

Welfare Concepts[☆]

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Abstract

Welfare is a scientific concept that refers to all living animals including humans. The welfare of an individual is its state as regards its attempts to cope with its environment. Hence welfare incorporates the individual's feelings and health as well as the functioning of various physiological, behavioral, and other adaptive mechanisms. Research by animal welfare scientists has provided information about the needs of a wide range of animals kept by man. Knowledge of these needs allows the provision of conditions in which the welfare of the animals will be good. The relationships between the concept of welfare and those of health, pain, needs, stress, feelings, quality of life and euthanasia are discussed. There are many scientific measures of welfare used in research and also welfare outcome indicators that can be used when legislation or codes of practice are being checked during an inspection.

Keywords

Euthanasia; Feelings; Health; Needs; Pain; Quality of life; Stress; Welfare

Introduction

The scientific study of animal welfare has developed rapidly during the last 30 years (Broom, 2011). Welfare is regarded by many people as a key factor when determining whether or not a system or procedure involving animals is sustainable. However, the term welfare requires strict definition if it is to be used effectively and consistently in precise scientific measurements, in legal documents, and in public statements or discussion. If animal welfare is to be compared in different situations or evaluated in a specific situation, it must be assessed in an objective way.

The welfare of an individual is its state as regards its attempts to cope with its environment (Broom, 1986). The definition encompasses the extent to which the individual fails to cope, or has difficulties in coping, or easily copes. The original meaning of the concept welfare is how well the individual fares or travels through life and the definition refers to its state at a particular time, ranging from very good to very poor, and includes its feelings and its health as well as the functioning of various physiological, behavioral, and other adaptive mechanisms. How well can our companion, farm and laboratory animals adapt to the conditions that we impose upon them? Substantial challenges to animal functioning include those resulting from: (i) pathogens; (ii) tissue damage; (iii) attack or threat of attack by a conspecific or predator; (iv) other social competition; (v) complexity of information processing in a situation where an individual receives excessive stimulation; (vi) lack of key stimuli such as a teat for a young mammal or social contact cues; (vii) lack of overall stimulation; and (viii) inability to control interactions with the environment. Hence, potentially damaging challenges may come from the environment outside the body, for example many pathogens or causes of tissue damage, or from within it, for example anxiety, boredom or frustration that come from the environment of a control system. The brain controls almost all of the coping mechanisms, including those that interact with the immune and other systems (Dantzer, 2001; Broom and Zanella, 2004). Systems that respond to or prepare for challenges are coping systems and coping means having control of mental and bodily stability (Broom and Johnson, 1993). Animals can adapt better if their needs are met but there are the limits to adaptation. An individual may adapt to an environmental situation with difficulty, in which case the welfare is poor. For example, if an individual is adapting, or has adapted, but is in pain or depressed. To say that the individual is coping implies that all mental and bodily systems have functioned so that any negative environmental impact is nullified and a positive state exists. Hence to cope is more than to adapt.

Naturalness is not part of the definition of welfare, nor should it be part of welfare assessment. The state of an individual trying to cope with its environment will necessarily depend upon its biological functioning, or put another way, upon its nature (Fraser, 2008). Natural conditions have affected the needs of the animal and the evolution of coping mechanisms in the species. The environment provided should fulfill the needs of the animal but does not have to be the same as the environment in the wild. Starvation, disease and attack by predators are part of the natural environment but clearly result in poor welfare.

The term 'well-being' is sometimes used interchangeably with 'welfare', but well-being is often more loosely used and less precise. Welfare is the word used by most scientists and in modern European legislation (Broom, 2009) and in most other countries. Quality of life is a term often used to refer to people, or companion animals, who are ill or recovering from illness. In judging quality of life, the impact on the functioning of the individual, including physiological and behavioral responses and especially indicators of pain or other suffering, should be evaluated. However, some of the methods presented for evaluating quality of life are not precise

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and replicable by others (Green and Mellor, 2011). The measures of welfare are scientific measures of quality of life. Both quality of life and welfare can be positive or negative, good or poor. There is some difference in the use of the terms as it would not be normal to talk about quality of life over a very short time scale such as a few hours or days. Welfare, on the other hand, can refer to short-term situations. Quality of life means welfare during a period of more than a few days (Broom, 2007; 2014). Hence quality of life can be assessed using the wide range of indicators that are available for assessing welfare. Another concept sometimes used is that of "a life worth living". This is ethical rather than scientific, although the ethical judgements would be based on scientific information. Worth depends on a concept of value and raises the question of who decides when it is worth living or not worth living. As a consequence, this concept is not scientifically usable.

