

Animal Welfare in Human-Animal Interactions

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About This Document

HABRI Central Briefs are peer-reviewed summaries of particular applications and issues within the field of human-animal interaction. Each Brief presents an overview of the subject matter, assesses the current state of research, then highlights unresolved questions or issues. Key resources are identified for further reading.

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Overview

Just as what comprises acceptable welfare in any people involved in human-animal interactions (HAI) represents an amalgam of multiple components that related to multiple disciplines, what comprises the welfare of the animals involved in these same interactions is similarly complex. Although researchers and others routinely address more than one component in their publications, this brief will focus on 5 topics of particular concern:

- The animal's physical welfare
- The animal's mental welfare
- Domestication and its effect on the animal's capacity to handle stress
- Ethical concerns
- Recommendations, guidelines, and laws

This material also will focus on material relevant to the welfare of domestic animals used in HAI.

State of Current Knowledge

Over time, the welfare responsibilities of those who work with or otherwise interact with animals have evolved as more research has become available. A document called "The Five Freedoms" published by the UK Farm Animal Council in 1979 forms the foundation of the animal welfare policies of multiple humane and veterinary organizations as well as governments (Figure 1). The Five Freedoms expanded previous farm animal requirements to provide quality food, water, shelter, and proper healthcare to ensure animal physical health to include providing space and facilities that would enable animals to express their normal behaviors and "ensuring conditions and treatment which would avoid mental suffering" (UK Farm Animal Welfare Council, 1979).

THE ANIMAL'S PHYSICAL WELFARE

Most veterinary organizations have policies that define the veterinarian's responsibilities regarding physical health comparable to those mentioned in the American Veterinary Medical Association's (AVMA) Animal-Assisted Intervention Guidelines. (American Veterinary Medical Association, n.d.), and many of these refer to the Five Freedoms. In addition to addressing those



1. Freedom from hunger or thirst
2. Freedom from discomfort
3. Freedom from pain, injury, or disease
4. Freedom to express normal behaviour
5. Freedom from fear and distress



Figure 1. The Five Freedoms (UK Farm Animal Welfare Council, 1979) provide the basis of modern animal welfare policies for humane and veterinary organizations and government agencies.

health concerns common to all animals (vaccinations, parasite prevention and control, nutrition, and preventive screening), those associated with the specific species and HAI in which the animal is engaged and age-related changes also are routinely addressed. These veterinary policies also acknowledge that their successful fulfillment depends on the cooperation of multiple people, including the animal's owner, handler, or some other person willing to accept responsibility for the animal's welfare. Using service dogs as an example, Olson (2002) expands this to include human and animal-care professionals working together to address all aspects of the HAI human and animal pair's wellbeing.

Fulfilling the HAI animal's physical needs also requires basic knowledge of normal animal anatomy and physiology, including animal vision, hearing, olfaction (i.e., sense of smell), taste, and response to pressure/touch all of which may vary compared to that of human. A basic veterinary technician text (e.g. Colville & Bassert, 2008; Shaw, J. & Martin, E. (Eds.), 2014) would provide this information.

The physical activities HAI animals may be expected to perform, duration of any interactions, and the ergonomics of any equipment the animal is expected to wear or carry also is of welfare concern because of their potential to undermine the animal's health (Coppinger & Coppinger, 2001). Because the range of novel and sometimes unpredictable human expectations and responses, environments, and physical challenges to which HAI

animals may be exposed may share similarities with those experienced by animals used in filmed media, welfare guidelines established for the latter animals (e.g. American Humane Organization, 2009) provide insights that would benefit those involved in HAI.

THE ANIMAL'S MENTAL WELFARE

Knowledge of what constitutes normal behavior is necessary to select animals most suitable for HAI work, the development of programs within the range of the animal's normal behavioral repertoire, and the prevention and early detection of behavioral problems.

