Development of the Human-Research Animal Bond and Its Impact on Animal Well-being

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Abstract

For millennia, relationships have developed between animals and people through the context of work, sport, companionship, or some combination of these activities. Often, a bond between animal and human results that is based on affection and/or respect. In the research environment, it is not uncommon for a bond to develop between the investigator, veterinarian, and/or animal care technicians and the animals with which they work; and such a bond can be just as strong for a mouse as it is for a dog. Circumstances that foster the formation of these bonds include the close and frequent contact between the researchers and their animals during studies or during training of animals to particular tasks, the long periods of time many research animals live in the facilities (often years), the dependency of the animals on the animal care staff for their daily needs, and the veterinarian/patient relationship, which is not unlike that of private practitioners and client-owned animals. In addition, overlaying the fundamental relationship with the research animal are special bonds that can form with certain animals. Among those that engender a special attachment are animals that are particularly friendly, amusing, or intelligent; animals requiring extra supportive care; animals that show courage; animals that represent a milestone in a particular scientific advancement; and animals that reflect humans' own strengths and foibles. The development of these relationships is enriching to both personnel and animals inasmuch as people who care about their animals are committed to promoting and ensuring the well-being of those animals.

Key Words: animal well-being; environmental enrichment; human-animal bond; training

"It's proper to make the distinction
When explanations are given;
Between those who care as a hobby
And others who care for a livin'."

Baxter Black, 1986
"Animal Lovers"
Coyote Cowboy Poetry

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Personnel who work in animal research facilities are occasionally the targets of claims that they are unfeeling. However, Baxter Black (1986) more accurately captures the essence of animal facility staff as individuals who do their jobs, in sometimes difficult circumstances, because they care. It is not only an interest in scientific endeavors that leads animal research facility staff to choose a career in the field, but also a regard for animals. This caring attitude characterizes the ideal animal facility employee; however, this approach also makes it difficult for these individuals to work in this special environment.

Although much has been written about the human-animal bond, both in descriptions of relationships between people and their pets as well as in animal-assisted therapy programs, catalysts for the bond that develops between research animals and the staff that work with them have received attention only recently (Arluke 1990). As described elsewhere in this issue (Chang and Hart 2002; Davis 2002; Herzog 2002; Iliff 2002; Russow 2002), the bond that develops between staff and animals in the laboratory involves a variety of species used in diverse projects with differing outcomes for the animals.

The following description of the circumstances in which bonds develop in the laboratory is not intended to be all inclusive. In some research studies, such as those in which the animals are infected with a highly zoonotic agent, it may be virtually impossible for a relationship of any substance to develop between staff and the animal subjects. In other cases, personnel will allow their feelings for the animals to deepen only to a limited degree as a self-protective mechanism, inasmuch as there is an obvious personal cost to the individual who becomes emotionally attached to laboratory animals that may eventually be euthanized.

Tannenbaum (1987) argues that a true bond can only be defined as bidirectional, which he describes as a relationship that benefits both parties and is mutually voluntary. I believe that a bond may be unidirectional, rather than solely bidirectional. For example, a staff member may become particularly attached to an animal that shows no special regard for that individual. In addition, an animal (e.g., a dog) may actively seek or initiate a relationship with animal facility personnel as a result of its exposure as a puppy to a socialization program that included people. Although a dog's attachment to people can occur throughout its life, a dog socialized during the sensitive period (beginning at approximately 3 wk of age and peaking at 6-8 wk) (NRC

1994; Scott and Bronson 1964) may be especially prone to establish relationships with its care givers.

Regardless of whether the bond is bi- or unidirectional, a strong contributing factor to the development of a bond is commitment to the animal. Staats et al. (1999) propose that the "cognitive intent to act in ways directed toward the well-being" of the animal, which they define as commitment, has a significant role in the relationship that develops between a person and an animal (p. 483). This commitment, the authors suggest, is measured by sustaining the relationship despite personal effort, time, money, and patience. The caring attitude for animals displayed by laboratory personnel, and articulated so well by Baxter Black (1986), clearly fulfills these criteria.

