

# Quality of life: A valuable concept or an unnecessary embellishment when considering animal welfare?

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## Abstract

Three general orientations towards animal welfare can be recognised: a *biological functioning* view, an *affective state* orientation, and a *natural state* view. A fresh, integrated characterisation of animal welfare is provided and its relationships to these three orientations outlined. This characterisation emphasises affective state, i.e. what the animal itself experiences, and how that is rooted in its physiological, pathophysiological and behavioural functionality. The concept of 'quality of life' (QoL) resides firmly in the second category in that it emphasises *affect*, especially the balance between negative and positive experiences, which, as perceived by an animal, is said to determine where its QoL is located on a continuum between bad and good. The extent to which the concept of QoL enhances extant notions of animal welfare, or unnecessarily duplicates them, has been considered in this paper. Overall, although the QoL concept beneficially highlights some features of an animal's likely experiences, it is concluded that its main use should be as a synonym for 'animal welfare status'.

## Introduction

seems obvious that in order to study animal welfare it is necessary to have a widely accepted definition of it. Yet, to date, no single, unified definition of animal welfare has emerged despite considerable effort to derive one (Nordenfelt, 2006; Mellor et al., 2009). If anything, notions of what animal welfare represents have become more diverse, not less. Several major interacting factors have contributed to this. First, animal welfare only emerged as a concept considered worthy of scientific investigation about 30 years ago (Stafford et al., 2002; Mellor & Bayvel, 2008). It was almost inevitable therefore that early attempted definitions would be modified or alternatives provided as more investigators gave thought to the subject. Second, beginning with these ideas, and continuing thereafter, an underlying evolution in notions about what

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animal welfare is has become apparent. This evolution has been driven by interactions at each point in time between new knowledge about animal functionality and extant ideas regarding animal welfare, which, in their turn gave rise to fresh thinking about both animal welfare and related functionality. Third, all of this has been affected by, and affects, the range of societal views on what constitutes acceptable or unacceptable ways of treating animals, views which are based on prevailing (and evolving) ethical, social, cultural, religious, economic and other values (Fisher and Mellor, 2008).

It is against this background that the place of 'quality of life' (QoL) as a concept within current thinking about animal welfare will be evaluated. First, however, three main orientations towards animal welfare that have emerged will be briefly described. Second, an integrated characterisation of animal welfare will be presented and, third, the relevance of that to the assessment of animal welfare status will be outlined. Finally, the extent to which the concept of QoL provides worthwhile complementary or additional perspectives on animal welfare will be considered.

### **Three main animal welfare orientations**

Three general animal welfare orientations may be recognised at present (Fraser, 2003). The first is a *biological functioning* view. This holds that, generally, welfare is good when animals are healthy, growing and reproducing well, and, for farm animals, when good meat, milk, egg and fibre productivity of individuals is associated with good health and reproductive performance. The second is an *affective state* orientation which emphasises the potential for animals to suffer or have positive experiences. According to this view, good welfare is present when animals adapt without suffering and/or with positive emotional experiences (feelings) during their interactions with other animals, people and the environment. Finally, there is a *natural state* view which holds that welfare may be compromised in proportion to how far the conditions in which animals are kept deviate from the presumed original wild state of the species and, in particular, by the extent to which the animals are, or are not, able to express most of their natural behaviours. These three orientations provide different perspectives on animal welfare and could lead to different conclusions being drawn about the welfare status of animals in particular situations (Fraser, 2003). The conclusions will also depend on how the welfare status is assessed, for instance, whether it is according to how well animals cope with their environment, or their fitness in terms of their health, reproductive success and survival, or the extent to which their needs are being met (provided that there is agreement on what those needs are), or in terms of the absence of negative states and/or the presence of positive states (Mellor et al., 2009).

