of addressing abnormal behaviors involved a captive born bottlenose dolphin named Pepe (Laule, 1984). Living with a couple other young animals, two separate attempts were made to integrate him into a larger social grouping of show animals. These attempts were unsuccessful, and in the process he developed several abnormal and problematic behaviors. These included an erratic appetite and attention span; biting people during unstructured play sessions; habitual regurgitation; and chronically swallowing objects that fell into the water.

In researching Pepe's situation and history, several factors were identified which may have contributed to the development of these problem behaviors. First, there were health-related problems, including the presence of small ulcers which could have affected his appetite and energy level. He had also sustained an injury to his peduncle area which caused occasional swelling, and which was under constant scrutiny. This was later diagnosed to be osteomyelitis and a source of his chronically high white blood counts.

Another factor was his submissive behavior. Every time he was introduced into the larger social group, despite his greater size, Pepe always aligned himself with the subdominant males and quickly became the lowest ranking animal. In that weak position, pressures were placed on him that he was apparently unable to cope with.

Differences in training regimen from one condition to the other may have also been a factor. These changes included the loss of his one primary trainer and subsequent replacement by four new individuals. Behavioral charts indicate he was worked inconsistently, less often than before, and with less challenging work. In the period of almost two years, he learned only one new behavior while losing several others. He also received less personal attention.

One last factor concerns the age at which Pepe was separated from his mother and the impact that may have had on his subsequent development. Compared to the other five dolphins born at the park, Pepe's separation from his mother, at eighteen months, was at a substantially earlier age. The average age of the other five animals was twenty-nine months, with the youngest being twenty-six months and the oldest thirty-three months.

Although I found no definitive research or conclusions on optimal age of separation, Herman notes in his book *Cetacean Behavior*, "Close affiliation between the newborn and mother continues for an extended period of time and dependency may persist even into adulthood" (Herman, 1980). Whether this had an impact on Pepe's later problems is uncertain but is nonetheless noteworthy in light of the extensive research done by John Bowlby on early separation of young children from their mothers and the far reaching effects it has on personality and behavioral development (Bowlby, 1973).

Once the potential causes and contributing factors were identified, a variety of strategies were employed to address each of the problematic conditions. Because of his delicate health, he was the first dolphin to be trained to present his tail flukes for blood sampling, and to accept a stomach tube, and fecal tube insertion for sample collection. With his voluntary cooperation, it was easier and less stressful to perform these procedures and monitor his health on a regular and frequent basis.

To help stabilize his eating habits, and to curb his throwing up, different feeding schedules were employed. For a period of two weeks, Pepe was fed twice nightly to increase his appetite and weight. Little change was noted. Next a schedule of eight feeds per day was begun which continued for approximately two months. His normal diet was fed in small amounts over the course of the day, with at least three of the feeds being training sessions. Accurate charts were kept, listing the time of day, number of pounds fed, and the amount, if any, of regurgitation seen. This provided a clear picture of Pepe's eating and regurgitating habits, and the evidence of change when it did occur. Specific intervention for the regurgitation included using a verbal "no" and short time out when Pepe would regurgitate during or after his feeds. Extra time was spent with him immediately following a feed during which time he was rewarded with attention and play for not regurgitating.

To address both the problem biting and his habit of swallowing foreign objects, desensitization work was initiated to train him to allow us to touch his mouth, tongue, and teeth, without biting. At the same time, he was trained to retrieve safe objects like paper cups or paper towels, and then let us open his mouth and remove the objects from his mouth or throat. Third, water work began with Pepe, reinforcing him for gentle play and non-biting behavior. The reinforcement was high at first, then slowly reduced until reinforcement was no longer necessary at all.

To assist in his socialization, he was specifically worked with each of the dominant animals. Pepe was encouraged and rewarded for participating in these sessions, while the dominant animal was rewarded for allowing him to do so. Conversely, if Pepe did not work, reinforcement was withheld from the other male until he did.

Other behavioral strategies included maintaining consistency of trainers, keeping the number of daily training sessions high, and balancing sessions between individual work and work with other animals. Special care was also taken to provide Pepe with a lot of personal attention and support (Fig. 4).

Finally, Pepe was moved to a different show area with four other animals. From the first day, consistency in trainers was maintained by having myself or another familiar trainer with him every day.

For the first two weeks we spent all of our extra time with Pepe, just sitting with him, rubbing him down, or playing. For two months we were present during shows and training sets to work exclusively with him. Concurrently, the other animals were reinforced for allowing Pepe to work, and any positive social interactions were reinforced.

The results of these strategies were quite encouraging. Pepe was successfully integrated into the show. Socially he appeared comfortable, interacting with all of the other animals and developing a strong bond with the female pilot whale, each displaying imitative behavior learned from the other.

His biting stopped completely. He would allow us to open his mouth and remove any objects. Rubbing his mouth and tongue became his favorite tactile behavior. In fact, Pepe's overall responsiveness to people increased tremendously. He would now seek attention and interact gently and non-aggressively. His retrieval work improved so that he would voluntarily return an item he found to the trainer or retrieve a specific object we pointed to.

His throwing up almost completely disappeared, with only an isolated occurrence being noted. His appetite and attention span, although occasionally erratic, improved greatly overall. He maintained his repertoire of behaviors and continued to learn others.

The examples just described were ambitious attempts to address and resolve a complex set of problematic behavioral issues. These efforts required an investment of time and effort that may not be practical or possible in many situations. However, what is applicable to every situation is the process. It doesn't have to be complicated and tedious, but to some degree it has to be done. Abnormal behavior is not a simple problem, and there are rarely simple solutions. The greatest success in dealing with abnormal behavior will come from addressing the causes of the problem, not just the problem behavior itself. With that approach, there are often simple things that can be done to positively impact the situation to some degree (Bayne et al, 1993).

Behavior is an acknowledged indicator of well-being (Petto et al, 1990). When we strive to provide optimal care for captive animals by providing for their physical and psychological well-being, reducing or eliminating abnormal behavior is an issue that cannot be overlooked or shortchanged.

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