

ANIMAL WELFARE: EVOLUTION AND EROSION OF A MORAL CONCEPT

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Abstract

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There are many definitions of animal welfare. These do not only differ in their meaning, but also in their function for making a broad concept accessible for scientific research. Lexical [dictionary] definitions establish what the common meaning is of the concept to be studied, and help to find some concrete phenomena which are related to the often vague and general descriptive terms. Explanatory definitions provide an elementary theoretical background for studying the phenomena. Operational definitions contain the parameters used in concrete measurements. In each step we reduce the concept to more measurable elements but lose other elements of the concept. In the case of animal welfare this results in an evolution of definitions which makes animal welfare more objectively assessable. But it also results in an erosion: development of a confusing diversity in parameters and a loss of the moral aspect of the concept of animal welfare. This erosion has a negative influence on political decision-making. It is important to recognize the possibilities and limitations of problem solving, based on 'animal welfare science'.

Keywords: *animal welfare, definitions, ethics, policy*

Introduction

In the mid-sixties the book *Animal Machines: The New Factory Farming Industry* (Harrison 1964) and the *Brambell Report* (Brambell 1965) marked the beginning of growing public moral concern about animal welfare. As a result, animal welfare became a subject of scientific research and of national and international law-making (Grommers 1988). As the concept of animal welfare entered the realm of science and law-making, definitions were needed. This was the start of an evolution in animal welfare definitions. In the *Brambell Report* (Brambell 1965) 'animal welfare' was described as 'a wide term that embraces both the physical and mental well-being of the animal'. Later Duncan and Dawkins (1983) depicted a broad field of welfare as including ideas of: the animal in physical and mental health; the animal in harmony with its environment; the animal being able to adapt to its environment without suffering; and some account being taken of the feelings of the animal. Duncan *et al* (1993) describe that at first these kinds of broad working-definitions seemed generally acceptable to the scientific community, but that later on problem cases led to

attempts to find more precise definitions. A problem case was for example: what is the welfare state of an animal with a subclinical disease, but otherwise normal? Duncan *et al* (1993) state that more precise definitions led to divergence of opinion as to which aspect of animal welfare was the most fundamental: emotional suffering (researchers like Dawkins, Duncan, Wemelsfelder) or biological functioning (researchers like Hurnik, Curtis). Mason and Mendl (1993) see the same development as above and state further that 'the exact way in which scientists define welfare will clearly influence the types of measure they use to attempt to assess welfare objectively.' Tannenbaum (1991) argues that different definitions of animal welfare are inextricably connected with value judgements: 'Someone who believes that welfare is fulfilled when there is absence of suffering takes the position that what constitutes an acceptable kind of life for an animal is one without suffering. Someone who believes that this is not sufficient for welfare believes that animals are owed more.'

The above-mentioned shows that different welfare definitions suggest different meanings of welfare and have a different influence on research and moral judgement. We will show that definitions also have different functions in making a concept amenable to scientific research. This results in an evolution of welfare definitions which makes welfare more objectively assessable. However, it also results in diversity and in an erosion of the moral element of the concept of welfare which may have a negative effect on political decision making. We will discuss briefly the role of the animal welfare scientist in limiting this erosion and promoting the ethical debate.

Functions of definitions

In the light of their function in the process of making a concept amenable to scientific research, we will distinguish between three kinds of definitions: lexical definitions, explanatory definitions and operational definitions.

We will use the term 'lexical [dictionary] definition' to refer to a denotation of the common meaning of a word. Such a definition can give, for example, a synonym which has more or less the same meaning or give a phrase which reflects the meaning. Sometimes a word denotes a concept. A concept is a general notion and contains different related aspects. Since animal welfare is an abstract concept which is relatively new, we may expect to find different interpretations of these aspects. (See for further elaboration on concepts and animal welfare: Fraser 1995.) Lexical definitions of a concept have the function of denoting the common notion. In order to be 'common' the lexical definition has to contain the aspects everybody agrees upon or it has to use terms that are so vague that most interpretations can fit in. As a result, lexical definitions are general and often short. Later on we will discuss three lexical definitions of animal welfare: (1) animal welfare is a state in which an animal feels good, (2) animal welfare is a state in which an animal is free from pain and suffering, and (3) animal welfare is a state in which an animal is physically and psychologically in harmony with itself and with its surroundings. At first glance these kinds of definitions seem not very relevant for scientific research because of their vagueness and general character. But this is not so. They are essential, for science does not operate in a social vacuum. If through public concern questions are raised which science tries to answer, the answer should be related to the relevant concepts held by the public. If not, science is of little use in solving the problems of the public. But the feedback does not only concern the general public.

