

## Sentience and Striving in a Theory of Justice for Animals

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**Abstract** My forthcoming book *Justice for Animals* commends and elaborates an account of justice for animals based on my Capabilities Approach (CA). The theory aims at supporting animals' strivings in central areas, focusing on the diverse goals each type of creature aims to attain (with much latitude for individual diversity and choice within a species). Understanding injustice as the wrongful impeding of a sentient animal's characteristic life-activities, I define minimal justice as protection of Central Animal Capabilities, up to a reasonable threshold. But which creatures are capable of significant striving? In this paper I argue that they are the creatures who have the elusive property of sentience, meaning that the world looks like something to these creatures, and they strive for the good as they see it. After providing a general philosophical account of sentience and how to look for it, I examine scientific evidence for finding this property (and the related abilities of perception, desire, and emotion) in a variety of animal species. I conclude that all vertebrates and many invertebrates are sentient.

That's how animals set out to move and act: the most immediate cause of their movement is desire, and this comes about either through perception or through imagination and thought.

Aristotle, *On the Movement of Animals*, ch. 7, 701a33-36

Ronald de Sousa is among my philosophical heroes, for the boldness, the imaginative power, and the rigor with which he has explored human emotions over the years. I teach his work all the time, and learn anew from it each time I do. It is, then, my great pleasure to contribute in his honor an extract from my forthcoming book *Justice For Animals: Our Collective Responsibility*. The extract deals with animal emotions and the larger topic of sentience.

*Justice for Animals* commends and elaborates an account of justice for animals based on my Capabilities Approach (CA). The theory aims at supporting animals' strivings in central areas, focusing on the diverse goals each type of creature aims to attain (with much latitude for individual diversity and choice within a species).

The CA is a minimal theory of justice that can serve as an ideal "virtual constitution" to guide our diverse efforts in local, national, and international lawmaking. Understanding injustice as the wrongful impeding of a sentient animal's characteristic life-activities, I define minimal justice as protection of Central Animal Capabilities, up to a reasonable threshold.

But which creatures ought to be treated as ends? Given my understanding of justice and injustice, this boils down to the question, which creatures are capable of significant striving? Of being not just damaged but wrongfully thwarted in their striving? The CA itself supplies answers to this question through its emphasis on significant striving. But we must now get specific about what the theory tells us.

The creatures protected by the CA must, it seems, be capable of perception and desire, and of moving in response to that combination. By perception I mean the capacity to focus on objects in the world, in a way that's not just a causal collision, that has real directedness or what philosophers call intentionality. The world *looks like something* to these creatures. They have some sort of subjective experience. With desire it is similar: the creatures we are looking for don't just mechanically jump away from harm or move toward food: they have a felt orientation toward what is seen as good and a felt aversion to what is seen as bad. That is what makes their striving significant.

In other words, they possess that elusive property known as *sentience*. The world looks like something to them, and they strive for the good as they see it. Sometimes sentience is reduced to the ability to feel pain; but it is really a much broader notion, the notion of having a subjective point of view on the world. I think it's helpful to open the idea of sentience up this way, before we get to the difficult scientific debates about how to show that a given animal is sentient, which usually focus rather narrowly on pain.

By now, after a lot of fascinating work, scientists are in general agreement that most animals – including all mammals, all birds, and teleost (hard-boned) fish – are such creatures, difficult though these scientific debates have been. Other cases (insects, crustaceans, cephalopods, cartilaginous fish) are more obscure. I'll present these debates, but the theory is the important thing: for we are making new discoveries all the time, and if we have the theory as a template we can easily regroup, classifying creatures differently.

My conclusion is in a sense neo-Aristotelian: animals are complex creatures striving for their characteristic ends, with the aid of perception/imagination/thought and of desires and emotions of many kinds. All of these abilities are not in the least mysterious: they have evolutionary/explanatory value.

### **The Evidence and the Pitfalls**

One pitfall we must beware of is a kind of anthropocentric complacency: human researchers think it is as clear as day that human beings have consciousness (however we define that elusive item), emotions, imagination, subjectively felt perceptions, and cognitions of many types. (Scientists typically define cognition broadly, as any process through which a creature acquires, processes, uses, or stores information, so there is a considerable overlap between these categories: perception and imagination are forms of cognition, emotions typically have cognitive or information-bearing elements.) Briefly, during the heyday of behaviorism, some psychologists suggested that human beings had none of these things, but were just stimulus-response mechanisms. However, this idea so clashed with life experience that it never penetrated very far into the world of biological research, and by now it has been abandoned.

Despite biology's general return to a more humanistic conception of human beings, involving rich forms of intentionality, the epistemic difficulties of such a conception need to be squarely confronted, as they typically are by philosophers discussing the 'problem of other minds,' but not so often by scientists doing research on animal intelligence. For the fact is that our evidence for the humanistic picture of human beings is complicated and uncertain. We have access to our own subjective experience, but even that is shaky. We know that we do not always know what we are doing, or what our emotions and intentions really are. As for other humans, what leads us to make the leap from self to other? The same things, really, that we will rely on (very cautiously) when we talk about other animals: biology, behavior, inference to the best explanation, and interpretive imagination. We know that other humans have a neuroanatomy like our own, and we reason that its deliverances are likely to be similar: if we have subjective awareness through the operations of our neural mechanism, so too, very likely, do others with similar neuroanatomy. That's the simplest account, and a highly plausible one. We see others behave in ways that suggest the types of actions that, when we undertake them, are accompanied by subjective awareness of many kinds – so we reason that the best explanation of that similarity of behavior would be to posit a similarity of experiential underpinnings. But what really justifies us in making these imaginative leaps from self to others? How do we really know that this putative friend, talking and laughing, is not a clever machine?

