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Human-animal interactions

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There has been limited research conducted on the importance of the human-animal relationship. This paper describes the ways in which human behaviour or attitude might influence the welfare of tamed animals.

That man is important in an animal's environment is not disputed. Direct interactions between humans and animals have always been a part of the animal production system. The way in which the animals respond to human contact is governed by the way in which they perceive humans, and this is influenced both by their early developmental experience and by their natural responses or genetics. In general, it is believed that domestic animals are less fearful of humans, their flight distances are shorter than their wild counterparts, and they are more able to cope with human intervention. But animal responses are at least in part governed by fear. The fear response of animals is thought to be one cause of a chronic stress situation. Simply by being in, and imposing themselves on, the environment of an animal, humans induce fear and adverse reactions in the animals¹.

Animal responses to humans have been measured. For example, in battery-housed hens there was an increase in the resting heart rate from 140–240 beats/min up to 280–350 beats/min when a human entered the building; and rose to 480 beats/min when the human approached the cage and encroached upon the birds' natural flight zone (or personal space).

Effect of handling animals

Recent studies have shown that different handling procedures influence the performance and behaviour of animals. Growth rates in pigs were shown to be adversely influenced by what were termed 'aversive' and 'negative' handling. Pigs were conditioned to elicit a

particular response from a human every time they interacted. The aversive treatment involved prodding with an electric prod every time a pig approached a human, and negative treatments involved a human approaching the pig in an upright posture and reaching towards it. Growth rates were approximately 10% lower in these treatments than in minimal contact or positive contact treatments. The reduction in growth rate was attributed to the chronic psychological stress experienced by the animal as a consequence of the handling treatments. In order to test this, the morphology of each treatment groups' adrenal glands was examined; it was found that the area of the adrenal cortex in pigs that experienced aversive treatments was almost 30% greater than those subjected to minimum, or positive treatments².

In other studies³, reproductive performance has been shown to be influenced by handling treatments. When gilts were conditioned to expect to be scratched and stroked by humans, or pleasantly treated, they were easily mated at second oestrus, with a pregnancy rate of 87.5% as compared to only 33% in gilts that had been conditioned to expect a shock from an electric prodder. Boars in the unpleasant treatment groups were on an average 31 days older before they demonstrated a fully coordinated mating response, and their testicles were 10 cm² smaller. Measures of the concentration of plasma cortiosteroids in the absence of humans showed higher concentrations in all pigs following the unpleasant treatment.

Thus, it appears that different forms of handling can influence growth and productivity, and that it is probable that this is due to the animals' fear response to humans. There are several more examples of the effect humans have on farm animals: milk yield has been shown to vary between stockpeople; handling can negatively affect ovulation rate in ewes; regular handling during early development can enhance growth in broilers (neat-producing hens), and so on. It is obvious that

we need to understand more about these effects and, in particular, we need to know how to have a positive effect on the animals under our care.

Is there an optimum level of handling?

It has been suggested that one way to influence an animal's perception of humans is to handle in a positive way early in development. This first indication of the positive effects of handling in early development was shown in Denenberg's work on the 'gentling' of rats in 1964 (ref. 4). Young rats were stroked for a short time every day, what Denenberg termed 'introducing extrinsic stimulation'. He found that rats performed better in learning experiments and were less fearful in tests later. Although in most cases this early handling has been shown to reduce the fear of humans in rabbits, chickens, pigs and cows⁵, it is often a very small effect and tends to be specific to certain handling procedures. In some cases, the effect of handling early on has had no effect, or even a negative effect, making animals even more fearful. For example, when calves were artificially groomed in the first 24 h of life, they stood up faster than ungroomed controls but they absorbed immunoglobulins at a lower rate⁶. There is very little understanding of the mechanisms underlying these apparent positive effects. Handling pigs at an early age can reduce excitability, making them easier to drive⁶, but too much handling may result in an animal with such a reduced flight zone that it no longer moves away from a human, thus making it impossible to handle. A good example of this is orphan lambs reared by humans – apart from the health problems they may experience, these animals are often difficult to manoeuvre as part of a flock.

It would thus appear that there is an optimum level of handling during early development that leads to a reduction in fear responses toward humans, but leaves the human the dominant figure in the animal's environment.

Are there sensitive periods of response to handling?

It has been suggested that humans can take advantage of the sensitive periods during an animal's development to condition it to certain cues. This is most obvious in birds that are reported to have sensitive or critical periods after hatching, when the bird is particularly sensitive to extrinsic stimulation. The term 'imprinting' describes the attachment that birds develop to their parents or peers during this time. In a study of game birds, where it is important that birds are fearful of humans, it was found that exposure to humans during the first 2 days after hatching resulted in birds being less fearful of humans, allowing them to approach much closer before

showing the escape behaviour than birds exposed to humans only after the first 2 days. It has been suggested that other animals are also particularly sensitive at certain times in development. Hemsworth and his colleagues suggest that a sensitive period existed in pigs prior to 8 weeks of age, when they could be socialized to humans⁵. Sensitive periods may occur also later on in life, such as during parturition, when bonding between dam and offspring takes place. Cows handled during their first calving have been shown to be easier to handle and display less flinch, step and kick responses during their first 2 weeks of milking, indicating that they were less fearful of the handling procedure. It has also been suggested that by encouraging the cows to develop a general attachment to humans during the sensitive period at parturition, the cows become less fearful later⁶.