Researchers themselves also start with a lexical definition which directs their thoughts. So lexical definitions define the field in which a researcher has to work.

Explanatory definitions do not elucidate the common meaning of a concept, but try to explain how certain aspects of the concept work or arise. To explain means in this context 'making (the phenomenon) intelligible', not 'illustrating the meaning of' (the word). The explanatory definition relates one or more aspects of the concept to certain other (scientific) concepts. This process can be taken as the development of a theory. Explanatory definitions are often part of a certain scientific discipline. A typical explanatory definition of animal welfare is: a state in which feedback information arriving at different behaviour systems corresponds with expected values, or will do so in reasonable time. An explanatory definition is not a definition in the usual meaning of the word. Imagine someone is given the above-mentioned explanatory definition. Outside the group of ethologists no one would recognize it as a definition of animal welfare! By 'translating' lexical definitions into scientific terms the concept can be fitted into a certain scientific theory and so be 'opened up' for scientific research. Aspects of the concept which do not fit in the scientific theory, for instance moral aspects or feelings, are excluded in the explanatory definition.

Operational definitions describe what concrete parameters should be used and how they should be measured in order to make a verifiable quantitative statement about a concept. An operational definition might read as follows: if the plasma free corticosteroids level increases above 40 per cent of the normal level, welfare is at risk (Barnett & Hemsworth 1990). Some see operational definitions as the only relevant definitions for science, because they quantify a concept and only quantifiable phenomena are significant in scientific research (Hempel 1973). Operational definitions define a concept in terms of specific experimental procedures and are as such the definitions with which researchers work in practice.

The above-mentioned definitions all have their own function in making a concept amenable to scientific research: at first we must establish what the common meaning is of the concept we want to study (lexical definitions). To study the concept we have to find some concrete phenomena, and relate them to a theoretical background (explanatory definition). Finally, we have to decide which parameters fit in the theory and which can be used to make concrete measurements (operational definition). In each step we reduce the concept to more measurable elements and we may lose other elements of the concept. If a scientific researcher has to explain the significance of his experimental results to a non-scientist, he needs all these definitions to be complete or even to be understood.

Definitions of animal welfare

Lexical definitions

As we have mentioned in the introduction, the original meaning of welfare was very broad (eg the description of the Brambell Committee). Sandøe and Simonsen (1992) state that the starting point – for someone who wants to know what welfare means – is the question whether 'someone's life goes well'. By analogy one should take the question 'when does an animal's life go well?' as a starting point for animal welfare. If this is so, the concept of animal welfare is in principle a very broad one. The lexical definitions below could then be taken as the first answers to the question of what we mean when we say that 'an animal's life goes well'.

We want to discuss three kinds of lexical definitions. The definitions are not literally reproduced, but their principal meaning is represented.

(1) First according to Wiepkema (1980) animal welfare is a state in which an animal feels good. This is a typical lexical definition. Wiepkema mentioned it to describe what people think of when they think about animal welfare. The two key words are 'good' and 'feel'. 'Good' is a normative term and has a link to morally good: for instance, in an utilitarian ethical approach, feeling good is of intrinsic value, and this is the basic value on which moral prescriptions are built. The word 'feel' limits the range of welfare to what animals feel.

(2) A second lexical definition is: animal welfare is absence of pain and suffering (eg Simonsen 1982). Key words are 'pain' and 'suffering'. Commonly these words indicate feelings, so feelings of animals are also here the sole determining factors of animal welfare. Welfare is negatively defined, only what is not welfare is specified. Pain and suffering have a morally significant meaning (see above).

If (1) or (2) are taken as a basis from which to start research, the research would in both cases only deal with feelings of animals. In (1) both negative and positive feelings would be studied, in (2) only the negative ones. If one takes welfare as a continuum which ranges from very bad to very good, and good welfare can be recognized by signs of good welfare, (1) can deal with the whole range, (2) only with part of it. The great challenge for science based on these definitions is to fit subjective feelings of animals into science. Some use an analogy postulate (Stafleu 1992), others develop a new theory on the nature of subjective feelings (Wemelsfelder 1993). If we take these definitions (1 and 2) as first answers to the question of what we mean if we say that an animal's life goes well, we may conclude that these definitions reflect a utilitarian attitude. What matters in life here is pleasure, freedom from pain, etc.

