Chapter 2
Ethics and the Welfare of Fish

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Abstract To what extent fish can experience suffering and enjoyment is not just an empirical question, but one that also calls for ethical reflection. This is firstly, because animal welfare research is value laden and secondly, because the empirical evidence requires a normative framework in order to become action guiding in practices involving fish, such as aquaculture. In this chapter, we describe the role of ethics and different ethical theories that have been applied in animal ethics and that are relevant for discussions on fish welfare. We particularly focus on utilitarian, rights based, relational, and virtue ethical animal ethics theories. We furthermore argue that fish welfare is a term that combines moral norms and biological concepts. After all, when we implement fish welfare measures we have already made certain normative choices. We illustrate the integration between ethics and science in seven steps, from implementing fish welfare at the farm level, to weighing welfare against other values, defining and measuring welfare, to the questions of why welfare is morally relevant and what this means for the moral status of fish. We then consider the question of whether fish should be attributed to moral status and hence whether their welfare should be taken into account in our moral deliberations. However, not all moral concerns regarding our treatment of fish can be addressed by focussing on welfare. We discuss a number of concerns beyond welfare that need to be taken into consideration in a moral discussion on how to relate to fish: does the killing of fish constitute a moral harm? and how should we morally evaluate the process of domesticating fish in aquaculture? The chapter concludes by pointing out a number of moral issues in four practices involving fish: aquaculture, wild fisheries, experimentation, and recreation.

Keywords Animal ethics · Welfare · Moral status · Harm of death · Domestication

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2.1 Introduction

From an ethical point of view, fish form an interesting case. They form a borderline case, between on the one hand mammals—about which broad consensus exists, both on the basis of common sense and scientific research, that they are sentient—and on the other hand other natural entities, such as rocks, about which we are certain that they are not sentient. While almost everyone now assumes that mammals experience pain, not everyone is convinced that fish do. This leads them to treat fish differently than other animals. Whether or not fish indeed suffer less than mammals is in the first place an empirical question and we need scientific research in the fields of neurophysiology, physiology, and ethology to answer it. At the same time, as this chapter will make clear, it is a question that cannot be answered without ethical reflection. This is, firstly, because scientific research is value laden (Longino 1990). Secondly, as we will show, this is because the empirical evidence requires a normative framework in order to become action guiding in practices involving fish, such as aquaculture.

We will start this chapter by briefly describing the role of ethics and different ethical frameworks, or theories, that have been applied in animal ethics and that are relevant for discussions on fish welfare. Next, we will address the question of what we mean by fish welfare. As we will argue, fish welfare is a term that combines moral norms and biological concepts. When we implement fish welfare measures we have already made certain normative choices. However, not all moral concerns regarding our treatment of fish can be addressed by focussing on welfare. We will discuss a number of concerns beyond welfare that need to be taken into consideration in a moral discussion on how to relate to fish. Finally, we will illustrate our arguments by briefly pointing out the moral aspects of a number of practices involving fish: aquaculture, wild fisheries, experimentation on fish, and recreational uses of fish.

2.1.1 Ethics Is Dynamic

Ethics is the systematic reflection on morality, i.e. the set of norms and values that a person or group considers to be important and action guiding. In daily life, we often answer moral questions and make moral decisions, for example while feeding animals and implicitly considering that one *should* care for animals. In other cases, there is much more unclarity or debate on what one should do. In these situations ethical reflection is important. Therefore, we need to understand the process of moral judgement formation.[1] In this process, the purpose of ethical theorizing is twofold:

[1]We will use the terms 'moral' and 'ethical' interchangeably.

Firstly, theories justify the basis of morality and thereby seek to answer questions such as 'why should we be moral?' and 'what is the goal of ethics?'. Is it, for example to enable peaceful coexistence in society or to protect the vulnerable? Secondly, theories aim to give guidance in practical moral problems or dilemmas by offering principles and values that help us make decisions about the right action to take or the good character to cultivate.

A distinction can be made between normative theories, which we will discuss below, and meta-ethical theories. The latter seeks to answer questions such as 'are moral judgments objective or subjective and are they universal or relative to culture?'. On a meta-ethical level, we embrace coherentist moral theories, which do not believe there is one ultimate foundation on which a theory must be built, but rather that a theory is valid when it achieves coherence between principles. In particular, we hold that forming a moral judgement goes by way of reaching a 'reflective equilibrium'—a balance between three 'pillars', namely our considered intuitions or moral emotions, morally relevant facts of the case at hand, and moral principles (Daniels 1979). When we deliberate about the right thing to do in a specific case, we need to move back and forth between these three pillars until we reach a balance. We often start with a moral intuition, for example that something is morally problematic about the case at hand—say, keeping a fish in a small round fishbowl. We then need to test our intuitions by squaring them with the facts of the case—are small round fishbowls bad for fish?—and relating them to moral principles—for example, a principle of respect for animal welfare. However, the principles themselves can be tested by our intuitions; if principles were to lead to very counter-intuitive implications, we have reason to consider whether it is necessary to refine or change our principles. By moving back and forth between these pillars we reach a considered moral judgement. Such a judgement has normative power and is action guiding, although it remains a temporary judgement.

