Animal ethics: sentience (pain consciousness) - 08/10 March 2023

1. Introduction to the debate: the moral considerability of non-human organisms;
2. The phylogenetic distribution of sentience;
3. Bioethical implications.

Davide Vecchi - Centro de Filosofia das Ciências da Universidade de Lisboa (CFCUL), Faculdade de Ciências da Universidade de Lisboa

dvecchi@fc.ul.pt

1.1 Introduction to the debate

In the case of many bioethical problems, such as euthanasia, only humans are the relevant members of the moral community, the possible moral agents of interest.

When we consider the animal ethics debate and the issue of our treatment of other species (in farming, animal experimentation, for consumption), the issue becomes whether **non-human animals** (or non-human organisms more generally) should be considered members of the moral community whose welfare (and possibly rights) should be considered.

Speciesists have a simple answer: we don’t care.

1.2 Introduction to the debate

Speciesism: characterisation of the concept of morally considerable member of the moral community in terms of a distinctive property of one species, which in this case is clearly the human species.

Singer (1974) argued that speciesism amounts to a morally unjustifiable bias, like racism:

"…. the racist violates the principle of equality by giving greater weight to the interests of members of his own race, when there is a clash between their interests and the interests of those of another race. Similarly the speciesist allows the interests of his own species to override the greater interests of members of other species. The pattern is the same in each case." Singer 1974, p. 108

1.3 Introduction to the debate

Speciesism is a way of founding **human exceptionalism**, i.e., the thesis that the human species is morally superior to others.

How do you found human exceptionalism biologically? What is the phenotype of interest?

Kant: moral considerability = being a rational, conscious and free agent.

Utilitarians: moral considerability = being sentient.

Rationality is the precondition for choosing the morally correct course of action, which is to universalise your maxim of conduct for Kantians.

Sentience capacities are the precondition for choosing to diminish pain and increase pleasure, which are the morally correct actions for utilitarians.

1.4 Introduction to the debate

There is something intuitively wrong in choosing rationality as the morally significant property.

As Dawkins (2001, pp. S27-S28) puts it: "*After all, you don't need to be very clever to feel pain or hunger or fear*".

The alternative is thus sentience. This is clearly in line with utilitarianism:

"*The day may come, when the rest of the animal creation may acquire those rights which never could have been withholden from them but by the hand of tyranny … What else is it that should trace the insuperable line? Is it the faculty of reason, or perhaps, the faculty for discourse?…**the question is not, Can they reason? nor, Can they talk? but, Can they suffer?***". Bentham, J. 1780/1789, chapter xvii, paragraph 6

1.5 Introduction to the debate

But it is also in line with a revised form of Kantian ethics where being rational is not considered relevant for moral consideration. After all, we consider all humans as end in themselves, even those with diminished (or even lacking) mental capacities.

If you stretch this deontological argument, you must encompass all organisms that are, as Regan (1985) argues, “subjects of a life”.

Being subject of a life means to experience pleasure and pain, enjoyment and suffering, satisfaction and frustration.

Being subject of a life means being sentient.

From this revised form of Kantian ethics, sentience is the crucial phenotype on which to ground moral consideration.

1.6 Introduction to the debate

"*It is the similarities* [between humans and animals] …. *not our differences, that matter most … all these dimensions of our life, including our pleasure and pain, our enjoyment and suffering, our satisfaction and frustration, our continued existence or our untimely death - all make a difference to the quality of our life as lived, as experienced, by us as individuals. As the same is true of those animals that concern us (the ones that are eaten and trapped, for example), they too must be viewed as the experiencing subjects of a life, with inherent value of their own.*" Regan 1985, p. 24.

1.7 Introduction to the debate

It is thus not surprising that many classic arguments in animal ethics - both from (unsurprisingly) the utilitarian (Singer 1974) and deontological (Regan 1985) tradition - focus on sentience.

Indeed “Animal sentience forms the foundation of animal welfare science and it is why animals need protection” (Proctor et al. 2013, p. 897).

Sentientism: sentience is the key biological property making an organism morally considerable.

So, the crucial question becomes: are some non-human organisms sentient? This is a biological question.

