

Animal ethics - 05 April

Jacques de Vaucanson's mechanical digesting duck (1739)

Animal ethics: sentience (pain consciousness)

- 5 April 2021

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

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1.1 Introduction to the debate

When we dealt with the themes of abortion and euthanasia, we dealt with the moral concept of person as member of the moral community.

It was unproblematically assumed that only humans are the possible persons of interest, the only members of the moral community, the organisms whose rights should be considered or protected.

When we consider the animal ethics debate and the issue of our treatment of other species, the issue becomes **whether non-human animals** (or non-human organisms more generally) **are members of the moral community** - if not persons, at least quasi-persons (slide 1.10 abortion class) - whose welfare (and possibly rights) should be considered or protected.

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 the human species.

Ryder (1989) and 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

Speciesism postulates the human species' moral supremacy over other species just as racism postulates a racial group's moral supremacy over other human racial groups.

1.3 Introduction to the debate

Speciesism is a way of founding **human exceptionalism**, i.e., the thesis that there exist distinctive human-specific phenotypes on the basis of which humans have moral status and non-human organisms do not.

One **first problem of human exceptionalism** is that, for any putatively distinctive phenotypic property, it will be very difficult to show: 1. that all humans have it (that it is universally distributed among *Homo sapiens*) and 2. that only humans have it (that it is species-specific and unique to *Homo sapiens*).

For instance, Warren - slide 1.9 in abortion class - identifies the ability to communicate as a criterion of personhood; note that this ability is lacked by some members of our species - e.g., small children, cognitively impaired humans - and that probably some primate species possess it in some form.

1.4 Introduction to the debate

Why does human exceptionalism face the first problem?

Because of evolution through descent with modification from a common ancestor: “*There’s no fundamental difference between man and animal in their mental faculties.*” Darwin, C. 1871.

A **second problem of human exceptionalism** is that, if some universally distributed and unique phenotypic properties of *Homo sapiens* exist in the first place, they might be morally irrelevant.

For instance, that only humans like football, lack ability to synthesise vitamin C, marry, wear clothes etc. are morally irrelevant properties.

1.5 Introduction to the debate

Given that it is difficult to find a distinctive and categorical property of the human species to separate us from the rest of nature, **the only way to characterise the concept of morally considerable member of the moral community is to identify a gradual property that we share in common with other species.**

Kant = moral considerability = rational, conscious and free agent.

Utilitarians = moral considerability = sentient being.

Both rationality and sentience are at the basis of moral choice.

Rationality is the precondition of freedom and the possibility of choosing the morally correct course of action.

Sentience is the precondition of choosing to avoid pain and pursue pleasure, which are the morally correct actions.

1.6 Introduction to the debate

First problem of characterising the concept of morally considerable member of the moral community by focusing on a gradual property: the issue of degree.

Notice that rationality, consciousness or sentience are neither distinctive human phenotypes nor categorical properties.

Many other species exhibit rational and sentient behaviour.

Some non-human animals indeed exhibit behaviour that is more rational - e.g., utility-maximising - than humans.

The phylogenetic distribution of sentience is the focus of this class (particularly part 3).

So, the crucial question become: what degree of rationality or sentience is sufficient for moral considerability?

1.7 Introduction to the debate

*“The idea of a person in the almost technical sense required by morality today is the one worked out by Kant in his Foundations of the Metaphysics of Morals. It is the idea of a rational being, capable of choice and therefore endowed with dignity, worthy of respect, having rights; one that must be regarded always as an end in itself, not only as a means to the ends of others. Because this definition deals solely with rational qualities, it makes no mention of human form or human descent, and the spirit behind it would certainly not license us to exclude intelligent aliens **Now, if intelligence is really so important to the issue, a certain vertigo descends when we ask, 'Where do we draw the line?' because intelligence is a matter of degree.**”* Midgley 1985, p. 3.

1.8 Introduction to the debate

Second problem of characterising the concept of morally considerable members of the moral community: which gradual property should we choose? **Rationality or sentience?**

There is something intuitively morally abominable in choosing rationality as the morally significant property. Why do insufficiently rational organisms (including small children and cognitively impaired humans) not deserve moral consideration given that they might, after all, still suffer?

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”*.

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.

1.9 Introduction to the debate

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

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

*“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

So, the crucial questions become: what degree of sentience is sufficient for moral considerability? And are some non-human organisms sentient?

2.1 From Aristotle to contemporary sentience studies

*“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, human and nonhuman, endow animals with instincts suited to their successful reproduction and survival.

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

2.2 From Aristotle to contemporary sentience studies

Descartes' conception of animals as automata makes sentience superfluous.