From this perspective, ethics is dynamic and this means that our judgements can change, for example when new information comes to light, when we are confronted with new situations, or when ethical theories are refined after discussion between ethicists. Proponents of different normative theories may reach different conclusions on a specific case, because they have different decision criteria; in fact, they may even have different views on who belongs to the moral community in the first place, or in other words, on whose interests we need to take into account in our moral deliberations. However, there can be points of convergence between different moral theories as well; this will lead to well-established moral judgements that are widely shared.

2.1.2 Different Animal Ethics Theories

Normative theories provide a frame that answers questions such as 'what is just and right?' and 'how should one act in the light of the available options?'. The two most influential normative theoretical frames are utilitarianism and duty-based theories

(such as Kantianism). Two other theories that have recently been applied to animal ethics are relational or care ethics and virtue ethics. We will briefly explain these four theories here. Utilitarianism is a forward-looking theory, as it only looks at the possible consequences of our actions. Utilitarians argue that we should achieve the best possible balance of happiness, well-being, or some other intrinsic value, over unhappiness or suffering, for all those affected by our moral decision. This entails that when we have to make a moral decision, we need to weigh the prospective consequences of different courses of action and make a calculation about which of the courses of action will lead to the best outcome. There are many different versions of utilitarianism. For instance, the specific version of utilitarianism that famous animal ethicist Peter Singer supports in *Practical Ethics* (2011) and *Animal Liberation* (1975) is preference utilitarianism, meaning that we have an obligation to weigh the preferences of different entities against one another.[2] This view is quite different from the version of utilitarianism that has been leading in discussions about the implementation of animal welfare measures at the farm. This so-called *animal welfarism* argues that the only thing that morally matters regarding the treatment of animals is what the effects of certain measures are on the welfare of all involved animals (and human beings) (Schmit 2011). This approach has been criticized for favouring only marginal reforms in animal husbandry and animal testing, rather than questioning the validity of these practices as such (Harfeld et al. 2016; Haynes 2008).

Criticism to animal welfarism often derives from rights-based theories, which tend to take a more abolitionist position on animal use. According to Tom Regan (1983), for example all beings that are subjects-of-a-life[3] have inherent value and we should treat them with respect for this value; this means, amongst other things, that we should not use them as mere instruments or means, but also always treat them as ends in themselves; a view that is clearly based on Kant. This principle of respect for inherent value is absolute, as inherent value does not admit of degrees. According to this theory we are not allowed to sacrifice an individual's integrity, right to be free from bodily harm, or autonomy in order to achieve good consequences for others. This means that there is a presumption against animal farming or animal testing in rights-based theories. Even though rights-based theories can take into account the prospective consequences of our actions, they are not only forward looking. They also place value on duties that are derived from our past actions; for example if we have promised we would do something we should stick to this promise. Also, the purpose and intention behind an action are relevant for the assessment of the action.

[2] Although recently, Singer seems to have shifted back to the hedonistic version of utilitarianism of his earlier writing.

[3] A being is a subject of a life, which can be understood as being able to experience one's life subjectively, when they are sentient but also possess a certain form of self-awareness, memory, beliefs, perception of the future, and preference autonomy. Of course, an important question in this context is whether fish could be considered subjects-of-a-life. While Regan at the time of writing his seminal work *The Case for Animal Rights* did not consider them as such, scientific research into the physiology of fish has advanced since then.

If our actions accidentally or unintentionally lead to good consequences, Kantians do not necessarily deem the action morally right.

Relational animal ethics—also sometimes termed contextual ethics or care ethics—rejects the abstract and rationalist nature of utilitarian and Kantian principles in favour of a more context-sensitive understanding of morality and a focus on social relationships (Donovan 2006). Relational ethics particularly focuses on relationships of care for vulnerable others, grounded in the understanding that each one of us could end up in a situation in which we need care. According to relational ethics, rational argumentation, like that of Regan and Singer, overlooks the centrality of feelings of sympathy or empathy that we can have towards animals. It is through these feelings that people come to change their behaviour, and not solely through rational argument (Gruen 2010). Our obligations to animals are determined by the specific relationships we have with them. For example, we have more responsibilities towards animals in our care than to animals in the wild, because through our act of domesticating them we have made commitments to them (Palmer 2010). Relational animal ethicists hold that we cannot make moral decisions regarding our treatment of animals without taking into account social and political contexts. Moreover, as Donovan (2006) has argued, relational animal ethicists do not only seek to theorize about animals, but to enter a kind of dialogue with them in the sense that they try to not drown out the 'voice' of the animal but try instead to include the animal's point of view in their ethical deliberations.