2.1 The phylogenetic distribution of sentience

"*Other animals, which, on account of their interests having been neglected by the insensibility of the ancient jurists,* ***stand degraded into the class of things*** …. ". Bentham 1780/1789, chapter xvii, paragraph 6.

Why is that so? Let us take a look at history.

Aristotle: only humans have rational souls, while the locomotive souls shared by all animals, endow them with instincts suited to their successful reproduction and survival. Plants have merely a vegetative soul.

Distinction between instinct and reason paves the way to an ontological distinction, a phylogenetic fracture, between humans and non-humans.

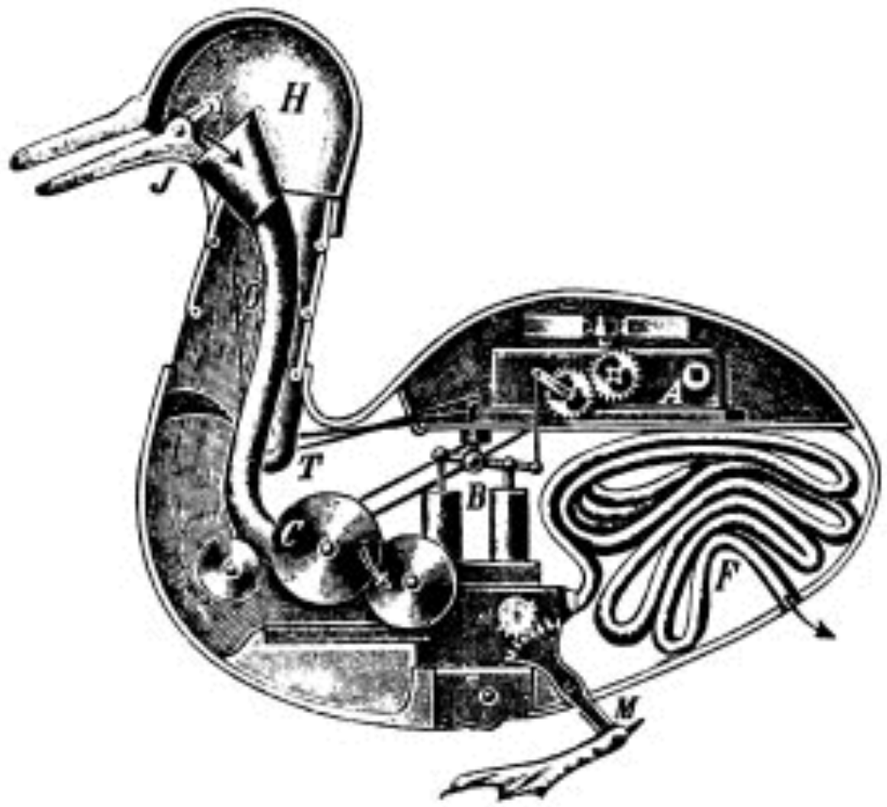
2.2 The phylogenetic distribution of sentience

Descartes' conception of animals as automata makes sentience superfluous.

Animals are reflex-driven machines, with no intellectual capacities.

(cf. The mechanical digesting duck of Jacques de Vaucanson's 1739).

"*Descartes himself practiced and advocated vivisection … and wrote in correspondence that the mechanical understanding of animals absolved people of any guilt for killing and eating animals*." Allen & Trestman 2016, section 3



2.3 The phylogenetic distribution of sentience

Aristotle: instinct vs. reason + Descartes: mechanical reflex vs. rational thought.

The alternative idea of **behavioural flexibility**, of being able to go beyond instinct or mechanical reflex, possibly involving some form of sentience, arose with evolutionism and Darwinism:

"*It is a significant fact, that the more the habits of any particular animal are studied by a naturalist, the more he attributes to reason, and the less to unlearnt instinct*." Darwin 1871, Book I, p.46.

Indeed, sentience studies move towards the **widening of sentience ascription** once confined to humans and now encompassing primates, mammals, vertebrates (Allen & Trestmann 2017) ..... up to where in phylogeny?

2.4 The phylogenetic distribution of sentience

Contemporary sentience studies are supported by a rich theoretical framework.

