

## ADDRESSING ANIMAL WELFARE FROM A BEHAVIORAL PERSPECTIVE

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### Introduction

What is animal welfare? What does it look like? What is quality of life? How does it feel? What is psychological well-being? How do we define it, recognize it, achieve it, improve it, sustain it? How do we begin? Where do we go from here? How do we know when we're there?

It's been several years since the Animal Welfare Act was revised to mandate that facilities housing nonhuman primates provide for their psychological well-being. After a great deal of attention and tremendous effort invested by a wide array of scientists and professionals, are we substantially closer to knowing what that means, or doing anything truly significant to address it? Environmental enrichment is now a household word in the zoological community. yet overall are captive animals better off? Webster defines well-being as 'the state of being happy, healthy, or prosperous'. How can we possibly know when an animal has achieved this state?

Tough questions with no easy answers. Yet as caregivers, managers, and displayers of captive exotic animals, it is our moral obligation to address this dilemma. Most if not all zoo mission statements include the goal of providing quality care for the resident animals. Whether specifically stated or simply implied, there is a recognition of a responsibility to address, in some meaningful fashion, the issue of animal welfare. If, as Mench and Kreger (1995) suggest, current public views on animal use include 'that they should experience a good "quality of life" while in captivity, then the public supports efforts in that regard. But what exactly does quality of life mean? It is certainly more than sparing an animal pain and suffering, and something less than providing a life free from all stress or risk.

Novak and Suomi (1991) have suggested that psychological well-being be generally defined as "the ability to adapt--to respond and adjust to changing situations." To assess well-being, they recommend using a combination of observations from at least two of the following variables: behavior, health, reproduction, and longevity. The definition may not be perfect, but the approach has merit. Focusing our efforts on tangible factors, as they suggest, may be the most direct course to building a real image of what well-being looks like. As that image gains focus and clarity, so too will a definition. This paper will focus on one of the suggested variables. the behavior of the animals.

Desmond (1994) suggests that in pursuing animal welfare. the behavior of the animals "should be the lens through which we focus our efforts." To that end, this paper will explore animal behavior as a variable of animal welfare in relation to three areas: (1) animal care and husbandry; (2) facility design and use; and (3) the visitor experience.

### Animal Care and Husbandry

The comprehensive use of positive reinforcement training has revolutionized the way we care for captive animals. By using recognized techniques, many tangible results and benefits can be subjectively identified. Animals are desensitized to frightening or painful events, like getting an injection, so the events become less frightening and less stressful. Animals gain the opportunity to voluntarily cooperate in these procedures, rather than being forced to do so. With a greater accessibility to more cooperative animals comes the opportunity to initiate preventative medicine practices and to explore techniques previously seen as less practical on a routine basis such as ultrasound or tube insertions for artificial

insemination. With this cooperation comes a reduction in the use of restraint and anesthesia. Many husbandry and veterinary procedures can be implemented with less disruption to all animals, by reducing the need to separate animals from their social groups for many procedures. Finally, the level of stress associated with these procedures can be significantly reduced.

This would appear to be compelling evidence, albeit circumstantial, that husbandry training is good for animals. Subjectively, I can look at the behavior of a great ape calmly presenting an arm and accepting an injection and compare that to the behavior of that same animal racing around the cage in an agitated state trying to avoid a dart gun pointed at him or her, and state emphatically that the animal's welfare has been positively impacted with husbandry training. Although that opinion is a subjective one, it is shared by a growing number of keepers, curators, and veterinarians. In fact, it is difficult to imagine a convincing argument against husbandry training. Of course, we should continue to develop the objective data to support this subjective, logical view.

There are methods of measuring the impact of husbandry training. We can use physiological measures like a comparison of cortisol levels in animals that are voluntarily cooperating in veterinary procedures to cortisol levels in animals being restrained or anesthetized for the same procedures. Behavioral data can be collected during the same two conditions and then correlated to specific states. We can compare the amount of time an animal is isolated from its group for medical work, with training and without. Or we can compare the level of compliance and reliability in routine husbandry procedures for animals in both conditions. We can simply count the number of sedations an adult chimpanzee used to go through to collect the monthly blood samples necessary to monitor a medical condition (12) and compare it to the number of sedations required to collect those blood samples now that the animal has been trained to voluntarily cooperate in a blood draw (0). This information, coupled with the initial subjective impressions that drove the actions taken, can not only make a case for husbandry training, but it can be used to begin to build a profile of animal well-being.