In addition to exploring the evolutionary, genetic, and biological mechanisms of normal animal behavior, ethologists also study animal learning, cognition, play, communication, interaction with members of their own and other species, reproduction and parental behaviors, as well as the biological (i.e., genetic, neurological, hormonal and immunological) changes associated with these (Drickamer, Vessey, & Jakob, 2002).

In the Handbook on Animal-Assisted Therapy, Serpell, Coppinger, Fine, & Peralta (2010) cite understanding the animal's social and behavioral needs as part of the animal owner's ethical and welfare obligation. The authors further express concern about what they perceive as the lack of ethological knowledge and training among practitioners in the field of animal-assisted interventions. Turner (2006) additionally makes a case for the need of ethological knowledge and training to understand and properly evaluate human-animal interactions under normal conditions as well as in the AAT setting. In their behavioral text, Broom and Fraser (2007) also position recognizing and fulfilling animal behavioral needs as part of the human ethical obligation to ensure the welfare of all domestic animals.

Recognizing animal cognitive abilities also play a key role in ensuring and rewarding HAI experience for the animal as well as the person. Studies of characteristics of companion animal cognition of importance are those exploring canine eye-tracking, i.e. the ability to look at a picture and focus on areas of interest without human prompting (Somppi, Törnqvist, Hänninen, Krause, & Vainio, 2012). In studies of eye-gazing in dogs, the ability to orient toward a person and then look where that person looks the same way human infants do, Téglás, Gergely, Kupán, Miklósi, & Topál (2012)

found that dogs responded similarly. However the authors of a later study concluded that dogs trained to eye-gaze did not perform as well as those in the previous study who were shown a video of a person turning toward one of two objects. (Wallis et al., 2015). Canine numerical competence also has been studied (West & Young, 2002), as has canine reactions to what others can and cannot hear (Kundey et al. 2010). Hanggi's (2005) extensive review of studies of equine cognition and perception provides insight into factors, a human awareness of which also contributes to the HAI equine's welfare. Shreve and Udall (2015) provide similarly extensive review of research exploring cognition in domestic cats that explores topics such as sensitivity to human cues, attachment bonds, memory and perception.

Understanding how animals learn also is important for those training, using, recommending, or monitoring the use of animals in situations in which the animals are responsible for human physical or mental wellbeing. In their article, Galef and Naland (2005) described how many of the biologically important decisions animals make to ensure their own survival are those they learn from the behavior of others, i.e., social learning. Other articles on this subject include those of LaLand (2004), Pongrácz, Vida, Bánhegyi, & Miklósi (2008) and Pongrácz, Miklósi, Kubinyi, Topál & Csányi (2003).

Additionally the ability to recognize and address the emotional state of any animal engaged in HAI also plays a key role in ensuring the animal's welfare. Although Charles Darwin's *The Expression of Emotions in Humans and Animals* (1872) explored the full range of animal emotions, until more recent times the bulk of the research has been limited to fear. Phelps and Le Deux's (2005) review of the human and animal literature regarding the role of the amygdala in fear was notable for two reasons. One: the authors acknowledged that amygdala plays a role in other emotional processes in addition to fear. Two: their review led the authors to conclude that there are five major research topics that demonstrate parallel roles for the amygdala in humans and other animals. These include "implicit emotional learning and memory, emotional modulation of memory, emotional influences on attention and perception, emotion and social behavior, and emotion inhibition and regulation." Mendl, Burman, & Paul (2010) proposed the use of an integrated and function framework for the recognition of animal emotions similar to that used in humans because of the role emotions play in animal welfare.

Supporting the findings of multiple researchers who noted the significance of social learning in animal wellbeing, Spinka (2012) provided a comprehensive review of animal emotion studies while making a case for the need to consider the role of social emotions, i.e. those emotions that animals use to communicate with others within their group, as a component of animal welfare. Of particular relevance to HAI is his discussion of positive and negative emotional contagion between and among animals.

