Animal sentience and the Capabilities Approach to justice

Martha C. Nussbaum, Justice for animals: our collective responsibility. Simon & Schuster, New York, 2023

eva read[1] · Jonathan Birch[1]

Abstract

Martha Nussbaum's *Justice for Animals* calls upon humanity to secure for all sentient beings the central capabilities they need to flourish. This essay review critically examines the ethical and scientific foundations of Nussbaum's position. On the ethical side, we explore the tension between a robust defence of animal rights and political liberalism, which requires tolerance of a range of reasonable views. On the scientific side, we reflect on how our uncertainty regarding the distribution of sentience in the natural world leaves us uncertain about how many claimants of justice there are and about the relative strength of their claims. We bring out some further problems with Nussbaum's views on animal killing and pest control. We also reflect on how animal welfare science might be done differently if guided by Nussbaum's framework.

Keywords Animal sentience · Justice · Capabilities Approach · Animal rights · Animal welfare · Insects

Introduction

In *Justice for Animals*, Martha Nussbaum argues for an expansion of her influential "Capabilities Approach" to encompass all sentient beings. The book is a welcome call to arms, recommending dramatic changes to animal agriculture, to zoos, and to attitudes regarding wild animals. We support the core sentiment of this book: sentient beings matter, and we must do better by them. This review, however, will focus on some of the problems Nussbaum's picture faces.

✉ Jonathan Birch
  j.birch2@lse.ac.uk

1   Centre for Philosophy of Natural and Social Science, London School of Economics and
    Political Science, London, UK

🙋 Springer

What is the "Capabilities Approach" (hereafter, CA)? As originally conceived, it is an approach to human economic development that requires us to think not only about growth, but also about the ability of states to secure for their citizens the central capabilities important for a flourishing life. Martha Nussbaum is one of the key architects of the CA and is behind the best-known list of the central capabilities: *life*; *bodily health*; *bodily integrity*; *senses, imagination and thought*; *emotions*; *practical reason*; *affiliation* [with other people]; [coexistence with] *other species*; *play*; and *control over one's environment*.[1]

Nussbaum has long urged us to think of the CA as a theory of *justice*, not just development. In other words, it is not simply that a country is doing well when it secures its citizens' central capabilities, but that citizens have an entitlement to have their capabilities secured up to a minimally adequate level. When governments fail to do this, they fail to achieve justice.

In *Justice for Animals*, Nussbaum builds on her own previous work,[2] constructing an expanded CA (let's call it ECA) on which all sentient beings, not only humans, can have claims of justice. Many of the details (including the list of central capabilities) are unchanged from the original, but the scope of the account is much broader, with the entitlements of humans recast as the tip of an immense iceberg. On the ECA, securing justice merely for humans still leaves a vast amount of injustice in the world.

The aim of this review is not to explain the whole book, but rather to zoom in on two main sources of trouble for the ECA: the difficulty of combining animal rights approaches with political liberalism and problems arising from our uncertainty about the distribution of sentience across living beings. We end on a more positive note by discussing the possible benefits of integrating the ECA with animal welfare science.

The place of animals in political liberalism

Outside of her work on animals, Nussbaum is best known as one of the major living political philosophers in the liberal tradition. In *Justice for Animals*, she attempts to defend both political liberalism and animal rights. But there is at least an intuitive tension: liberalism requires tolerance of a wide range of different cultures, yet many practices that lead to animal welfare concerns are also important cultural traditions.[3] How is this circle to be squared by the ECA?

John Rawls, a major influence on Nussbaum, placed great weight on the idea of "overlapping consensus". Rawls' starting point was that there are many "comprehensive doctrines" that aim to give us frameworks for living well. Religions are one source of these doctrines, but not the only source (think also of utilitarianism, Kantianism, etc.). Rawls' hope was that there could be a political conception of justice, formed of principles that could be endorsed for good reasons from within any of the various reasonable comprehensive doctrines. But the principles he arrived at were silent regarding the human treatment of other animals. On the face of it, that was stra-

---

[1] Nussbaum (2000, 2011a).