Mechanistic explanation of the behaviour of nonhuman animals by reflex.

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

(cf. The mechanical digesting duck in the first slide).

“Descartes himself practiced and advocated vivisection (Descartes, Letter to Plempius, Feb 15 1638), 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 From Aristotle to contemporary sentience studies

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 and **hedonic control behaviour (i.e., the capacity to choose to avoid pain and seek pleasure)**, arose with evolutionism and Darwinism.

In the 1970s, Donald Griffin, makes an important contribution to ethology. Griffin coined the term “cognitive ethology” and “... *emphasized behavioral flexibility and versatility as the chief source of evidence for consciousness, which he defined as ‘the subjective state of feeling or thinking about objects and events’*”. Allen & Trestman 2016, section 3

2.4 From Aristotle to contemporary sentience studies

Despite criticism, Griffin used behavioural, functional and neurological evidence in cognitive ethology research and paved the way to the modern investigation of the distribution and evolutionary origins of consciousness and sentience.

What the history of ethology shows is that **the anthropomorphic bias in sentience studies has been abandoned** and that justified sentience ascriptions on the basis of evidence encompass many more species of organisms.

This is in line with what Darwin predicted: ***“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.

2.5 From Aristotle to contemporary sentience studies

Contemporary sentience studies are supported by a rich theoretical framework.

A crucial requirement for sentience is **nociception** (the capacity to sense noxious stimuli). Evidence of nociception is ubiquitous, as even bacteria perceive noxious stimuli. But nociception is considered insufficient for sentience ascription (otherwise bacteria would be considered sentient, something generally denied, for interesting reasons).

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.

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

2.6 From Aristotle to contemporary sentience studies

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?**

In order to answer this question, consider the analogy with the philosophical problem of other minds: how can I be sure that you, my neighbour, are an experiencing subject, feeling pleasure and pain, rather than merely a reflex-driven machine?

2.7 From Aristotle to contemporary sentience studies

The problem of other minds points to a fundamental asymmetry between direct self-knowledge about my pain and indirect/inferential knowledge about others' pain.


John Stuart Mill – a founding father of utilitarianism and ethical sentimentalism (slides 2.2 ff class 3 of the introduction to moral philosophy) - proposed a solution to this problem by distinguishing between two kinds of evidence:

“... [other humans] have bodies like me, which I know in my own case, to be the antecedent condition of feelings; secondly, they exhibit the acts, and outward signs, which in my own case I know by experience to be caused by feelings.” (Mill 1872, p. 243)]

2.8 From Aristotle to contemporary sentience studies

Mill's idea is that there are two sources of evidence:

1. My human neighbour has a body like mine, that is, we share, by being members of the same species, **roughly the same morphology and physiology**, whereby this phenotypic similarity provides evidence concerning the nature of the apparatus for our capacity of feeling pain and pleasure;
2. My human neighbour **behaves like me in the same circumstances in which I know that my behaviour is caused by feelings of pain and pleasure.**

Mill's argument: I know by introspection that I am sentient —> You are similar enough to me morphologically and physiologically —> We share a similar bodily apparatus for feeling pain and pleasure —> You are also behaving like me when I am in pain  Thus, you are sentient.

2.9 From Aristotle to contemporary sentience studies

By analogy, when we enquire about other organisms' minds, we should consider:

1. **evidence from comparative morphology and physiology, that is, phylogenetic.** The difficulty of the problem of establishing the phylogenetic limits of sentience is that when “bodies” are too different, then phylogenetic evidence becomes increasingly problematic (between-species analogies are much weaker than within-species ones).
2. **behavioural evidence.** The difficulty in this case is that there are various behavioural indicators of sentience and that evidence for each is difficult to interpret in a neutral way (without endorsing a biased phylogenetic perspective).

Let us now take a look at the biological problem concerning the phylogenetic distribution of sentience.

3.1 The phylogenetic distribution of sentience

How can phylogenetic evidence provide the basis for ascribing sentience to non-human organisms?

Scientists partially rely on this analogical methodology:

1. Choose a morphological or physiological phenotype X that is unproblematically associated with sentience in a reference organism A;
2. Investigate whether target organism B of a different lineage from A has a structurally homologous (e.g., the pentadactyl limb in mammals, with forms varying from the human hand to the bat's wing to the whale limb) or functionally analogous (e.g., mammal and insect eyes) morphological or physiological phenotype X' to X of A;
3. If it does, then B is probably sentient; otherwise it is not.

3.2 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 a *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 fish are not sentient.

But this argument is too coarse.