Similarly, virtue ethics rejects the abstract and universalistic modes of reasoning of theories such as utilitarianism and Kantianism. For virtue ethics the central question is not 'what is the right action to undertake?', but rather 'what makes me a good person?'. In other words, virtue ethics is not action oriented but character oriented. Virtue animal ethicists regard animals as individuals with whom we share a common life (Gruen 2010). If we treat animals badly, we are displaying the wrong character traits. Virtuous character traits are, for example sensitivity and compassion and we do not cultivate these traits when we routinely harm animals.

For all the above-mentioned theories the intentions and purposes behind animal use are relevant. For example, it is generally deemed more justified to kill fish for consumption than for recreational use and it may be deemed more justified for people with no other means of sustenance to kill and eat fish than it is for people who have other alternatives. From a utilitarian point of view, this is because the interests involved in recreation are not as important as the interests involved in consumption. From a rights-based perspective this is because not only the consequences, but also the intentions of an actor should be morally assessed. For a relational ethicist, this is because we need to take the social context into account: if someone who is barely surviving kills a fish for consumption this is done out of necessity and not out of cruelty or dominance. For a virtue ethicist, intentions behind actions are relevant, because they tell us about someone's character. If someone kills a fish simply for pleasure, this betrays a cruel disposition. Against the background of these normative theories, we will now look at fish welfare.

2.2 Welfare of Fish and Its Moral Dimensions

When we speak about fish welfare, it is important to realize that we are not merely talking about a biological category that we can measure. As we will argue below, welfare is a concept that combines biological aspects and moral dimensions.[4]

2.2.1 Defining Animal Welfare

As Haynes (2011, 112) argues, 'animal welfare is an evaluative concept, like product quality and building safety'. This means that the discussion about the welfare of animals cannot be seen independently from normative assumptions. For instance, innovations in order to slaughter fish 'humanely' or the question of what housing system makes fish suffer the least (e.g. Van de Vis et al. 2003) require more than empirical evidence to come to decisions. Moral considerations are at play here too. With regard to animal welfare and housing systems, we need to ask how to balance values related to animal welfare to other legitimate values that play a role. For example, how do we weigh the value of public health against that of animal welfare? For public health reasons it is best to transport live fish to specialized slaughter facilities, but this transport leads to stress (Manuel et al. 2014) in the fish and may be detrimental to their welfare. This interplay between biological views and moral norms raises the question of what we mean when we speak about fish welfare in the first place. From this general claim that moral dimensions play a role in the welfare debate, it is important to stress that the moral questions are not restricted to problems of implementation. It is also linked to the level of defining and assessing animal welfare.

The definition of animal welfare has changed through time from only denoting balanced biological functioning to also including an animal's subjective experiences. While at first good welfare meant the absence of negative experiences, more recently the presence of positive emotions and the capacity to carry out natural or species-specific behaviour are also included in the definition of welfare (Ohl and van der Staay 2012; Duncan 2006). However, an emphasis on the negative aspects is still found in authoritative definitions of animal welfare such as the five freedoms of the Farm Animal Welfare Council.[5] According to this definition, we can establish that an animal's welfare is met if it is free from hunger and thirst, discomfort, pain, injury or disease, and fear and distress, and if it is free to express normal behaviour. Only the last freedom potentially entails positive experiences. Within this welfare concept,

[4]We argue for this position in more detail in Bovenkerk, B. and Meijboom, F.L.B. (2013). 'Fish Welfare in Aquaculture: Explicating the chain of interactions between science and ethics' in *Journal of Agricultural and Environmental Ethics*, vol 26 (1): 41–61, special issue on fish welfare.

[5]See http://webarchive.nationalarchives.gov.uk/20121010012427/http://www.fawc.org.uk/freedoms.htm (accessed on July 3, 2018).

a moral evaluation of animal welfare needs to be made when some of these freedoms conflict with each other. For example, dehorning dairy cattle may come with some sort of pain, but is often argued for with reference to the prevention of future injuries. Consequently, one has to weigh the relative weight of these freedoms in this case. The moral dimension is, however, not the result of this specific five freedom definition. Also, other views on the concept of animal welfare lead to similar ethical issues. For instance, a more recent dynamic view on animal welfare states that an animal is in a state of welfare if it has the ability and capacity to adapt to its environment and experiences it as positive (Ohl and Van der Staay 2012; Nordquist et al. 2017). Here again, the definition includes moral assumptions and needs a normative view on how to deal with situations in which different parts of animal welfare conflict. An example is the situation in which exploring a new environment may be stressful for an animal, but may also entail positive emotions in the long run.