I don't want to say that we have no reason to ascribe mental life to other humans. I want to say instead, that we do: but not the sort of knock-down evidence that is typically demanded in the case of non-human animals. Failure to recognize the difficulty of our own case leads researchers to set the bar impossibly high in theirs. In both cases the evidence and the difficulties are roughly similar.

The first source of evidence scientists use in tackling the issue of animal awareness is *neuroanatomy*. If it is sufficiently similar to our own, then explanatory parsimony suggests that its functions are very likely to be similar: it plays the same evolutionary role. If in us it produces perceptual experiences, feelings, and emotions, it is highly likely that it does so in other similarly equipped creatures – including other human beings. So far so reasonably good. Any hypothesis to the contrary is likely to be unnecessarily baroque, treating similar cases dissimilarly.

The converse, however, is not true. That is, if we see a neuroanatomy that is far removed from our own (no neocortex, perhaps not even a centralized brain), we cannot rightly infer that the functions of whatever system takes its place must be extremely different. For a long time mistakes were made in this way: no neocortex, said scientists, then no cognitions, pains, or emotions. But we have learned by now that evolution is devious, and follows, often, convergent paths to a similar goal. Thus humans and birds diverged so far back on the evolutionary tree that they have many large neuroanatomical dissimilarities. And yet: birds inhabit the same world of nature humans do, and face an array of challenges not too dissimilar to those we face. As it turns out, birds have adapted to face those challenges, but with strikingly different structures. Similarity of structure is pretty good evidence, then, of similar function (including its subjective properties); but difference of structure is not good evidence of difference of function, when we can study the way the creature functions independently and try to figure out how it does so.

At this point we need to bear in mind that subjective experience is not an idle frill: it plays many crucial explanatory roles. To take the simplest case, the feeling of pain is useful in keeping animals alive, and has no doubt evolved to serve a vital role in signaling the presence of harmful stimuli. So pain is linked usefully to animal behavior, and has evolved because of its survival value.

The second, and in many ways, most important piece of evidence is, consequently, *behavior*, under a variety of experimental and observational conditions. Behavior is crucial, but it is not easy to interpret. Some moving creatures may be harm-avoiding mechanisms without subjective awareness. We'll see that scientists have figured out ways to distinguish those from creatures who have genuine awareness. Here pain plays a useful role, since it is a sharp subjective experience that typically has clear behavioral consequences. But these experiments are themselves controversial.

Scientists and many philosophers alike at this point use *inference to the best explanation*, just as we ourselves do when we ascribe mental states to other humans in ordinary life.<sup>1</sup> Inference of this type is fraught with uncertainty (have we really defeated competing explanations?), and it is at best imprecise. Used in conjunction with other clues, however, as scientists typically use it, it gets us to a reasonably secure conclusion. Philosopher Michael Tye makes a lot of progress by using this strategy. On pain, for example, he writes:

The hypothesis that there is one phenomenal quality in me that causes groaning, bodily tension withdrawal behavior, etc., and a different phenomenal quality in you that has these effects is more complex, and it is ad hoc. A difference is postulated without any evidence, without any reason to suppose that there is a difference... My final conclusion, then, is that it is rational for me to accept that you feel pain when I see you bloodied by your broken bike, for it provides the best available explanation for your behavior. What goes for pain goes for fear and the visual consciousness of red. Indeed it goes for feelings and experiences generally. (67-8)<sup>2</sup>

Sometimes these promising inferences are blocked by overemphasis on a difference or differences between humans and other animals. Particularly common is what I'll call the *false lure of language*. Scientists often tend to think that human awareness is linguistic in structure, and that a creature without language must have a totally different kind of

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<sup>1</sup> Not surprisingly, philosophers defend several different views; I present here a common view and one that I myself find the most convincing.

<sup>2</sup> Tye 2017. References will be made by page numbers in the text.

awareness, if any at all. But of course human perceptual and emotional experience is not always linguistic in form. We get used to reporting on our experience by using language, but that's a translation game. It isn't as though sentences go through our head as we have the experience, or at least not very often. We're used to reading novels that give detailed linguistic accounts of human experience, but that is an artful rendering of something that takes place in our own minds with great compression and little verbal elaboration. Novelists even portray in elaborate language the inner lives of children; but they acknowledge that they are attempting to render something that occurs very differently within the child. As Henry James wrote in his Preface to *What Maisie Knew* (1987/2021), "Small children have many more perceptions than they have terms to translate them; their vision is at any moment much richer, their apprehension even constantly stronger, than their...vocabulary." But it is not only children of whom this is true: probably only novelists command the vocabulary of novelists, and that no doubt not completely, when they are moving rapidly through their own lives. For this reason Proust boldly claimed that the only fully realized life is literature, meaning that the novelist's rich language goes beyond the gappiness, dullness, and impoverishment of daily experience. We should not believe Proust in his contention that the novelist's language is *superior* to most people's daily experiences. We should always remember that it is very *different*.

Human experience, in short, is far from novelistic, and it usually isn't even particularly verbal: it often uses pictorial and sonic representations. Even when it's to some degree verbal, it isn't crisp and precise the way a sentence describing it will aspire to be. And on the rare occasions when our experience is highly demarcated into sophisticated patterns, these won't all be linguistic; some will be pictorial and even musical. We all begin life not knowing how to use language, and not even knowing how to demarcate our own bodies from those of others. At this early stage we have deep and powerful perceptions and emotions, many of which persist and influence adult awareness.

When novelists attempt to write from the point of view of a nonhuman animal, they are accused of illegitimate anthropomorphism. Sometimes criticism of some sort is due, if the novelist has not bothered to investigate the life-world of that type of creature, but has lazily imagined the animal as rather like a human in a costume. Novelists do not always err in this way. What the critic forgets however, is that a novel describing the world from the

points of view of various human characters is also guilty of the anthropomorphism, if we can call it that, of pretending our gappy messy inner worlds are articulated into crisp and eloquent sentences characteristic of the literary construct, a “human being.”