How the Bond Forms

Caring for Animals

The job title applied to individuals with the most frequent and intense contact with research animals—caretaker or animal technician—might be described more appropriately as "caregiver." The very nature of this position—provision of care—often leads to the formation of a relationship or bond between the individual and the animals. A bond is commonly formed when a caring or nurturing pattern is established between human and animal (Beck and Katcher 1996). The animal needs the person for basic resources such as food, water, bedding, health care, and—depending on the species—companionship and affection. The dependency of the animal on the human, according to Beck and Katcher (1996), is not unlike that of a child on its parent. Indeed, they go so far as to say that, "Dogs... more than any other animal... have been shaped genetically to look and behave like juveniles" (p. 42).

A bond may also be established between facility personnel and some laboratory animals because, as Hart (1996) has observed, the physical similarities between human and nonhuman primates can lead people to identify with nonhuman primates in an emotional manner. In addition, neither infants nor animals have words to express their needs, and so it is left to the caregiver to anticipate and provide for those needs. This process, in turn, requires the person to understand the animal(s) in his/her care. Consequently, the greater the understanding of the animal's behavior, the more likely that understanding will lead to the development of a bond between human and animal.

Recognizing Laboratory Animals' Individuality

Another factor contributing to the formation of a bond between research personnel and laboratory animals is the amount of time spent together. The longer an animal resides in the research facility, the more likely staff will develop a bond with it. For example, researchers who use nonhuman primates in test paradigms where the individual and the animal are in close physical proximity over protracted periods of time often refer to the "personalities" of those animals and frequently refer to them by name.

The concept of naming laboratory animals constitutes further evidence of an individual relationship between the animals and the staff. Sometimes the animal care staff (veterinarians or caregivers) confer names, and sometimes researchers name the animals. Even an animal's identification number can become a name, as in reported work with nonhuman primates whose identification numbers were 1, 10, and 14 and who had been with a researcher for more than 30 yr (Bayne 1985). Those animals' names were equivalent to their numbers.

Names given to animals frequently have some relevance to the person or a trait of the animal. People may name research animals after friends, family members, or famous people (e.g., a dog named "Betty Davis" because of her beautiful eyes), or fictitious characters (e.g., a rodent named "Stuart" after the famous mouse). Alternatively, they may choose names that reflect the animal's temperament (e.g., "sweetie," "Mr. Macho"), appearance (e.g., a particularly handsome primate was named "Robert" after Robert Redford), or a quirk (e.g., a primate who was known to be an escape artist from his cage was named "Houdini," and another particularly inquisitive primate was called "Curious George").

Segal (1989) encourages using names for laboratory animals, rather than numbers, and the relative pronoun "who," rather than "that," to increase recognition of the individuality of each laboratory animal. Segal relates that as she became aware of each animal as an individual, she concomitantly recognized similarities between the animal and herself. In other words, recognition of each animal's uniqueness through increased familiarity with the animal forged a bond. Arluke (1990) has proposed that animals' physical characteristics (e.g., appearance, pregnancy, infancy), perceived pain or distress, and certain behaviors result in staff members' increased attention to those animals, their individualization of those animals, and the resulting formation of a bond.

Training

Laboratory animal training for routine procedures can reduce animal and personnel stress. Reese (1991) has described the resulting stress reduction as key to the "trust and friendship" between animals and personnel. This training generally necessitates additional time spent with the animal as well as close proximity between the individual and the animal. The task required by the animal may be an element of an experimental procedure. Examples include adapting swine and sheep to a cloth sling for restraint purposes (Panepinto et al. 1985); training rats to perform a number of different behavioral tasks such as lever pressing and moving through a maze; training nonhuman primates to use a "joy-

stick" in visual task-oriented projects; cooperating in venipuncture (Reinhardt 1991), vaginal swab sampling (Bunyak et al. 1982), urine collection (Laule et al. 1996), or cerebral spinal fluid sampling (McCully et al. 1990); and training horses to use a treadmill for exercise physiology studies. Staff may also train animals to perform certain actions to facilitate husbandry procedures. For example, they may teach dogs to "shift" from one portion of an indoor/outdoor enclosure to the other so that staff can clean the enclosure. Similarly, nonhuman primates are trained to move from their home cage into a transfer cage to facilitate routine cage sanitation procedures and to avoid the necessity of anesthetizing the animal to manually remove it from the soiled cage. In these circumstances, the trainer often can distinguish differences in performance among animals, including the speed at which the animal learns the task, the degree of cooperation the animal exhibits, the most effective rewards, and which of the trainer's cues produce the best learning results. In this way, the elements of proximity, longer temporal relationship, and enhanced understanding of the animal act synergistically to foster a relationship between the trainer and the animals.