Konok, Nagy, & Miklósi (2015) concluded that the results of their study of human interpretations of canine emotions suggest that people judge emotions in dogs based on their own. They went on to note that such awareness is important because of the role "folk animal psychology" may play in a society's view of animal welfare. This further supports the need for basic knowledge of animal anatomy and physiology, including that of sensory perception.

Clinical evidence also supports the legitimacy of concerns that research supporting the existence and manifestation of animal emotions does not necessarily guarantee accurate human interpretation of those animal emotions. Stress-fueled destructive behavior in the human caregiver's or charge's absence may be attributed to the animal's spitefulness or, conversely, great love for that person; fear-based aggression may be described as protective; stress-based eating—especially of foods such treats and "people food"—may be perceived an evidence of the animal's love; depression arising from infection or injury may be defined as evidence that the animal is mourning for a human partner whose loss the owner cannot accept; attempts to relieve stress via masturbation or other sexual displays in intact and sterilized animals may be perceived as "dirty" and elicit human anger. The less knowledge of normal animal health and behavior and the more physically and emotionally vulnerable the person, the more symbolism he or she may attribute to the emotion underlying the animal's behavior. The more any projections comfort the vulnerable person, the less willing he or she may be to change those perceptions no matter how much they undermine the animal's health and behavior. (Milani, 1997-2015)

EFFECTS OF DOMESTICATION ON STRESS

Unless those who interact with domestic animals used in HAI recognize the different ways stress affects animal physiology and, by extension, animal physical and mental (cognitive and emotional) health, they cannot

address it in a meaningful way. Gantt, Newton, Royer, & Stephens (1966) expanded Pavlov's and other researcher's earlier work regarding the effect of human presence and interaction on resting and stressed canine cardio-respiratory rates to include animals of other species. In a chapter on learning and behavioral disturbances in dogs, Lindsay (2000) reviewed these and the results of other Effect of Person studies (as these are collectively known). Samuel Corson and Elizabeth Corson (1985), better known for their later work in pet-facilitated therapy, demonstrated that stressful conditions also may affect canine salivary gland secretion, gut-motility, and urine production, but that these effects varied. They speculated that these variations could be breed-related. Comparable studies involving human effect on horses include Lynch, Frederick Fregin, Mackie, and Monroe (1974).

Other studies have been conducted in more natural settings. Hama, Yogo, and Matsuyama (1996) studied equine heart rate response to human stroking in a riding facility as a function of the person's attitude toward horses. The development of more sophisticated portable monitoring technology increasingly enables researchers to validate or refine findings of previous studies. An example of this is the use of electronic heart monitors to validate previous findings regarding canine emotional/cardiac response to familiar and unfamiliar people (Kuhne, Hößlerb, & Struwe, 2014). In studies conducted in home and research environments, Mongillo et al. (2010) studied changes in canine attachment to humans and capacity to cope with emotional social distress (2013) as a function of age, two other areas of welfare concern when animals are used in HAI. McMillan (2013) reviewed the experimental evidence of stress-induced emotional eating in animals and voiced concern about its role in the epidemic of obesity in companion animals.

It is also important to recognize that domestication is a dynamic process during which animal physiology and the physical appearance and behaviors it supports change in response to human interactions over time. The longest study of these effects was begun by geneticist Dmitry Belyaev and his colleagues in 1959 and continues today. Breeding farmed foxes strictly for what the researchers referred to as "tameability" (which characterizes domestication) they determined that doing so resulted in animals more physiologically and behaviorally immature compared to their predecessors. Of particular importance to those breeding, selecting, training, and recommending

the use of companion animals for HAI in interactions during which the client, patient or caregiver may see the animal as fulfilling some sort of protective role is that the domesticated foxes resting levels of cortisol (a stress hormone) declined significantly during this process. In practical terms, the domesticated animals' willingness to interact with people in a friendly manner resulted in physiological changes that rendered them less equipped to handle stress than their wild ancestors (Trut, 1991).