Steering clear of the false lure of language is very difficult. Equally difficult, in connected ways, is steering clear of the *false lure of meta-cognition*. Many people, including some scientists and philosophers, are enamored of the idea that what sets humans apart is reflexive self-awareness, awareness *of* one’s own mental states. Sometimes consciousness is defined in terms of such meta-cognitions, and anything lacking it is held to lack consciousness. As Tye and others have convincingly argued (and really it’s surprising that anyone ever held a different view), most of our experience goes on without reflexive awareness, as we pursue our lives in the world. We see, hear, feel. Things feel and look like something to us: and yet most of the time we do not turn the laser beam of reflection on those states, although certainly at times we do. The false lure in this case is twofold: we are lured into thinking that this particular ability to reflect on one’s states is a necessary condition of feeling pain and having many other subjective experiences. This is false, as we know every day. And then, second, we err by believing that only humans have this trait. Experiments have shown, however, that quite a few animals have it. We don’t have to look for an exalted light-beam going on in their heads: we can infer this ability from what they are able to do. One key is the practice of deception: to deceive another animal about where some choice food is located, for example, an animal needs the ability to think about appearances, how a given set of indicators will appear to, be read by, the animal being deceived. Animals as different as dogs and crows practice deception, showing that they have meta-cognition. Meta-cognition, then, is not the be all and end all that some have thought it, putting a creature on a pedestal; nor is it the special exalted property of humans alone. It’s an ordinary ability that is useful to many creatures for whom hiding and deceiving are useful, and useful, no doubt, in many other ways. To give just one more example, we’ll later encounter birds who probably have to be able to think about how the female bird will view that elaborate bower they are making, or that endlessly rehearsed song they are singing – just as we select a new outfit by thinking about what others (maybe particular others) will think of it.

Meta-cognition, although just a small part of conscious awareness, is useful to us in proving conscious awareness. If we encounter a creature who is capable of deceiving another creature in a way that shows awareness of how the world appears to that creature, then surely that creature does a fortiori have basic awareness: the world appears a certain way (Tye 86-88). Sometimes this can be useful, where we are inclined strongly to doubt that there is something the world looks like and feels like to a given type of creature. But of course meta-cognition, while sufficient for ordinary conscious awareness, is not necessary for it.<sup>3</sup>

### **What Is Sentience, and How Do We Find It?**

How do we figure out which creatures have what is usually known as sentience? Well, first, we need to define what we're looking for.

Animals have evolved through natural selection. Their major attributes and abilities do something for them, or they would very likely not have been selected. So sentience is a useful trait, and we need to bear that in mind at all times, lest we get sidetracked by a tendency to ooh and ah over subjectivity. Sentience does something for the creature, or it would not be there. Of course there is occasionally something useless. But on the whole everything serves a practical role, and all the abilities are integrated into an overall successful life-form.

Scientists divide “sentience” into three elements.

1. Nociception, which literally means “apprehending the harmful.”
2. Subjective sensory awareness: the world looks/feels a certain way.
3. A sense of significance or salience.

Scientists tend to focus obsessively on pain, so that's why the first rubric is nociception, being aware of what is harmful, an ability necessary to survive, and prompting aversive behavior. With our more comprehensive focus on fitness and striving, however, we should really also include awareness of things that are good for the creature, prompting movement toward that thing. Aristotle imagines a thirsty animal saying to itself (in effect)

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<sup>3</sup> See also Tye 2016.

“Drink for me”; and then, being a lucky animal, “Here’s drink” (*De Motu Animalium* ch. 7). “Here’s drink” would be nociception’s opposite, perception of the good. Animals need the awareness of where food and drink are to be found just as much as they need the ability to avoid pain and danger. So let’s call this one: *apprehending the good and the bad*.

But a creature could have that ability and still be like an automaton, reacting to stimuli with no felt awareness. Scientists typically use the term “nociception” to describe a reflex operation of the peripheral nervous system that by itself involves no subjective awareness of pain.<sup>4</sup> Some creatures probably are more or less like automata. (Not only plants but some animals are like this.) So, the second thing we are looking for, in addition, is subjective awareness: the world looks a certain way to the creature: it has a felt point of view. Again, let’s not focus obsessively on pain, but think about seeing colors, feeling desire and pleasure, as well as pain and distress. This is our ordinary notion of *conscious awareness*.

To give an example of ordinary awareness at work in an intelligent creature, we have to translate their thoughts into our language, and we should not seek poetic frills, because the awareness of most intelligent animals is highly practical. Let me, then, return to my chapter one example, Empress of Blandings, since Wodehouse captures with insight and humor the sorts of thoughts that this remarkable pig might have, after being kidnapped, driven all over Shropshire, and then returned to her own home sty:

She looked about her, happy to be back in the old familiar surroundings. It was pleasant to feel settled once more... She did like a quiet life. All that whizzing about in cars and being dumped in strange kitchens didn’t do a pig of regular habits any good.

There seemed to be edible substances in the trough beside her. She rose, and inspected it. Yes, substances, plainly edible. It was a little late, perhaps, but one could always do with a snack...She lowered her noble head and got down to it.<sup>5</sup>

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<sup>4</sup> See Balcombe 2016, 72.

<sup>5</sup> Wodehouse 2008, 248.

Wodehouse's description is not far from Aristotle's animal "practical syllogism," which contains the premises, "Drink for me," and "Here's drink" – and the conclusion is the action of drinking.<sup>6</sup> Both writers capture the way in which perception and desire combine in an intelligent life that seeks diverse good things: food, quiet, stability. That's everyday sentience, and it's obvious that most vertebrates have it.