[2] Nussbaum (2004, 2006, 2011b).

[3] For a detailed discussion of this tension, see Schultz-Bergin (2017).

tegically smart. Opinions vary so much when it comes to other animals that the project of finding principles all reasonable people can agree upon may look unpromising.[4]

Nussbaum, however, is not deterred. It becomes clear as one reads *Justice for Animals* that Nussbaum is defending both a comprehensive doctrine and a political conception of justice. Nussbaum's own comprehensive ethical framework combines a Kantian focus on questions of justice with an Aristotelian focus on what it takes to live a flourishing life. She recognises there will never be consensus around the whole view. A key idea, though, is that it is not just her own ethical views that support the core of the ECA. The claim is that this core can be an object of overlapping consensus. Much of the first half of the book is dedicated to making the case that followers of many comprehensive doctrines, both religious and secular, can get behind the project of securing the central capabilities of other sentient beings.

What about all the fierce disagreement over questions of animal ethics? An important idea for Nussbaum is that overlapping consensus does not have to be achieved immediately. It can be an ambition for the future, as long as we can lay out a credible path through which it could be achieved:

> Rawls urges (and I have long agreed)… to propose political principles that are, first, narrow in scope, not covering all areas of human concern … and, second, thin, expressed in neutral ethical language rather than in the metaphysical language of one group rather than another … if we manage things with restraint, the political principles can form what Rawls calls a "module" that all citizens who hold different reasonable comprehensive doctrines ("reasonable" meaning willing to propose and accept fair terms of cooperation) can attach to their own doctrines … Eventually, it is hoped, the political principles will become the object of an "overlapping consensus" among the partisans of all the doctrines … This may take a long time, but the proponent of the CA should be able to sketch a path by which people of differing views might ultimately come to agree on these core principles. (Nussbaum 2023, pp. 93–94).

This passage is useful for understanding Nussbaum's wider project. The ECA is intended to be "narrow in scope" in a specific sense: the capabilities that it requires a just society to secure to each sentient being is not an exhaustive list of all their capabilities, or even all those that matter to them or that lead to welfare concerns when neglected. Rather, it is a subset of core capabilities, ones that are necessary for even having the opportunity for a minimally good life.

Moreover, the imperative to secure these capabilities is "thin" in the sense that controversial assumptions about the reasons *why* we should secure them are omitted. People can have a variety of reasons for endorsing the ECA. One might endorse the ECA for utilitarian reasons, or because (like Korsgaard 2018) one thinks sentient beings should be regarded as ends-in-themselves, or because (like Nussbaum) one thinks the flourishing of a sentient being is objectively valuable and wrongful thwart-

---

[4] Rawls (1996) considered the question of whether we can extend justice to other animals to be one of several areas ("problems of extension") where, in order to arrive at an answer, we seem to have to appeal to a specific comprehensive doctrine or controversial metaphysical position.

ing of it objectively unjust. One might even endorse the ECA because one thinks sentience makes an animal resemble humans enough to deserve justice. That's a poor reason by the lights of Nussbaum's comprehensive doctrine, but nonetheless a reason that may lead people to join the consensus she hopes to build.