Multiple studies use cortisol levels to determine animal stress in HAI settings and results are mixed. One study of certified therapy dogs and therapy dogs in training compared the dogs' cortisol levels at home and on non-working days to those collected during sessions with adults in mental health therapy settings. However the significant difference in cortisol levels of dogs working on- and off-lead caused the authors to note the need for further research on the relationship between the handler and the therapy dog (Glenk et al., 2013). Glenk et al. did not speculate regarding why this might be so although the breeds of those animals as suggested by Corson and Corson (1985) and the nature of the relationship between those people and the dogs as suggested by other studies might be one possibility (see Jones & Josephs, 2006; Lit, Schweitzer, & Oberbauer, 2011; Handlin, Nilsson, Ejdeback, Hydrbring-Sandberg, & Uvnas-Moberg, 2012). A study led by Ng (2014) of registered assistance dogs exposed to potentially stressful situations concluded that these did not result in significant elevations in cortisol levels. However the authors also noted that observed stress-related behaviors did not correlate with cortisol levels.

Ethnographic studies offer more intimate details and insights regarding specific animals engaged in specific kinds of HAI. Piva, Liverani, Accorsi, Sarli, and Gandini (2008) followed a shelter dog through the selection process, integration into an Alzheimer's facility, and 3-4 weekly sessions with patients over a 6-month period. During this time the researchers used a combination of indirect assessment, direct observation, and measurements of stress-induced hormonal changes to monitor the dog's behavioral and physical welfare. In this study, cortisol levels seemed to correlate with clinical as well as behavioral findings.

Instead of using mechanical or biochemical monitors to determine stress level, Kaiser, Heleski, Siegford, and Smith (2008) developed a behavioral ethnogram to determine

any differences in the amount of stress experienced by 14 horses ridden by at-risk individuals or those with physical disabilities. They concluded that while therapeutic riding does possess the potential to provide meaningful work for horses without being unduly stressful or otherwise detrimental to their wellbeing, this is a function of the facility, management, and riders. In particular they noted that rides with at-risk children were sufficiently stressful that they should be limited in length and sessions per week. Another study used a combination of open-ended interviews with parents of children with autistic spectrum disorder and on-site observation to identify key welfare factors that affected the welfare of the service dogs. These included the animals' social relationships with the child's parents as well as the child. They determined that the social relationship was stronger with the parents than the child (Burrows, Adams, & Millman, 2008).

Other studies simultaneously considered the effects of HAI on the animals and the humans involved. One that compared the cortisol levels of handlers and dogs participating in AAT programs found that the levels of both increased on days when they participated in these activities (Haubenhofner & Kirchengast, 2007). A more inclusive study by Marenelli et al. (2009) followed 18 dogs used in 1889 interactions in a fixed-care setting over a 4-year period to assess the threats to animal welfare. During this time, the team collected an extensive range of information about the dogs as well as the people who interacted with the animals. In addition to recording each dog's gender, breed, age, and origin, the researchers recorded the type, duration of session, number of daily sessions, interval between sessions, location characteristics (temperature, available space, possibility of interference). Data collected on the people involved included the number, type, and age of the clients, and handler perception of the quality of the intervention. The authors concluded that their findings demonstrate the need to not only study the specific factors that affect the welfare of animals used in HAI, but also the variability in the way these interventions are conducted and the different contexts in which they occur.

ETHICAL CONSIDERATIONS

In their discussion of the ethical issues associated with animal-assisted therapies (AAT), Iannuzzi and Rowan

(1991) analyzed the welfare of the animals as a function of Jerrold Tannebaum's criteria for a human-animal bond: continuous relationship, significant benefit to both, voluntary, bidirectional, and entitles each to respect and benefit in their own right. The authors conclude that, relative to AAT programs, potential for inappropriate animal use and exploitation exists.