Subjective awareness is useful to creatures. Pain is a great incentivizer of aversive movement, just as desire and pleasure are of movement toward something. We know this from observing human beings who have lost the ability to feel pain in some part of their body (for example by having all the nerves removed in an arm). This is a person at high risk of harm. In short, subjective awareness is really useful, and we can understand why nature selected for it. It's not just a fancy ooh-ah thing, it is a part of animal survival equipment. It is logical that lots of creatures would have it.

But there is something more. I have spoken of *significant striving*. Creatures pursue some goals as vital to their lives, and neglect others that are more trivial. Sensory experience reports both the major and the trivial, but to make choices and act in the world creatures need a sense of significance, a stronger "oomph" to certain experiences, whether aversive or propulsive. This "oomph" is typically understood to be the evolutionary role of emotions, as we'll see. For now, let's just stick to a simpler case, pain. If a pain is small, the creature may or may not move to avoid it. If it is great, aversive movement is usually expected. But there's a catch: sometimes it is possible to feel even a very substantial pain without that pain seeming *bad*. This doesn't happen under normal life conditions, but we know that the way some opiates work is exactly this way: the sensation is there, but you don't mind it. A type of dissociation has set in. So we can see that in theory at least, the sensation and its significance can come apart. Maybe a true-believer ascetic thinks hunger is fine, maybe even good, because it's a sign that he is moving toward his goal. It is likely that these types of dissociation of perceptual experience from life-meaning are uncommon in non-human animals when they are not injected with a dissociation-inducing drug. Still, we need to build into our picture the idea of significance, since without that selection of movement and activity is likely to be random, ill-directed for attaining the creature's goals.

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<sup>6</sup> Aristotle, *De Motu Animalium*, chapter 7.

Empress of Blandings did not simply see edible substances, she attributed great significance to those substances.

Because subjectivity and meaning usually go together, and indeed subjectivity would not be much use unless it communicated goals that had significance for the animal's activities, the real question is whether we are entitled to attribute subjective awareness to animals. Some scientists are skeptics. Often this is because they think of consciousness as a mysterious somewhat hidden entity, rather than as what I've been talking about, ordinary daily subjective awareness of objects. Explanations of behavior that appeal to psychological structures and do not reduce them in every case to a particular neural mechanism are actually preferable to reductive explanations when we're dealing with behavior that is multiply realizable in different neural structures, since these explanations are simpler and have greater predictive power.

There are good reasons why scientists today almost universally attribute subjective experience (and a sense of significance or salience) to many animals: pain is a very good teacher of life-preserving behavior. It alerts animals to danger that may lead to impairment or even loss of life. And it trains the memory, motivating creatures to avoid an event that has caused pain in the past.<sup>7</sup> The same goes with good things, in the other direction.

### **Experimental Confirmation: The Case of Fish**

But even if we are ready to believe that similar behavior requires a similar type of explanation, and that if awareness is crucial in our case there's a presumption in favor of its being crucial in the case of goal-seeking and goal-avoiding animals, we still have more work to do. Particularly in cases where neural structures are profoundly different, it's important to probe the relevant behavior experimentally, to see how far our working hypothesis makes sense. Again: we are looking for subjective awareness. Experimentally, we are almost always going to find this in areas that also have significance or meaning for the creature, because awareness of trivia does not alter behavior.

Most experimental scientists have concluded that fish feel pain. The leaders of the pro camp are biologists Victoria Braithwaite at Pennsylvania State University and Lynne Sneddon at the University of Liverpool. But there are skeptics: in 2012 James Rose,

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<sup>7</sup> See Balcombe 2016, 72.

Professor Emeritus at the University of Wyoming, published a paper with six colleagues, in the journal *Fish and Fisheries*, entitled “Do Fish Really Feel Pain?”, giving a negative answer to that question. The approach of the “no” authors is question-begging, since it begins from the premise that only creatures with a neocortex can feel pain; since fish obviously lack a neocortex, they can’t really feel pain whatever experiments suggest. It’s not good method to assert one’s conclusion as a premise of one’s argument, and I am not sure that this paper really merits refutation. One obvious problem is that there is by now an overwhelming consensus that birds have subjective experiences of many kinds, and yet birds do not have a neocortex. Still, it’s useful to ask why Braithwaite and Sneddon concluded that fish do feel pain. After all, we’ve insisted that nociception is not sufficient for subjective awareness, and we’ll later see that some creatures have nociception and avoidance behavior without subjective awareness.

As it turns out, their ingenious experiments, summarized in Braithwaite’s book *Do Fish Feel Pain?*<sup>8</sup> are convincing. First, they carefully examine the fish neuroanatomy, finding nerves that contain both A-delta and C-fibers, the two types that are associated with pain in humans and other mammals. (A-delta fibers signal the sharp initial pain of an injury (say, touching the hot stove), whereas C-fibers signal the subsequent sensation of the damage, which is likely to be a duller, more throbbing sensation. So fish may not have a neocortex, but they do have the right type of equipment. Next, Braithwaite and Sneddon subjected the skin of trouts to painful stimuli in the area where sensitive nerve tissue had been found.<sup>9</sup> There were four treatment groups: one group was injected with bee venom; one with vinegar; one with a neutral saline solution; and one group was handled but not injected, to rule out behavioral effects of merely being handled. The fish in the first two groups, but not the third and fourth, showed evidence of distress: elevated gill beats, rubbing their lips against the tank, rocking from side to side. Their next step relied on a simple fact: creatures given a pain-relieving drug such as morphine will not feel pain. (Fish are known to be responsive physically to morphine.). The administration of morphine removed the distress behavior.

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<sup>8</sup> Braithwaite 2010.

