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Introduction

Quality of life: the heart of the matter

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Abstract

It is believed widely, and with good reason, that some other members of the animal kingdom, like us, have feelings (associated with brain states induced by various sensory inputs and cognitive processes) which can be pleasant or unpleasant. Associated with the strengthening scientific foundations for this belief, there has been growing consensus around the world that we have a moral responsibility, in all of our dealings and interactions with sentient animals, to take account of their feelings. This has led to widespread re-evaluation, in recent years, of the nature of our interactions with other animals. However, assessment of the feelings of animals — the quality of their lives — remains a great challenge for veterinarians and others involved with their management. The fundamental difficulty is that whilst judgements about management or treatment often have to be made on the basis of our inferences of how they feel (ie of the feelings they consciously experience), a subjective step cannot be avoided in making these inferences. We cannot know how other animals feel but can only infer this based on our knowledge of the animal and on our own experiences of feelings. This inevitable 'gap' in objective deductions about feelings is often wide enough that people can reach radically different conclusions when judging an animal's quality of life. Opinions thus often differ regarding the point at which it becomes kinder to euthanase an animal than not to do so, the point at which it becomes kinder not to undertake a potentially painful therapeutic intervention than to do so, and where the balance lies when animal welfare costs are being 'weighed' against some benefit of their use for humans (eg as laboratory, farm or companion animals). The aim of this meeting is to discuss if and how science has helped in developing reasoned approaches to these dilemmas, and to consider the need for further research, education, and policy development.

Keywords: *animal welfare, cost–benefit judgements, ethics of human–animal interactions, quality of life, sentience, welfare assessment*

Introduction

We are very fortunate to live at this time. In the last three or four hundred years humans have mastered the scientific method and have been able to find the resources to use it in pursuit of inquiries that have not only resulted in material benefits to our quality of life (QoL), but which also are illuminating the great and ancient mysteries about the nature of life and the cosmos. The problem of consciousness, of how matter creates mind, has been spoken of as the last (or at least the next) great scientific challenge. And, already, particularly in the last few decades, remarkable advances have been made in this direction through explorations of the design and function of the brain.

There is a very long way yet to go, but preliminary schemes of how brains might generate conscious feelings have begun to be sketched out (eg Churchland 1996; Damasio 1999; Rolls 1999; Edelman & Tonini 2000; Koch 2004). Perhaps some remain unconvinced that such efforts are certain evidence of scientific progress in this most technically and conceptually difficult subject, but there is now, at least, general agreement that mind is a function or emergent property of (some kinds of) brains, and a wealth of information has been accumulated about the impacts on particular aspects of conscious perception resulting from stimulation of, or damage to, specific brain regions (eg Weiskrantz 1997).

The title of this Symposium is 'Quality of life: the heart of the matter'. My aim in this brief introductory paper is to sketch out parts of the territory to be covered, cognisant of the fact that it is dotted with semantic and conceptual pitfalls. I would suggest that the matter of central interest here is the animal's own perspective on the quality of its life in terms of some kind of positive/negative dimension. The implication is that QoL is about feelings (here, and throughout, I use the word 'feelings' to mean 'consciously perceived feelings') and QoL applies therefore only to those organisms that have the capacity to have feelings. It seems sensible to start with some comments about sentience and feelings in the animal kingdom.

Sentience and feelings

There seems now to be quite a widespread consensus amongst welfare scientists that concern for an animal's welfare is concern, at least partly, for its feelings — concern for the quality of its life as it consciously experiences it (for a recent review of various conceptions of 'health' and

'welfare', see Nordenfelt 2006). This is in line with the view held commonly amongst the general public. Although health and evolutionary fitness are usually of utmost importance to animal welfare because threats and insults to them are typically associated with very unpleasant feelings, concern for welfare is not focussed primarily on physical health or evolutionary fitness but on their consequences as experienced by the animal (if it were otherwise we should be concerned equally for the welfare of plants). In view of this I have, elsewhere, hazarded that welfare is: "the balance, now or through life, of the quality of the complex mix of subjective feelings associated with brain states induced by various sensory inputs and by cognitive and emotional processes" (Kirkwood 2004). This capacity to consciously feel or experience something is called 'sentience'.