Also relative to the welfare of animals engaged in HAI is Rollin's contention that, quite unlike the emotional distance that enabled people to perceive and address unethical practices related to laboratory and farm animals, the special relationship with companion animals has blinded many to ethical considerations related to the use of those in this group (2005).

Zamir (2006) explored the moral basis for animal-assisted therapy by comparing the Kantian, Cartesian, liberationist, and utilitarian perceptions of this process. The author concluded that "it is possible to meet the human need in a substantial—though sometimes not maximal—way without compromising the well-being of animals." One limit of the study is that the analysis only addressed the use of dogs and horses.

With the increased research into ethology, including animal cognition and emotion, there also is increased interest in expanding current animal welfare evaluations that focus solely on limiting or eliminating negative outcomes to include those aspects of ethology and physiology that support positive outcomes for the animals. Boissy et al. (2007) reviewed the biological processes that underlie positive emotions, including neurobiological effects on the brain, changes in sympathetic and parasympathetic nervous system balance and the neuroendocrine and immune system. They proposed these as a legitimate way to monitor positive emotions in animals.

In their review of the animal welfare literature, Yeates and Main (2008) also argued for an approach that takes positive outcomes into account. One benefit cited for this approach of significance relative to HAI that may be resource-intensive in terms of program development, animal selection, care, and training was that it permits better use of what may be limited resources. Recognizing and maintaining an animal's positive state is more cost-effective than treating problems that result when those needs are ignored or overlooked.

REGULATIONS AND LAWS

Multiple organizations that promote the use of animals for human health benefits offer recommendations regarding the welfare of the animals. These include the International Association of Human-Animal Interaction Organizations “Guidelines for Animal Wellbeing” (Jagatheesan et al., 2014), Assistance Dog International’s “Standards for Assistance Dog Partners” (Assistance Dog International, 2015) and the AVMA’s aforementioned “Animal-Assisted Interventions Guidelines” (AVMA, n.d.). Some of the special regulatory issues described by Hampshire (2003), that must be addressed when companion animals are used in clinical investigations and trials for products or techniques designed to advance human health or that of other animals also may apply to animals used in HAI research.

Existing animal welfare laws in general give mixed signals regarding the HAI-involved segment of the animal population. For example, the United States Animal Welfare Act (AWA) does not cover service animals during the performance of their duties because it defines an animal as “any live or dead dog, cat, monkey, guinea pig, or any other warm-blooded animal intended for use in in research, experimentation, exhibition, or as a pet” (Section 2132 g), and animals involved in HAI are not considered pets. However if these animals are used for display purposes for commercial reasons, then the AWA would apply. Relative to HAI research, the AWA only applies if the object of the research is to determine the effect of the interaction on the animal; it does not apply to research being done to determine the effect of the animal on humans (W.V.Koch, personal communication, June 12, 2015). Meanwhile US state laws addressing assistance animal welfare also vary considerably in content as Wisch’s (2014) state-by-state comparison makes clear.

A review of organizational regulations, national, and local laws also reiterates a problem that has plagued the interdisciplinary HAB community from its inception: the lack of uniform terminology to describe the animals and the different HAI activities in which they engage. For example, although the US Animal Welfare Act defines only dogs as service animals, some state definitions include members of other species.

Areas for Future Investigation

Animals have been engaged in HAI long enough that retrospective studies embracing larger populations would be helpful. Those that compare and contrast the criteria used to select and train animals, and evaluate animal physical, behavioral, and emotional health, as well as length of service would be invaluable. Retrospective ethological studies also are needed that compare the welfare and performance of shelter animals, purebreds, and those bred for specific HAI purposes. Studies of breeding criteria, and the amount, duration, and quality of same-species maternal care as well as neo- and postnatal human care of animals in the HAI population to gain information about genetic and epigenetic effects that may affect the welfare of these animals also are needed. Research that compares if and how stress manifests as a function or breed, temperament, and training of the HAI animal is needed, as is that which considers any effect of the animal’s reproductive status—intact, spayed, or neutered—on the ability to handle stress.