Nussbaum suggests that overlapping consensus is within reach (Nussbaum 2023, p. 110). The ECA may indeed be thin enough to allow overlapping consensus among different ethical doctrines that regard sentience as the ground of moral standing. Most people in the animal advocacy world can be brought within that fold, and Nussbaum may be right to think the points of disagreement within this world are often overstated. As she rightly complains, animal advocates often focus on large and charismatic mammals with impressive cognitive abilities (an approach Nussbaum labels "so like us"), but often they are doing so only to get their foot in the door (politically and legally), with the intention of eventually expanding their political/legal agenda until it protects all sentient life. Utilitarianism emphasizes pain and suffering, not capabilities, but plausible versions of the view have always defined "pain and suffering" very broadly, incorporating subtle forms of suffering, such as boredom, that arise from having one's capabilities neglected. Similarly, Korsgaard argues that it is sentience that makes an animal deserving of moral concern and "end-in-itself" status, and securing an animal's basic capabilities can be seen as part of respecting them as end-in-themselves. Nussbaum is optimistic that, whilst she and these other three foundations for animal advocacy disagree about foundational questions, they are "well on [their] way to an 'overlapping consensus'… where political principles are concerned" (p. 110).

But this leaves us with a political conception of justice that may capture an overlapping consensus across four major frameworks in the animal rights tradition ("so like us", utilitarianism, Korsgaard and Nussbaum). What about everyone else? Nussbaum still seems far off Rawls' idea of an overlapping consensus among all reasonable comprehensive doctrines.

Are some of the excluded doctrines simply unreasonable? Nussbaum contrasts the four animal rights positions with positions which "demean animals and place the worth of other species in accordance with the scala naturae" (p. 94). These positions consider closeness to our own species on some imagined scale as the source of moral standing, an idea portrayed by Nussbaum as an unjustifiable relic from the Greek and Roman Stoics who underestimated the ability of other animals to have mental lives and considered them "as brutes" (p. 22). This sort of overt speciesism is analogous to racism, ableism, homophobia, misogyny: prejudiced positions steeped in irrational biases. Rawls did not seek to include racist doctrines in an overlapping consensus, and Nussbaum need not include speciesist ones.

But there are positions that sit between overtly speciesist positions and animal rights positions. An orthodox Kantian view that sees a deep connection between moral standing and rationality is one such middling case. Another case is Rawls himself, who thought other animals fell outside the scope of justice because justice is concerned with what we owe to each other as partners in a fair system of cooperation. Animals owe us nothing (the reasoning goes), so the sort of reciprocal obligation that characterizes justice is absent. Is Nussbaum dismissing Rawls as unreasonable?

Sometimes it seems that way. Nussbaum in fact seems to believe that other animals can have obligations towards humans. She emphasizes the ability of animals to adhere to norms (p.77). When advocating for sentient beings to be no longer considered as property but as citizens, she says:

> [This] idea would impose on human companions further specific duties to promote the capabilities of the animals who live with them. And, since citizenship is reciprocal, it would impose duties on the animals as well: not to bite people or other animals, not to urinate and defecate in inappropriate places, not to be a nuisance in airports. If animals are cited for violations, their human companion must bear the cost, but it seems right to cite the animals, since holding accountable is a sign of respect. The breeding process that resulted in domestication means that these duties can usually be reliable fulfilled, given appropriate education… (Nussbaum 2023, p. 206).

The tension between liberalism and animal rights explodes when we consider that in the human version of the CA, "special attention is devoted to the worst off, making sure that they are up to an adequate level" (Nussbaum 2023, p. 86). In earlier work, Nussbaum described three forms of "special attention" with which the CA is compatible: "complete egalitarianism, a Rawlsian difference principle, and a weaker focus on a (rather ample) social minimum" (Nussbaum 2000, p. 86). Does the ECA retain the special focus on the worst-off that is central to the human version, or not?

If it does, highly controversial recommendations are likely to result. As Nussbaum (2000) has noted, redistributive policies that help the worst-off at the expense of the better-off are needed even on versions of the CA that stop short of complete egalitarianism. And it seems very unlikely that any humans are among the worst-off sentient beings, on any way of making cross-species comparisons. So, the ECA implies that humans should be willing to shoulder significant burdens to help other sentient animals secure their basic capabilities. That duty extends to wild animals, as Nussbaum emphasizes in Chap. 10. Even if all the animals in direct human care had their central capabilities secured, the state would still owe it to wild animals, as a matter of justice, to secure their central capabilities, even if resources had to be taken from humans to fund this.