To structure the variety of animal welfare concepts and the related moral dimensions, we follow Fraser (2003). He defines three groups of views on welfare: function-, feeling-, and nature-based views. Applied to fish, function-based views are about the ability of fish to cope with farming conditions. Feeling-based views assume that fish have subjective feelings and that these are constitutive of their welfare (Duncan 1996). Nature-based views regard fish welfare as the ability of fish to display natural or species-specific behaviour. These views are not necessarily mutually exclusive, but they can certainly conflict in specific contexts. For example, robust species of fish can cope with the stress caused by handling (EFSA 2008), but this does not exclude negative emotions as a result of the handling. One's ethical theoretical framework often determines which of the three views one emphasizes. For example, a utilitarian who focuses on sentience and strives for maximizing overall welfare, would be more likely to support the feeling-based view. Someone who argues from an ecocentric theory, which gives a central place to natural ecosystems, would be more inclined to reason from the nature-based view on welfare. However, in most practical discussions on fish welfare, we see an emphasis either on function-based parameters or on the absence of pain. This is understandable, as questions surrounding fish welfare arise in the context of aquaculture and in this context ability to cope with farm conditions is important. Moreover, while there is an increasing consensus amongst fish biologists and physiologists that fish can feel pain (Braithwaite 2010), this dispute is still being disputed (see for instance Rose et al. 2014). Only recently, research is being carried out into what constitutes positive experiences for fish. For example, research is being done on environmental enrichment in fish tanks and on preferred substrates (Manuel et al. 2015; Galhardo et al. 2009).

2.2.2 Measuring Animal Welfare

The question of how to implement fish welfare in aquaculture assumes not only that we know what welfare is, but also that we know how to measure it. At first sight, this

seems to be a purely empirical question, but in fact, this also involves an interaction between empirical science and ethics. In any scientific study value assumptions and judgements are made at several points, from the formulation of the research question, to the determination of the test set-up and the interpretation of results (Longino 1990). For instance, we can ask what we are in fact measuring when we perform a preference test. Do we test short-term or long-term preferences? Or do we only find the least bad option out of two evils? A more fundamental question is to what extent preferences are indicative of welfare in the first place. Furthermore, there is a difference between the experience and assessment of welfare on an individual- or on the group-level. For example, on fish farms fish welfare can be assessed by measuring the amount of cortisol in the water. This gives the farmer information about the welfare on the level of the group, but of course, there can be large differences between the welfare of individual fish. This is a relevant distinction for ethical assessment and invites debate about the question whether or not the system works if the farmer cannot offer individualized care. Or perhaps group welfare is what the farmer ought to be striving for in the first place? Furthermore, we can measure the state of an animal's welfare at a specific point in time or over the course of the animal's whole lifespan. Also, the question of whether an animal experiences acute or chronic discomfort has implications for how we assess its welfare. During the assessment of welfare, we, therefore, make implicit value choices about what we deem important about animals' welfare.

Measuring fish welfare is even more complex than measuring the welfare of mammals, since we cannot use our own experiences as a frame of reference as fish's physiology is so different from ours. Little is known yet about preferences and experiences of fish. Moreover, there are many different species of fish and if we found out what preferences or experiences one species has this would not automatically translate to other fish species. We need to bear in mind that most research has been carried out on fish species that are of particular interest to humans, such as trout and salmon. There are over 30,000 species of fish and the differences between them can be as big as the difference between—say—an elephant and a mouse. This raises the question of whether welfare indicators can be translated between different species of fish. It also demonstrates the enormity of the task at hand if we want to find out more about fish welfare.

We have now given some examples of normative aspects of defining and measuring fish welfare, but before we claim that we need to implement, weigh, define, and measure welfare, we have already made two important steps. First, the assumption that welfare matters morally. Only from this starting point, it matters whether animals can experience pain or pleasure. There are theories, however, that give a less central place to pain or pleasure, such as virtue ethics. Other theories do not focus on the interests of individual animals at all, but rather on collectives, such as ecosystems or species. From an ecocentric viewpoint, avoiding suffering is not what counts, but rather the survival and flourishing of an ecosystem or species. In this view, suffering is simply part of life and has an important function, namely survival. Second, the focus on the welfare of fish indicates we already assume that fish have moral status. This point asks for some additional elaboration.

2.3 Do Fish Have Moral Status?

Implementing fish welfare implicitly assumes that fish matter from a moral point of view. Discussions about housing conditions, sustainable aquaculture, or humane slaughter all raise the question of how we should treat fish and this implies that the interests of fish matter from a moral perspective. Another way of saying this is that fish have moral status. But what exactly do we mean when we speak about moral status of animals? And what does the attribution of moral status imply for the way we treat them? In case of conflicts between the interests of different animals, or animals and humans, how should we adjudicate between these interests? As we will show, a theory of moral status does not yet tell us how we should weigh different duties in practice.[6] This requires a normative theory. This means that when we encounter practical questions about how to treat fish, for example in aquaculture, we need to be aware that we cannot find answers without adopting a specific moral framework.

