

Is 'a life worth living' a concept worth having?

JW Yeates

RSPCA, Wilberforce Way, Southwater, Horsham, West Sussex RH13 9RS, UK; email: James.Yeates@bristol.ac.uk

Abstract

A recent FAWC report introduced 'a life worth living' as a useful concept in farm animal welfare discussions and policy. But what does this concept mean? And is it a useful one? This paper extends FAWC's approach in several ways. It firstly provides an account of the concept of a life worth living in more detail, in relation to current animal welfare thinking, such as experiences and quality of life. It then describes how the concept might be applied in animal welfare management decisions and in setting standards for regulations and Farm Assurance schemes. The paper identifies several advantages to the concept: it is animal-based, intuitively understandable, and has direct prescriptive force in decision-making. But the concept also has certain limitations, especially that it is potentially complex and subjective and that it cannot include all ethically relevant concerns about farm animal welfare. Nevertheless, the paper concludes that the concept may become a useful addition to welfare dialogue, and finishes by identifying the core areas where further work is necessary.

Keywords: animal welfare, euthanasia, insentience, life worth avoiding, life worth living, quality of life

Introduction

Animal welfare concepts affect how animal welfare is assessed, and consequently can be important determinants of how farm animals are treated. Decisions are made on-farm about individual animals, such as those concerning euthanasia, breeding or mutilations. Broader decisions are made about what standards should be set in regulations or labelling schemes. Animal welfare assessment and policy evolve, and new underlying concepts and approaches to assessment are suggested. Each novel suggestion needs to be analysed and evaluated within the animal welfare literatures, in order to establish its usefulness and limitations.

One recent suggestion is that of a life worth living (LWL). This idea was introduced by Stephen Clarke and Michael Reiss (D Morton, personal communication 2009). Its use was suggested in various contexts (eg APGAW 2007; European Commission 2008; Wathes 2008) and eventually formed a prominent component of the *Farm Animal Welfare Council's Past, Present and Future Report* (FAWC 2009).

This concept "capture[d] the current zeitgeist" (Wickens 2010) and has since been used by the UK Government (DEFRA 2009) and EU Commission (Paulsen 2010). It may have the potential to be useful in various situations, but before it can be applied, the concept needs definition, clarification and analysis. There are many questions to be addressed that the FAWC document does not answer. What does an LWL mean precisely? How does the concept extend animal welfare thinking? And how does the concept affect animal welfare management practically?

This paper presents a framework in which the concept can be considered in relation to current animal welfare concepts based on experiences and quality of life (QOL). This provides a definition of the concepts of a life worth living, and of related concepts of a life not worth living (LNWL) and a life worth avoiding (LWA). This allows us to identify some cases in which the concept might be useful in management decisions and in setting standards for legislation or labelling schemes. These applications highlight several advantages and limitations to the concept.

LWL as an extension of current animal welfare concepts

It is possible to consider the LWL concept as the culmination of thinking that progresses through a series starting from basic units of single welfare states, through wider concepts that combine multiple states, such as overall welfare and quality of life, and concludes with the concept of an LWL. The concept of an LWL is therefore not a replacement or substitute for other ideas, but is an holistic idea of an animal's welfare over its whole life, based on more fundamental concepts.

Basic welfare states (worth having)

Animal welfare traditionally focuses on states of an animal. For example, Broom famously described animal welfare as "the state of the animal as it attempts to cope with its environment" (Broom 1988). States of an animal have certain 'qualities' that make them relevant to that animal's welfare. These are qualities that are important from the animal's

point of view (Dawkins 1990). Which states and which qualities are important is a matter of debate (Appleby & Sandøe 2002; Nordenfelt 2006).

Two types of interacting relevant qualities can be identified. The first type is 'modifiers', which in themselves do not make a state important; rather they augment or reduce its importance. For instance, modifiers, such as intensity and duration, matter for an animal's welfare only insofar as they extend or increase the severity of a second type of quality. This second type of quality is the qualities possessed by states that have intrinsic significance for an animal.