### **Expression of Species Typical Behavior**

Just as the management strategies we use with animals directly impact welfare, so too do the environmental elements we provide captive animals through habitat design and enrichment. In fact, how an animal uses or doesn't use a particular space may be a valuable indicator of well-being. Indeed, a real litmus test in determining whether an exhibit "works," is how much the animals use it. All too often the result is less than ideal, with problems ranging from excessive inactivity to stereotypic or abnormal behavior. In short, it is not enough just to provide environmental features for the expression of purposeful behaviors. It is equally important, and a greater challenge, to find ways to encourage this desirable behavior to occur. As Mench and Kreger (1995) put it, we must place emphasis on designing zoo environments that meet needs that animals *themselves* perceive to be important." If we can do that, we will have come along way in addressing captive animal well-being.

Perhaps the best analogy is to look at the basics of training an animal to perform a behavior using positive reinforcement. The process has three parts: 1) a stimulus or cue, 2) the performance of the behavior, and 3) the reward or reinforcer. It is the last part, the reward, that is responsible for increasing the likelihood that the behavior will occur again. Whenever I train any behavior, from a dolphin performing a forward flip, to a chimpanzee voluntarily cooperating in a blood draw, to a great extent it is the reinforcers I use, and how I use them, that ultimately determine if I will get the desired behavioral results.

Now look at this same paradigm in nature. A cat hears a rustle in the bushes - the cue. He moves quietly through the brush, crouches in position, and pounces - the behavior. He catches a vole and consumes it - the reward. Now he won't get rewarded every time, but he must get reinforced often enough to maintain the behavior. This logical progression, with varying degrees of subtlety, applies to any behavior that occurs. A raccoon wades into water because of the possibility of catching a crayfish. A primate climbs to the top of a tree because it makes a safe resting spot. A bear pulls apart a rotten log because there might be some edible insects inside. These are all examples of purposeful behaviors that continue to occur because there is a good enough reward, often enough, to maintain them.

Now look at this same paradigm in a naturalistic zoo exhibit. There are very few cues - rustling bushes, warning calls, or unexamined rotting logs - that have significance to wild animals. There are far too few rewards to be gained - prey to catch, predators to successfully avoid, berries to pick, roots to dig up. Consequently, very little of the natural behavior that is dependent on these cues and rewards occurs. Furthermore, the simple fact that captivity provides so many of the basic needs or reinforcers of animals - food, shelter, protection, social contacts - without the need to work for them, the very basic bias for conservation of energy comes into play. In a very real sense, many of our animal management practices reinforce a sedentary, inactive lifestyle.

So, how can we create exhibits that encourage species typical behavior? First, I would suggest that when we design zoo habitats we confront the same issue animal trainers do - how do we make it worthwhile for these animals to engage in desirable behaviors? One answer, I would suggest, is to take ethological information on the species and turn a naturalistic exhibit into a habitat simulator. A place where cues and rewards are cleverly built into the environment in many unpredictable and changeable ways. These cues and rewards must be consistent with the sensory modalities each species relies on such as sound, sight (movement), or smell. Operationally this requires planning and building exhibits that include extra features such as a layer of built-in conduit and universal attachment points throughout the facility that can support a wide range of apparatus, sound equipment, and mechanical devices. Possible apparatus include: various feeders to deliver food items at the site as in honey stumps and termite mounds, feeders that scatter, catapult, or drop the food; spritzers to release scents; servo switches to rustle bushes or other vegetation; and speakers to input different sound cues. At the same time, an aggressive enrichment program must be implemented and maintained that provides an overlay of objects and activities that are related to species-typical behaviors.

Studies on the relative enrichment value of different strategies have shown repeatedly that variety and novelty are key components in increasing the time animals spend engaged in the activities. Mench (1994) writes that the presence of novel aspects of environments increases investigative or exploratory behavior. Carlstead (1991) reports that maintaining multiple objects in a bear exhibit helped to counteract general habituation to new objects. Based on this information, only by providing multiple items, that can be turned on and off, swapped out, moved around, and expanded regularly will we be able to significantly increase species-typical behavior.

Finally, it is important to address animal welfare on a 24-hour basis. In most cases we interact with captive animals for only a third of their day. But what is their life experience during the other 16 hours? In many cases, it means spending that time in off-exhibit holding areas, which are traditionally, and remain today, much smaller, more sterile environments than habitats seen by the public. When viewed in that light, it is apparent that to enhance animal well-being, holding areas should be designed to serve as the primary housing areas that in reality they are. That means making them pleasant and interesting areas with soft substrates, diverse environmental features, and apparatus that can be run by computer

or on a simple timer. It seems logical to assume that animals that engage in desirable behavior, even when they are not in public view, may be likely to spend more time overall performing purposeful behaviors. That requires more resources in behind-the-scenes facilities, but if animal welfare is a serious goal, this must be done.