<sup>9</sup> Braithwaite 2010, ch. 3, Balcombe 2016, 78-80.

All of this strongly suggested that the fish were *feeling* pain and not just engaging in reflex nociceptive behavior. The next step confirmed that conclusion. Fish typically are very wary of a new object suddenly introduced in their environment. The experimenters built a tower of red LEGO blocks and put it in their tank. The fish who had not been injected avoided the tower. The fish who had been injected, however, failed to alter their behavior in the usual way. It seemed that they were unable to function properly: they wandered near the strange object, apparently distracted. This behavioral change suggests that they were really feeling something that was a sufficiently powerful signal to distract them and alter their awareness of other parts of their environment. And then the clincher: when they gave the fish in groups 1 and 2 morphine, they once again returned to their ordinary watchful behavior.<sup>10</sup>

Other variants of these experiments, which I won't elaborate here, were tried out over a long period of time, further confirming the team's conclusions.

In short: we have *neuroanatomy, behavior* for which the best explanation is a subjective sensation of pain, and the *significance of pain for goals* (pursuit and avoidance.)

### **Emotions: A Road-Map of Significance**

Animals typically have many subjective feeling-states. But we now know that they have another closely related piece of equipment: emotions. Not just *pain*, then, but also *fear*, and a bunch of others. Depending on the animal and its form of life and cognition, these may include *joy, grief* (if the creature has an idea of death and the loss of what is precious), *anger* (if the creature has causal reasoning), *compassion* (if the creature has a clear distinction between self and other and some capacity for *empathy*, by which I mean putting oneself imaginatively in the place of the other), maybe *envy* and *jealousy*. As the great biological expert on this topic, Frans de Waal, emphasizes in a recent book, these are names for general categories, but in the world we often find mixed emotions and subtle species distinctions.<sup>11</sup>

Emotions are often closely associated with feelings, but they are not reducible to feelings, because they involve not just a stabbing sensation (for example), but a cognition

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<sup>10</sup> Braithwaite 2010, 103-4.

<sup>11</sup> De Waal 2019. Other important studies of animal emotions are Bekoff 2008 and Safina 2015.

of important good or bad. Emotions are where we definitively move from subjectivity to *significance*, the third item on my list. From a time when behaviorists thought that no advanced psychology of animal (or human) behavior would allude to emotions, we have now come full circle to a world in which biologists see emotions as key to evolutionary fitness. Animals need to become aware of how things are in the world with respect to their most important goals and projects. Emotions fill that need: they are in effect cognitions of salience, of what the great psychologist Richard Lazarus called “core relational themes.”<sup>12</sup> As Frans de Waal reports, neuroscientists, like so many humans, used to disparage emotions, contrasting them strongly with “reason.” No longer: “As a result of Damasio’s insights and other studies since, modern neuroscience has ditched the whole idea of emotions and rationality as opposing forces, like oil and water, that don’t mix. Emotions are an essential part of our intellect.”<sup>13</sup>

Antonio Damasio's primary concern, in *Descartes's Error*, is to convince his reader that the emotion/reason distinction is inaccurate and misleading: emotions are forms of intelligent awareness.<sup>14</sup> They are ‘just as cognitive as other percepts’<sup>15</sup> (xv), and they supply the organism with essential aspects of practical reason. They serve as ‘internal guides’ concerning the relationship between subject and circumstances.<sup>16</sup> His secondary aim is to show that emotional functioning in humans is connected with particular centers in the brain.

The case from which Damasio starts is the sad history of Phineas Gage, a construction foreman who, in 1848, suffered a bizarre accident: an explosion drove an iron bar through his brain. Gage was not killed; indeed, he made an amazing recovery. His knowledge and his perceptual capacities were unaltered. But his emotional life was altered completely. He seemed to be like a child, with no stable sense of what was important and what was not. He was fitful, intemperate, obscene. It was as if he didn't care about one thing more than another. He seemed bizarrely detached from the reality of his conduct. So

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<sup>12</sup> Lazarus 1991. See my 2001, ch. 2.

<sup>13</sup> De Waal 2019, 205.

<sup>14</sup> Damasio 1994. I discuss his findings and those of quite a few other neuroscientists and cognitive psychologists in my 2001, ch. 2.

<sup>15</sup> Damasio 1994, xv.

<sup>16</sup> *Ibid.*

he could not make good choices, and he could not sustain good relationships with the people around him.

Damasio discovered a modern Gage by accident, in a patient named Elliot, a formerly successful businessman, who had a benign brain tumor. Elliot was weirdly cool, detached, and ironic, indifferent even to intrusive discussion of personal matters – as if it were not really about him. He had not previously been this way; he had been an affectionate husband and father. He retained lots of cognitive functions: he could perform calculations, had a fine memory for dates and names, and the ability to discuss abstract topics and general world affairs. After surgery to remove the tumor, he was even less able to care about things or to rank priorities. He could stick obsessively to a task and perform it very well; but on a whim he might shift his attention and do something completely different. ‘One might say that Elliot had become irrational concerning the larger frame of behavior, which pertained to his main priority.’<sup>17</sup> On intelligence tests, Elliot showed as unimpaired. Even the cognitive tasks (sorting, and so on) that are often used to test frontal lobe damage were a breeze to him. Standard IQ tests revealed a superior intellect. Two things were out of order: his emotions, and his capacities for setting priorities and making decisions. Emotionally, he lacked all sense that something was at stake for him in the events he could coolly narrate. Damasio's idea was that this failure – which clearly seemed connected with his brain damage (even Elliot himself could remember that he was different before) explained his decision-making failure. How can one set priorities well in life, if no one thing seems more important than any other? Even though Elliot could reason his way through a problem, he lacked the kind of engagement that would give him a sense of what to do.<sup>18</sup>

Damasio's research confirms the work of many cognitive psychologists: emotions provide the animal (in this case human) with a map of how the world relates to its own set of goals and projects. Without that sense, decision-making and action are derailed.