Several researchers have suggested that the qualities which determine the intrinsic significance of a state for an animal are ones that relate to the animal's biological functioning, such as its physiology, pathology or productivity (eg Dantzer & Mormède 1983; Curtis 2007). Other people consider naturalness to be an intrinsically significant quality (Bracke & Hopster 2006). Such accounts have their advantages. Biological qualities can be directly observed or relatively easily measured, using increasingly sophisticated measures. Naturalness-based concepts fit with environmentalist accounts. However, it is less clear that such qualities have direct value for the animal itself: why is it valuable in itself to an animal to have low cortisol levels, produce large volumes of milk or behave how its ancestors did? They may be indices of current or future high states of welfare (Fraser *et al* 1997), but the functional states they represent may also lead to worse welfare (Curtis 2007; Kirkwood 2010). This makes it hard to say that such indices have direct intrinsic significance for the animal.

More recently, other approaches have considered that animal welfare is ultimately a matter of animals' mental experiences (Dawkins 1990; Duncan & Petherick 1991). This view appears to be reflected in several policies, such as the Treaty of Lisbon, which recognises animals as sentient animals, and Section 4 of the UK Animal Welfare Act (2006), which is concerned with animals' suffering. Experiences are part of the biological functioning of animals in natural environments (Fraser 1999; Kirkwood 2010). Consequently, the view that experiences have significance can be shared to some extent by those who value naturalness or functioning (eg Bracke & Hopster 2006).

An animal's experience is a matter of the sensory inputs it receives and its engagement with those experiences. These engagements include conscious emotional experiences with qualities, such as painfulness or pleasantness, as well as cognitive engagements (Boissy *et al* 2007a). These may result in motivational states, as well as in physiological changes and behaviours (Denton *et al* 2009).

Not every quality of an experience has value for animal welfare. The quality that determines the value of an experience is its *valence*. Experiences may be unpleasant, such as pain, fear or distress, and be said to have a negative valence. Other experiences may be pleasant, such as satiety, foraging, play, enjoyment or satisfaction, and be described as having a positive valence.

From a neurological or phenomenological perspective, the overall feeling involved in an experience is not simply a function of its valence. Some experiences may be simple experiences of pain or pleasure. Others may be complicated combinations of many feelings, for example, a gustatory experience may involve a combination of many taste, olfactory and visual feelings; the combination may have an overall pleasant or unpleasant quality. Furthermore, an experience may have many other qualities besides its valence (Russell 1980). These may include arousal (Désiré *et al* 2002; Burgdorf & Panksepp 2006) and potency/dominance/coping (Scherer *et al* 2006; Veissier & Boissy 2007). In some cases, these other qualities may be modifiers, insofar as they enhance or modify the experience's pleasantness or unpleasantness.

Nor does the concern for valence require that there is a single neural correlate of valence. Both pleasantness and unpleasantness may be generic terms corresponding to a whole range of neural events. For example, there appear to be at least three genetically distinct classes of pain (Mogil *et al* 1999a,b; Shir *et al* 2001; Lariviere *et al* 2002) and many subjective manifestations of it (Gregory 2004) and pain may itself be made up of various qualities (eg LaCroix-Fralish & Mogil 2009). In addition, pain and pleasure may have at least partly different neural correlates to each other, although they may share some of their neural circuitry (Berridge 2003). They may have evolved separately, and for different purposes (Fraser & Duncan 1998). Indeed, pleasantness and unpleasantness may not even be precise opposites on a single scale (Russell & Carroll 1999; Rafaeli & Revelle 2006). Nevertheless, it is possible to consider all experiences along one domain of negative-positive valence (Feldman Barrett & Russell 1998; Spruijt *et al* 2001), whilst recognising that this is an 'axiological', rather than biological model.

Experiences can therefore be said to have significance depending on their overall pleasantness or unpleasantness. Furthermore, unlike functioning or naturalness, pleasant/unpleasant experiences have direct and intrinsic positive/negative value for the animal itself. One might therefore describe a pleasant experience as being worth experiencing in itself, because it has 'worth' to the animal, and it would be worthwhile for the animal to have it, all else being equal (ie excluding indirect unpleasant effects on the animal at a later time or on other animals). Similarly, negative experiences can be said to be worth avoiding. The animal would have better welfare if it did not have these experiences, and thus it would be worth avoiding them (ignoring any cost of avoiding them in terms of later suffering). There are two ways to avoid such unpleasant states: firstly, for the animal to experience another state instead (such as satiety instead of hunger) and, secondly, for the animal to experience no state at all, such as being anaesthetised, insentient or dead. Such negatively valenced experiences therefore constitute a cost or 'negative worth' to the animal. Other experiences may be neutral (Kirkwood & Hubrecht 2001), which one might define as being neither worth having nor worth avoiding.