A fast-growing body of literature indicates that social learning, i.e. learning from observing others, is the way the animals evolved to learn. As Ganef and Laland (2005) wrote:

“Many species have evolved a capacity to use information provided by others to guide their learning. Experienced others, such as parents, provide a reservoir of potentially useful behaviors. Adopting behaviors directly from this reservoir allows naive individuals to shortcut the many iterations of trial and error necessary for most individual learning, and to move directly to solutions previously tested by others.” (p.495)

Studies that considered the full range of training options would be helpful to determine the best approach to prepare animals to provide the kind of physical and emotional support to humans that domestication primed animals to expect from humans.

Food treats often are perceived as the reward of choice or an acceptable way to communicate affection by many animal-care professionals as well as members of the public. Given that animals used in HAI may need to perform under stressful conditions, and the effect of stress on appetite stimulation, determination of whether emotion-based feeding may further contribute to animal weight gain would be helpful.

Although a large body of animal research exists on the physiological and behavioral changes that occur in response to environmental stressors, increased research is needed to determine a) whether veterinarians and those engaged in HAI, including patients or caregivers recognize these, and b) if they do, what changes are recommended to identify and prevent or reduce stressors in the HAI environment.

Given the critical role knowledge of normal behavior plays in the development and maintenance of quality animal welfare, studies are needed that assess the ethological knowledge of those who breed, select, train, use, or prescribe animals for HAI. In this same vein, research regarding who assumes the ultimate responsibility for the fulfillment of the welfare needs in animals used in HAI would be helpful to avoid people wrongly assuming these needs are being met when they are not.

Other areas of welfare significance that deserve attention include the influence of media representations of HAI on public, clinician, and client/patient expectations, the status of the growing emotional support animal population, the ready availability of sham service animal credentials on the Internet, and the negative publicity improperly trained or used animals may create for all animals used in HAI (Cassidy, 2014).

Human disability law terminology that may make it impossible for others to determine an animal's fitness to function safely in a public setting also merits attention. For example, the Americans with Disabilities Act (ADA) states that "When it is not obvious what service an animal provides, only limited inquiries are allowed. Staff may ask two questions: (1) is the dog a service animal required because of a disability, and (2) what work or task has the dog been trained to perform. Staff cannot ask about the person's disability, require medical documentation, require a special identification card or training documentation for the dog, or ask that the dog demonstrate its ability to perform the work or task" (ADA Requirements, 2010). While this does protect the rights of the truly disabled with legitimate service dogs, it also fuels the proliferation of sham service animals who may be physically or mentally unfit to fulfill their owners expectations and suffer because of this.

Conclusion

Addressing all of the factors that contribute to the welfare of animals used in HAI in a meaningful way requires knowledge regarding the species-specific and individual physical and mental (including cognitive and emotional) needs of the animals involved as these related to the functions the animal is expected to perform. Ensuring the identification and fulfillment of these needs requires cooperation of human and animal physical and mental healthcare providers, ethologists, breeders, trainers, patients, parents or care-givers, ethicists, and policy-makers. Admittedly this is a daunting challenge. However once those involved directly or tangentially in HAI become accustomed to addressing animal as well as human needs in the design and implementation of any HAI-related activities, that will ensure that any animals also will benefit from these interactions.

Key Resources

Broom D.M. and Fraser, A.F. (2007). *Domestic Animal Behaviour and Welfare* (4th edition). Boston, MA: CABI.

This well-researched and -written text is a valuable resource for those who lack a background in ethology or those who seeking to update theirs. In addition to discussing the fundamentals of ethology, the authors also describe the behavioral repertoire animal use to fulfill their basic needs as this relates to the animal's welfare. Of particular value for those engaged in HAI are chapters on the behavior and welfare of domestic species such as horses and other equids, dogs, cats, rabbits and fish which may be used in these activities.

