

NOISES OFF: WHAT VOCALIZATIONS CAN AND CAN'T TELL US ABOUT ANIMAL WELFARE

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1. INTRODUCTION

In Canada and elsewhere, there is growing public concern about animal welfare. This paper reviews the background to animal welfare research and highlights some welfare studies that have used vocalizations. Emphasis will be placed on the studies' practical significance.

2. BACKGROUND TO ANIMAL WELFARE RESEARCH

Animal welfare is more than what animals feel. The most widely accepted definition is that welfare is an inherent state comprising bodily function (e.g., health), feelings (e.g., fear, pleasure) and the animal's nature (genetic traits manifest in e.g., breed and temperament) (Fraser et al. 1997). Current scientific questions about animal welfare have arisen from developments in our relationship with animals during the last ~50 years. These developments provide the context in which the results of welfare research must be applied, and are outlined below.

Following World War II, farming methods were intensified in order to ensure an abundance of cheap food. Public expectation of the latter continues and results in very small profit margins for farmers, many of whom would not choose the production methods that the market requires. However, having cheap food has increased our disposable income. This increase, coupled with changes in societal fabric, has led to many more dogs and cats being kept as companions. The resulting human-pet bond is intense and has contributed to the present sophistication of companion animal medicine (e.g. diagnosis by MRI, hip replacements). All these developments continue to prompt questions about the effects of our usage on animals. The discipline of animal welfare science seeks to address these questions.

Animal welfare science applies physiology, ethology, neuroscience and veterinary medicine to questions about what happens to animals when we treat them in different ways. Animal welfare is complex, therefore there is not yet a comprehensive way to assess it. Instead, scientists tend to focus on specific questions (e.g., Are variations in piglet vocalizations related to degree of need?) and to use either physiological or behavioural measures of outcome. Both types of measure are objectively quantifiable, but carry the contradiction of being used to make judgements about the animal's total experience - how it is faring - which is partly subjective and therefore not accessible to measurement

within a Cartesian framework (Wemelsfelder 1997). However, despite philosophical criticisms, traditional behavioural measures can tell us something of how animals are faring e.g. their needs and aversions. Vocal behaviour has been used in this way, as outlined in the next section.

3. USE OF VOCALIZATIONS IN ANIMAL WELFARE RESEARCH

Vocalization offers promise as an endpoint in animal welfare research. Its role has been reviewed by Watts & Stookey (2000) who note that the multidimensional nature of vocalizations (frequency, duration, rate) and their specific role in communication, offer advantages over less specific indices that can increase in response to pleasant or unpleasant events and are therefore difficult to interpret (e.g., heart rate). The authors identify several categories of vocal response that may assist in welfare research, including pain-related vocalization, need-related vocalization and social vocalization.

3.1 Pain-related vocalization

Many species vocalize when in pain. The calls indicate clearly that the caller is distressed, therefore they are useful in welfare research. Pain-related vocalization has been used to study the welfare of animals undergoing (i) procedures needed to safeguard welfare under management systems that would otherwise lead to reduced welfare (e.g., debacking of poultry chicks to prevent cannibalism), (ii) procedures that protect the animals' long-term welfare (e.g., docking lambs' tails to prevent "fly strike"), and (iii) procedures that are conducted for human benefit (e.g., castration of piglets to avoid "boar taint" in meat). The use of vocalization to examine the welfare of (male) piglets at castration is reviewed below.

Piglets are castrated at ~1-2 weeks of age. The procedure is surgical and takes ~75 seconds. Economic and practical considerations preclude use of anaesthesia or analgesia (e.g., anaesthesia would interfere with piglets' return to the litter and to suckling). A series of randomized, controlled studies with appropriate statistics, used the rate and frequency of vocalization to identify those aspects of castration that are most distressing to piglets. Weary et al (1998) compared, in litter-mate pairs, piglets that were surgically castrated with those that were sham-castrated. The authors found that (i) the frequency of individual calls showed a bimodal distribution with peaks at 100-600Hz and 3000-4000Hz, and

a trough at ~1000Hz, (ii) piglets undergoing castration made significantly more calls over 1000 Hz than did shams, and (iii) different methods of restraint produced different rates of high-frequency calling, but restraint did not affect the pain caused by castration. Using a similar design, Taylor and Weary (2000) investigated which part of the surgery caused the most pain. High-frequency calling was increased by skin incision and was highest when the spermatic cords were pulled and cut. The method of cutting the cord did not make a significant difference to the rate of calling. Further work examined the effect of age (Taylor et al 2001). Piglets castrated at 3, 10 and 17 days of age were compared with sham-castrated littermates. Older piglets in both groups produced more high-frequency calls of longer duration than did younger piglets. However, age did not affect the rate of high-frequency calling during castration which was three times the rate during sham-castration. Duration of calls was not affected by castration. Taylor et al (2001) concluded that, ideally, male pigs should be left intact and slaughtered when younger in order to avoid "boar taint". Until this is practised, they recommended development of non-surgical castration. The case illustrates that science alone cannot indicate how animals should be treated. That question also depends on our values (Fraser 1995), because animals are not the only moral stakeholders in issues of welfare concern. At present, the value placed on preventing male piglets from suffering is overridden by that placed on our having cheap food. Thus, pigs are slaughtered when farmers can get maximum return on their inputs, but this is also when meat from intact male animals would be unpalatable.

3.2 Need-related vocalization

The concept of "honest signalling" has been applied to questions of whether animals' distress calls are reliably related to degree of need (Watts & Stookey 2000; Weary & Fraser 1995). Weary & Fraser (1995) found that the rate of calling in piglets seemed to reflect the degree of hunger and of thermal discomfort i.e., the need for food and warmth.

3.3 Social vocalization

An important type of social vocalization is the calling between mother and offspring. Early separation causes both to vocalize and show distress, but is a commercial necessity in some farm species. Dairy cows are usually separated from their calves 24 hours after birth. This is thought to be less distressing than separation at 4 days when milking of the cow resumes. Work by Weary and Chua (2000) confirmed this: calves and cows vocalized more when separated 4 days after birth than at either 24 hours or 6 hours. However, the older calves had less diarrhoea. Thus,

choice of separation time requires judgement between distress and health, on both welfare and economic grounds.

4. CONCLUDING REMARKS

This paper highlights some important studies that have used vocalization to address questions about animal welfare. Other such research includes the effect on dogs in shelters of the noise from barking, vocalization as a sign of anxiety in dogs left alone and of distress in farm animals at slaughter, and stereotyped vocalization as a sign of extreme frustration. Vocalizations could also be used to examine when animals are experiencing pleasure. Research in these areas will help to inform the debate about animal welfare.

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