Overall welfare (worth having)

More recent work has attempted to consider an animal's overall welfare at a particular time (Bracke *et al* 1999a,b; Spruijt *et al* 2001). An individual's overall welfare depends on the combination of all its current experiences, in terms of their valence and severity. How multiple experiences combine can also depend on the interactions between these experiences. Some interactions are a matter of 'cancelling each other out', for example, an arousing or pleasant experience, such as sex, may mean an animal does not engage with a potentially painful sensation (Yeates & Main 2008). Other interactions may involve one experience augmenting another. For example, one painful experience may be associated with hypersensitivity to others (Lariviere *et al* 2002). Interactions may also be a matter of altering attention, for example a feeling of fear may alter how much attention an animal gives to a feeling of pain, as suggested by research in monkeys (Dubner *et al* 1981; Bushnell *et al* 1984), rats (Ford *et al* 2008), cats (Casey & Morrow 1983) and chickens (Gentle 2001). Other experiences may be reciprocal combinations, for example the reduction of an unpleasant experience may be experienced as a pleasant feeling ('relief'). These relations mean that the concept of an animal's overall welfare is more complicated and richer than that of a basic state, but nevertheless is an understandable concept.

Just as simple states can be conceptually considered as being unpleasant or pleasant, so can an animal's overall welfare be modelled as having a positive or negative value as a whole (Broom 1999; Dawkins 2006). Thus, in the same way that an individual state is worth having or worth avoiding for an animal because of the overall valence of the feelings involved, so the overall welfare state of an animal may be worth having or worth avoiding because of the total value of all the experiences involved.

Avoiding a negative overall welfare might be achieved in two ways. Firstly, a negative overall welfare may be avoided by providing pleasant experiences to outweigh the unpleasant ones at that time. Alternatively, it may be achieved by preventing all experiences. For example, surgery, such as thoracotomy, would be likely to cause significant pain and fear if the animal was able to experience the injuries and engage with the resultant nociceptive sensory inputs. These unpleasant experiences would be unlikely to be outweighed by sufficient pleasant experiences at the same time. So, making the animal unable to experience all feelings through general anaesthesia would avoid that pain, and thus avoid the overall welfare worth avoiding, albeit at the expense of avoiding any hypothetical pleasure. Since pleasure is intrinsically worth having, providing sufficient pleasant experiences would be better than preventing all experiences. Nevertheless, the absence of all experiences is, by definition, better than an overall welfare worth avoiding.

Quality of life (worth having)

The idea of an animal's overall welfare at a particular time can be broadened further to include all its experiences over an extended period of time. This might be called an animal's quality of life (QOL) (Morton 2007; Yeates & Main 2009).

Like overall welfare, QOL is a matter of animal's mental experiences (McMillan 2003), and is again a combination of more basic elements (Hewson *et al* 2007; Broom 2008). It is effectively a balance of all experiences within a specific period. It is therefore a matter of the valence, severity and duration of all experiences. Plus, experiences may interact in even more complicated ways over an extended period. Earlier experiences may alter how animals engage with later stimuli. Recurrent pleasant or unpleasant experiences may lead to an animal being in an 'optimistic', 'depressed' or 'anxious' state (Harding *et al* 2004, Paul *et al* 2005).

QOL can, like overall welfare, be considered as worth having or worth avoiding. If the pleasant experiences outweigh the unpleasant ones then the overall balance of experiences is positive, and so the animal has a QOL worth having. Conversely, an animal's QOL may be worth avoiding. Again, the ideal might be to avoid such a poor QOL by providing enough pleasant experiences, otherwise the prevention of all experiences for that period of time would be better for the animal, all else being equal, than a QOL that is worth avoiding.

Value of life (worth living)

These considerations allow the idea of an animal's QOL to be broadened to include the entire period of its life. By definition, the value of an animal's life depends on all the experiences that the animal has from the moment it begins to live until its death. This includes all events in the animal's life, such as any social pleasures, mutilations, transport and disease, and the lead up to and method of slaughter or other mode of death. It also depends on interactions between periods, such as the effects of early developmental periods, where socialisation and sensitisation can affect later experiences and engagements (Appleby *et al* 2002; Prescott *et al* 2004). It would effectively exclude any time between conception and the onset of consciousness (see Diesch *et al* 2007) or the time between pre-stunning and slaughter.