## A characterisation of animal welfare

Animal welfare may be characterised in terms of the following principal features (Mellor et al., 2009):

- Animal welfare is a state *within* an animal. It is not management procedures applied to the animal, nor features of the animal's environment, which may affect its welfare.
- The animal must be phylogenetically and developmentally *sentient*; i.e. it must have a brain with sufficient functional sophistication to transduce impulses in sensory and other nerves into experienced sensations.
- As animal welfare relates to *experienced* sensations, the animal must be *conscious*; unconscious animals cannot experience anything.
- These experiences can be negative, neutral or positive.
- These experiences arise as the integrated outcomes of sensory and other neural inputs from within the animal's body and from its environment.
- These inputs are processed and interpreted by the animal's brain according to its species-specific and individual nature, and past experience.
- The integrated outcome represents the animal's current experience (i.e. its welfare status), and this changes as the balance and character of the inputs change.
- These experiences are subjective states and, *based on human experience*, are likely to include negatives such as thirst, hunger, nausea, pain and breathlessness, and positives such as satiety, contentment, exploration and play.
- As subjective states they cannot be measured directly.
- Informative indirect indices of such experiences rely on knowledge of physiological, pathophysiological and behavioural responses, critically evaluated with particular regard to the specific context of the animal.
- The welfare status of an animal at any one time may vary on a continuum between extremely bad to very good.

This characterisation of animal welfare emphasises *affective state* expressed in terms of the negative, neutral or positive subjective experiences an animal may have. The nature and range of these experiences may be suggested by reference to updated

versions of the Mellor and Reid (1994) 'five domains' paradigm for animal welfare assessment (Mellor and Stafford, 2001; Mellor, 2004; Mellor et al., 2009).

The five domains represent areas of potential welfare compromise. The first four domains, encompassing potential *nutritional*, *environmental*, *health* and *behavioural* compromises, are largely physical or functional. Sensory inputs from these domains result in subjective experiences in the fifth *mental* domain, which also receives sensory inputs elicited by external stimulation. Examples of likely subjective experiences associated with compromise in each of these domains are as follows:

- Nutrition:* Water deprivation leading to *thirst*  
Food deprivation leading to *hunger*  
Nutrient imbalances (deficiency/excess) leading to *debility or weakness*
- Environment:* Extremes of cold leading to *chilling* and *debilitating hypothermia*  
Extremes of heat leading to *hyperthermic distress*  
Injurious housing leading to *pain*
- Health:* Disease, injury and functional impairment leading to, for instance, *breathlessness, nausea, sickness, pain, distress, fear or anxiety*
- Behaviour:* Space restrictions, isolation or barren environments leading to, for instance, *boredom, frustration, loneliness or helplessness*
- Mental:* Sensory inputs arising from compromise in the other four domains, plus cognitive inputs and related mental activity arising from external challenge (e.g. eliciting 'fight-flight-fright' responses), resulting in experienced sensations of *thirst, hunger, weakness, debility, breathlessness, nausea, sickness, pain, distress, fear, anxiety, helplessness, boredom*, and so on.

The experiences just described are negative. This is in line with the predominant characterisation, over the past 30 years, that good animal welfare represents an absence of negative states (Nordenfelt, 2006). More recently, however, good animal welfare is being considered to depend on the presence of positive experiences or feelings as well (Duncan, 1996; Fraser & Duncan, 1998; Kendrick, 2007; Broom, 2007; Yeates & Main, 2008). Thus, other forms of welfare compromise may arise from an absence of positive mental states arising from an absence of feelings of reward or satisfaction in circumstances which hinder an animal's capacity to experience, for instance, *vitality, companionship, contentment, satiety, happiness, curiosity, exploration, foraging and play* (Mellor et al., 2009).

The notion that a good state of welfare exists when the nutritional, environmental, health, behavioural and mental needs of an animal are met accommodates all of these considerations (Mellor et al., 2009). That is because meeting the mental needs of animals can be taken to incorporate both the absence of demonstrably negative experiences and the presence of positive experiences that have been shown to be important to the animal.

### **Assessment of welfare compromise**

Assessments of the welfare status of animals and the degree of welfare compromise they may experience are based on the substantial knowledge of functional disruptions studied by numerous scientists, veterinarians and others over at least the last 50 years (Mellor & Bayvel, 2008). Such assessments have been, and are, made by veterinarians and animal-based scientists in particular (e.g. Morton and Griffiths, 1985; Blood & Radostits, 1989; Mellor & Bayvel, 2008), and also by stock handlers, pet owners and others, as part of their daily engagement with animals in clinical, production, scientific, domestic and other contexts. These assessments rely on numerous well-validated indices that are available within the veterinary clinical arena (e.g. diagnostic tests), as well as in applied nutritional, environmental, behavioural, and neural/cognitive spheres (e.g. state-specific physiological, pathophysiological and behavioural measurements). Indeed, there are so many that it is impractical to list them here. Note, however, that such indices relate to the degree of functional disruption in each of the domains of potential welfare compromise. The interpretation of what such disruptions mean in terms of the likely experience the animals may have requires the careful exercise of informed judgement.