### **Animal Welfare and the Zoo Visitor**

According to Mench and Kreger (1995), -Zoo visitors sometimes experience uncomfortable and contradictory feelings when they stand outside of an animal exhibit, especially if the animal appears to them to be “bored” or “unhappy,” As zoo professionals we can insightfully evaluate the behavioral measures discussed thus far to assess and address the welfare of the animals in our charge, but how does the zoo visitor evaluate animal well-being? The Roper poll commissioned by Sea World in 1992 reported that 74% of Americans are strongly concerned about how zoos, aquariums, and animal parks treat captive animals (Kreger and Mench, 1995). A visitor study conducted by People, Places & Design Research for Marine World Africa USA evaluated answers by children to a “projective” question on their perceptions of animal life in captivity. Of the three principal types of answers to the question, 38% referred to “the stress of the experience” of life in captivity.

Studies looking at the attractiveness and holding power of exhibits have shown repeatedly that animal activity is a key variable In Increasing the time people spend at an exhibit (Bitgood et al, 1985; Hodges, 1978; Martin and O'Reilly, 1982). Furthermore, the People, Places & Design Research study concluded that, seeing animals in action is an important foundation for appreciating animals and being impressed by how they move and what they can do.

Subjectively, it has been my experience that zoo visitors respond positively to concepts of environmental enrichment and husbandry training. With the invaluable guidance of a visitors study expert, Susan Norrlandia, and the cooperation of three zoos, the Toledo Zoo, the San Antonio Zoo, and Northwest Trek, we designed and conducted a two-part study to look at (1) the length of time visitors spent at four different exhibits and (2) their perceptions of the animals they had just viewed. Data was collected in two conditions, when there was enrichment present, and when there was no enrichment present. Animal activity was noted by observers during the data collection period and categorized as either active, inactive, or stereotypic. Exhibits consisted of (1) 1.0 polar bear, (2) 1.1 American black bear, (3) 1.0 black mangabey, and (4) 1.1 American black bear. The exhibits ranged in style from traditional concrete and moat to over one acre of natural forest.

A random sample of adults were timed from the moment they entered a designated viewing area, until they exited the area. These individuals were then approached and asked if they would be willing to fill out a very simple questionnaire on the animals they just viewed. They were asked to answer the questions without looking at the exhibit again. Sample size ranged from over 200 for the mangabey, polar bear, and black bears in the traditional exhibit, to 100 for the black bears in the naturalistic exhibit. Preliminary results indicate several interesting points.

First, the holding power study showed significant differences between the amount of time visitors viewed the exhibits, with the greatest difference related to activity states, that is active versus inactive, rather than enriched versus unenriched. This supports previous data on the holding power of active animals. Second, it appeared that enrichment consistently increased animal activity. The only significant variable (defined by having over 20 respondents) in the enriched condition was an active state. The only significant variables in the unenriched condition were inactive or stereotypic.

The questionnaires also indicated some qualitative differences in visitor perceptions of animals in different conditions. Preliminary results indicate that visitors were consistent in describing animals in an enriched-active condition, choosing the terms "active," "alert," "busy," "content," "relaxed," and "comfortable." In the two cases where the inactive state was significant, the results were more varied and the undecided option was greater. Generally, visitors chose the terms "active," "alert," "bored," "content," "relaxed," and "comfortable," to describe the animals; however, further analysis is required. Finally, some of the most surprising results were related to stereotypic behavior. In the case of the black bears in the traditional enclosure, most visitors chose "active," "alert," and "bored," but there was a great deal of variability in the last three questions. In the case of the polar bear in a similar enclosure, respondents chose exactly the same terms used for animals in an enriched-active condition. One factor of note, the black bear stereotypy was a land-based pacing, while the polar bear stereotypy was a water-based swimming pattern. Further analysis of all the results is underway, and further studies are planned.

Three issues are raised from these preliminary results. First, was the questionnaire effective or are revisions necessary? Second, are visitors perceiving normal and abnormal behavior as similar conditions. What are visitors learning about the animals? Finally, although the public may be concerned about the way zoos treat animals, we may not be able to rely on their perceptions to direct our efforts towards addressing animal welfare. In the case of stereotypic behavior, we must aggressively pursue methods to reduce abnormal behavior simply because it is best for the animals.

### **Conclusion**

Providing for the well-being of captive animals is a complex task. Behavior as a variable of well-being provides one means of assessing and addressing animal welfare on an on-going basis. It also provides us a means of evaluating the public's perception of how good a job we are doing. We may never have a definitive picture of what well-being or quality of life is for all captive animals. But we must continue to pursue a proactive approach to discovering the individual pieces of that elusive whole.

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