A life can then be considered as having sufficient value to be worth living for the animal. This refers to a simple question of whether the animal is 'better off' alive. The threshold between whether or not an animal has an LWL is a matter of whether the experiences throughout the life were worth having as a whole, ie for a life to be an LWL "the balance of an animal's experiences must be positive over its lifetime" (FAWC 2009; p 14).

For other animals, it may have been better for them to be dead or never to be born at all (Wathes 2010). The FAWC (2009) document suggests that the opposite of an LWL is a "life not worth living" (LNWL). This is a useful oversimplification. Strictly speaking, the concept of an LNWL

includes two different types of life. The first is what one might expect FAWC means: a life that is worth avoiding (LWA). As with individual experiences worth avoiding, an LWA may be avoided through providing the animal with a better life through more pleasant experiences, or through making the animal have no experiences. Death represents a state without experiences, and as such may be said to be neutral, ie neither worth living nor worth avoiding in itself. Death may therefore be preferable to a life in which the overall balance of unpleasant experiences outweighs the pleasant experiences across an animal's lifetime.

The second type of lives that are not worth living is those that are neither worth living nor worth avoiding. In experiential terms, such lives and being dead have equivalent value to the animal. This concept relates firstly to insentient animals, which might be described as having a life without experience (LWE). It also relates to animals where the pleasant and unpleasant experiences (and any other non-welfare value) precisely cancel each other out, so that the benefits of avoiding the unpleasant experiences would be precisely countered by the cost of missing out on pleasant experiences and *vice versa*. On an experiences-based account of animal welfare as described above, these animals might be described as having a life worth nothing (LWN). This concept is likely to be relatively unimportant in practice, firstly, because it seems almost impossible to accurately determine when the pleasant and unpleasant experiences of sentient animals precisely cancel each other out and, secondly, because assessors may be unable or unwilling to ignore other values, such as a value of life independent of the animal's experiences. But the concept may be helpful in providing a theoretical benchmark by which the other concepts may be compared. We therefore have at least a three-tier system: an LWL, an LWA and an LWN.

Applications of the concept of an LWL

We may now consider possible uses of the concept of an LWL. The concept has a number of characteristics that may be considered to increase its usefulness. Firstly, the comparison to non-experience (or an LWE) provides a 'zero point' by which to evaluate the worth of an animal's life in experiential terms. This point is not arbitrary like concepts of 'severe', 'good' etc, although its assessment may still involve subjective evaluations. Secondly, LWL is an animal-based concept, unlike concepts such as 'reasonable', 'acceptable', 'humane' or 'necessary'. This is signposted by the use of the term 'worth living', since living is something the animal does (in contrast, the animal's keepers perpetuate, support or breed the animal's life). So, the concept relates to whether it is worth the animal living the life, rather than whether the animal's instrumental value makes it a life worth perpetuating, supporting or breeding for its keepers. Thirdly, the concept is one that people can understand, at least on a superficial and intuitive level. The introduction of the novel concept may actually help public dialogue and understanding of animal welfare. Fourthly, the LWL concept is directly prescriptive because, whereas other assessments need to be converted into an ethical decision,

the assessment of a life as an LWL or LWA directly entails an ethical value to be taken into account in decision-making alongside other values.

These features suggest that the concept might be useful. But it is helpful to consider its usefulness when applied more specifically to matters such as management decisions about individual animals and setting standards.

Animal welfare management decisions

Euthanasia

An obvious application of the concept of an LWL is in euthanasia decisions. Euthanasia may be defined as killing an animal in its own interests (Regan 1983). Various criteria have been suggested for determining when euthanasia is appropriate. Some are based on single states, such as suffering or 'suffering extremely' (Webster 1994). But, since there are no absolute, natural units of severity, this is an inevitably subjective and arbitrary threshold. Other criteria are based on an overall assessment at the time of the decision. For example, Edney (1989) suggests a list of questions to ask about the animal's current overall welfare, but these relate only to one particular time. Others have suggested that euthanasia decisions should be based on the animal's quality of life (Yeates & Main 2009). But it is hard to define the threshold of QOL where euthanasia is indicated.