The terms health and welfare have exactly the same meaning for humans and for other animal species, hence the current interest in 'one health' and 'one welfare'. When the welfare of individuals is poor, there is increased susceptibility to disease, hence improving welfare generally reduces disease. Preventing anti-microbial resistance is good for animal welfare because disease can then be treated. In addition, improved welfare is often associated with better immune system function so can reduce the need for use of anti-microbial products. The identical meaning of welfare for humans and non-human animals is important because those with a medical background and those with a veterinary or other biological background benefit from exchanging information, in particular because of the similarities in disease and in other causes of poor welfare in humans and other species. Care for people and care for animals used by people is generally better if all are considered as individuals. We should be concerned about the welfare of all animals but legislation generally reflects the greater concern of the public about sentient animals. Sentience is discussed by Broom (2014) and elsewhere in this volume.

Welfare in Relation to Needs, Feelings, Stress, Health, Pain and Euthanasia

The environment is appropriate if it allows the animal to satisfy its needs. Animals have a range of functional systems controlling body temperature, nutritional state, social interactions, etc. Together, these functional systems help the individual to control its interactions with its environment and hence to keep each aspect of its state within a tolerable range. The allocation of time and resources to different physiological or behavioral activities, either within a functional system or between systems, is controlled by motivational mechanisms. When an animal is actually or potentially homeostatically maladjusted, or when it must carry out an action because of some environmental situation, we say that it has a need. A need can be defined as a requirement, which is part of the basic biology of an animal, to obtain a particular resource or respond to a particular environmental or bodily stimulus. Humans and other animals have needs for particular resources and needs to carry out actions whose function is to obtain an objective (Thorpe, 1965). Needs can be identified by studies of motivation and by assessing the welfare of individuals when their needs are not satisfied (Hughes and Duncan, 1988; Broom and Fraser, 2015). The idea of providing for "the five freedoms" was first suggested in the Brambell Report in 1965 but it was modified from the concept of needs presented in that report by W.H.Thorpe. The list of freedoms provides a general guideline for non-specialists. Animals have many needs and these have been investigated for many species. Hence the rather general idea of freedoms is now replaced by the more scientific concept of needs. This is the starting point for reviews of the welfare of a species. A list of needs has been the first step in Council of Europe recommendations and E.U. scientific reports on animal welfare for over 20 years. The freedoms are not precise enough to be used as a basis for assessment of the welfare of a particular species or group of species. Also, the 'five freedoms' are illogical in places if the wording is considered exactly. For example, "freedom from pain, injury and disease" for domestic animals is a desirable state and those responsible for animals should aim at it but it is not achievable. Any animal might slip and fall or collide with something and be caused pain and injury. Freedom from disease cannot be achieved because pathogens may result in disease that could not have been prevented. Similarly, "freedom from fear and distress" could not be achieved in some individuals because they have to encounter humans and are disturbed by such contact. Also, "freedom from hunger and thirst" would not be possible unless food and water were available at all times. "Freedom to express normal behavior" would include giving the animals the possibility to show aggression to others and other anti-social behaviours that are normal for the members of the species. Just as unlimited freedom is harmful for humans (Broom, 2003; 2014), the freedom for the animals should have social limitations. A consequence of these logical inconsistencies is that some of those who use animals may say that they follow the five freedoms approach, knowing that they are not fully achievable and, as a consequence, do not follow the general guidelines and provide for all of the animal's needs. The four welfare principles and 12 criteria proposed, as a development of the five freedoms concept, by the Welfare Quality project (Blokhuys *et al.*, 2010) are a more useful general guideline. However, they have some of the same disadvantages, for example they also include: "no disease", "no injuries", "expressing normal behavior", although normal behavior is qualified by "non-harmful". In addition they are aimed at certain, housed land animals so some wording is difficult to apply to extensively kept or aquatic animals, e.g., "good housing" and "comfort around resting". A general guide like this should not be used when preparing guidelines for a particular species. Laws and guidelines for animal care, whose aim is to ensure good welfare, should refer to needs rather than to freedoms.