The waking (and dreaming) lives of humans are characterised by many kinds of feelings. Some of these (eg sights, sounds, tastes, warmth, cold, and touch) are associated with external sensors; others (including general, non-localised or only vaguely localised feelings such as exhaustion, malaise or nausea, and localised feelings such as specific aches and pains) are associated with internal sensors that provide information about the states of our bodies. In addition, we are familiar with feelings associated with thoughts and emotions prompted either by the inputs from these internal and external sensing devices, or (it seems) by the incessant conscious or subconscious ponderings of our brains.

We know that we ourselves have conscious awareness, but what about individuals of the other millions of species on earth? Historically, at least in the West, there has been controversy, led by a number of religious and philosophical authorities, about animal sentience (as reviewed, for example, by Rollin [1989] and Ryder [2000]), and doubts about sentience have been very antagonistic to concerns for animal welfare. However, although scientific views on the distribution of sentience in the animal kingdom vary (Kirkwood & Hubrecht 2001), there is now a strong consensus that the benefit of the doubt about capacity to subjectively experience pleasant or unpleasant feelings should be given to all of the vertebrate branch of the animal kingdom, and this is reflected in various forms of legal welfare protection given to vertebrates. It remains difficult to judge where the line should be drawn (Kirkwood 2006) but the explorations of the mechanisms of sentience now underway may lead, in time, to a much firmer basis for deciding on this very important issue.

Although sentience may be widespread, it seems highly likely that the nature and range of feelings experienced by animals and which may affect the quality of their lives vary considerably among species in association with sensory and cognitive capacities. For example, eyeless animals cannot (presumably) experience the feeling of vision or photophobia; likewise, animals that lack the cognitive capacity for reflection about their actions or insight about what conspecifics think about them cannot suffer embarrassment. The capacity to experience negative and positive feelings relating to basic functions of existence (eg pain, fear, warmth, satiation) may have evolved at a relatively early stage, with various other senses and cognitive functions then also coming within the 'illumination' of sentience as they evolved.

Associated with the strengthening scientific foundations for belief that other animals have, like us, the capacity for feelings and thus suffering, there has been growing consensus around the world that we have a moral responsibility to take account of this in all of our dealings and interactions with sentient animals. This has led to widespread re-evaluation, in recent years, of the nature of our interactions with other animals. It is therefore worth briefly reviewing, at this point, the scope and scale of our interactions with other animals.

Our interactions with other animals

There are now over 6.5 billion of we humans (US Census Bureau 2006); we keep more than 23 billion domesticated livestock animals for food production (FAO 2006) and hundreds of millions of companion animals (CAWC 2003). These animals are dependent upon their human keepers, who have, therefore, strong ethical obligations to ensure their good welfare and proper care, and these obligations are increasingly being backed up by law. There are many challenges to keeping animals to good welfare standards. There is no room for even the most cursory review of these here, but the recent CAWC report (CAWC 2006) on the breeding and welfare of companion animals — which deals with a relatively small aspect of biology in just one subset of the animals for which we are responsible — provides some insight into the scale and range of problems that can arise. However, the problems go beyond just the animals we keep. We utilise energy at biologically unprecedented rates and, whether we like it or not, in our vast multitudes and accompanied by huge entourages of kept animals, we compete with enormous numbers of wild animals for food, space and other resources. As a result of this and other anthropogenic (human-caused) threats, many species are likely to become extinct unless action is taken to prevent this. There are many ways in which these threats also affect the welfare — the quality of the lives — of wild animals (eg Sainsbury *et al* 1995). In most cases, these are unintended consequences of various of our agricultural, industrial and other activities (eg through pollution or the introduction of infectious diseases), but there are many ways also in which wildlife welfare is severely compromised by deliberate actions, as, for example, with some pest control methods.

There has been a tendency to overlook the welfare of free-living wildlife. In my view there are good reasons for generally not intervening for the welfare of free-living wildlife. However, it seems to me that we certainly do have obligations for their welfare where we cause welfare problems to them and, to some extent also, in cases where we manage them closely such that they are no longer truly free-living but to some degree under or dependent on our stewardship. So, in addition to our farmed, laboratory, companion, zoo and other (temporarily or permanently) kept animals, we have responsibilities also for the QoL of

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those in the wild in some circumstances — at least to try to minimise or alleviate anthropogenic problems and especially when these are the result of deliberate actions.