In animal ethical discussions, moral status functions as an umbrella concept that encompasses both moral considerability and moral significance (Gruen 2010; Goodpaster 1978). Lori Gruen explains it as follows:

> To say that a being deserves moral consideration is to say that there is a moral claim that this being has on those who can recognize such claims. A morally considerable being is a being who can be wronged in a morally relevant sense. (Gruen 2010, np)

We could say, then, that moral considerability gives a being an entry ticket into the moral community. Moral significance, on the other hand, says something about the relative weight of a being's interests. Gruen explains the difference below:

> That non-human animals can make moral claims on us does not in itself indicate how such claims are to be assessed and conflicting claims adjudicated. Being morally considerable is like showing up on a moral radar screen—how strong the signal is or where it is located on the screen are separate questions. (Gruen 2010, np)

Determination of an animal's moral significance sheds light on the question of how we should treat an animal in a particular situation, but it does not fully determine this treatment. This is because other considerations may enter into our decision-making process. What considerations these are in turn depends on what specific normative theory one holds. For instance, a relational animal ethicist holds that we have a stronger duty of care to our pet goldfish than we have to a fish in the wild. Both fish may have the same moral considerability and significance, but our moral judgement about how to treat them is different because towards the pet fish we have made a commitment that we have not made to the wild fish. In order to know how we should decide when conflicts of interest arise, we, therefore, need more input than just a position on moral considerability and significance. Furthermore, even if two animal

[6]We argue for this position in more detail in B. Bovenkerk & F. Meijboom (2012). 'The Moral Status of Fish. The importance and limitations of a fundamental discussion for practical ethical questions in fish farming' in *Journal of Agricultural and Environmental Ethics* vol. 25, iss. 6, pp. 843–860.

ethicists were to grant moral considerability to an animal on the same basis, for example its capability to suffer, they could still reach different conclusions about how to treat the animal, because their arguments are based on different normative theories. For instance, two animal ethicists can agree that salmon has moral status because it has the capacity to suffer and enjoy, but they can still disagree about the moral acceptability of genetically modifying the salmon. For a welfarist it might be allowed as long as the welfare of the salmon is not harmed, while for a Kantian it may be morally problematic, because it would not respect the salmon's inherent value.

There is no theory neutral answer to the question of whether fish, or animals in general, have moral status. Ethicists with different theoretical backgrounds justify the moral considerability and significance of animals on different grounds. Most animal ethicists do use a similar strategy, however, which is basing moral status on the possession of a certain property or group of properties. Candidates for such properties are, most commonly, sentience or capacity to suffer, conscious experience, the possession of desires, self-reflective agency, or autonomous activity. For Singer (1975) animals belong to the moral community in as far as they are sentient, or have the ability to experience pain and pleasure. In his view, what matters in morality is the possession of interests and his theory starts from the basic principle that equal interests should be treated equally. Only sentient beings have interests, because only to them it matters how we treat them: A rock does not have an interest in not being kicked, while a mouse does. In the Kantian view of Tom Regan, as we saw above, animals are attributed moral status if they are subjects-of-a-life, which is to say that they can experience their life subjectively due to certain characteristics, including sentience, but also a certain amount of self-awareness. Relational or virtue ethicists, on the other hand, place less strict demands on the cognitive capacities that beings need to possess before they count morally; animals are simply recognized as belonging to our moral community either because they are embodied like us and they can be vulnerable, or because they are the kind of creatures we can have empathy with.

How do these views on moral status relate to fish? As we saw, for utilitarianism and Kantianism cognitive capacities of animals are important, in particular sentience or a certain amount of self-awareness. Many fish have a nervous system and nociceptors, but this does not tell us yet whether they subjectively or consciously experience sensations such as pain (Braithwaite 2010). Conscious pain perception would require a signal to be sent from the nociceptors to the brain and some researchers doubt whether this happens, because fish brains are so different to mammalian brains (Rose 2002; Arlinghaus et al. 2002. Rose et al. 2014). Yet, an increasing consensus amongst fish researchers now seems to be that fish can consciously experience pain (Braithwaite 2010; Roques et al. 2010, Chap. 10). The possession of more complex cognitive capacities is harder to establish, but research performed with for instance cod indicates that in this species a declarative memory is present (Nilsson et al. 2008, Chap. 8) and for other species studies show that they are able to generate complex representations of their environment rather like a mental map (Braithwaite and De Perera 2006; Ebbesson and Braithwaite

2012). Evidence is also found that different species of fish, in particular groupers and moray eels, cooperatively hunt (Bshary et al. 2006).

More research needs to be done into fish cognition and we need to bear in mind that such research is complicated by the fact that fish are anatomically quite different from us. It takes a lot of imagination to devise tests to establish whether fish can do things like act intentionally or whether they have a sense of the future. Moreover, such test results need to be interpreted and such interpretations are often not value neutral. We need empirical research to find out whether the animals experience pain or stress or have other cognitive capacities, but for the interpretation of this research we also need moral reflection. Especially because of the large knowledge gap we still have about fish it is necessary to reflect on our normative presuppositions. We encounter factual uncertainties and the relevance of these uncertainties depends on one's moral principles and values. For example, if mere sentience is sufficient for the attribution of moral status, information about intentionality in fish is less relevant, than if we also think fish need to possess more complex cognitive abilities in order to be part of the moral community. Moreover, we need reflection from the field of the philosophy of mind to help us determine what we can know about animal consciousness and what we should understand by concepts such as animal awareness, consciousness, and mind.