Interestingly, current thinking about what animal welfare represents increasingly seems to be emphasising *affective state* (Broom, 2007; Kendrick, 2007; Scott et al., 2007), i.e. one of the three main ways animal welfare has been envisaged (Fraser, 2003; see above). These three orientations, to date, appear to have been considered broadly to stand as parallel, somewhat independent, paradigms. The foregoing discussion, however, suggests possible interactions. The indices of *biological functioning* objectively relate to the physical-functional status of the animal. Such indices can have a quite specific focus, indicating the presence of particular functional states such as dehydration, undernutrition and hyperthermia (Mellor et al., 2009), or they can be more general, focusing on the integrated overall outcome of all such states or the 'fitness' of the animal expressed in ways that include egg production, milk production, growth,

general health status and/or reproductive success (e.g. Barnett & Hemsworth, 2003). The specifically focused functional indices are linked more to the animal's experience, its *affective state*, than are the 'fitness' indices. This is because the former indices detect changes in functional states that elicit sensory inputs to the animal's brain that lead directly to experiences such as thirst, hunger, hyperthermic distress and so on. The *natural state* orientation, in emphasising disjunctions or concordance between the animal's current circumstances and those in its wild state, may be seen to beneficially focus attention on features of systems for managing animals which might induce negative affect or promote positive affect. Clearly, judgements about that would rely on methodologies and interpretations derived from both the biological functioning and affective state orientations.

In terms of the practical maintenance of acceptable animal welfare, it is important to note a feature of the relationship between the objective indices of specific functional states and the associated subjective experiences the animals may have. Animal welfare assessments that focus on affective state, inferred from human experience, are often viewed as being less rigorous than are those that rely on the use of functional state indices, so that caution is advised when making the required inferences about animals from human subjective experiences (Broom, 2007; Kendrick, 2007; Scott et al., 2007). However, as the functional state indices may be used to demonstrate an absence of unacceptable compromise in the nutritional, environmental, health and behavioural domains, and indeed in some areas of the mental domain (e.g. stress), their use can also exclude the significant negative affect considered to be associated with those specific compromises. It is therefore not necessary to be able to measure thirst, hunger, hyperthermic distress, pain, anxiety, fear, and so on, directly in order to be confident that they are at acceptably low levels. This also means that when the functional state indices suggest that unpleasant affect may be present, the success or otherwise of corrective action may be determined by the extent to which the functional state indices have returned to levels that indicate the likely disappearance of those subjective experiences. When assessing the *type* of compromise an animal in a poor welfare state may be experiencing, perhaps in the context of dealing with a serious regulatory infringement, both objective functional state indices and professional judgements about the likely associated affective states would be employed, as has long been the case.

There is an important caveat. Although some affective states, including thirst, hunger, breathlessness, pain and fear, seem likely to be experienced across most mammalian

and avian species, the existence, nature and/or significance to the animals of other experiences such as boredom, frustration, loneliness and helplessness, and indeed vitality, companionship, contentment, satiety, happiness, curiosity, exploration, foraging and play, are either less well established or have not yet been convincingly demonstrated. Much greater caution must therefore be exercised when making evaluations that may be thought to involve the latter possible experiences (Broom, 2007; Kendrick, 2007), that is, until they are better understood and characterised.

### **Quality of life (QoL) – A valuable concept or an unnecessary embellishment**

In a lengthy and detailed consideration of the QoL concept, McMillan (2005) provided the following definition:

*Quality of life is the affective and cognitive (to the degree that the animal can form such a cognitive construct) assessment that an animal makes of its life overall, of how its life is faring, experienced on a continuum of good to bad. This assessment is derived from the balance between the various pleasant and unpleasant affects experienced by the animal at and recently preceding the QoL assessment. In general, the further the affect balance tips towards the pleasant side, the higher the QoL. The contributory weights of the specific affects vary between individuals and are determined by the psychological impact of the affect on that individual.*

The close correspondence overall between this definition of QoL and the characterisation of animal welfare in terms of affect, as outlined above and in somewhat different ways by others (e.g. Broom, 2007; Kendrick, 2007; Kirkwood, 2007; Scott et al., 2007), is striking. Indeed, the phrase 'animal welfare status' could easily be substituted for 'quality of life' in the above definition without much loss of meaning.