(3) A third often used lexical definition is: animal welfare is a state of physical and psychological harmony between the organism and its surroundings (eg Lorz 1973; Hughes 1976; Hurnik 1988). The key word here is 'harmony'. 'Harmony' has a broader meaning than 'feeling good', 'suffering' and 'pain', and these three are all about subjective feelings. In the definition of welfare, the adjectives 'psychological' and 'physical' limit the meaning of harmony. The term 'psychological' provides a link to subjective feelings, but is broader than that. It may also include sensations, unconscious mental processes, etc. 'Psychological' is in some definitions of this kind replaced by the term 'ethological'. This term indicates a scientific method and as such its use is a first step towards an explanatory definition. The term 'ethological' may be used to indicate how psychological processes in animals can be studied or it replaces 'psychological' because of the difficulties some people have with the concept of the psyche of animals. The term 'physical' is a broad one, concerning biological processes of the body. It can be connected with terms like 'health', 'biological fitness', etc. So the harmony definition of animal welfare is a broad one, which may include aspects of mental processes, health, biological fitness, etc. Many interpretations of welfare may fit in. For example, when taking this definition as a starting point, the mere presence of a subclinical tumour may well be a welfare problem. This is so because not only the negative consequences which an animal can feel are relevant for animal welfare, but also health as such. Stereotypic behaviour is in this definition more easily evaluated as a sign of a welfare problem, because harmony and stereotypic behaviour are not compatible as such. Taking the

other definitions as a starting point, one has to prove that stereotypic behaviour indicates suffering. Also, other norms concerning the human-animal relationship may enter via the term 'harmony' into the concept of animal welfare. This definition may reflect utilitarian as well as deontological attitudes.

Explanatory definitions

We will discuss three explanatory definitions.

First, according to Baerends (1978), welfare is a state in which feedback information arriving at different behaviour systems corresponds with expected values, or will do so within reasonable time (Baerends 1978). This a clear-cut explanatory definition. It has hardly any meaning in common language: it contains theoretical terms such as 'feedback information' and 'behaviour systems'. It fits well in biological/ethological theories in which animals are approached in mechanical terms. It is not clear what kind of concept of animal welfare is the starting point. It could be all three lexical definitions we mentioned above. One could say that a state, in which feedback information does not correspond with expected values, is conceived by the animal as unpleasant. This should be proved or made plausible to trace the definition back to a 'feeling good' concept of welfare. A 'harmony' concept fits more easily into this definition if one takes as disharmony a difference between feedback information and expected value.

Second, Broom (1991) defines the welfare of an individual as its state as regards its attempts to cope with its environment. This definition is far less theoretical than the definition of Baerends. If one thinks of coping with the environment as of paramount importance to the concept of welfare, it can even be taken as a lexical definition. But this definition seems to concentrate on a process and not on the result of the process and that is more typical of an explanatory definition. It fits into biological theories which emphasize the animal-environment interaction as an important biological system. The definition of Baerends may be taken as reflecting a more abstract theory about what happens in an animal when interacting with its environment. Broom's definition does not indicate which state results in good or bad welfare, but better coping seems to produce better welfare. Elsewhere Broom adds to his definition: 'The level or degree of welfare is seen as the degree of success achieved by the animal in coping with difficult situations' (Fraser & Broom 1990). The tracing back of this definition to the above-mentioned three lexical definitions requires comparable steps as with the definition of Baerends: linking – not coping – with the animal conceiving unpleasant feelings, or coping with pleasant feelings, or equate not coping with disharmony. To make the definition operational, it is necessary to find measurable signs of not coping. This requires more theory, because it is not self-evident that, for instance, stomach ulcers or stereotypic behaviour are signs of not coping.

Third, Curtis (1985) defines welfare as a state in which an animal can fulfil its needs/wants. This definition is also less theoretical than (1). 'Needs' may point to biological or physical needs, the fulfilment of which is necessary to cope with the environment or for biological fitness. But Duncan and Petherick (1989) speak of cognitive needs which should be met to have a state of welfare. Cognitive needs are needs of which (non)fulfilment is perceived by the animal. Physical needs are in most cases also cognitive. But if the (non)fulfilment of a physical need is not perceived by the animal, then this (non) fulfilment does not matter from a welfare point of view (Duncan & Petherick 1989). Cognitive needs

are also called 'wants' (Duncan *et al* 1993). The terms 'behavioural needs' (Farm Animal Care Trust/Universities Federation for Animal Welfare 1988) and 'species-specific needs' (Verhoog *et al* 1990) are also found. From the above it is clear that the term 'need' should be further embedded in a theoretical framework: for instance, an ethological framework (behavioural needs, species specific needs), a veterinary framework (physical needs), a wider biological frame work, etc. Different sorts of needs can be traced back to all the mentioned lexical definitions.