First, why should ACC be such a crucial phenotype? The evidence that, in humans, ACC is crucial for pain consciousness (in processing the affective dimension of pain) rather than nociception is not enough to dismiss the possibility of fish being sentient.

3.3 The phylogenetic distribution of sentience

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

“The anterior cingulate cortex (ACC) is a particularly important structure of the mammalian brain 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

Difficulty in identifying structurally homologous and functionally analogous structures in clades with separate evolutionary history.

Thirdly, Mill proposed that we need to take into account also behavioural evidence: does the analysis of fish’s behaviour show that it is caused by feelings of pain?

3.4 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 a *Homo Sapiens* and a large variety of 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.

3.5 The phylogenetic distribution of sentience

Again, this argument is too coarse.

First of all, vertebrate brains vary extensively, from lampreys to humans.

Secondly, 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.

Thirdly, the use of analogical phylogenetic evidence can be criticised for a fundamental reason: evolution might have produced a variety of morphological and physiological structures realising sentience.

Fourth, as Mill suggested, phylogenetic evidence needs to be complemented by behavioural evidence: does insects' behaviour show that it is caused by feelings of pain?

3.6 The phylogenetic distribution of sentience

Behavioural indicators of sentience: what kinds of behaviour should be associated with pain consciousness or affective pain?

Theoretically speaking, **pain consciousness is hypothesised to require centralised and integrated cognitive processing of noxious stimuli with other kinds of perceptual, memorised and internal (i.e., physiological) stimuli.**

The centralisation requirement is necessary in order to distinguish between:

1. organismal responses that are **systemic/global** from those that are dependent on the reactive capacities of subsystems such as cells or organs;
2. organismal responses that are **flexible and plastic** from those that are instinctual, reflexive, innate or genetically determined.

3.7 The phylogenetic distribution of sentience

The rationale of this view is that global and flexible responses can be interpreted as somehow planned and directed behaviours, indicating some form of “decision-making” on the basis of nociception.

Global and flexible responses indicate that the organism is capable of **the hedonic control of behaviour**, that the organism “evaluates” whether to minimise pain (and possibly maximise pleasure).

Some behavioural indicators of sentience:

1. motivational trade-offs: the organism behaves as if weighing its preference to avoid a noxious stimulus against other preferences;
2. conditioned place avoidance: the organism learns to avoid locations at which it previously encountered noxious stimuli.

On the basis of behavioural evidence, can we extend sentience ascription beyond the vertebrate limit?

3.8 The phylogenetic distribution of sentience

Elwood and Apple (2009) subjected hermit crabs to weak electric shocks. The reason is that weak electric shocks do not elicit nociceptive localised reflex responses such as the immediate evacuation of the shell.

What such shocks elicited was a series of more 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.

Hermit crabs’ behaviour is consistent with the hypothesis of trade-offs between desirable but incompatible organismal needs.

3.9 The phylogenetic distribution of sentience

For instance, crabs were more likely to abandon the less preferred species of shell and they were less likely to evacuate their shells when the presence of predators was perceived, thus displaying a capacity of evaluating comparatively whether the advantage of keeping the shell for protection is worth the cost of being electrocuted or predated.

It seems intuitive to conceptualise crabs' avoidance of prospective painful experiences because, despite having cognitively unsophisticated brains, they must somehow realise the capacity of feeling affective pain, that is, the aversive quality of the noxious stimulus (Elwood 2019).

This is possible evidence of sentience.

Sentience ascription might thus include some invertebrates.

3.10 The phylogenetic distribution of sentience

The same kind of methodology of mixing phylogenetic and behavioural lines of evidence can be applied to all organisms, including plants and bacteria.

Sentience ascriptions should be proposed following the **principle of triangulation**: organismal pain should be assessed by using a **wide range of phylogenetic and behavioural indicators**; while these indicators in isolation should not be taken as evidence of pain, “... *together they represent an increasing level of complexity of responses to pain that go beyond simple and acute detection and reflex responses and begin to demonstrate a level of behavioural complexity that would require some form of experience.*”

Sneddon et al. 2014 p. 209

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

What are the bioethical implications of sentience research?

4.1 Bioethical implications

Summing up, there is some form of agreement (among utilitarians and Kantians, cf. slide 1.8) that many organisms possess a capacity for feeling pain and that, as a consequence, they should be considered morally considerable.

This agreement shows that speciesism and human exceptionalism should be considered biases, perhaps grounded on an anachronistic view of biological organisms as reflex-driven machines.

This perspective has its rationale in evolutionism.

Compatibly with the gradualist approach of evolutionism, contemporary biological research increasingly shows the difficulty in finding an objective way to cut phylogeny dichotomously in order to substantiate the ontological fracture between sentient and non-sentient organisms.