Major features of the QoL concept include the following. It emphatically highlights that, whatever our human perspectives might be, it is the animal's internal subjective experience of its own state that is important to the animal, and that the animal's perception of its QoL will be determined by an overall balance between pleasant affect and unpleasant affect (McMillan, 2005; Scott et al., 2007). The QoL concept (McMillan, 2005; Broom, 2007; Kendrick, 2007; Scott et al., 2007) also emphasises the

importance of the animal's positive experiences much more than has been apparent in previous animal welfare thinking, thereby supporting the increasing attention now being given to this by animal welfare and behavioural scientists. Moreover, the fact that both 'quality of life' thinking and 'animal welfare' reasoning have, as it were, independently arrived at the notion that affective state is of primary importance lends strength and credibility to the idea that it is appropriate to focus more on what the animal itself experiences.

As the affective experiences (feelings) that are related to human QoL were the starting point for this animal QoL reasoning (McMillan, 2005), it underscores *empathetic* consideration of animals as a focus for attempts to improve or maintain their QoL. Although this has the possible benefit of increasing human sensitivity towards animals, and may lead to the deployment of innovative care strategies that deal with a wider range of potential unpleasant affective experiences in animals with a low QoL (see McMillan, 2005), there is also a danger that human experiences (feelings) will be incorrectly or inappropriately attributed to some animals (Kirkwood, 2007; Scott et al., 2007). Accordingly, the caution recommended above when making animal welfare evaluations that might involve affective experiences the existence of which has yet to be convincingly demonstrated or which are poorly understood, should be applied equally to QoL assessments.

It is acknowledged that measurement of QoL is attended by a number of difficulties (McMillan, 2005, 2007; Broom, 2007; Kendrick, 2007; Morton, 2007; Scott et al., 2007), some of them akin to those outlined above for the assessment of animal welfare status where the primary focus is on affective state. One example, which exemplifies pitfalls of subjective extrapolation, proposed a four-step process (McMillan, 2005): first, list all feelings in the animal's life (pleasant, unpleasant, emotional, or physical in origin); second, weight each of these according to their level of biological or survival value or urgency; third, individualise the weights attributed to these feelings in the particular animal; and fourth, construct a scale to assign weights to the adjusted important feelings. As an intellectual exercise such a process may be of value for those attempting to understand the possible different dimensions of an animal's affective state in a comprehensive manner. However, as some, perhaps many, of the conclusions arrived at with each step are likely to lack an objective foundation, at least at present, they would be open to serious challenge. A best guess is the probable outcome (McMillan, 2005). Although this might allow changes in estimated QoL, positive or negative, to be inferred for particular animals, it would preclude the

derivation of any absolute QoL score for comparison between animals in the same system or in different systems, or indeed between different species of animals.

Other systems for assessing animal welfare status are available and, in being rooted in established functional linkages to what may be considered to be well-accepted affective experiences, they are perhaps less subject to the above criticisms (e.g. Mellor and Reid, 1994; Mellor and Stafford, 2001; Mellor, 2004; Mellor et al., 2009).

Accordingly, the credibility of QoL assessment may be enhanced by an analysis that, where possible, makes explicit linkages between those affective states that are considered likely to be experienced by animals in different functional states, where, and this is important, those functional states are defined physiologically, pathophysiologically and behaviourally, as outlined above.

Is QoL a valuable concept? Yes, in the sense that it approaches the question of an animal's possible or probable experiences from a markedly different direction from that adopted until recently by established animal welfare science. It has thereby provided heuristic insights which have broadened perspectives and, moreover, re-enforced the current greater emphasis that animal welfare scientists are now giving to affective states and, within those states, to positive affect. Is QoL an unnecessary concept? Yes, in as much as it appears to largely duplicate current thinking about animal welfare status (Broom, 2007; see above). It might also become confusing if what emerges are 'quality of life' and 'animal welfare status' schools that compete with each other. Thus, while genuinely appreciating the expanded insights the QoL concept provides, these authors are likely to use the term 'quality of life' only as a synonym for 'animal welfare status', and then sparingly (also see Broom, 2007).

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