

How does pain rank as an animal welfare issue ?

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Abstract

Pain is one of a number of negative affects common to humans and animals, which functions to alert them to actual or potential injury and enable them to take evasive action. It is increasingly recognized that the brain modulates pain responses, and that it is associated with the development of an anxiety/fear syndrome in response to pain. Thus although it might be possible to estimate the negative affect caused by pain as a product of duration and stress responses to the injury, this would not take into account long term impact on anxiety/fear, which conditions animals to avoid, or wish to avoid, similar situations. Pain is the most commonly researched of all the freedoms normally associated with good welfare, with nearly as many scientific journal publications as the others (normal behaviour, fear/stress, hunger/thirst and discomfort) put together. However, surveys of university teachers of animal science students suggest that, although they recognize the need to avoid unnecessary pain in farm animals, they do not believe that current systems, which clearly inflict pain on the animals, needed changing. Hence students are being taught that certain painful procedures in animal production are acceptable and necessary. Amongst the wider student population, attitudes to the acceptability of practices that impact on animal welfare appear to be influenced by perceived differences in sentience between species. It is concluded that pain is perceived to probably be the most important animal welfare issue confronting modern animal management systems, but that some pain is considered by experts to be necessary for the systems to function effectively.

Introduction

Pain is one of a suite of primary negative affects¹, which are probably common to higher animals and humans. They include fear, terror, hatred, distress, dissmell², anguish and disgust (Tomkins, 1963; 1991). Secondary negative emotions include shame and guilt, which in the view of humans at least may be more common in humans than other animals³. These affects often co-exist and one may predispose to another, so in the case of pain, the additional negative affects are most commonly fear and distress.

¹ A brief biological, innate, instinctive response to a stimulus

² The negative affect of experiencing noxious odours

³ Legally, animals cannot experience guilt since they are recognized only as property (Brenner, 1998).

Pain is described as “an aversive sensory experience caused by actual or potential injury that elicits protective motor and vegetative reactions, results in learned avoidance, and may modify species specific behaviour, including social behaviour” (Zimmerman, 1986). Pain therefore fulfills a vital function of alerting an animal to potential or actual injury, so that they can take evasive action. Without pain animals would die at an early age. If we acknowledge the welfare of an animal to be a function of its experiences, good and bad, then pain obviously has a direct input into welfare, because it exists both during and after a bad experience. However, it may help to avert further bad experiences through the animal’s evasive action, which will also have an impact on lifetime welfare. The exhibition of pain, therefore, is not necessarily indicative of an overall negative impact on welfare.

The pain response to injury is not a ‘straight through’ biological mechanism, where the affective response is directly proportional to the tissue damage, but it is influenced by the subject’s level of attention, anxiety, suggestion and prior experience (Melzeck, 1987). Up until the 1950s it was believed that pain responses were only a function of the somatic neuronal pathways, which could be best controlled by neurosurgery, at least experimentally (Melzeck, 1993). After this date, psychological influences, such as those referred to above, that had previously been dismissed as *reactions* to pain began to be recognized as pain modulators, and it became clear that a ‘top-down’ approach was necessary in examining pain responses. Furthermore, Melzeck and Wall (1965) proposed that the transmission of nerve impulses from afferent fibres to spinal cord transmission cells is modulated by a spinal gating mechanism in the dorsal horn, which can be influenced by signals from the brain. They proposed that if the number of nerve impulses is more than a critical value, pain is experienced. They also found that rubbing the affected area closed the gate, whereas pinching opened it. This began two decades of research to elucidate the mechanisms involved in brain regulation of pain responses.

Surveys of attitudes to pain as a component of animal welfare

We have little direct evidence of the importance of pain in animal welfare, other than the extent of scientific research, compared to other areas of welfare, and attitudes of stakeholders in the animal industries. By the year 2005, the number of scientific journal articles that had been published on pain in animals (4793) was considerably greater than those on the other Freedoms commonly recognized as the major components of welfare (normal behaviour, 2599; fear/stress 1286; hunger and thirst 1247 and discomfort 486) (Phillips, 2005).

Most animal welfare surveys have focused on American university staff and students, in particular those concerned with animals in veterinary or animal science programs, as these will be, or are leaders in the field of animal

management and health treatment. When animal science faculty members in American universities were surveyed on their attitudes towards animal welfare, because of their influence on animal production in the United States, nearly all (97%) believed that animals should have freedom from unnecessary pain (Heleski et al., 2004). They also believed that animals should be free from other negative affect, such as thirst, hunger, fear or distress. However, when asked about specific practices that are commonly used in the animal production industries and are known to cause pain (e.g. Taylor and Weary, 2000), such as castration without anaesthetic use or beak trimming in poultry, approximately 70% believed that these practices did not warrant concern. This agreed with the majority view that current farm practices did not require any change, or that changes should be minor. In a direct comparison of veterinary and animal science staff, Heleski et al. (2006) concluded that the former had greater levels of concern for animal welfare.