4.2 Bioethical implications

Where is the ontological fracture in phylogeny? What if all organisms are capable of hedonic control behaviour, to evaluate and choose between actions on the basis of the quality of their subjective experiences?

“The continuity of descent now established between man and the animal world made it impossible any longer to regard his mind, and mental phenomena as such, as the abrupt ingression of an ontological principle at just this point ... Where else but at the beginning of life can the beginning of inwardness [i.e., sentience] be placed?” Jonas 1966 [2001], p. 58

Can scientific evidence ever be sufficient to draw a line between sentient and non-sentient organisms? If it cannot, how can biology inform bioethical debates concerning animal welfare?

4.3 Bioethical implications

The most general point is that **science cannot determine policy**: this is a general moral concerning all the debates we have seen so far (e.g., abortion, euthanasia, response to the current pandemic).

The issue is not only that we are often ignorant, but that some questions concerning rights, quasi-rights, necessity of legislation, policy action etc. are **intrinsically ethical** (e.g., when does a developing human become a person with rights? Is the right to die morally acceptable?).

In the case of non-human organisms with quasi-rights, analogous ethical issues emerge (what level of behavioural flexibility is sufficient for sentience ascription?), particularly when scientific evidence concerning the sentience of an organism is inconclusive: **what should we do then?**

4.4 Bioethical implications

How much evidence is necessary to convince us that an organism is sentient? Absolute certainty is unachievable:

“Whilst other areas of science will often make do with imperfect data, animal sentience is required to buck the trend and provide unequivocal proof. Neuroscientist Donald Griffin coined the term ‘Paralytic perfectionism’ to describe this contradictory way in which scientists still demand absolute certainty before they can accept animal sentience.”

Proctor et al. 2013 p. 883

(The problem of other minds - cf. slide 2.6-2.8 - shows that absolute certainty is unachievable even in the human case).

However, the lack of absolute certainty is not a good reason to deny legal protection to potentially sentient animals. A precautionary approach could be justified when evidence is insufficient.

4.5 Bioethical implications

A precautionary approach (slides 2.10-2.11 abortion class) might be justified when we lack evidence but policy decisions must be taken promptly in order to limit some kind of damage.

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

The application of a precautionary approach is particularly understandable from a utilitarian perspective: consider the billions of farmed animals and millions of animals used in lab testing; if unprotected, their suffering would cause a massive decrease in the total happiness of the moral community.

4.6 Bioethical implications

Now consider the case of decapod crustaceans (e.g., crabs, lobsters, crayfish). There is evidence in favour of their sentience (slides 3.8-3.10), but if the evidence is considered inconclusive, how should we act?

A precautionary approach would recommend decapod crustaceans protection. Indeed, New Zealand's Animal Welfare Act (1999) includes both crabs and crayfish (Proctor et al. 2013, p. 894).

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 their protection.

This difference in approach is not due to the interpretation of the evidence. It depends on other ethical considerations.

4.7 Bioethical implications

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. This is a utilitarian argument: the benefit of continued biomedical experimentation with decapods for the moral community outweighs the costs for decapods. 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 relevant, see Carvalho et al. 2019).

* 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.

4.8 Bioethical implications

Another possible rationale of the EU legislation might be that the quasi-rights of decapods (given the limited evidence in favour of their sentience) are **less important** of the quasi-rights of vertebrates (for whom evidence of sentience is stronger). This position seems speciesist.

(There is an analogy between the abortion debate here, see slide 1.10).

What kind of ethical argument could be used to justify the view that some animals' suffering is morally more important than others'? Does it make sense to compare the sentience capacities of humans, cows, octopi, crabs etc? As Birch (2017, p. 12) claims, the gradualness of sentience “... *raises the question of how degrees of sentience are to be conceptualized and estimated (if such comparisons are even possible).*” There is no univocal answer to the question: what degree of sentience is sufficient for moral considerability?

This is the most significant theoretical problem for sentience studies.

4.9 Bioethical implications

From a deontological perspective, it is an obligation to protect animal welfare whenever evidence of sentience is strong. Regan (1985, p. 24) argues that given that many animals are sentient, they have **an intrinsic value** and, as ends in themselves, should be protected. Probably New Zealand's Animal Welfare Act (1999) endorses a deontological position.

From a utilitarian perspective, evidence of sentience is enough for moral considerability, but not enough for granting legal protection. The moral community includes all humans and all sentient species, so protection for one species must be counterbalanced by an **analyses of the benefits for the entire moral community**. Probably the EU Animal Welfare directive has a partially utilitarian ethical underpinning.

Where do you stand?

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:

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