Operational definitions

Operational definitions define a concept in terms of specific experimental procedures. As a model for an operational definition for animal welfare we take: measure the level of plasma free corticosteroids in the animal. Welfare is at risk if this level is more than 40 per cent higher than the normal level (Barnett & Hemsworth 1990).

The long road of reduction from concept to concrete parameters may lead to two difficulties: (a) The road from, for instance, a corticosteroid level to not feeling good is so long that one may wonder whether this corticosteroid level really still indicates not feeling good; (b) If, for instance, a higher corticosteroid level indicates altered welfare, to what extent does it do so?

Concerning point (a): take the example of the corticosteroid level. It fits in a stress model. Stress is a physiological term and fits in a physiological theory. First it must be shown that the level of the hormone indicates stress. Then stress must be traced back to disharmony, to disease and (via analogy reasoning) to suffering or to not feeling good. Each step in this reduction has the risk of introducing uncertainties and losing elements of the concept. Uncertainties are for example: does an animal feel distress as unpleasantly as humans do? Is the level of the hormone indeed an indicator of distress? Yousef (1988) argues for examining the effects that stress has on reproduction, immunity, etc, instead of measuring discrete physiological responses such as hormone levels and heart rates. This is a plea for a step back on the road of reduction.

Concerning point (b): to what extent does eg 'a level 40% above normal' indicate changed welfare? In the reduction from concept to parameters, one may lose aspects of the original concept. Losing aspects may lead to the idea that the parameter is sufficient for indicating welfare and not only for one aspect of it. It is often argued that for doing proper welfare research, parameters from different disciplines (eg ethology, physiology) should be used (Smidt 1983). Operational definitions which could be combined are, for example: count the number of lesions in a group of animals. If this number of lesions is higher than x the welfare of the group is diminished. Count the number of animals which show stereotypic behaviour. If this is higher than x per cent there is a welfare problem. Let an animal choose between two different situations. The situation it chooses is perceived by the animal as being more welfare-friendly than the other. Measuring the 'cost' (eg effort) the animal wants to make to get into that situation is an indication for the quality of welfare.

The gap between common concepts and scientific parameters may also cause one not to notice that – although there is consent on the parameters – there is no consent on the underlying concept. This causes confusion when the validity of the parameters is criticized. Take, for example, stereotypic behaviour. If one shows that stereotypic behaviour is not connected with suffering, this would mean for someone with a 'suffering concept of welfare'

that this behaviour is not relevant for animal welfare. But for someone with a harmony concept the relevance still stands, since stereotypic behaviour is disharmony *per se*.

Discussion and conclusion

We stated above that lexical definitions are quite relevant for science, because they define the political and social frame of reference for scientific research, and the starting point for the researcher. By introducing explanatory and operational definitions the concept is made amenable to scientific research. These definitions relate the concept to phenomena which can be studied empirically, which is a condition for doing scientific research on the subject. But there are disadvantages. The process of reduction results in a situation in which many different phenomena are studied and have to be interpreted. There is also a loss of elements of the concept which are not empirically accessible, but belong to the core elements of the original common concept.