At the present time, we are faced with the challenges of meeting the requirements of the still very rapidly growing human population, protecting biodiversity, and protecting also the welfare interests of other sentient species that we use or whose fates depend upon our actions. This requires, amongst other things, that we make sound inferences and judgements about feelings in other animals: whether or not they have them (bearing in mind that the animal kingdom includes many organisms that have no nervous system); their quality — pleasant or unpleasant; and their intensity. The aim is to best serve the welfare interests of the animals in our care, and, in circumstances in which our interests conflict with those of other animals, to attempt to balance these interests wisely and kindly, and also to take proper steps to prevent or minimise risks to welfare.

What is best for welfare?

It is widely agreed that we should try to meet the welfare needs of animals. However, assessment of the feelings of animals — the quality of their lives — remains a great challenge both for welfare scientists and for veterinarians and others involved with animal management. Whilst judgements about management or treatment often have to be made on the basis of our inferences of how they feel, a subjective step cannot be avoided in making these inferences. We cannot know how other animals feel but can only infer this based on our knowledge of the animal and on our own experiences of feelings. This inevitable gap in objective deductions about feelings is often wide enough that people can reach radically different conclusions when judging an animal's QoL or deciding, for example, which procedures, methods of treatment, or methods of euthanasia are the most humane. Thus, opinions often differ regarding the point at which it becomes kinder to euthanase an animal than not to do so, the point at which it becomes kinder not to undertake a potentially painful therapeutic intervention, and where the balance lies when animal welfare costs are being 'weighed' against some benefit of their use for humans (eg as laboratory, farm or companion animals).

We cannot directly gain access to, or measure, how other animals (including other humans) feel. We have to make inferences about this based on behavioural, clinical or other observations of the animal and in the light of knowledge of its biology and of our own experiences of pleasant and unpleasant feelings. The process of welfare assessment involves two steps. The first involves making an, ideally comprehensive, scientific description of the observable or measurable factors that may have an impact upon the animal's welfare: its state of biology, health and behaviour. The second is to make a judgement about the possible impact of these measurable parameters on how the animal feels (Kirkwood *et al* 1994). The subjectivity of the second step cannot be avoided but the problems associated with this can be minimised by making the bases for the judgements as explicit as possible. To take a simple example: if it is observed that an animal has a midshaft fracture of a limb bone and shows very marked lameness associated with this, it is reasonable to conclude that its welfare is compromised by severe pain.

This process involves detailed knowledge of the clinical and pathological effects of the insult or injury under scrutiny and an assessment of their impact on the animal's feelings based on observations and knowledge of their impact on its behaviour, and in the light of how similar conditions feel to humans. A wide range of clinical, behavioural and post mortem observations can inform judgements about welfare (eg Zoos Forum 2006). These include: grossly apparent signs of injury or disease, physiological changes (eg elevated respiratory or heart rate), changes in cellular, biochemical or endocrine concentrations in the blood, and changes in behaviour (Appleby & Hughes 1997).

The quality of feelings may range from intensely unpleasant (as in severe pain or fear) to intensely pleasurable. The point, along this spectrum, at which feelings become *unacceptably* negative can be a difficult judgement. Pleasant and unpleasant feelings are (it appears) 'carrots and sticks' that motivate animals to perform valuable behaviours and to avoid, or minimise the adverse effects of various threats. These feelings are to some extent side effects of the very business of living. Generally, challenges that cause unpleasant feelings (eg fear or pain) that are brief, mild and not repetitive, or at least not frequently repeated, are not considered to have a significant impact on welfare. Significant welfare concern arises when unpleasant feelings are more severe and/or of longer duration, and when the animal is unable to react to limit them or if it is prevented in some way from doing so. However, these are matters of judgement, and it may not be easy to identify a point at which welfare challenges move from acceptable to unacceptable. Societies' views appear not always to be consistent but to vary according to circumstances, greater welfare insults apparently being accepted in the course of rodent control programmes, for example, than in the handling of animals at slaughter.

Difficulties with cost–benefit judgements

In the management of animals, whether they be our pets, those kept for production or use in science, or free-living 'pests', we frequently find ourselves having to weigh the benefits of some course of action against the costs to the QoL of the animal and having to decide which of various alternative actions in these cases is the most humane.