Many animal advocates would cheer that result, but Rawls, Kant and several major religions would want to get off the Nussbaum bus at the wild animals stage, if not sooner. Moreover, many environmentalists who see ecosystems and the biosphere as the key priority, not individual animals, would also reject this approach. Even utilitarians, who are supposed to be close allies, would want us to weigh the claims of existing animals against those of the yet-to-exist sentient beings (potentially including AI) of the long-term future, and so they too would find a special focus on the currently existing worst-off unacceptable.

In short, it seems like we have numerous apparently reasonable views on our obligations to other sentient beings that will not accept the ECA's political recommendations, particularly if it retains a special focus on the existing worst-off. So, if the ECA retains the special focus on the existing worst-off that was central to the original CA, then it is not realistic to think overlapping consensus could form around it. But if the

ECA does not retain the special focus on the existing worst-off, its claim to being a theory *of justice* seems weak.

Which species deserve justice?

Nussbaum's ECA considers all and only sentient individuals as deserving justice. Sentience, for Nussbaum (and we agree), draws a "dividing line in nature" (Nussbaum 2023, p. 51). This dividing line "isn't just the ability to feel pain (and pleasure), but also the ability to have subjective perceptual experiences of many types, emotional experiences, and the cognitive awareness of good and bad" (p. 138).[5]

But which animals are sentient? The ECA makes the stakes of this question extremely high. Being sentient leads to a suite of entitlements that human societies have an obligation to respect, whilst being non-sentient means that your interests, such as they are, do not create entitlements. If we incorrectly treat a sentient being as if they are not sentient, serious injustice is likely. But there are also risks associated with incorrectly treating a non-sentient being as sentient: we may pour resources into securing their capabilities that would have been better spent elsewhere. Correctly identifying sentient animals is of the utmost importance.

Nussbaum's view is that we should follow the evidence where it leads. Mammals and birds are sentient without doubt (pp. 141-2). Moreover, there is an emerging consensus for sentience in fishes (excluding elasmobranchs, such as sharks and rays), reptiles are probably sentient, and cephalopod molluscs (such as octopuses) are "strong candidates" (pp. 142–146). Oddly, when it comes to elasmobranchs, Nussbaum thinks "there is good reason to conclude that they are not sentient" on the grounds that they supposedly lack nociceptors.

The claim about elasmobranchs merits scepticism. There are two main types of nociceptive neuron in mammals, Aδ-fibres and C-fibres. Aδ-fibres, linked to sharp pains in us but also used for mechanoreception, have been found in elasmobranchs by at least three studies (Kitchener et al. 2010; Lacap 2022; Snow et al. 1993). Evidence of C-fibres, associated with lingering pains in us, was obtained for the first time by a study in 2022, but the C-fibres were specifically responding to nociceptive stimuli in the cranial region (Lacap 2022). It remains plausible that elasmobranchs do not feel pain in relation to injury anywhere other than in the head, but this is no basis for the conclusion that they are not sentient. Sentience is, as Nussbaum herself stresses, more than pain (Nussbaum 2023, p. 119).

Shrimps, crabs and lobsters are another case of significant uncertainty. Here, Nussbaum suggests, "we should probably err on the side of caution while we try to learn more" (Nussbaum 2023, p. 146), the closest Nussbaum gets to endorsing a precautionary framework for thinking about these issues (of the type advocated by Birch 2017). With bees, Nussbaum writes, "we should probably continue to debate"

---

[5] There is some ambiguity in how Nussbaum uses the word "sentience". In places, sentience encompasses emotional experience and cognitive awareness (and is said to be sufficient for moral status), and in other places it only encompasses pleasure and pain (not emotional experience and cognitive awareness) and is said to be only *part* of a sufficient condition for moral status. We will go with the first sense here, since it seems to be Nussbaum's more considered view of the matter.

whether they are sentient, regarding them as stronger candidates than other insects (p. 147-8). By contrast, it is very unlikely that any of the cnidarians (jellyfish) or the porifera (sponges) are sentient (p. 148).