Multiple phenomena

Different branches of science may emphasize the study of different phenomena. Ethologists will tend to study all kinds of behaviour, physiologists study discrete physiological parameters like hormones and heart rates and veterinarians may be more interested in the incidence of disease. Different parameters may also originate from different views on the key element of welfare (emotional suffering versus biological functioning), or from different views on the extrapolation of the parameters to these key elements. As is broadly accepted, the best way to tackle the problem of diversity is to use multiple parameters, originating from different scientific disciplines (Smidt 1983). But there remain some problems. Sometimes the interpretation of the parameter itself is not clear: which behaviour is stereotypic? (Mason 1993). Sometimes different parameters give contradictory indications of animal welfare and/or it is not clear what the relative weight of the different parameters is. These problems can partly be solved by doing more and detailed research on the nature and relation of different parameters (Mason & Mendl 1993). But Fraser (1995) argues that our conception of animal welfare inherently involves value notions and that scientific study and interpretation of animal welfare inherently flow from these underlying value notions, and that therefore science cannot measure the overall welfare in a way that eliminates value related disagreements. So in the end, different researchers may come up with the measurement of different parameters, which may indicate different levels of welfare. This fact has negative consequences for decision making: which results should decision-makers use and how to 'translate' them into policy? Science has become a supermarket for interested parties or pressure groups in search of scientific arguments (Beck 1986). Policy-makers ask scientists for help and they answer with a demand for more research, which may lead to more questions, etc etc. In this situation science becomes liable to opportunistic use by policy-makers. For instance, the diversity can be used to generate reasons for not having to make a moral decision and so postpone the development of what the animal welfare debate was all about: making decisions on how we ought to treat our animals. Part of what has been won in making a vague common-sense concept concrete, has lost in diversity. What was started as a help for decision-making, ended in making it too complicated to make a decision at all.

Loss of non-empirical elements

The public concern, which started the debate on animal welfare, was a moral one. The treatment of animals in factory farming was thought of as an ethical problem. As we have seen, the moral aspect of welfare is lost in the process of scientific definition. 'Science gives facts not values' is the dominant opinion of scientists. Some explicitly state that their definition is value free (Broom 1991). Tannenbaum (1991) has shown that the science of animal welfare can never be value free, because choices are made on definitions, parameters, levels to be studied etc¹. Scientists should be aware of this, to avoid the mistake of stating that they draw factual conclusions whereas these conclusions are in fact value-laden (Fraser 1995). But after these choices have been made, there is a given (moral) framework in which facts can be produced without further moral judgement. Scientists produce results which for instance give a measure of the state of coping with the environment, but they say it is up to society to give a moral judgement of how acceptable such a state of coping is (Sandøe & Simonsen 1992). So there is a difference between providing scientific information and normative evaluation, but how are they interrelated?

In cases where welfare is conceptualized as having to do with subjective feelings, these feelings disappear in the process of reduction. This is caused by the (presupposed) fact that subjective feelings can never be studied objectively. Some only state that 'the question of to what extent they (the parameters) are indicators of well-being² will remain a matter of interpretation' (Koolhaas *et al* 1993). Curtis (1987) states that the assessment of well-being does not include the assessment of suffering because such an assessment is not possible. Scientists who start from a 'suffering concept' use some sort of argument from analogy which bridges the gap between objective indicators and subjective feelings. The question how accurate such a bridging is, can never be answered scientifically. But if one accepts that 'plausibility' instead of 'scientific proof' is sufficient in this matter, the problem is of less significance for the interpretation of results of welfare research (Stafleu *et al* 1992). If one is not willing to accept plausibility, the gap between indicators and feelings cannot be bridged, and any concept of animal welfare which contains the aspect of subjective feelings cannot be scientifically studied. Wemelsfelder (1993) tries to solve this point by stipulating a definition of subjective feelings in such a way that they can be empirically studied and thus are open for scientific research.

Conclusion

The analysis of definitions of animal welfare show how a broad concept is reduced to make it amenable to scientific research. This process is inevitable to produce facts necessary for the making of decisions, at least in modern society where science plays a key role in policy-making. We call this the evolution of the concept. But the process has certain disadvantages:

¹ Most of Tannenbaum's argumentation is not only true for the science of animal welfare but for all science. In fact he argues that sciences is not value free, which is an accepted opinion among most philosophers.

² The words 'well-being' and 'welfare' are often used as having the same meaning. We will not discuss possible differences in meaning.

a confusing diversity of parameters and loss of the ethical aspect of the concept. This we call its erosion.

Scientists may help to limit this erosion. In the first place, scientists ought to be more explicit about the value judgements they make. For example, they ought to make clear which common concept of animal welfare they start from and how their reductions may be traced back to this concept. In this way, the moral choices behind the scientific facts can be introduced in the moral debate. In the second place they could do more, co-ordinated and detailed research on the relationship of the many different parameters, to limit the occurrence of contradictions and to provide more reliable qualitative assessments of animal welfare. But more research will not fill the two important gaps we have come across. First a gap between what we can measure (eg corticosteroid levels) and the subjective feelings of animals we want to measure in most welfare concepts. Second, a gap between scientific measurements like corticosteroid levels and moral considerations concerning the overall welfare in a situation and the acceptability of that situation.

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