The use of animals in scientific procedures is permitted when the benefits (in whatever dimension) are judged to outweigh the costs to the welfare of the animals involved. Although there is no formal procedure for such cost–benefit analysis in deciding what procedures or systems are acceptable for farmed animals, society does set limits on what is judged to be acceptable or not (allowing, for example, castration without anaesthetic in neonatal farm livestock but not in older animals). A frequent dilemma for pet owners and their vets is deciding at what point it becomes better to cease efforts to prolong a pet's life when this involves some

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discomfort or pain, and to euthanase instead. In the keeping of animals for species conservation in zoos, the benefits for conservation sometimes have to be weighed against welfare costs (Zoos Forum 2001). Similar cost–benefit decisions have to be made in the management of wildlife when interventions have to be made in the interests of one species but which compromise another (eg Independent Working Group on Snares 2005) and, in the control of pests, judgements have to be made about the relative humaneness of the methods available in deciding which should be used.

The decisions we reach in all such cases depend on our judgements of the relative magnitudes of the benefits and of the impact upon the quality of the lives — the welfare — of the animals involved. This will always remain a subjective process: it is not one in which objectively correct answers can be reached, in a mathematical sort of way, from logical deductions based on solid facts. Not surprisingly, conclusions reached are sometimes widely divergent. Decisions have to be made, and it seems to me that the best way forward is for these to be made (or, at least, for guidelines about decision-making to be made), and kept under review, by suitably constituted ethical review groups after open and careful consideration of all the relevant information. There may be an opportunity, at the present time, for the British Veterinary Association's Ethics Committee to take an important leading role in this field.

Two points that tend to be overlooked

I will draw towards a conclusion with two points that I believe are important but often overlooked. The first is, I suggest, relevant to understanding what 'quality of life' is about, and the second is relevant to judgements about life quality *versus* quantity for particular animals.

What is concern for quality of life a concern about?

Animals, including ourselves, are the 'lumbering robots' that genes have constructed to maximise their chances of replication (Dawkins 1976). At some point during evolution, genes saw fit for some reason (and purely for their own ends) to equip our ancestors with the capacity for pleasant and unpleasant feelings. (Of course genes do not have intentions but speaking as if they do avoids the need for laborious text.) Since then, life for each of we lumbering robots has had a quality — it has felt like something. Genes strive constantly to design we animals such that, in pursuit of our own interests, we best serve theirs. That is, they try to design us such that the thing they most want us to do next for their purposes, is the thing we most want to do next. Generally, that is a good way to get us to work with maximum efficiency for them. However, in some circumstances, we robots find ways to gain the rewarding feelings without having to do the tasks that the genes wanted to get us to do by putting up the reward in the first place. QoL is about the interests of we animals ourselves — to pursue pleasures and avoid pains (or *vice versa* if so inclined) — in ways that are not necessarily in line with conducting ourselves as our genes would have us do.

Consequences of life in a closed system

The earth is a finite and closed ecosystem: the amounts of space, food and other resources available for the animals that live on it are (approximately) fixed. To a large extent now, we humans control which animals have access to these resources. We can, and do, choose which species we wish to have present in large numbers and we can, and do, choose where in the world we want them to be. But, since resources are fixed, when we choose to keep a large population of *these*, then necessarily there will be less of *those*. We cannot have more of everything. If we wish particular animals to survive to old age, we can often arrange this (through application of modern veterinary science), but not without occupying the niches that would otherwise be filled by the next generation or utilising resources that would otherwise be used by others. For these reasons, when focussing on the interests of one group, it is important always to consider possible knock-on consequences to others. If improved (non-human) animal welfare is the aim, there is unlikely to be a logical case for improving one animal's lot if the price involves a net greater harm (in terms of severity, duration and numbers affected) to the welfare of others.

The aims of this meeting

Few disagree that some other animals, like us, have the capacity for pleasant and unpleasant feelings — that the quality of their lives can be good or bad — and that we should take this into account in our dealings with them. In practice, this leads to many difficult judgements and, because these involve subjectivity, opinions frequently differ. The aim of this meeting is to discuss if and how science has helped in developing reasoned approaches to these kinds of dilemmas in the management of animals, and to consider the need for further research, education, and policy development.

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