2.4 Limits of the Animal Welfare Concept

The discussion on moral status shows that we—based on scientific evidence and in line with most of the theories of moral status—have good reasons to consider fish morally considerable for their own sake. This stresses the importance of the attention to welfare of fish. However, it also indicates that the ethical dimensions related to our interactions with fish cannot be reduced to a discussion about welfare only. Such a reduction would result in two problems. First, an exclusive emphasis on animal welfare tends to hide the plurality of views on the moral position of animals. Quite often animal welfare seems to serve as an overarching concept that can be embraced by different people who hold a variety of moral positions. On the one hand, we grant that the broadly shared importance of welfare serves the important function of enabling discussion by a common frame of reference to groups with otherwise opposing views. On the other hand, this means that all manner of considerations and values are translated into welfare terms, even if these considerations are in fact not about welfare at all. This is a consequence of a strategic use of animal welfare arguments, because they are broadly considered as legitimate, while less consensus exists about other moral concerns. This leads advocates of, for example relational ethical or rights-based views to restate their arguments in terms of welfare, while in fact their concerns address considerations about relationships or rights (Leuven, J., 2015, The role of philosophical theory in political activism: animal advocacy and the political turn, unpublished manuscript). For instance, in the debate on the early separation of cow and calf implicit relational- or rights-based arguments are put

forward as animal welfare concerns (Ventura et al. 2013). This means that the debate on animal welfare has to deal with a large variety of questions and this muddies both the conceptual scientific and moral discussions. Animal welfare scientists are then called upon to answer questions that actually arise from public views on sustainable animal farming and the relationship between farmer and animal, rather than on the long-term effects on the calves' social behaviour.

Second, when animal welfare has become an all-encompassing concept in public deliberations on the just treatment of animals, it results in a lack of attention for anything other than welfare. Surely, many issues can ultimately be framed in terms of animal welfare. Yet, public discussions on, for example tail docking in dogs for aesthetic reasons or keeping wild animals in circuses show that we do not see the full picture if we only approach these from an animal welfare perspective. Some people are against keeping animals in a circus because this violates their intrinsic value or because they oppose using animals for amusement and not only because it may be bad for their welfare (Brando 2016). Others argue that when we dock a dog's tail we violate the dog's integrity, even if the dog does not suffer from this (Bovenkerk et al. 2001). These are animal rights and virtue ethical considerations that cannot be reduced to a discussion on animal welfare. Therefore, we need to be aware of the limits of animal welfare and keep a broader perspective on the ethical debate on the human interactions with fish. Otherwise, we miss many important considerations. To further elaborate this point, we address two issues that we consider to be 'beyond welfare', namely killing of fish and domestication.

2.5 Is It Morally Harmful to Kill Fish?[7]

In many practices involving fish, such as aquaculture, wild fishing, and recreational fishing killing fish plays a central role. If we attribute moral status to fish, this does not only mean that we have to take into account their welfare in these practices, but it may also mean that killing them constitutes harm, even if this killing would be done painlessly. In other words, the ethics related to killing fish is not restricted to the question of 'how' fish should be killed, but also includes the question of whether killing as such is a moral problem and harms[8] the fish. This latter question, in other words, focuses on whether it would still be harmful if we were to kill fish painlessly.

[7]The arguments in this section are laid out in more detail in Bovenkerk, B. and Braithwaite, V. (2016). 'Beneath the Surface: killing of fish as a moral problem'. In: F. Meijboom and E. Stassen (eds) *The end of animal life: a start for ethical debate. Ethical and societal considerations on killing animals.* Wageningen: Wageningen Academic Publishers, pp. 227–250.

[8]We should mention here that when we speak about 'the harm of death', we are talking about harm in a moral sense. Of course death harms a fish in the sense that its body is damaged—in the same sense as a plant can be harmed when it is cut—but is this a harm that matters morally?

2.5.1 A Preference to Stay Alive

This leads to the question of what arguments have been put forward for the view that killing animals is harmful. Some argue it is wrong to kill animals if they have a preference for staying alive (Singer 1980).[9] The next question then is whether (some species of) fish have such a preference. According to Singer, an animal can form a preference to stay alive only when it has the capacity to be aware of itself as a distinct entity existing over time (Singer 1980). This question can also be approached from the other side: Some argue death is only a harm to those animals that have a preference not to die (e.g. Bracke 1990; Cigman 1981). This would imply that the animals need to have a concept of death. It has been argued that this requires language or second-order beliefs or intentions (Davidson 1982; Bracke 1990). From a rights theory perspective, it has been argued that a being can only have a right to life if it has a desire to live and that only beings who have an awareness of their desire actually have a desire to live (Tooley 1972). Tooley thinks this requires self-consciousness. Similarly, Cigman (1981) takes self-consciousness as necessary, because she thinks death is only a harm for beings with the capacity for categorical desires. Life as a categorical desire answers the question of whether or not 'one wants to remain alive' (Cigman 1981, 58). Desires like wanting to raise children or writing a book are categorical desires, because they give us reasons to go on living.