Whilst we agree with the evidence-based approach, the brevity of the discussion is disappointing given the high stakes. Amphibians and jawless fish are omitted. No molluscs other than the cephalopods are discussed (e.g. snails, mussels, scallops), and no arthropods other than crustaceans and insects (e.g. spiders, oysters). Important distinctions are overlooked, such as the distinction between decapod crustaceans and other crustaceans, many of which are microscopic zooplankton.

These details matter to the overall picture. For instance, if insects are sentient[6] then the world contains a vastly greater number of individual animals entitled to basic justice (on Nussbaum's account) than many people have ever imagined. And this influences the plausibility of the idea that there are such entitlements, or that there can be a universal list of basic capabilities that enumerate those entitlements – or that this can be a matter of overlapping consensus. Entitlements for horses is one thing, entitlements for their attendant horseflies is another.

For many animals, it is not that there is strong evidence against their sentience, but rather that the question has been severely neglected. There is no agreed lower bound for the size of a brain capable of supporting sentience. When we think about tiny animals like krill, brine shrimp, copepods, nematodes and tardigrades (the first three included in the scope of justice by Nussbaum, the latter two excluded), we can say "no positive evidence", but we cannot say that sentience has been ruled out.

This all leads to a big-picture concern. Can an adequate conception of justice be developed at all prior to the existence of a much richer evidential picture regarding animal sentience? This is a problem not just for Nussbaum, but for the wider animal ethics literature. There is sometimes a tendency to assume that we can work out what we owe to animals independently of the project of studying animal sentience scientifically. But justice requires that we distribute resources among claimants in proportion to the strength of their claims. In order to know what we owe to each claimant, we have to know how many other claimants there are and how strong their claims are.

Our current evidence on the distribution of sentience across species is too sparse to support a reliable estimate of how many claimants there are (consider again the possibility of insect sentience). And while Nussbaum does not discuss the relative strength of the claims of members of different species, a theory of justice must at some point confront this.[7] Overall, it seems our understanding of sentience (both its distribution and its content) is not yet rich enough to inform assessments of what we owe to other sentient beings as a matter of justice.

---

[6] There are reasons to take this idea seriously. See Gibbons et al. (2022) for a recent review of the evidence.

[7] There are various options here. For example, the relative strength of an animal's claims might depend on the richness of its evaluative experiences (Birch et al. 2020) or on its "capacity for welfare" (Browning 2023).

Which species may we kill?

We are faced with a similar concern when Nussbaum explains which sentient animals, under her theory, we are permitted to kill. According to the ECA, all sentient beings deserve just treatment. But for which animals does just treatment require not being killed?

The ECA may seem to imply a simple answer. The first central capability is *Life*. In previous work, Nussbaum described this capability as that of "Being able to live to the end of a human life of normal length; not dying prematurely, or before one's life is so reduced as to be not worth living" (Nussbaum 2011a, p. 33). One way to extend this to all sentient animals would be to say that they too have an entitlement to a life of a "normal" length for their species. This would lead to the problem of defining a "normal" length. Nussbaum, however, avoids this problem by characterizing the capability in a new way, one that does not involve talk of "normal" lifespans.