A crucial requirement for sentience is **nociception** (i.e., the capacity to sense noxious stimuli). Evidence of nociception is ubiquitous (e.g., bacteria perceive noxious stimuli). But nociception is considered insufficient for sentience ascription.

A basic theoretical distinction is drawn between mere nociception and pain: being sentient is being **pain conscious**, i.e., being able to feel the aversive quality of noxious stimuli, its feeling of unpleasantness, that is, to experience the suffering generated by noxious stimulation.

2.5 The phylogenetic distribution of sentience

This distinction between sensory (i.e., nociception) and affective pain is ubiquitous in sentience studies (even though it's also criticised, see Talbot et al. 2019).

But if pain consciousness requires a **subjective experience** concerning the aversive quality of noxious stimulation and its feeling of unpleasantness, **how can we identify the pain conscious and sentient organisms** who experience the affective dimension of pain?

We need to identify phenotypes that are linked to sentience: what are the **indicators of sentience**?

Phylogenetic and behavioural evidence used.

2.6 The phylogenetic distribution of sentience

Example 1: phenotype = anterior cingulate cortex (ACC). **Sentience = mammalian phenotype. Phylogenetic distribution: all mammals.**

1. The ACC is unproblematically associated with sentience in *Homo Sapiens* and mammals;

2. Investigate whether fish (e.g., salmon) possess a structurally homologous or a functionally analogous trait X' to ACC;

3. Salmon lack X'. Thus, by extrapolation, fish are not sentient.

But this argument is too coarse. Why?

2.7 The phylogenetic distribution of sentience

First, why should ACC be such a crucial phenotype? Is the evidence that, in humans, ACC is crucial for pain consciousness (in processing the affective dimension of pain) rather than nociception enough to dismiss the possibility of fish being sentient?

Secondly, and most generally, the use of phylogenetic evidence can be criticised for a fundamental reason, i.e., **evolution might have produced a variety of morphological and physiological structures realising sentience**:

"*While the ACC is important to mammals, there remains the possibility that other taxa may have functionally similar structures, such as the corticoidea dorsolateralis in birds.*" Allen & Trestman 2017 section 6

2.8 The phylogenetic distribution of sentience

"…. the most obvious place to draw a line between pain-conscious organisms and those not capable of feeling pain consciously is between vertebrates and invertebrates." Allen & Trestman 2017 section 7.1

Example 2: phenotype = centralised nervous system (CNS). **Sentience = vertebrate phenotype. Phylogenetic distribution: all vertebrates.**

1. The CNS is unproblematically associated with sentience in *Homo Sapiens* and many vertebrates;

2. Investigate whether insects (e.g., bee) possess a structurally homologous or functionally analogous trait X' to CNS;

3. Insects lack X'. Thus insects are not sentient.

Again, this argument is too coarse.

2.9 The phylogenetic distribution of sentience

First of all, morphological evidence of this kind is difficult to interpret. For instance, Barron & Klein (2016) argue that the cephalic ganglion of the insect brain executes a command function over the behavioural system, making the insect brain functionally analogous to a vertebrate CNS.

Secondly, the use of phylogenetic evidence can again be criticised because evolution might have produced a variety of morphological and physiological structures realising sentience (e.g., the octopus brain).

Indeed, in sentience studies, phylogenetic evidence is complemented by behavioural evidence.

Notably, evidence of flexible responses can be interpreted as somehow planned and directed behaviours, indicating some form of “decision-making” on the basis of nociception.

2.10 The phylogenetic distribution of sentience

Elwood and Apple (2009) subjected hermit crabs to weak electric shocks (not eliciting immediate evacuation of the shell).

Evidence of flexible behaviours:

- crabs were more likely to abandon the less preferred species of shell;

- crabs were less likely to evacuate their shells when the presence of predators was perceived.

Inference: crabs display the capacity of evaluating comparatively whether the advantage of keeping the shell for protection is worth the cost of being electrocuted or predated.

2.11 The phylogenetic distribution of sentience

What electric shocks elicit is a series of complex behavioural responses compatible with the occurrence of “evaluations” on the basis of memorised information concerning the strength of the shock and the quality of the shell as well as perceptual information concerning the presence of competitors and predators.

It seems intuitive to conceptualise crabs’ avoidance of prospective painful experiences (Elwood 2019).