Using the LWL concept, euthanasia decisions can be based on whether an animal is expected to have an overall LWA, measured from the time of the euthanasia decision to when it would otherwise be expected to die or permanently lose consciousness. If the opportunity for pleasant experiences is not worth the unpleasant experiences, ie the animal's future life is worth avoiding, this provides a reason to euthanase it. This account could, however, imply that there is a reason against killing animals that have an LWL (Yeates 2009) — which may be thought undesirable for other reasons (Sandøe *et al* 1997).

Breeding

The concept of an LWL may be similarly useful in deciding what animals may be bred. Previous policies have been based on other, more arbitrary concepts, for example the EU General Farm Animals Directive (98/58/EC) states that:

“[a]nimals may only be kept for farming purposes if it can reasonably be expected, on the basis of their genotype or phenotype, that they can be kept without any detrimental effect on their health or welfare”.

But it is not clear what counts as “detrimental effect on their welfare”. Similarly, the FAWC argued that harms that lead to severe or lasting pain should always be avoided (FAWC 1998). But the use of such modifiers does not make it clear what degree of pain counts as 'severe' or what duration counts as 'lasting', or why pain has a special status above other unpleasant states. Others have argued that the acceptability of breeding methods should depend on the animal's QOL (McGreevy 2007), but again it is unclear what level of QOL is acceptable.

It is less complicated to argue that an animal should not be created unless it can reasonably be expected, on the basis of their genotype or phenotype, that it will have an LWL. This would require: i) that the animal is of a breed capable of having an LWL; ii) that the environment was one capable of providing an LWL; and iii) that the breed and environment were sufficiently appropriate in relation to each other that the combination leads to every animal having an LWL. An alternative, but similar, principle would be that an animal should not be created if it can reasonably be expected that it will have an LWA — the difference between this and the principle based on the LWL concept depends partly on how cautious breeders should be, and partly on whether it is acceptable to create an insentient animal. In either case, the decision involves subjective judgements, but it may nevertheless be possible to formulate the principle itself in an agreed and formal manner.

Insentience

The issues of producing insentient animals by breeding and making sentient animals insentient by various means are decisions where the concept of an LWE may be useful. The FAWC have argued that the generation of beings with sentience so low as to be mere instruments is another harm that ought never to be allowed (FAWC 1998). But the welfare-based grounds for this conclusion are not clear. It cannot be on the basis that it will lead to negative mental states, because an insentient animal will not experience those states. An insentient animal by definition has an LWE, which is neither worth having nor avoiding. Insentience may be considered a harm if it prevents animals that would otherwise be sentient from experiencing an LWL; conversely, rendering sentient animals insentient (eg by decerebration surgery) is beneficial to that animal if it would otherwise have an LWA, albeit less beneficial than ensuring the animal has an LWL. Thus, making animals insentient may be considered desirable in some cases but not others.

Mutilations

The concept of an LWL can also provide a way to think about mutilations. For example, some mutilations, such as tail-docking and mulesing, are usually performed for the benefit of the animals that undergo them. In lambs, mutilations such as tail docking and mulesing may cause unpleasant experiences, such as pain and distress (Kent *et al* 1993; Jongman *et al* 2000). These experiences may last for hours (Peers *et al* 2002) or several days (Shutt *et al* 1987; Thornton & Waterman-Pearson 2002). On the other hand, undertaking these mutilations may avoid the negative consequences of conditions, such as fly-strike, which cause unpleasant experiences, such as distress and malaise (Colditz *et al* 2005). These latter negative experiences may be more severe (Phillips 2009) and last longer (an average of ten days; Lee & Fisher 2007) than those caused by the mutilations.

Welfare assessments may calculate the benefits and harms of mutilation on a flock level (Morris 2000; Goddard 2008). But, it may be hard to justify tail-docking when the percentage of animals expected to get fly-strike is suffi-

ciently low (Goddard 2008). The concept of an LWL provides a different approach. It seems likely that fly-strike would lead to a lamb having an LWA because of the severe unpleasant experiences. In contrast, the lesser harm of tail-docking may still make it likely that the lamb has an LWL. On the principle that farmers should prevent any animal having an LWA, tail-docking all lambs would be acceptable, but allowing even one lamb to get fly-strike is not. Thus, on this principle, the herd should be docked.