This discussion on the harm of death in terms of preferences or desires suggests that fish—until evidence proves otherwise—do not fulfil the right criteria to be able to speak about a preference to stay alive or avoid death. This, however, does not imply that therefore killing fish does not include a moral harm. One can raise doubts about the framing of the harm of death in terms of a desire for continued life. We can wonder whether we value continued life because it is desirable or whether we desire continued life because it is valuable. If we value life and therefore desire it, then perhaps the desire itself is not the decisive factor, but rather the value that we place on life.

2.5.2 Foregone Opportunities

This connects to an alternative argument, the so-called 'foregone opportunities account' according to which death is morally harmful for animals because it deprives them of future happiness or goods (DeGrazia 2002). Animals derive pleasure from certain goods in their life and they have an interest in the continuation of these goods.

[9]When confronted with avoidance behaviour of animals that are in danger, such as the struggling for survival of a fish on a hook, at first sight we might interpret this as a fear of death. Singer (1980), however, warns us against taking this to mean a preference for continued existence. Rather, we should interpret this as a desire to stop the pain or the threatening situation and of course this desire can also come about by killing the animal.

According to DeGrazia (2002, 61), 'death forecloses the valuable opportunities that continued life would afford'. In other words, life is *instrumentally* valuable for animals to the extent that they can have valuable experiences that make their lives worth living. According to Kaldewaij (2006, 61) a benefit of this view is 'that it can explain the magnitude of the harm of death: death takes away the possibility of ever experiencing, doing or accomplishing anything you value again'. One could object that animals are not aware of these foregone opportunities. However, this view on the harm of death does not require that individuals are aware of their lost opportunities. A being, it is argued, can have an interest in continued life, without actively being interested in it (Višak 2013). As long as the animal has the ability to have experiences that matter to it and that it would be deprived of when dead, it can be harmed by death in this account. As animal welfare scientists have shown, animals—including fish—do not just have simple desires such as eating when they are hungry and sleeping when they are tired, but they actually derive pleasure from acts such as eating and mating and it could be argued that this makes their life worth living (Duncan 2006).[10]

2.5.3 The Harm of Death: Reason for Ethical Assessment

The view that death is more than a welfare issue and that killing is harmful to a fish, does not straight forwardly lead to all manner of prohibitions. The implications of this view depend on how the harm of death should be weighed compared to other harms or benefits that are linked to fish consumption, sports fishing, or other activities where fish are routinely killed, such as in the aquarium industry or animal experimentation. At this stage, we need input from ethical theory again. Utilitarians make a calculus, weighing the total amount of happiness, pleasure, or preferences that an act yields against the total amount of unhappiness, displeasure, or unfulfilled preferences. In such a calculus, if people need to eat fish to survive this outweighs the death of a number of fish. This would particularly be the case for people in poor countries or for Inuit, who may have no realistic alternatives to eating fish, whereas people from wealthy countries can resort to alternative sources of protein. While some argue that it would be more sustainable if people ate more fish, thereby contributing less to climate change than eating meat (Kiessling 2009, but see Röcklinsberg 2012, p. 10 for a critical discussion of this viewpoint), this would not justify the vast numbers of fish being caught for consumption (including by-catch) today (estimated to be between 9.7×10^{11} and 2.7×10^{13} individuals)

[10]While the foregone opportunities account seems rather plausible, it does raise a troubling question, namely whether we can really be deprived of something if we do not exist anymore. After all, when we are dead, we do not know what we are missing. This problem has spurned a philosophical debate too complex to discuss within the scope of this chapter. This debate centres on the question of whether you can be harmed by something even if you do not experience this harm and no consensus has as of yet been reached in this debate (Nagel 1991; Silverstein 1980).

(Mood and Brook 2012). Arguing from a rights-based perspective one could claim that even if fish have a right to life, this right can be trumped. Rights are not absolute, so when another being's life is on the line, killing of fish might be justified. This gives rise to the question of how much the right to life for fish counts vis-a-vis the rights of other animals (including humans).

According to a broadly shared intuition, it is worse to kill a human being or another mammal than to kill a fish. What could this intuition be based on? DeGrazia (2002) argues that life is instrumentally valuable for the goods that it brings a being. However, different species can have different interests in life if they differ—qualitatively or quantitatively—in the goods that are valuable for them. Assuming that this reasoning is convincing, what does it tell us about the moral acceptability of killing fish? This question is by no means settled, but depends on an assessment of basic, serious, and peripheral interests of humans in killing fish for consumption, recreation, or experimentation and weighing these against the basic interest of fish in survival, or in other words what they stand to lose when killed.