This is possible evidence of sentience.

Sentience ascription might thus include some invertebrates.

2.12 The phylogenetic distribution of sentience

So, how far down phylogeny can we find evidence of sentience?

This is a difficult question also because two models of the analysis of behaviour are applied to different lineages for reasons that seem to be more the expression of phylogenetic bias.

One is the “belief+desires=decision” model of human action and another is the Cartesian “organism=machine” model.

Roughly, the first model is applied in ethology (see crabs case), the second in molecular research.

They are very different kinds of models with very different theoretical (e.g., about the minimal cognitive apparatus for sentience) and philosophical (the first postulates free will while the second seems deterministic) assumptions.

2.13 The phylogenetic distribution of sentience

So, how far down phylogeny can we find evidence of sentience?

In principle, we can apply the Cartesian model to human behaviour, as already suggested by La Mettrie in 1748 in the book “L’Homme Machine”.

Would we get rid of human decisions?

“To me, one of the most interesting questions of behavior is how an organism can make a decision about what to do when it encounters conflicting stimuli …. We are now identifying the genes involved in that mechanism, and we will **determine how the proteins normally made by those genes declare a decision. This may apply not only to flies but perhaps also to other organisms including humans**.” Adler 2011, p. 59

2.14 The phylogenetic distribution of sentience

So, how far down phylogeny can we find evidence of sentience?

Conversely, still in principle, we can apply the “belief+desires=decision” model to all organisms. So I can enquire about the putative “decisions” and sentience of plants and even bacteria (uhhh!).

Trends in Plant Science

CellPress
REVIEWS

Opinion

Plants Neither Possess nor Require Consciousness

Lincoln Taiz,[1,*] Daniel Alkon,[2] Andreas Draguhn,[3] Angus Murphy,[4] Michael Blatt,[5] Chris Hawes,[6] Gerhard Thiel,[7] and David G. Robinson[8]

ANIMAL SENTIENCE
AN INTERDISCIPLINARY JOURNAL ON ANIMAL FEELING

Reber, Arthur S; Baluska, Frantisek; and Miller, William B, Jr. (2022) All living organisms are sentient. *Animal Sentience* 31(3)
DOI: 10.51291/2377-7478.1700

“Decision”-Making in Bacteria: Chemotactic Response of Escherichia coli to Conflicting Stimuli

Abstract. *Motile bacteria presented simultaneously with both attractant and repellent respond to whichever one is present in the more effective concentration. Apparently bacteria have a processing mechanism that compares opposing signals from the chemoreceptors for positive and negative taxis, sums these signals up, and then communicates the sum to the flagella.*

3.1 Bioethical implications

Can scientific evidence ever be sufficient to draw a line between sentient and non-sentient organisms?

Independently of this, the application of a precautionary approach would be arguably justified. It would be particularly understandable considering there are billions of farmed animals and millions of animals used in experimental settings.

A precautionary principle can be formulated in the case of animal welfare in this way: "*Where there are threats of serious, negative animal welfare outcomes, lack of full scientific certainty as to the sentience of the animals in question shall not be used as a reason for postponing cost-effective measures to prevent those outcomes*." Birch 2017, p. 3

Let us consider two test cases regarding animal experimentation and farming.

3.2 Bioethical implications

Consider the case of decapod crustaceans (e.g., crabs, lobsters, crayfish) and their use in animal research.

There is some evidence in favour of their sentience (slide 2.10-2.11), but if the evidence is considered inconclusive, how should we act?

A precautionary approach would recommend some form of protection of decapods (UK 2021 Sentience Bill: https://researchbriefings.files.parliament.uk/documents/CBP-9423/CBP-9423.pdf).

However, the current EU Animal Welfare directive (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0063&from=EN) does not include decapod protection.

3.3 Bioethical implications

Why this difference in approach? The difference depends on other ethical and pragmatical considerations.

One of the reasons at the root of the lack of protection of decapods in EU legislation might be that the biomedical research practice to “reduce, refine and replace”* would be impeded because decapods would not be used as alternatives to **replace** vertebrates in animal research.

* Replace the use of animals with alternative techniques + Reduce the number of animals used to a minimum + Refine the way experiments are carried out, to make sure animals suffer as little as possible.