Training of the animal care staff in animal behavior is a key component to improving job performance and, more importantly, enhancing animal well-being. For example, personnel who have a sound understanding of the species-typical behaviors of the nonhuman primates with whom they work will be able to use that knowledge to expedite animal training programs, avoid behaviors that may be interpreted by the animals as threatening (e.g., direct staring/eye contact, jerky arm movements), and increase their sensitivity to changes in an animal's behavior that may indicate an alteration in that animal's physical or psychological well-being. The training should include the general behaviors for the species as well as the specific behaviors expressed by individual animals (Fouts et al. 1994). This increased understanding of the animals can lead to empathy for them, which builds a bridge between staff and animals. The editors of Webster's Dictionary (1999) recognize that understanding is essential to the development of a relationship. They define understanding as a "sympathetic awareness," implying an affinity or bond between two parties based on their definition of the word sympathy.

Talking to the Animals

For training programs to be successful, there must be effective communication between the trainer and the animal. In general, a positive reinforcement paradigm will promote achievement of training goals. However, it is not uncommon for the trainer also to use verbal commands and praise during behavioral shaping sessions. Staff may also use verbal communication as they would with a pet animal. For example, staff at one facility successfully use the command "NO!" to stop or reduce the occurrence of undesirable (e.g., aggressive) behaviors in nonhuman primates (S. Iliff, Merck Research Laboratories, Rahway, New Jersey, personal communication, 2001).

Human-animal communication also occurs outside the context of training regimens. For example, staff provide special food treats to the animals while using species-relevant visual and auditory cues that signal behaviors or intentions. As little as 6 min of staff time each week spent handing out food treats to rhesus monkeys while the individual exhibits submissive or affiliative behaviors (e.g., lipsmacking and casting the eyes down) results in a reduction of stereotypic behavior and an increase in species-typical behavior for a protracted period of time (Bayne et al. 1993).

Communication with animals should not be restricted to the larger laboratory species. Hart (1996) notes that a newsletter on pet rats included in its first issue a discussion of teaching a rat to come to its name. Although the capacity for laboratory animals to understand verbal communication has not been defined fully, there is sufficient anecdotal information to suggest that verbal communication can be effective with a variety of animals. Clearly more research is needed in this area with other laboratory species.

It should not be construed that laboratory personnel principally talk to the animals in their care only during training sessions. Indeed, the fact that staff frequently name animals indicates that names are serving as verbal reference points—not only between personnel discussing an animal but also between the staff member and the laboratory animal. The staff member may say something to the animal while handing it food treats, cleaning its cage, or working with it during a clinical or experimental procedure. Veterinarians commonly speak to the animals they are handling and offer the animals some comfort by using a soothing tone of voice. Beck and Katcher (1996) have shown that much of the verbal communication between people and animals is in the form of simple questions—asking how or what the animal is doing, whether it is hungry, or what it wants. Frequently the pitch of the voice is similar to that used when talking to an infant. Interestingly, research has shown that talking to animals can reduce a person's stress and blood pressure (Friedmann et al. 1983). The sharing that occurs naturally during communication and the enhanced feeling of well-being experienced by individuals talking to animals are additional building blocks for a bond to form between staff and laboratory animals.

Role of Regulations and Guidelines in Fostering the Bond

Since their inception, federal laws and policies aimed at protecting animals have reflected the public's concern for the humane treatment of animals. Laws and policies designed to protect laboratory animals frequently do so in ways that facilitate the creation of a relationship or bond between the animals and facility staff. For example, Principle IV of the US Government Principles for the Utilization

and Care of Vertebrate Animals Used in Testing, Research, and Training (IRAC 1985) states that it should be assumed that a procedure considered painful to a human should also be considered painful to an animal. Not only does this statement establish a baseline for the appropriate use of analgesics, but it also encourages scientific staff to identify their own feelings with those of animals.