On the view given in *Justice for Animals*, death is not necessarily a harm to a sentient being, even if it comes before the end of a normal lifespan. Nussbaum defends the "interruption argument" concerning the harm of death,[8] according to which death is harmful to you to the extent that it interrupts your temporally extended projects or goals. She writes: "When a life contains temporal unfolding of which the subject is aware and which the subject values, death can harm it" (Nussbaum 2023, p. 161). Nussbaum is not clear on the particular cognitive capacity that she has in mind when talking of "temporal unfolding". It seems likely that she is referring in part to *mental time travel*: episodic memory and future planning. However, one can imagine a sentient animal without mental time travel but for whom experience nonetheless has a temporal structure, with a subjective past, present and future, as experience flows dynamically from one moment to the next. It is not clear whether this short-term temporal "thickness" is enough to count as "temporal unfolding".[9]

Let us bracket this, and consider the view on which death is a harm to an animal if and only if it experiences "temporal unfolding" of the relevant kind(s). The next problem is to say something about which animals have these temporally rich experiences. For Nussbaum, it is clear that all mammals and birds are in this category. As a result, we are not permitted to kill mammals or birds for food. We are only permitted to kill these animals when it is in their best interest (for example to save them the suffering of a debilitating illness) or in self-defence (discussed later). Farmed mammals and birds are almost invariably killed prematurely, at a time when they still likely have plans for the future.

By contrast, Nussbaum suspects that teleost fishes are likely to live "in a perceptual present" whereby they "do not remember the routines they repeatedly execute" and have "no prolonged projects to be interrupted" (p. 168). She concludes that, if this is correct, it is legitimate to kill fishes for food if the killing is done painlessly. But a further remark complicates the picture:

---

[8] Originally made by Furley (1986) and subsequently developed by Nussbaum (e.g. Nussbaum 2013).

[9] See Hoerl and McCormack (2019) on temporal cognition for a good entry point to this sort of question.

Do we even need to wait until the fish reaches adulthood? Do they have any consciousness of maturity as a goal? It seems that they don't, if they really live in the moment. Still, one can imagine that a very young fish has a fleeting awareness of being small while other fish[es] are big, so the case is unclear. Therefore it is always good to err on the side of caution and avoid killing baby fish[es]. (pp. 168–169).

It seems we no longer need temporally rich experiences for death to be a possible harm. All we need is "fleeting awareness" of others having reached some later developmental stage. This raises many questions. Is it only a harm to kill baby fishes who have seen adult fishes? Is it the size, or the objective developmental stage that matters? And what counts as "fleeting awareness" of these facts? These questions are not answered in the book, and there is a certain casualness here that seems misaligned with the gravity of the issues being discussed. The stakes, after all, are huge. Are mammals and birds entitled to a normal life span in a way that fishes are not? Can improvements in capture and slaughter methods make fishing a morally acceptable practice or is it irremediably unjust? Readers of *Justice for Animals* are left wondering.

The message we draw is that, to the extent that the interruption argument is credible, there is a correspondingly urgent imperative to conduct more research into the temporal structure of experience (including, but not limited to, mental time travel) across species. As things stand, a proponent of the interruption argument can have no firm grip on which animals (if any) it is permissible to kill.

Killing in self-defence

In some cases, we need to kill animals to defend ourselves, and this, for Nussbaum, provides a second potential justification for killing. Controversially, Nussbaum sees some forms of pest control as falling under this heading.

Another group of animals, who were of interest to Bentham, were those whom he called "pests", i.e., animals who constantly attempt to harm us. Many of these ([cock]roaches, mosquitos, flies) are insects anyway, but we should also put street rats (not lab rats) into this category. Here Bentham thought that killing was acceptable by a principle of self-defense, and I basically agree. However, most sensible self-defense statutes require the assailant to retreat first, before using deadly force. The analogue in this case would be for humans to use nonlethal means of self-defense, such as contraception, rather than killing, wherever they can." (Nussbaum 2023, p. 167).

Nussbaum adds that killing must be humane and "should be a last resort" (pp. 216–217) and that the pest must threaten our "life and safety". But this just raises the hard question of what actually counts as such a threat. Generally speaking, it is only in very rare instances that an individual cockroach or rat threatens the life or safety of a human; it is large populations that push the total risk of disease transmission above

a level we can tolerate. But the principle of "self-defence against overpopulation by means of mass killing" is generally not accepted in the human case, and it is not clear how Nussbaum's framework justifies this asymmetry between the human and non-human cases. And a symmetric approach to this issue will have to consider the extent to which humans are pests to other sentient species.