## **Sentience and Striving**

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<sup>17</sup> Damasio 1994, 36.

<sup>18</sup> See Damasio 1994, 46-51.

Now we're in a position to sketch the life of the sort of creature my theory of justice has in mind: a life of *significant striving*. Two more ingredients are required: *desire*, and *movement from place to place*. (These were already insisted on by Aristotle.) Perception and subjective feelings, including those of pleasure and pain, plus the information about the good conveyed in emotions, inform the animal about where benefit and harm are to be found. This in turn triggers pro-desire or aversion, which typically, other things equal, triggers movement toward or away. Some aspects of sentience, particularly pain and pleasure, are usually conceptually linked to desires and action tendencies, and emotions are very tightly so linked. Desire and emotion are coextensive with perception whenever the animal moves from place to place in search of its goals. Fear does not guarantee movement away, since other emotional factors (for example love of offspring) might intervene. And some emotions have only unclear and highly general action tendencies: love and compassion often lead to helping behavior, but the connection to action may be broken by distance, or lack of a clear way forward. That is why Aristotle's 'practical syllogism' for animals always includes a step that he calls a 'premise of the possible': such as 'here's (something to) drink.' Something, in other words, that presents itself as a way forward in the present circumstance. To the extent that an animal is capable of planning, the step may be just the first step in a chain that leads to the good result in the end.

These abilities all go tightly together, but not exceptionlessly. I've said that there are creatures who have nociception without sentience. These creatures do move from place to place, but they don't have subjective perception, emotions, or desires (a form of subjectivity). Then there are other creatures who appear to move to and away from things without having the physical equipment for nociception (cartilaginous fish). And some creatures (the ones that Aristotle called 'stationary animals,' sponges, anemones, etc.) may possibly have some ability to avoid the harmful without either sentience or whole-body movement from place to place. These are hard cases. I am claiming that a necessary and sufficient condition for being a subject of a theory of justice is the possession of what I can call the 'standard animal package': sentience, emotion, cognitive awareness of objects, movement toward the good and away from the bad. To such creatures the world is endowed with meaning: things are experienced subjectively as relevant to their well-being. They are responsive to the good as good and averse to the bad as bad. Here we come back to the

great truth in Utilitarianism: there is a dividing line in nature created by sentience, the great uniter of the animals. We need, however, to couch this truth in a broader way: it 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: the whole of what I've called the 'standard package.'

Suppose we found a creature who pursues a species-typical form of life, moving toward the good and away from the bad, but who had lost (or who never had) the ability to feel pain and pleasure (perhaps through some damage to its sympathetic nervous system). Does this creature fall under my theory of justice or not? Would we be committing injustice by doing to this creature what would normally be painful? First, in my theory pain is a threshold, but not the only thing that matters, and this maimed creature is very different from a creature whose whole form of life involves non-sentient robotic movement. Pain is not the only form of sentience (the world seeming a certain way to the creature), although it is an especially conspicuous form, and for this reason easy to focus on when doing experiments. Sentience is subjective awareness, and this comes in many varieties, including subjective visual, auditory, and other sensory awareness. The imagined creature is injured, and given that its form of life would typically include pain-sentience, it is likely to be very short-lived. Pain is useful, indeed crucial for the creatures who have it. This creature will have to be constantly on guard lest it be cut, burned, and so forth. But that means that to live for even a day, it must have some type of sentience in my enlarged sense, even if not the ability to feel pain: perceptual awareness above all. It must watch its limbs with subjectively registering perception, and be constantly aware of them. Even if some of its senses are damaged, then, in this case the sense of touch, it is sentient. So the theory is about the whole form of life, not (as for Bentham) about pain as the only thing that matters. If we find striving and subjective awareness of some type, however handicapped, then the creature is sentient.

This brings us to another important observation. For a creature to have a flourishing life, it needs to have, insofar as possible, the abilities that enable it to be part of its own species community. It is there that it will have friendship and community, offspring and family, if at all – even though for some creatures, such as dogs, the relevant community also includes members of another species. This is why it's so crucial to teach human

children with cognitive disabilities to use some type of language, often sign language, but not important to teach chimpanzees to use sign language. They can learn it, but it plays no role in its form of life with other chimpanzees. When, then, we encounter disability in another species, it is similarly important to try as hard as we can to bring the disabled creature in touch with the characteristic abilities of its species community, whether individually or by some type of extra assistance. So: epistemically we build the theory of justice around the species norm, then we try to extend justice to every species member.

As we do this we should always bear in mind that a wide range of creatures learn their abilities through teaching within the species group culture, not just through inheritance. A general tendency may be inherited, but its specific realization often depends on cultural learning, one reason why the presence of a representative species group is so essential for animal flourishing.

Significant striving, then, includes subjective perception of things that are helpful and harmful (the world looks like this to the animal), plus a variety of subjective attitudes, such as pain and pleasure, and, in addition, numerous other subjective states that motivate behavior: desires and emotions. The sentient animals we are describing have all of these abilities. Now we must ask what difference this makes for a theory of justice.

### **Creatures and the Working Boundary**

Where, then, do we draw the line, where justice is concerned? Which creatures are included, and which does our current evidence seem to exclude? First of all, we must always keep our eyes and minds open, drawing the line humbly and tentatively, aware that our knowledge is highly incomplete. The theory about what a creature must be like to receive justice is far more secure than are specific conclusions about which creatures are in this group. Still, it is worth applying the general theory, to give a general sense of where it leads us. I leave mammals to one side, since it is obvious by now, given scientific consensus, that my theory of justice includes them all.