A similar process could be used to ethically analyse other mutilations which benefit other animals. For example, the harm of dehorning cattle might still allow each cow or steer to enjoy an LWL, whereas the harm of being significantly mauled may involve significant unpleasant experiences which would mean that animal has an LWA. Dehorning all animals would therefore be justified to prevent any having an LWA, even if it leads to a greater amount of pain than it avoids overall.

Setting standards

The FAWC suggests that:

“the primary aim of the future strategy for farm animal welfare in Great Britain ought to be that every farm animal has a life worth living” (FAWC 2009; p 44).

The FAWC suggests two related ways to achieve this goal. The first is that “full compliance with the law should mean that an animal has a life worth living”. For instance, it could be made an offence to cause or permit an animal to have an LWA. Alternatively, more specific regulations might be formulated that together would prevent any animal having an LWA, for example through banning husbandry systems that do not ensure every animal has an LWL, mandating euthanasia of animals expected to have an LWA etc.

The second way would be for farm assurance labelling to be based on whether the animal has an LWL. It is important for consumers to understand labels (FAWC 2006), and they might be expected to understand the concept of an LWL more easily than other currently used terms, such as stress, distress, consumer demand, risk, needs and medical terms, which can be complicated and have specific scientific meanings that may be relatively opaque. Furthermore, labelling products from animals that have had an LWL (and perhaps those that had an LWA) might provide a psychologically potent source of information, which consumers may find it hard to disregard. (Although one caveat to this is that some consumers might deliberately purchase such meat because it is better to help an animal avoid an LWA than to kill an animal that is having an LWL).

Ensuring that every animal should have an LWL would not mean that no animal can be allowed to suffer. It would simply require that this suffering is somehow compensated for by pleasant experiences. Thus, suffering experienced during transportation and slaughter might be acceptable as long as this is balanced by sufficient other positively valenced experiences. Indeed, having an LWL does not even require the avoidance of severe harms. The FAWC suggests that an animal’s life is not worth living (ie worth avoiding) if it is managed in systems that are known to “induce severe negative mental states, frustrate normal

behaviour, preclude positive experiences or cause physical debilitation” or “fail to meet the physiological and mental needs of the animal” (FAWC 2009; p 15). But these are not all necessary conditions. It is at least theoretically possible that an animal may suffer severe negative mental states, for which it is compensated by the provision of pleasant experiences. Similarly, an animal may have an LWL despite having some of its normal behaviours frustrated or undergoing moderate physical debilitation. The preclusion of any positive states at all is a more apposite condition, because an animal that cannot have positive experiences would have an LWA if it experienced even mildly unpleasant states.

The use of the LWL concept in setting standards may have several benefits. Ensuring animals have an LWL requires consideration of all positive and negative experiences though animals’ whole lives, rather than focusing only on certain elements, such as slaughter or mutilations. The LWL concept compares favourably to other concepts in terms of relating to a fixed value (an LWE). In comparison, other thresholds may be more arbitrary or complicated. For example, the Welfare Quality® Project (www.welfare-quality.net) uses very detailed mathematical models, which may be difficult for consumers to understand, to classify systems as ‘enhanced’, ‘excellent’ or ‘acceptable’. The Danish Cattle Federation (DCF) recently suggested a policy that farm assessments should evaluate the positive and negative experiences of the animals across their whole lives (DCF 2006). But the DCF prescribed that animals should live ‘good’ lives, which does not provide a clear threshold of what is acceptable. This vagueness is repeated by the FAWC’s use of the same term to designate an even higher welfare standard than an LWL. Other approaches, such as the Bristol Welfare Assurance Protocol, define welfare standards relative to other animals’ conditions (Webster 2005; also Huxley *et al* 2004).

In addition, a policy of ensuring that every animal has an LWL might usefully redirect animal welfare discussions about husbandry systems from debates over which system is better to the simpler question of which systems are acceptable. If keeping a strain of broilers or broiler breeders under system A or system B both cause different problems which lead to lives worth avoiding, then farmers should not choose the less harmful system, but find new ways to farm broilers which ensure that every bird has an LWL. If this cannot be achieved for a particular strain, then that strain should not be farmed at all.