In effect, "pest" status provides a third important dividing line in Nussbaum's moral universe, overriding some of the entitlements that sentience and temporally rich experience would otherwise ground. Like the other two lines (sentience and "temporal unfolding"), the nature of this line stands in need of further elaboration.

Reimagining animal welfare science

Let's shift focus from problems to possibilities. *Justice for Animals* aims to set a long-term agenda for governments, campaigners and scientists. How would the science of animal welfare be different if this agenda were adopted?

Nussbaum accepts that much more research is needed to work out the details of what it takes for animals of different species to flourish. Strikingly, Nussbaum's list of central capabilities for other animals is exactly the same as the list for humans. This can only be intended as a "best guess" that can offer interim guidance while we await the construction of species-specific lists describing "the things that matter most when it comes to survival and flourishing" (Nussbaum 2023, p. 101) for each species. Ideally, even these species-specific lists would eventually be supplanted by lists of central capabilities specific to a developmental stage, sex, and so on.

This is clearly the work of a whole scientific field, not a single person. And the closest *currently existing* field is animal welfare science. This is our main source of knowledge, at present, concerning the health, preferences, typical behaviour and emotional needs of sentient beings[10]. Given this, it is a weakness of *Justice for Animals* that it overlooks this field (apart from one mention of Marian Stamp Dawkins). Nussbaum does cite some scientific evidence, but focuses on individual scientists or philosophers who have lived "with a given type of animal for years and with love and sensitivity" (p.101), forming close emotional bonds. Nussbaum even writes that "scientists today insist on giving proper names to the individual animals they study" (p.xvi), something that is untrue of almost the whole of biology. Implicitly, the assumption seems to be that knowledge of animal flourishing is best achieved through intimate bonding with individuals rather than through science-as-usual.

The neglect of animal welfare science may be accidental or deliberate. Either way, we think it is a misstep, because engaging with a field that has been working on related questions for decades would be useful in the process of developing the ECA. Animal welfare science aims to understand the conditions under which different animals thrive and suffer, how we should even think about what it *means* for an animal to thrive or to suffer, and how their needs relate to their ecology and evolutionary history. Research of this type seems essential to the construction of the detailed lists the ECA needs.

---

[10] See for example Olsson et al. (2018) for an introduction to the field.

Crucially, though, the engagement should be two-way. Animal welfare science could be improved, even revolutionised, by rethinking its own aims to better align with the ECA. Animal welfare science as it exists today functions within the constraints of human economic interests. How we define welfare, what we consider to be acceptable welfare, and what we regard as good indicators of welfare are heavily influenced by human-centred biases. Animal welfare scientists tend to think of themselves as having a societal mandate (Fraser 2008), but also tend to see that mandate in quite a narrow way: advising animal industries (farms, zoos, pet breeders/retailers/owners) on how to improve welfare within economic constraints. The field is also to a large extent reliant on funding and resources from the industries it aims to advise.

Nussbaum's ECA, by contrast, thinks about society's obligations towards animals in a way that does not regard human interests as fundamental constraints. It starts instead with the idea that sentient beings have their own lives to lead and are not primarily living to serve human ends. It implores us to give special priority (in some way) to the worst-off. It is a picture on which constraints go the other way: all forms of animal ownership (including farming and zoos) must either find ways of providing animals with their basic entitlements or else should cease.

A science of animal welfare pursued in service of that end would look excitingly different. We can think of more and less radical versions of this idea. On the radical version, we should entirely reorient the field of animal welfare science to aim at investigating and securing animals' central capabilities, rather than at improving welfare incrementally within economic constraints. On a less radical, more pluralistic version, we should pursue both programs simultaneously, leaving part of the field dedicated to working with industry in pursuit of incremental gains, while also committing resources towards a program focused on investigating and promoting animal flourishing for its own sake.