The feelings of an animal, including pain, fear, and various forms of pleasure, are an extremely important part of its welfare. Information can be obtained about feelings using studies of positive or negative preference. Other information giving indirect information about feelings can be obtained from studies of physiological and behavioral responses of animals (Dawkins, 2004). Feelings are aspects of an individual's biology that have evolved as a result of natural selection because they increase survival chances, just as aspects of anatomy, physiology, and behavior have evolved (Broom, 1998). They are part of biological functioning because they maximize fitness, often by helping the individual to cope with its environment (Duncan and Petherick, 1991). With every year,

more evidence accumulates that the various feelings are widespread amongst animals and are functional. When we refer to the welfare of an individual, this does not just pertain to the feelings of that individual, as some have suggested, but also to the state of other aspects of its coping systems. If welfare did not have this wider meaning, the term could not be applied to an individual that had no feelings because it was asleep, or anaesthetised, or drugged, or suffering from a disease that affects awareness. A further problem, if only feelings were considered, is that a great deal of evidence about welfare, like the presence of neuromas, extreme physiological responses or various abnormalities of behavior, immunosuppression, disease, inability to grow and reproduce, or reduced life expectancy, would not be taken as evidence of poor welfare unless bad feelings could be demonstrated to be associated with them. Although scientific investigation, including studies of behavior, can provide some indirect information about feelings, we can never know with any precision the feelings of any individual other than ourselves. Other humans may tell us about their feelings but we do not know whether they are telling the truth or the extent to which their description of a feeling corresponds to ours. Hence, the measurements of behavior described by [Broom \(2019\)](#) provide useful indications about feelings and therefore about aspects of welfare. However, to limit the concept of welfare to feelings is harmful to efforts to consider carefully and improve the welfare of humans and other animals ([Keeling, 2019](#); [Greening, 2019](#); [Corke, 2019](#); [Hart, 2019](#)).

The word stress should be used for that part of poor welfare that involves failure to cope. A definition of stress as just a stimulation or an event that elicits adrenal cortex activity is of no scientific or practical value. A precise criterion for what is adverse for an animal is a reduction in biological fitness. Stress can be defined as an environmental effect on an individual that overtaxes its control systems and reduces its fitness or seems likely to do so ([Broom and Johnson, 1993](#)).

The term health, like welfare, can be qualified by good or poor and varies over a range. However, health refers to the state of body systems, including those in the brain, which combat pathogens, tissue damage, or physiological disorder. Health may be defined as an individual's state as regards its attempts to cope with pathology. The same definition applies to humans. Welfare is a broader term than health, covering all aspects of coping with the environment and taking account of a wider range of feelings and other coping mechanisms than those that affect health, especially at the positive end of the scale. Health is a part of welfare and hence disease always has some adverse effect on welfare.

The pain system and responses to pain are part of the repertoire used by animals, including humans, to help them to cope with adversity during life. Pain is clearly an important part of welfare. Pain is defined here as an aversive sensation and a feeling associated with actual or potential tissue damage. Pain assessment is explained by [Corke \(2019\)](#). Welfare continues until death. However, questions about whether or not it is right to kill an animal are not questions about welfare. The way that animals are killed affects welfare. Humane killing means treatment of animals prior to death in such a way that their welfare is good to a certain high degree. It is not a relative term so the method of killing is either humane or it is not. In order to kill an animal humanely, there should either be: effective stunning leading to instantaneous loss of consciousness, then killing before recovery of consciousness, or killing without any pain or other poor welfare. Euthanasia means "a good death" so it does not just mean humane killing. A definition is: Euthanasia is the killing an individual for the benefit of that individual and in a humane way ([Broom, 2007](#); [Broom and Fraser, 2015](#)). Hence, whilst the killing of a sick or injured animal in order to prevent further suffering is euthanasia, the killing of an unwanted pet, or of a farm animal for human use of its meat, or of a laboratory animal because it is no longer wanted, is not euthanasia. This meaning is the same as that when the word euthanasia is used for humans.

Decisions About Welfare

Concerns about animals may be affected by whether or not the animal is considered to be sentient. Decisions about this will depend upon a range of observations of the animal, largely observations of its behavior in controlled circumstances. Nonetheless, the term welfare applies to both sentient and non-sentient animals, so welfare assessment does not require determination of sentience. The methods for the scientific assessment of welfare and of needs is discussed further by [Broom \(2019\)](#) and the application of the concepts in current and future E.U. law is discussed by [Broom \(2017\)](#). Some other ideas for developments in animal welfare in the future are presented by [Mellor and Bayvel \(2014\)](#). Where welfare inspection is required in relation to laws or codes of practice, the indicators that are suitable for animal welfare scientists may not be practicable so measures that can be used by a veterinary or other inspector are needed. A combination of resource-based indicators and animal-based welfare-outcome indicators, together with risk and benefit assessment, has been utilised by the European Food safety Authority (EFSA) and others in providing scientific advice on animal welfare issues, as well as on animal disease management issues ([Berthe *et al.*, 2012](#); [Broom and Fraser, 2015](#)).

See also: Animal Welfare and Conservation: Indicators of Good Welfare; Indicators of Pain; Sentience; Stress, Health and Social Behavior.
Methodology: Assessment of Welfare and Needs.

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