In fact, the principle could be used to assess whether farming is acceptable as an entire industry. If the FAWC’s aim of all animals having an LWL were achieved, this would make farming a beneficent process to farm animals, which would therefore get to experience an LWL that they otherwise would not have. In this case, death may be considered to be due payment for the opportunity for life (Lund & Olsson 2006) or a necessary sacrifice to allow new animals to have lives worth living. Conversely, where farmed animals have lives worth avoiding, farming is a more pernicious enterprise, exploiting animals that would be better off having never been born.

Limitations of the concept of an LWL

Despite these applications, the concept of an LWL does have certain inherent disadvantages and limitations. Firstly, its wide-ranging scope may make assessment complicated. Some of these complications are the complexities of the underlying concepts, such as the problem of quantifying mental experiences and the complexities of aggregating experiences into single assessments. Other complications are additional, such as the practical problems of assessing welfare over very long periods and predicting the likely QOL of an animal until it dies. Such complexity may be especially disadvantageous for farm assessment (Sørensen & Sandøe 2001). Thus, assessment methods may be extremely complex and opaque, and potentially unfeasible, unless simpler, reliable ‘iceberg’ measures are developed.

Secondly, the concept may be understood in different ways, because different people will have different ethical views about the value of life for an animal. Specifically, some people may subconsciously be biased by underlying sympathy for ethical views such as animal rights or sanctity of life, which are commonly included within evaluations of human life (Huxtable 2007). Others may be swayed by what QOL is ‘socially acceptable’ (indeed FAWC imply this [2009; p 18]). Others may be biased by personal interests: for example, it seems unlikely that well-meaning farmers would be easily convinced that their stock would be better off dead. However, these limitations and biases are not unique to the LWL concept. Animal welfare is, in itself, a value-laden concept (Tannenbaum 1991; Sandøe *et al* 2003), and may be understood differently by different people.

Thirdly, the complexity and subjectivity of assessment may lead to poor inter-observer reliability in Farm Assurance assessments. Further work would be needed to establish methods to achieve acceptable levels of precision and reliability, as has been achieved for some other complex and subjective assessments (Wemelsfelder 1997; Meagher 2009).

These first three limitations threaten to undermine some of the concept’s possible advantages. For example, excessive complexity or opacity of assessment methods would lose the benefits of the concept being easily understood at a superficial and abstract level. Confusion or debate about any proposed policy or labelling scheme may make policy-makers or consumers feel unable to make good decisions using the concept, and thus fail to formulate the requisite policy or to purchase the approved farm animal products.

A fourth limitation is that the concept of an LWL/LWN/LWA is a three-tier system and is therefore an insensitive classification. It does not differentiate between an animal that has a wonderfully pleasant life and one that has a life that is only just worth living. Similarly, it cannot differentiate between an animal that has a life worth avoiding because the overall balance of experiences is slightly negative, and one that has a life of extreme and constant suffering.

The specific principle suggested by the FAWC, that every animal should have an LWL, also has limitations, in addition to the potential disadvantages of the concept of an LWL. Some are practical, such as how this aim is to be

ensured (ie what husbandry methods, how success is to be verified etc). Other limitations concern the principle's implications, because ensuring that an animal has an LWL cannot be expected to achieve all the ethical principles held by society. An obvious example is that the three-tier system means that the principle only requires that all animals have an LWL and no better than that. There is therefore no reason to add further value to an animal's life. Another obvious example is that the principle may be dogmatic and not allow an animal to have a life that is only just worth avoiding where this would have major benefits to others. For example, the idea that every experimental subject should have an LWL may mean that certain strains cannot ever be used, whatever the possible medical benefits. This limitation might be considered a positive implication (Yeates 2010), but it would be undesirable on utilitarian terms.

Other ethical principles are more subtly excluded. The FAWC states that for an animal to have an LWL, "any pain, suffering, distress or lasting harm must be necessary, proportionate and minimal" (FAWC 2009; p 14). But this is not a necessary condition for an animal to have an LWL. Any pain, suffering, distress or lasting harm an animal experiences during its lifetime will certainly affect the value of that life for the animal. But the issue is whether or not that pain, suffering, distress or lasting harm is sufficiently balanced by pleasant experiences, not whether it was necessary, proportionate or minimal. For example, as described above, it could be that tail docking or mulesing still allows all lambs to have an LWL. The principle that pain should be minimal would promote the use of analgesia, on the grounds that this appears to reduce the severity of the unpleasant experiences involved in both tail docking (Graham *et al* 1997) and mulesing (Paull *et al* 2007; Lomax *et al* 2008). But the principle of ensuring every sheep has an LWL only requires that the pain is balanced by sufficient pleasant experiences. This may be easier if the pain is less severe, but the principle that every animal should have an LWL does not itself require that analgesia be provided.