3.4 Bioethical implications

This is a utilitarian argument: the benefits of continued biomedical experimentation with decapods for the moral entire community outweighs its costs.

A criticism of this position might be that animal models in biomedical research are, as a matter of fact, not very useful (e.g., that *in vitro* techniques are much more useful, see Carvalho et al. 2019).

But there are deeper ethical questions: what kind of ethical argument could be used to justify the view that some animals' suffering (e.g., vertebrates) is morally more important than others' (invertebrates)? Is this not another form of speciesism?

This points to a huge theoretical problem for sentientism: **what degree of sentience is sufficient for moral considerability?**

3.5 Bioethical implications

There is also a practical problem for sentientism: **what kind of protection should we give to animals given evidence of sentience?**

From a Kantian perspective, it might be argued that it is an obligation to strongly protect animal welfare whenever there is evidence of sentience (Regan 1985, p. 24). For instance, veganism is the only way forward.

From a utilitarian perspective (Singer 1974), it might instead be argued that, while evidence of sentience is enough for moral considerability, it is not enough for granting strong forms of legal protection as the moral community includes, as Mill said, all “sentient creation”, including us.

3.6 Bioethical implications

To make visible this persistent clash between utilitarianism and Kantian ethics, consider the practice of animal “disenhancement": decreasing the capacities of animals.

For instance, consider the practice of genetically engineering farmed chickens to make them blind so that they do not peck each other but focus on pecking food.

The proximate aim of this practice is enhanced food production for human consumption (as visually-impaired chickens supposedly peck more food than sighted ones).

But the underlying aim of this practice seems to be to make animals so stupid that their sentience capacities are reduced, to ultimately create non-sentient animals.

Is this practice morally acceptable?

Primary resource:

Allen, C. and Trestman, M. 2017. Animal Consciousness. The Stanford Encyclopedia of Philosophy (Winter 2017 Edition). Edward N. Zalta (ed.) - Sections 3, 6 and 7.1

https://plato.stanford.edu/entries/consciousness-animal/

Additional resources:

Adler, J. 2011. My life with nature. Annual Review of Biochemistry 80:42–70.

Barron, A. B., & Klein, C. 2016. What insects can tell us about the origins of consciousness. PNAS 113(18), 4900-4908.

Bentham, J. 1780/1789 [1982]. An Introduction to the Principles of Morals and Legislation, edited by J.H. Burns and H.L.A. Hart, London: Methuen.

Birch, J. 2017. Animal sentience and the precautionary principle. Animal Sentience 16(1). https://animalstudiesrepository.org/animsent/vol2/iss16/1/

Carvalho, C. et al. 2019. The Relevance of In Silico, In Vitro and Non-human Primate Based Approaches to Clinical Research on Major Depressive Disorder. Alternatives to Laboratory Animals. 2019;47(3-4):128-139. doi:10.1177/026119291988557 8

Darwin, C. 1871. The Descent of Man and Selection in Relation to Sex. New York: Appleton. Chapter 3

Dawkins, M.S. 2001. Who needs consciousness? Animal Welfare 10:S19-S29.

Elwood R.W. 2019. Discrimination between nociceptive reflexes and more complex responses consistent with pain in crustaceans. Phil. Trans. R. Soc. B 374: 20190368. http://dx.doi.org/10.1098/rstb.2019.0368

Elwood, R. W. & Appel, M. 2009. Pain experience in hermit crabs? Animal Behaviour 77:1243–1246.

Proctor, H.S. et al. 2013. Searching for Animal Sentience: A Systematic Review of the Scientific Literature. Animals 3(3): 882-906. doi: 10.3390/ani3030882.

Regan, T. 1985. The Case for Animal Rights. In Peter Singer (ed.), In Defence of Animals, Oxford: Basil Blackwell, pp. 13–26.

Singer, P. 1974. All Animals are Equal. Philosophic Exchange, 5(1), Article 6.

Talbot, K. et al. 2019. The sensory and affective components of pain: are they differentially modifiable dimensions or inseparable aspects of a unitary experience? A systematic review. British Journal of Anaesthesia, 123(2):e263-e272