#### ***Fish***

Fish, as we've seen, are definitely sentient creatures, and, beyond that, creatures of striving and flourishing, creatures to whom my theory applies. This has been demonstrated to the satisfaction of the vast majority of scientists, and to my own. There is a great deal more to

say about fish, and readers will find it accessibly retold in Balcombe’s book. They are capable of surprising feats of intelligence, including transitive inference.<sup>19</sup> They have a variety of sophisticated modes of sensing the world, including keen sight, hearing, and smell – and these also register subjectively, as we know from experiments showing that fish are fooled by optical illusions.<sup>20</sup> They even have a sense we lack: an ability to sense objects through electrical waves. They are capable of many emotions, including fear and joy, probably some variety of love. They have a rich social life, including pair-bonding. In short they have very complicated and fascinating lives, and seem to deserve our concern and restraint every bit as much as the mammals do. As Braithwaite puts it: ‘Given all this, I see no reason why we should not extend to fish the same welfare considerations that we currently extend to birds and mammals.’<sup>21</sup> It is exhilarating to learn a great deal more about these remarkable members of our world.

So far I have been speaking, as do Braithwaite and Balcombe, of ‘bony’ or ‘teleost’ fish, which comprise about 96 percent of the species we know. A very different story should be told about cartilaginous or ‘elasmobranch’ fish, which include sharks and sting rays. These creatures are historically far removed from the teleosts: the two groups diverged way back in the Devonian and Cretaceous periods. So although people run the two groups together mentally and call both ‘fish,’ they are extremely different in all respects. Because there is no evidence that elasmobranch fish have an anatomy sufficient for nociception – they have ‘a general lack of nociceptive receptors’<sup>22</sup> – there is good reason to conclude that they are not sentient. One consequence is that they feed on species that are in fact noxious: they are found with dozens of sting ray barbs in their mouths. They do wriggle and try to get away when movement is interfered with, but as we’ll see, this is true of many creatures who give no evidence of sentience. And they continue undisturbed at their feeding even when severed in two, behavior we do not find in sentient creatures. As Tye concludes, ‘For elasmobranchs, so far as I am aware, there is *no* behavior, the best explanation of which is that they feel pain.’<sup>23</sup>

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<sup>19</sup> Braithwaite 2010, 92-4. She describes complex experiments in which fish, faced with choices about how to position themselves in relation to potential rivals, clearly uses this thought pattern.

<sup>20</sup> See Balcombe 2016, 25-39, esp. 36, Tye 2017, 114. And on all these things see Tye 2017, ch. 6.

<sup>21</sup> Braithwaite 2010, 113.

<sup>22</sup> Tye 2017, 102.

<sup>23</sup> Tye 2017, 103.

### *Birds*

Fish sentience continues to be debated, though a clear consensus is emerging. The sentience of birds is no longer in doubt. This was not always the case. Until very recently, the small size of bird brains and their lack of a neocortex led to a widespread view that birds were ‘lovely automata capable only of stereotyped activity.’<sup>24</sup> Since the 1990s, particularly, our knowledge of birds has grown rapidly, as ‘[c]omplex concepts, such as planning for the future or theory of mind, were translated into carefully controlled tests. The results have been eye-opening and hard to disavow by skeptics due to the rigor of the experiments.’<sup>25</sup> Indeed, de Waal continues, it is our knowledge of the highly sophisticated and flexible intelligence of birds that has, more than any other field of animal studies, revolutionized science’s overall picture of intelligence:

We used to think in terms of a linear ladder of intelligence with humans on top, but nowadays we realize it is more like a bush with lots of different branches, in which each species evolves the mental powers it needs to survive.<sup>26</sup>

For a long time, understanding was impeded by a blinkered view of anatomy: no neocortex, no or very little intelligence. By now, a close look at birds’ proverbially weak brains shows that those brains are actually rich in neurons, and that through convergent evolution the bird brain organizes them differently, in clusters rather than layers; but the cells themselves are ‘basically the same, capable of rapid and repetitive firing, and the way they function is equally sophisticated, flexible, and inventive.’<sup>27</sup>

Equally revolutionary, toppling old stereotypes, has been the study of bird behavior. We now know that birds possess great adaptability to their environment, and a wide range of highly developed capacities. Parrots and corvids have been shown to have exceptional conceptual intelligence and flexibility. Corvids use, and make, tools better than most any other non-human animal.<sup>28</sup> Parrots, as has been memorably shown by Irene Pepperberg in

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<sup>24</sup> Harvey Karren (neuroscientist), quoted in Ackerman 2016, 55.

<sup>25</sup> De Waal 2016, 8.

<sup>26</sup> *Ibid.*

<sup>27</sup> Ackerman 2016, 58, summarizing the research of Erich Jarvis.

<sup>28</sup> Ackerman 2016, ch. 3 summarizes this research.

her initially mocked but by now heralded experiments with Alex, a gray parrot, turn out to have wide-ranging and sophisticated minds.<sup>29</sup>

Where language and expression are concerned, it isn't just parrots who have linguistic talents. It turns out that bird song is not just lovely, it is also a highly intelligent system of communication. In many species song is endlessly rehearsed – even when birds are alone they are practicing – and individual differences in fluency are appreciated by other (especially female) birds. Birds have an anatomy that would be the envy of many human singers: the syrinx, the bird analogue of our larynx, can sound two notes at one time. So bird song involves complicated aesthetic capacities, but it also has combinatorial powers akin to language, in at least some species. The calls of the chickadee, for example, have been ranked ‘one of the most sophisticated and exacting systems of communication of any land animal,’ complete with a syntax that can generate an open-ended number of call types.<sup>30</sup>