Similarly, deliberate cruelty is generally thought of as being morally wrong. But it is possible that an animal may suffer deliberately cruel treatment, yet for the resultant unpleasant experiences to be outweighed by earlier or later pleasures. For instance, bulls or game might be farmed in a manner that affords them significant pleasure and limited pain during most of their lives, in order to be fought or hunted in a cruel manner through the deliberate infliction of significant pain. This cruel treatment may still allow each animal to have an LWL overall, so the principle that every animal should have an LWL would not prohibit such cruelty.

The principle of ensuring an animal has an LWL also fails to include other ethical principles related to the value of life. It does not require that an animal has a natural lifespan. Killing an animal earlier does not, by itself, mean that it does not have an LWL, so long as its short life was worth living. Indeed, the FAWC's principle would allow that an animal could be legitimately bred or kept so that it is expected not to be able to live without suffering beyond a certain age. For

example, a strain of broilers may be bred so that they would suffer if kept alive beyond 60 days. But if they are killed before that suffering has occurred after, say, 32 generally pleasant days, those birds would have had an LWL.

One final limitation of note is that the principle that every animal should have an LWL may, on occasion promote the use of systems that are worse on welfare-based calculations within utilitarian frameworks. As a hypothetical example, a certain enriched cage system might be judged to provide all birds with an LWL — but only just. It may cause certain negative experiences (eg frustration of motivations; Hughes 1973; Baxter 1994), but may allow just enough pleasant experiences (eg food, dust-bathing, company; Widowski & Duncan 2000; Boissy *et al* 2007b; Yeates & Main 2008) to compensate (in addition, the few birds that are ill might be removed promptly through good surveillance by stockpersons). This may mean that all birds are judged to have an LWL in these cages. At the same time, an excellent free-range system may be considered better than a battery system because it allows chickens to range. Overall, it could be argued that the enjoyment of ranging more than outweighs the increased risks of negative experiences due to parasitism, predation, feather-pecking etc, so that ranging birds have, on average, much better lives than birds in cages. However, not all birds use ranges (Green *et al* 2000). The birds that do not range therefore have the risk of unpleasant experiences without being compensated for the unpleasant effects of any parasitism, predation etc. This may mean that some birds are judged to have an LWA in this free-range system. A focus on avoiding any animal having an LWA would therefore favour the cage system (in which all birds have an LWL) over the free-range system (in which a minority have an LWA).

Animal welfare implications

The ultimate benefit of the concept could be that fewer animals have lives worth avoiding. Since the concept is directly prescriptive, this would be worthwhile by definition. But uses of the concept should not make us ignore other ethical principles that are also important to ensuring animal's welfare.

Conclusion

In conclusion, the concept of an LWL probably does provide a useful addition to the welfare vocabulary. LWL can be considered as an extension of the concepts of experiences-based welfare, individual overall welfare and QOL. It does indeed appear to 'capture the current zeitgeist', and may provide an embellishment from which practical benefits can be derived. It is animal-based and directly applicable in decision-making. In euthanasia decisions it is already used, albeit implicitly (Wathes 2010); but greater discussion and analysis of the use of the concept in this context would be beneficial. In breeding and policy standards it may provide a useful way to set thresholds, where other standards are more arbitrary and confusing.

But the concept, as it stands, has limitations and there are several areas in which further development and analysis are

needed. Especially useful areas for further work include determining: (i) exactly how animals' lives should be assessed in a simple and reliable way; (ii) what values should be considered in deciding whether an animal's life is an LWL; (iii) what ethical principles should be used to apply the concept (eg is the prescription that every animal should have an LWL appropriate?); (iv) how principles based on the concept relate to other principles, such as utilitarian evaluations; (v) implications of other applications of the concept; and (vi) which systems, breeds and practices allow animals to have an LWL.

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