Conclusion

There are more ideas in *Justice for Animals* than we have been able to discuss here. Later in the book Nussbaum reflects on issues such as pet ownership, wild animals, the law, and how we should individually relate to other sentient beings. Some of the problems we have raised have downstream consequences for these discussions. If we do not yet know enough about the prevalence of sentience or mental time-travel to be confident about the scope of our obligations, suggested legal reforms based on a contentious set of assumptions may turn out to be hasty. Many of Nussbaum's proposals are much less radical and much more feasible if the scope of the relevant obligations is relatively small.

Yet we also want to emphasize the value of the positive vision at the heart of the book. We are not the only sentient species, nor the only one capable of flourishing, nor the only one for whom flourishing means more than just avoiding pain and experiencing pleasure. A society aimed at securing the flourishing of all sentient life would be almost unimaginably different from what we have now. Even if the evidence does not yet allow us to say much with confidence about the varying entitle-

ments of different species, the exercise of trying to imagine such a society, and how we might get there, is important.

Declarations

Conflict of interest The authors declare there are no conflicts of interest.

References

Birch J (2017) Animal sentience and the precautionary principle. Anim Sentience 2:1

Birch J, Schnell AK, Clayton NS (2020) Dimensions of animal consciousness. Trends in Cognitive Science 24:789–801

Browning H (2023) Welfare comparisons within and across species. Philos Stud 180:529–551

Fraser D (2008) Understanding animal welfare. Acta Vet Scaninavica 50:S1

Furley D (1986) Nothing to us? In: Schofield M, Striker G (eds) The norms of Nature. Cambridge University Press, pp 75–91

Gibbons M, Crump C, Barrett M, Sarlak S, Birch J, Chittka L (2022) Can insects feel pain? A review of the neural and behavioural evidence. Adv Insect Physiol 63:155–229

Hoerl C, McCormack T (2019) Thinking in and about time: a dual systems perspective on temporal cognition. Behav Brain Sci 42:1–77

Kitchener PD, Fuller J, Snow PJ (2010) Central projections of primary sensory afferents to the spinal dorsal horn in the long-tailed stingray, Himantura fai. Brain Behav Evol 76:60–70

Korsgaard CM (2018) Fellow creatures: our obligations to the other animals. Oxford University Press

Lacap R (2022) A new approach to determine the presence of nociception in elasmobranchs. Dissertation: California State University, Northridge

Nussbaum MC (2000) Women and human development: the capabilities approach, vol 3. Cambridge University Press

Nussbaum MC (2004) Beyond 'compassion and humanity': Justice for nonhuman animals. In: CR, Sunstein, Nussbaum MC (eds) Animal rights: current debates and new directions. Oxford University Press, pp 299–320

Nussbaum MC (2006) 2006. Frontiers of justice: Disability, nationality, species membership. The Belknap Press

Nussbaum MC (2011a) Creating capabilities: the human development approach. Harvard University Press

Nussbaum MC (2011b) The capabilities approach and animal entitlements. In: TL Beauchamp & RG Frey (eds.), The Oxford handbook of animal ethics. Oxford Handbooks. pp. 228–252

Nussbaum MC (2013) The damage of death: Incomplete arguments and false consolations. In: JS Taylor (ed.), The metaphysics and ethics of death: New essays. Oxford Academic. pp. 25–43

Olsson AS, Galindo F, Appleby MC (2018) Animal welfare, vol 3rd editionrd. CABI

Rawls J (1996) Political liberalism. Harvard University Press

Schultz-Bergin M (2017) Animal rights in a diverse society. PhD thesis, Bowling Green State University

Snow PJ, Plenderleith MB, Wright LL (1993) Quantitative study of primary sensory neurone populations of three species of elasmobranch fish. J Comp Neurol 334:97–103