Galef, B. G., Jr. and Laland, K.N. (2005). Social Learning in Animals: Empirical Studies and Theoretical Models. *Bioscience*, 55(6), 489-499. Retrieved from <http://bioscience.oxfordjournals.org/content/55/6/489.full>

Primary characteristic of domestication includes that it enables animals to accept humans as one of their own, relate to them in a friendly manner, and accept direction from those people. Galef and Laland's well-referenced article describes how many of the biologically important decisions animals make to ensure their survival are those they learn from the behavior of others. Additional articles of interest on this subject include those of LaLand (2004), Pongrácz, Vida, Bánhegyi, and Miklósi (2008) and Pongrácz, Miklósi, Kubinyi, Topál, and Csányi (2003).

Iannuzzi, D., and Rown, A. N. (1991). Ethical Issues in Animal-Assisted Therapy Programs. *Anthrozoös*, 4(3), 154-163.

This article provides a well-organized overview of what motivates people to keep animals plus an equally well-organized review of the ethics of AAT as it relates to the most common programs. Relative to the welfare of animals used in HAI, the article also serves as a means to compare how far addressing this issue has (or has not) come since it was published. Rollin's (2005) discussion on the ethical status of companion animals complements this material nicely.

Serpell, J.A., Coppinger, R., Fine, A.H., Peralta, J.M. (2010). Welfare considerations in therapy and assistance animals. In A.H. Fine (Editor), *The Handbook on Animal-Assisted Therapy* (4th edition). 481-503. doi: 10.1016/B978-0-12-381453-1.0023-6

The authors provide a well-researched overview of the animal welfare problems experienced by animals engaged in human therapy and assistance. The chapter discusses the need to address these animals' freedom to express normal behavior, aging and retirement issues, their capacity to handle stress, and the use of wild animals for these purposes. Equally important are discussions of welfare issues of concern in specific therapeutic settings, such as visitation and residential programs, counseling and psychotherapy and the larger issue of ecotherapy. The remainder of the chapter addresses welfare issues specifically related to dogs trained to provide service to a disabled person: changes in social and physical environment, selection and breeding, early development, training methods, unrealistic expectations, poorly designed equipment and facilities, and end-user problems.

Spinka, M. (2012). Social dimension of emotions and its implication for animal welfare. *Applied Animal Behaviour Science*, 138, 170-181. doi:10.1016/j.applanim.2012.02.005.

The stated intent of this article is to demonstrate why an awareness of the social dimensions of animals is essential to ensure animal welfare. To this end the author first considered research related to human-human transmission of emotion and the importance of these interactions for wellbeing. He then compared this to what research demonstrated occurs between and among animals.

The indirect value of this article is related to the effects of domestication, one of which is that it enables a member of one species to accept a member of another. (See Trut below) Although HAI literature often describes emotional benefits humans gain from socially interacting with animals, that the same social dimension of emotions that affect the behavior of conspecifics (i.e., those belonging to the animal's own species) for better or worse also could occur between human-animal pairs has not received as much attention.

Trut, L.N. (1991). Early Canine Domestication: The Farm-Fox Experiment. *American Scientist*, 87, 160-169. Retrieved from <http://www.americanscientist.org/issues/pub/early-canid-domestication-the-farm-fox-experiment>

Because the majority of animals used in HAI are domestic ones, understanding the physiological and behavioral effects of that process is necessary to recognize and fulfill the welfare needs of animals used in these interactions. Aside from the domestication process resulting in more infantile physical, behavioral, and physiological factors that make the domesticated animal less able to handle stress, this elegant long-term study also reveals key physiological as well as behavioral elements of the human-animal bond as it affects animals. It demonstrates that merely breeding animals for companionship, i.e. "tameability" or friendliness, is a dynamic process, the physiological and behavioral effects of which are enhanced as the process continues. In other words today's domestic may be more susceptible stress. The ramifications of this for the welfare of companion animals used in HAI programs cannot be understated.

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