Amongst tertiary level students of veterinary medicine and other disciplines, there is a belief that some domesticated species are more capable of experiencing emotions than others (Levine et al., 2005; Phillips and McCullough, 2005). Specifically, students of veterinary medicine in an American college believed that dogs and cats were more capable in this respect than farm animals, with a particularly low rating for poultry (Levine et al., 2005). In contrast to the animal science faculty members, most of these students considered normal practices with farm animals that are known to cause pain, such as branding with a hot iron, castration by banding or at a very young age and surgical procedures, to be inhumane. Amongst students of all disciplines and of a mix of nationalities, there is also a belief that species have differing ability to experience sentience, and again the dog receives a high rating (sentience ratings: monkey > dog > newborn baby > fox > pig > chicken > rat > fish, Phillips and McCullough, 2005), despite an absence of anatomical or physiological evidence to support this belief. Animal science students in America also believed that there are species differences in the capacity to feel pain, with horses apparently having greater capacity than other farm animals (Heleski and Zanella, 2006). Also of concern is that these differences in attributed sentience levels appear to influence the students' attitudes to practices that cause pain or cruelty, with a more tolerant attitude if the animals were believed to be less sentient (Phillips and McCullough, 2005). Some differences between students of different nationalities towards sentience were also detected, for example pigs and poultry were attributed high levels of sentience by students from south east Asia, and Chinese students attributed particularly high levels of sentience to rats and fish. In an international comparison of 15 different nations (Pifer *et al.*, 1994), members of the public were asked to agree or disagree with the statement '*Scientists should be allowed to do research that causes pain and injury to animals like dogs and chimpanzees if it produces new information about human health problems.*' The intensity of opposition ranged from low levels in Japan (42%) and the USA (42%) to high levels in France (68%), West Germany (60%), with Great Britain, Italy and Spain being intermediate.

In Pifer et al.'s study, gender also affected the attitude to animal research, with women being more opposed than men in all 15 nations. Gender also influences attitudes to practices that affect animal welfare, with women having greater concern than men (Pifer et al., 1994; Heleski et al., 2005; Phillips and McCullough, 2005), but men and women have similar attitudes to the sentience capabilities of different species (Phillips and McCullough, 2005).

Evaluating pain responses as a component of animal welfare

The science of determining that an animal is in pain has been successfully developed to include the administration of analgesics (e.g. Sneddon et al., 2003). Self-selection by chickens has conclusively demonstrated scientifically that lame birds are experiencing pain (Danbury et al., 2000). The quantification of pain would be even more desirable, in order to compare welfare impact of different husbandry procedures. It is possible to determine the severity of short-term pain responses from the levels of stress invoked and the longevity of the response. Hence, responses to mastitis could theoretically be evaluated by measuring the duration and the degree of pyrexia. However, mean disease durations and the stress responses over the time have received little attention, so caution is required in any interpretation of such models. Evaluating pain responses in this way does not take into account the long term increase in avoidance and possible anxiety/fear developing in the animals concerned.

Pain undoubtedly has the potential to cause anxiety and fear in humans, and in humans pain therapy aims to dissociate pain from conditioning factors like fear, anxiety and attention (Pruinboom and van Dam, 2006). Asmundson and Hadjistavropoulos (2007) have demonstrated physiologically, by looking at the time taken to react to words, that human patients with high fear of pain also have a generalized anxiety towards their health and even non-threatening issues. However, Wilson et al. (2007) have suggested that individual differences in baseline anxiety levels do not modulate pain responses in rodents, and it is therefore unclear the extent to which animals respond cognitively to pain the same way as humans.

Conclusion

Pain is probably the most important area of animal welfare, both in terms of the research focus and effect on animal welfare, as perceived by experts. There is major concern amongst stakeholders that it should be controlled in production animals at least. However, those closely associated with the animal industries may become habituated to pain and accept it as a normal part of the system. Scientific methods of demonstrating pain in animals have improved considerably, but quantifying the pain is difficult, especially given the paucity of information on responses in animals. Significant pain is likely to induce secondary negative affects, such as fear and anxiety, but this has rarely been investigated in animals.

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