Among the 1985 amendments to the Animal Welfare Act was a mandate to provide for nonhuman primates an environment that promotes their psychological well-being. In subsequent years, the scientific community and different animal care staff have developed and implemented numerous methods of providing environmental enrichment. In general, these methods have resulted in increased interaction between the animals and their caregivers. Staff may be engaged in maintaining the enrichment devices and in monitoring the interactions of the animals with the enrichment devices to ensure animal safety and to verify the efficacy of the enrichment technique(s). Overall, an enrichment program requires more staff time with the animals; however, including personnel in the design of enrichment techniques is an important element of the behavioral management program because this activity can be stimulating and mutually rewarding for animal care staff and animals (Roberts 1989).

It is also possible to assign the care staff the responsibility for assessing the results of their enrichments, which further increases the time personnel and animals spend together. Indeed, Roberts (1989) encourages inclusion of this evaluation time in the care staff's work schedule so it is not displaced by other duties. Staff may vary enrichments to accommodate the specific needs manifested by individual animals and learn which animals use which devices (i.e., the animals' preferences). These staff members have such a thorough knowledge of the animals in their care that they can describe and distinguish the interactions of individual animals with their enrichments. For example, Bayne and Dexter (1992) note that grooming of laboratory chimpanzees by facility personnel using a hairbrush, toothbrush, or emery board can be "comforting and enriching" to the chimpanzee and can foster a bond with the staff member, with different animals showing varying preferences for the different grooming techniques. When animals are housed in pairs or groups for purposes of social enrichment, animal care staff similarly know which animal is dominant and which is subordinate; and they usually know when the relationship between animals is changing. As mentioned above, this depth of understanding contributes to bond development. With increased familiarity of individual animals, there is often an associated increase in a perception of "ownership" of the animals by their care staff. It is common in an animal facility to hear animals in a room referred to as "my animals" or the animals in "my room." Such terms reflect the facility staff's vesting in or attachment to the animals.

The development of bonds between individuals and research animals can even extend beyond facility personnel, as demonstrated by the Alliance for Primate Enrichment by Seniors ("APES") program at the Yerkes Primate Research Center Field Station. This program involves residents of a nursing home in the preparation of enrichment food treats. In return, the ambulatory seniors tour the facility and become acquainted with the animals they are helping, and the nonambulatory seniors view videotapes of the animals consuming the food treats. The founders of the program report that the enrichment program is the most popular activity at the nursing home and has increased the residents' "sense of self-worth and purpose" (Megna and Ganas 2001).

The importance of providing laboratory housing environments that facilitate the expression of species-typical behaviors for all vertebrate species is reflected in the *Guide for the Care and Use of Laboratory Animals* (NRC 1996). The provision of environmental complexities for frogs, rodents, cats, dogs, and numerous other laboratory animal species is recommended in the *Guide*. Initially, sources of enrichment devices for these animals were limited to commercial distributors of pet toys. More recently, a cottage industry has evolved of vendors in the laboratory animal science field who sell enrichments specific to a variety of laboratory animal species and environments. Many facility personnel, however, continue to purchase toys or food treats from the same store where they purchase these supplies for their pets, and the toys provided laboratory animals are often identical to those offered to pets at home. Some staff members donate toys their children have outgrown to particular laboratory animals; they may even scour yard sales and flea markets for inexpensive but appropriate toys for the animals in their charge. Many care staff design and custom-make enrichment devices suitable for the housing conditions of the animals at their institutions, often on the individuals' time outside regular work hours. Additionally, some care staff provide appropriate common household items such as cardboard boxes, empty plastic soda or detergent bottles, and telephone books to some species of primates at little or no cost to the institution (Bayne and Dexter 1992). Similarly, metal washers and aluminum soda cans are used to enrich rabbit environments, and cardboard tubes may be given to some rodents.

Often, staff are sufficiently knowledgeable about the animals' individuality that they can identify the animal best suited to test out a new enrichment device based on the animal's ability to destroy toys, thus allowing an assessment of the safety of the device; the animal's ability to solve any puzzles inherent in the enrichment device, thereby foretelling the challenge it will pose to other animals; the role of the animal as facility "mascot"; or the particular animal's expected benefit from the enrichment. Regardless of the species, the environmental enrichment program necessitates familiarity with the animals, a responsible caring attitude, and more one-on-one time with the animals.

The authors of the Animal Welfare Regulations (CFR 9) may have had some notion that a positive relationship between animal facility personnel and laboratory animals would be beneficial to the animals' well-being because even in early drafts of those sections of the Regulations pertain-

ing to nonhuman primate psychological well-being, they included language that urged staff to engage in positive physical contact with the primates in their care. This language was dropped in subsequent drafts after the potential for inherent risks of physical harm to staff members was recognized. Nevertheless, the concept of humans touching animals is fundamental in the human-animal bond literature that focuses on pets. Beck and Katcher (1996) state that "No matter what kind of emotional bond people have with their pets, touch is an essential part of that relationship" (p. 84). However, in the research facility, there are usually reasons for avoiding touching some animals due to the nature of the experiment (e.g., an infectious disease protocol) or because human contact may frighten, rather than reassure, a particular species of animal. Some animals may be touched/petted for reassurance during the provision of daily care, when they are being trained, when they are under the care of a veterinarian, or in certain experimental protocols. In those cases, it is important to offer the touch judiciously and only after it has been determined that the contact is safe, is stress-reducing and/or comforting to the animals, and will not have a negative impact on the research project.

Blurring the Lines Between Laboratory Animals and Pets

Another aspect of animal facility routines that may contribute to the development of bonds between laboratory animals and facility personnel is a blurring of the distinction between animals procured specifically for research purposes and pet animals. Simmonds (1996) has stated that in his >30-yr career in laboratory animal science, he has never worked in a facility where there was no pet. He further comments that occasionally the animals held as pets in the facility have been removed from the facility's official animal inventory. Hart (1996) has observed that as "laboratory animals become identifiable, workers develop petlike relationships with them" (p. 27). She also notes that many facilities display art that portrays the species of animals in their care, if not specific individual animals once living in the facility, much as people display photographs or portraits of beloved pets in their homes. As mentioned above, toys for research animals are often purchased from pet stores. In addition, laboratory animal adoption programs are becoming more common (e.g., Ake 1996; Wyrick 1996) and include adoption of dogs, cats, rabbits, and a variety of rodents. Each of these circumstances conveys both subtle and not-so-subtle messages to facility personnel regarding the acceptability of a close relationship with the animals.

Impact of the Bond on Animal Well-being

Davis (1996) has commented that a bond between humans and research animals can have a "profound" influence on the animals' behavior and physiology. Line et al. (1989) support this premise by documenting that even the performance of routine husbandry procedures by familiar personnel can influence an animal's physiology, such as an increase in heart rate. Thus, we must construe that laboratory animals respond to many, if not all, of the activities occurring around them both behaviorally and physiologically. Relationships that develop between facility personnel and laboratory animals may result in an overall reduction in stress for the animals and may serve to buffer the potential stress of certain experimental situations resulting from the novelty of the procedure area, an intellectual challenge, disease conditions, or certain experimental procedures (e.g., gavaging, tail snips, blood sampling). The individual staff member or the environment created by caring staff members (e.g., with cage complexities, food treats, conspecific positive social interactions) can have a significant beneficial influence on the well-being of the research animal. Although such relationships can be difficult for the facility personnel (Arluke 1999) when the animal is euthanized or is perceived to be experiencing pain or distress from an experimental paradigm, Mandrell (1996) recommends as an employment criterion that key facility personnel demonstrate a "genuine caring attitude toward animals" (p. 103). Indeed, he suggests that interviews with potential new employees include questions designed to assess a candidate's approach to providing care for animals and responsibility for alleviating unnecessary pain or distress.

Administrators of animal research, testing, and teaching programs should look for opportunities to encourage the development and maintenance of bonds between personnel and laboratory animals, beginning with the initial employee interview and carrying the philosophy through to providing for a humane final disposition of the animal. Staff should be trained not only in ways to optimize the performance of their jobs but also in the basics of animal behavior for species in use at the institution. The outcome will be more refined research, improved animal well-being, and personnel who gain more reward from their jobs.

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