Language is part of social interaction, and birds are among the most sophisticated social animals, forming long-lasting pair bonds (80 percent of species are monogamous) and teaching a wide range of behaviors to their young, a striking instance of cultural learning. Feeding nestlings is taxing, requiring intense parental communication and attention. Equally impressive is the attention some species devote to aesthetic matters in constructing their dwellings: the bowerbird is an extraordinary artist. Magpies pass the mirror test, showing especially keen awareness of self and other, while corvids in general excel in reciprocity accompanied by gift giving.<sup>31</sup> In the process birds clearly experience a wide range of emotions, including fear, but also love and grief. And they not only feel their own pain, they are keenly sensitive to the pain of others of their kind.<sup>32</sup>

Equally impressive are abilities that are difficult to compare at all to human abilities, especially the marvelous powers birds have to map their spatial location, partly by sight (birds have the most advanced visual system of any vertebrate, particularly sensitive to color distinctions), and partly by smell. Birds thus find their way to and from distant

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<sup>29</sup> Pepperberg 2008.

<sup>30</sup> Ackerman, 2016, 40 and ch. 5, Emery 2016, 77-87, 174-5.

<sup>31</sup> Ackerman 2016, ch. 4, and see a remarkable photo of a bowerbird's edifice in Emery 2016, 77.

<sup>32</sup> See Tye 2017, 127-8; Ackerman 2020, 162. Emery (2016, 158-9) finds evidence for empathy in consolatory behavior after a fight. See also Safina's (2015) extensive account of the capacities of parrots.

destinations, an ability in which they so surpass humans that the operations of the bird GPS system are still poorly understood.<sup>33</sup>

Where striving is concerned, these fragile and relatively weak creatures are among the most successful strivers, with keen senses and a flexible form of life that has enabled them to flourish, each sort, in its own environment.

[I now omit sections on reptiles, cephalopods, crustaceans, insects, “stationary animals,” and (the other side of the sentience line) plants.]

### **Ethical Consequences**

I have argued that creatures of surprisingly varied types have a place in the theory of justice, and that we should keep an open mind about others, since our knowledge is incomplete. This suggests that our duties are huge, stifling even. How can we face up to them? But let’s remember that the justice-membership of a creature does not yet tell us *what* it is owed. There is no ladder of nature. Creatures strive for flourishing in manifold ways that don’t line up to be graded on a single scale, and complexity of life does not determine justice-eligibility. Level and complexity of life, however, do determine precisely *what* is a harm to a justice-eligible creature. Human beings are not *better* or *higher* than dolphins; but there are things that are serious harms and wrongs to a human being that would not be wrongs to a dolphin: for example, the denial of an education conferring basic literacy. On the other hand, the ability to swim unfettered through large tracts of water is a key ability in the life-forms of fish and marine mammals, but to deprive humans of a chance to swim for endless miles is no injustice. And so forth.

When we consider justice and injustice, in short, we need to bear in mind the form of life of each creature. The goal is that each creature gets a decent chance to flourish in its own way. When we humans impede that flourishing – and we are omnipresent in these lives since we control the earth, the seas, even the skies – we need to correct our overweening ways.

One thing we can say for sure – the great truth in Utilitarianism – is that pain is very bad for all sentient beings. So its wanton infliction (infliction that does not further the animal’s own good) is always, in my theory, an injustice for sentient creatures. In my next

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<sup>33</sup> Ackerman 2016, ch. 7 summarizes the research.

chapter I'll argue that whether a painless death is a harm to a creature depends on some specific factors about its form of life. Once we digest these arguments, the demands of my theory may look like requirements that serious and sensitive human beings could live with, or at least strive to fulfill more adequately as time goes on.

### **References**

- Ackerman, Jennifer. 2016. *The Genius of Birds*. New York: Penguin.
- Ackerman, Jennifer. 2020. *The Bird Way*. New York: Penguin Press.
- Balcombe, Jonathan, 2016. *What a Fish Knows: The Inner Lives of Our Underwater Cousins*, New York: Scientific American/Farrar Straus and Giroux.
- Bekoff, Mark. 2008. *The Emotional Lives of Animals*. San Francisco: New World Library.
- Braithwaite, Victoria. 2010. *Do Fish Feel Pain?* New York: Oxford University Press.
- Damasio, Antonio R. 1994. *Descartes' Error: Emotions, Reason, and the Human Brain*. New York: Putnam.
- De Waal, Frans. 2016. "Foreword to Nathan Emery", *Bird Brain: An Exploration of Avian Intelligence*, Princeton: Princeton University Press.
- De Waal, Frans. 2019. *Mama's Last Hug: Animal Emotions and What They Tell Us about Ourselves*. New York: W. W. Norton.
- Henry, James. 1897/2021. *What Maisie Knew*. Project Gutenberg. <https://www.gutenberg.org/ebooks/7118>.
- Nathan, Emery. 2016. *Bird Brain: An Exploration of Avian Intelligence*. Princeton, NJ: Princeton University Press.
- Lazarus, Richard. 1991. *Emotion and Adaptation*. New York: Oxford University Press.
- Nussbaum, Martha C. 2001. *Upheavals of Thought: The Intelligence of Emotions*. Cambridge: Cambridge University Press.
- Pepperberg, *Alex and Me* (New York: Harper, 2008)
- Safina, Carl. 2015. *Beyond Words: What Animals Think and Feel*. New York: Picador.
- Tye, Michael, 2016, 'Are insects sentient? Commentary on Klein & Barron on Insect Experience'. *Animal Sentience*. 9 (5), 1-3.
- Tye, Michael, 2017, *Tense Bees and Shell-Shocked Crabs: Are Animals Conscious?* New York: Oxford University Press.

Wodehouse, P. G. 2008. *Pigs Have Wings*. New York: Random House, original date 1952