Training the animals

Animals can also be trained or conditioned to accept certain restraining devices if they are positively rewarded in some way. Teaching animals to behave in an appropriate way depends on the animals' ability to make certain associations, though animals are thought to be generally limited in their ability to learn. Constraints on learning have been seen in laboratory experiments with pigs which, in response to a food reward, tend to perform their species-typical food-searching activity – rooting⁸. In addition, training depends on an animal being able to remember the association. Training is often time-consuming and sometimes impractical where animals remain in a system for only a short time; but it has been used with sheep and cows with promising results. Sheep trained to run a race and to enter a handling machine for barley food rewards, have been shown⁹ to run the race quickly from year to year. Dairy cows have been conditioned to move from their field to the milking parlour in response to the sound of a bell, and an estimated 1 h of a stockman's day can be saved in this way¹⁰. Natural leader sheep or Judas sheep can be trained to lead a flock through a slaughterhouse¹¹.

It appears, therefore, that humans can have considerable positive effects upon farm animals but can also have negative effects. Human behaviour is often inconsistent and dependent upon mood, and humans are often perceived as a fear-provoking stimulus. It has been suggested that automation of animal units might be more predictable and, therefore, more easy to 'adapt' to. Mechanized broiler and turkey catchers are currently being developed and have been shown to provoke lower stress responses than normal procedures by humans. Food for thought!

1 Metz, J H M., in *The Role of the Stockman in Livestock Production and Management* (ed Seabrook, M. F.), CEC (EUR 10982), Luxembourg, 1987.

- 2 Gonyon, H W, Hemsworth, P H. and Barnett, J L., *Appl Anim Behav Sci*, 1986, 16, 269–278
3. Hemsworth, P H, Barnett, J. L. and Hansen, C., *Appl. Anim Behav Sci*, 1986, 16, 259–267.
- 4 Denenberg, V. H., *Psychol Rev.*, 1964, 71, 335–351
5. Hemsworth, P H, Barnett, J L. and Coleman, G. J., *Anim Welfare*, 1993, 2, 33–51
- 6 Grandin, T., *Lab Anim*, 1986, 15
7. Csermely, S., Mainardi, S and Spano, S., *Appl. Anim Ethol*, 1983, 11, 177–182
8. Breland, K and Breland, M., *Am Psychol*, 1961, 16, 661–664
- 9 Hutson, *Appl Anim Behav Sci*, 1985, 15, 263
- 10 Kiley-Worthington, M and Savage, P., *Appl Anim Ethol.*, 1978, 4, 119–124.
- 11 Brenner, K., *NZ J Agric*, 1980, September, 25.

Conflicts or coexistence?

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The sprawling American city of Los Angeles has obliterated vast areas of natural habitat in southern California, and its suburbs continue to encroach upon the remaining fragments of forest and coastal sage scrub, for condominiums and recreation. The Angelenos forest has, amazingly enough, survived to this day, and is one of the remnant fragments of wilderness near the city. Even this is surrounded by suburbia – and is a source of frequent conflicts between humans and wildlife.

A young mother jogging alone one evening on a mountain trail in the suburbs got killed by a mountain lion: the first known mountain lion attack on humans this century! The local police and fish and wildlife officials immediately swung into action and, in a couple of days, tracked down and killed a female mountain lion. Shortly after they confirmed – using genetic tests of hair samples – that it was indeed the same killer animal, a solitary mountain lion cub was found near where the jogger was attacked. The cub was then sent to a zoo. It seems likely that the jogger strayed too close to the cub – *Had she seen the animals? Did she deliberately approach them too close (like so many Americans brought up on the ideas of cuddly wild animals often do)? Or did she just blunder into them?* – and provoked the mother into attacking her.

About a month after the mountain lion attack, a big black bear strayed out of the Angelenos forest and wandered into a suburban mall. Panic ensued and the local police and wildlife warden were alerted. The game warden soon shot the bear dead after unsuccessful attempts to tranquilize it for translocation. A few weeks later, a panic-stricken 911 (the emergency telephone line) call from another LA suburb reported another black bear which the caller could see outside her/his window near a school. When the cops and game warden rushed in, they found the bear perched up in a tree *looking at some children playing in the schoolyard* – so it had to be shot dead too!

Reading about these incidents in the long, hot Californian summer of 1994, when a vast forested area out-

side LA was burnt down (by arsonists?) and huge tracts continued to burn all over the northwestern US, I could not help but wonder if we in the third world had anything to learn at all from this, the world's most advanced, industrialized, first-world nation, in terms of managing our wildlife and natural habitats.

I myself grew up in Bombay, a city often compared to Los Angeles or New York, but much worse in terms of infrastructure or civic amenities, and on an average, offering a lower quality of life to its inhabitants. Unlike LA, Bombay also faces a shortage of land to accommodate its burgeoning human population. Yet, bordering the megalopolis' northern suburb of Borivli lies a 100 km² tract of tropical forest protected in the form of a National Park. The forest is in remarkably good shape, considering it is completely surrounded by over 15 million human beings. The park also has a resident population of leopards estimated at around 20–40: certainly too high a density of large carnivores to be supported by the habitat. The Indian leopard is a larger animal than the North American mountain lion, with a long and continuing history of man-eating problems that keep cropping up all over the country each year. Many of the Borivli leopards, lacking space and food inside the park, venture outside the forest at dusk to pick up dogs and other small animals from the shanty towns bordering the park. Sometimes the prey include human children, and even adult humans have been attacked and killed. Yet, the leopards are tolerated and their population allowed to build up over the past many years. It was only recently – responding to a public outcry after a child's killing – that the forest department trapped two individuals, which, unfortunately enough, bashed themselves against the cages and died.

The Borivli leopards are by no means an exception to man–animal relations in India. There is another longstanding, recurring conflict between a large mammal and human beings in eastern India for which the solution still eludes the Forest Department. This is the case of the famous Dalma or Bihar – Bengal herd of elephants: