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Concepts of distress, suffering and their operational interpretation

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What an operational definition of distress is not.

The major concern of this paper is with the operational interpretation of animal distress and suffering – that is, with the issue of how we can measure the extent of an animal's distress in practice. I shall probably make myself very unpopular by expressing the view right from the outset that I think it is neither possible nor desirable to try to discover universal 'indicators' of distress that will apply to all animals in all situations.

There are three reasons for taking this view.

First, we now have available to us many different potential indicators of distress and suffering in animals, including an increasing number of non-invasive ways of accessing physiological changes such as heart rate, corticosteroid ('stress' hormone) measures from urine and feces, body temperature and various measures of behavior such as vocalizations and stereotypies. The problem is that we often find that these different measures do not correlate very well, or even give contradictory pictures of what situations most distress animals (Rushen, 1991). For example, in laying hens, a greater increase in corticosteroids and a greater distortion of shell quality was found in birds given access to an enriched environment than in those only given access to a barren environment, despite their being an overt behavioral preference for the enriched environment (Dawkins et al, 2004a.). The birds thus seemed to prefer an environment that appeared to make them more 'stressed'.

Second, many 'indicators' of distress are not unique to situations of distress but may also vary naturally during the course of the animal's life or when they are engaged in apparently pleasurable activities such as sexual behavior and in anticipation of food. Corticosteroid levels vary naturally with time of day, degree of activity and reproductive state (Wingfield et al 1997), making it invalid to interpret them solely in terms of a change in levels of distress. This should not be particularly surprising. Many of the so-called indicators of distress are simply autonomic responses that prepare the body for action. The prey animal distressed by being chased by a predator and the predator chasing it and anticipating the pleasure of a meal will both show many of the same physiological reactions (increased heart rate, increased levels of various hormones, increased body temperature etc) because both are engaged in intense physical activity. The autonomic changes on their own (and many physiological indicators of distress are autonomic changes) thus give no indication of the valence of those changes – whether they are experienced as pleasurable or distressful by the animals themselves.

Third, an evolutionary view of animal distress and suffering suggests that the way animals can be expected to respond, both physiologically and behaviorally to a given distressful situation, will depend critically on what that situation is. Thus, an animal distressed by being deprived of food will show a different set of reactions to one distressed by the fear of being caught by a predator, which will be different again to that of one distressed by separation from its offspring. Animals do not have general 'indicators of distress'. Rather, what they do in a distressful situation can be expected to be related in some way either to getting themselves out of a dangerous situation or of avoiding it altogether. An animal in danger of dying of starvation will seek food, or lie low to conserve energy, whereas an animal in danger of being eaten by a

predator will run away. Because an evolutionary approach leads us to expect distressed animals to be taking steps to remove themselves from the cause of that distress, and because what steps need to be taken will vary with the cause, we should be prepared not only to study each species individually but also to document its responses to individual distressors. Of course we may find that there are commonalities between the way an animal reacts to different sources of suffering but we should not initially assume it and if it is the case, it should be established empirically.

A possible operational definition of distress: the two question approach

Having now emphasized what the operational interpretation of distress and suffering is not, I now come to what it might be. Whatever it is, it is not going to be simple and it is going to involve detailed studies of each species and of each species' responses to different sources of suffering. A great deal has now been written about how to assess suffering and distress in animals (e.g. Dawkins, 1980; Moberg, 1985; Broom, 1988; Broom and Johnston, 1993; Mason & Mendl, 1993; Duncan, 1993), much of it emphasizing that we must not rely on single measures but need to take into account a wide variety of measures. What has not been addressed in sufficient depth is how the many different measures we now have available (biochemical, physiological, behavioral) should be put together to give an overall picture of an animal's state of distress or welfare. In view of the difficulties discussed above, this is a serious issue and one that needs to be addressed if we are to make progress in animal welfare assessment. The danger is to assume that the longer the list (i.e. the more different measures we have) the more accurate will be the picture of the animal's state of distress or suffering. I am going to risk becoming even more unpopular by saying that while longer and longer lists are useful and new measures of distress are to be welcomed, they are less important than being able to answer two key questions about animal suffering. These two questions are: 1) Are the animals healthy? and 2) Do the animals have what they want?

I shall now argue that, operationally, animal distress can be recognized when either or both of these questions is answered negatively.

1) Are the animals healthy?

Good health is the foundation of all good welfare. Conversely, conditions that compromise animal health, lead to increased risk of dying, injury and/or disease are major sources of suffering and distress. It is not particularly contentious to argue that conditions that lead to higher mortality, disease, deformity or injury cause greater distress. What is more contentious is whether just assessing health is enough. For some people that is all there is to good welfare. For many other people, however, good welfare implies a great deal more than an observation that the animals are not actually dying of injury or disease. What that 'more' consists of is the challenge confronting the study of animal distress.

2) Do the animals have what they want?

This is an operational question and one that can be investigated empirically, which is of course what we are seeking. I now need to show that the question itself is up to the job of supplying us with the key complementary information about animal distress and suffering. Can it give us the 'more' we want in addition to animal health measures?

When applied to ourselves or to other people, we use the word 'suffering' as an umbrella term to cover an enormous range of different states. We talk about people suffering from thirst, suffering from cold, suffering from a bereavement, suffering from exam nerves as well as suffering from pain, or from a facial disfigurement that is not painful. These states are all very different, not just

in their physiological manifestation but in what people do and, above all, in what it is like to consciously experience them. So what makes us apply this one word to such diversity and give it any sort of meaning?

The answer is that they are all states that can be described as unpleasant, states that we would rather not be in if we could possibly avoid them, states that we would get out of if we had the means to do so. (The unpleasantness must be either prolonged or severe. We would not count a mild itch as suffering but an itch that persisted and/or was so severe that it stopped us doing other things would count as suffering).

The word 'suffering' as used in common everyday speech about people thus subtly links together what they are doing (piling on more clothes and huddling over the fire), their autonomic response (shivering, white fingers) and what we assume their conscious experience to be (we use our own experiences of what it is like to be really cold and showing the same symptoms). But the key point is that all of the various ways in which people can suffer or be distressed involve them either being in a situation that they want to get out of (and would do so if given the opportunity) or not having something they want (and would obtain it if they could). Suffering from hunger means (operationally) wanting food and being prepared to go to great lengths to get it. Suffering from the cold means wanting to get warmer. Suffering from a bereavement means wanting the loved one back. Suffering from a facial disfigurement means wanting to look different. In each case, the implication is that the wanting is strong, so that the person is not just mildly but strongly motivated to obtain something they do not have (food, warmth) or get away from something they do have (pain, loud noise).

To ask whether other animals have what they want is therefore not a small or peripheral question, but one that takes us to the heart of what we mean by distress and suffering in ourselves and, by analogy what we might mean by it in other species. As we now have a wide variety of ways of measuring what animals want and how much they want it, we potentially have the operational tools for assessing distress that may occur in the absence of physical ill-health. The question 'Do the animals have what they want?' thus does deserve its favoured place as one of the two key questions we need to ask about animal distress.

The advantages of the 'two question' approach to distress

Concentrating on finding answers to these two key questions rather than on constructing longer and longer lists of indicators of distress has the further advantage that it enables us to assess the usefulness of contentious welfare measures.

For example, if we want to decide whether a caged animal is distressed by not being able to perform a behavior that is part of the a natural repertoire of uncaged animals (dust-bathing in chickens, for example (Vestergaard et al, 1997)), we can ask 'does performing the behavior improve the animal's health?' and 'does the animal show evidence of wanting to do the behavior?'. If the answer to both of these questions is negative, then the argument for saying that the animal is distressed by not performing the behavior is weak or non-existent. But if the answers are positive, then the case is very strong. Similarly, if we want to know whether a rise in corticosteroids or an increase in stereotypic behavior indicates poor welfare, then we again need to ask the same two questions.

Being very practical, the two questions together also indicate how to address otherwise intractable questions such as whether the high stocking densities at which broiler chickens are kept on commercial farms cause distress or suffering to the birds. This is a highly controversial

question (Webster, 1994) and the well-being of many millions of animals hangs on the correct answer. Operationally, we can ask: 1) whether giving birds more space improves their health; and 2) whether they want more space. If we can answer these two questions, then we are well on the way to answering the question (Dawkins et al, 2004b). If we cannot, however, then we lack the evidence to make an informed decision.

So I am putting forward for discussion at the workshop the somewhat sweeping statement that, operationally, measurement of animal distress and suffering is best done by asking two major questions and, even more controversially, that these are really the only questions that we need to ask. Veterinarians can help us with the assessment of animal health as a first step in the assessment of distress and suffering but we need more than just this to tackle what most people mean by suffering. That 'more' comes from finding out what the animals themselves want and finding out whether they want to change or continue the environment they are in.

Sometimes what the animals tell us is very compelling, even to those who might be reluctant to admit that animals may be like us in experiencing pain or suffering in the way we do. A good example is the way in which broiler chickens have shown that they 'want' to avoid the pain of lameness by learning to select food containing an analgesic. Danbury et al (2000) scored the walking ability of broiler chickens on a 6-point scale from 0 (=good walking) to 5 (=unable to walk) (Kestin, 1992). They presented both healthy (score 0) and lame birds with two differently colored foods, one of which contained carprofen, which is a non-steroidal anti-inflammatory drug. The lame birds learned to choose the color with the drug, whereas the healthy birds with good legs did not show such a preference. Furthermore, birds that had ingested carprofen walked more easily and improved their scores. It is hard not to conclude from this that considerable distress is caused to broiler chickens by being lame, partly because they have leg deformities but also because they demonstrate that they want relief from the pain.

We now have many other examples of animals not only expressing what they want but also how much they want it, and thus indicating what situations cause them distress. Laboratory rats, for example, do not just prefer to be with other rats when given the choice, they will work hard (press a lever many times) to gain access to companion rats, much harder than they will work to gain access to a larger cage or a cage with novel objects (Patterson-Kane et al 2002). Mink will push extremely heavy doors to gain access to water where they can swim (Mason et al 2001) and the rise in urinary cortisol that occurs when they are locked out of their swimming bath is only slightly lower than that which occurs when they are locked out of their food compartment. Since being locked out of an empty cage or a cage with an alternative nest site resulted in no change in urinary cortisol, this suggests that mink value access to water and may be distressed without it.

While there are undoubtedly problems with the interpretation of such experiments (Fraser and Matthews, 1997), such as experiments giving different results depending on whether the animals can see what they are working for (Mason & Warburton 2003), the animal's developmental history, the precise choices they are offered and how stressed they are when making the choice (Mendl, 1999), this just means that when asking the two questions about animal distress, care needs to be taken to answer them in the correct context. For example, in asking whether a particular species of laboratory animal is distressed by being kept in isolation in commercial laboratories, it would be important to make sure that the developmental history and other factors of the animals used to test this would be comparable to those of the commercially kept animals. Provided they were comparable, the possibility that rearing the animals in different conditions might give different answers as to what they wanted (or even to what made them healthy) would be interesting but irrelevant.

Conclusions

In conclusion, the difficulties of assessing distress in animals should not be underestimated because it involves venturing into that most difficult and mysterious of places – the private experiences of other organisms (Duncan, 1993; Broom, 1998). But neither should the difficulties be overestimated and cause us to give up the quest altogether as a consequence. The definition of suffering we use for other people offers a way forward because it involves linking observable evidence of what they do (specifically evidence of what they want to obtain or want to avoid) with what we assume they feel. This definition can then be extended to other species with a minimal leap of analogy about what other species feel. Operationally, suffering in other animals can be investigated by asking two questions: are the animals healthy? And do the animals have what they want? Distress or suffering can be defined as when either or both of these questions is answered in the negative and when there is evidence that the distress is prolonged or severe.

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