2.6 The Domestication of Fish

A moral issue in the context of aquaculture that moves our discussion beyond welfare concerns regards the domestication of fish. Whether or not this is done intentionally, keeping fish in captivity and selecting them for favourable traits, leads to a change in their behaviour and genetic make-up. A formerly wild species then becomes domesticated.[11] For example, at the advent of aquaculture, many fish were nervous and became stressed by contact with humans, but after a couple of decades of selecting for fish that were easier to handle, their genetic make-up has changed and they can deal much better with human proximity. While on the one hand domestication might be beneficial both to the farmer and the fish, it also raises moral issues. We want to illustrate this with an example involving the farming of naturally aggressive fish species. Placing aggressive fish in high-density conditions could lead to attacks and hence to welfare problems in the fish that are attacked. Even if everyone agrees on the importance of the value of welfare and agrees that this kind of housing leads to welfare problems, then it is still not directly evident how one

[11]We build on the definition of domestication given by Swart and Keulartz (2011) who make a distinction between wild and domesticated animals on the basis of two characteristics: the degree to which an animal has adapted to its human environment and the degree to which it is dependent on humans. The more an animal has adapted and the more dependent it is on humans, the more domesticated it is. We use this definition because it remains neutral on the human intentions by which animals were domesticated (i.e. domestication can be the product of unintended and unforeseen selection pressure that we have put onto animals) and emphasizes the fact that wildness and domesticity are matters of degree. Regarding the part of the definition about adaptation, we assume that this adaptation is generally passed on to the next generation and that the genetic make-up of domesticated animals has changed.

should deal with this problem. First, scientists could try to select and cross less aggressive specimens, in fact changing the species to become less aggressive (thereby domesticating them). Second, they could examine what stocking density of these fish would lead to less aggression and change the density accordingly. A third option could be the claim that given these welfare problems these fish should not be kept under farming conditions in the first place. The underlying moral question, that determines how we assess the different options, is whether we should adjust the animal to its farming surroundings or whether we should adjust the farm to the animal.

Another example is the case of piscivorous fish. Because of the high costs, both economically and environmentally, of feeding kept fish with wild-caught fish, it is deemed preferable to switch the fish to more plant-based diets. In aquaculture, we see that many carnivores are in fact slowly being turned into herbivores. At first sight changing these fish' constitutions by domestication seems very efficient and practical, but this move does cause resistance. In response to livestock farming, there has been moral and societal discussion about the consequences of animal domestication and it is likely that aquaculture will face a similar reaction. Part of this discussion focuses on the harmful side effects of adapting animals' genomes. For example, salmon in aquaculture are three times more likely to become deaf than their wild counterparts, due to an ear malformation caused by abnormally fast growth of the fish (Reimer et al. 2017). However, there are also moral objections to changing animal genomes when animals' welfare is not obviously harmed (see Bovenkerk and Nijland 2017 for an overview). Some argue that such changes violate an animal's integrity (Rutgers and Heeger 1999; Bovenkerk et al. 2002) or that it treats animals as if they are mere things (Brom 1997), or that it objectifies or commodifies them (Bos et al. 2018). These objections all revolve around a view of what animals (in this case fish) should be like; they assume a certain 'natural' species norm that is disregarded. If a predator is turned into a herbivore, the species' integrity has been violated. A herbivore catfish is then somehow less of a catfish. The fish is used instrumentally to achieve our goals without respecting its own goals in life. Most of these moral objections have a Kantian or a care-ethical background, and whether they are convincing to someone will depend at least in part on the ethical framework she espouses.

2.7 Practices Involving Fish: Ethical Aspects

In the foregoing sections, we have discussed animal ethics theories pertaining to fish welfare. Also, we have shown that not all ethical discussions about our treatment of fish can be captured under discussions about welfare. In this section, we will point out a number of moral issues in four practices involving fish: aquaculture, wild fisheries, experimentation, and recreation.

2.7.1 Aquaculture

In 2014, the consumption of fish raised in aquaculture facilities has surpassed consumption of fish from wild fisheries[12] and it is projected that in 2030 aquaculture will generate nearly two-thirds of the global fish supply for consumption.[13] Of course, there are different types of aquaculture facilities—large or small-scale, at sea, in ponds or on land in recirculation systems, commercial or subsistence farms—and each comes with its own moral questions. Certification systems such as the Aquaculture Stewardship Council (ASC) label for responsibly farmed fish tend to focus on social and environmental sustainability rather than animal welfare concerns, although recent efforts have been made to include the latter.[14] Welfare issues at fish farms revolve around stocking density, water quality, transport stress, feeding strategies, slaughter, and negative side effects of breeding for desirable traits, such as growth rate. If we take the Animal Welfare Council Five Freedoms as a measure for farmed fish welfare, it becomes apparent that certain freedoms can be in tension with each other. For example, if we think it is important for fish' welfare that the fish have the freedom to carry out natural or species-specific behaviour, we encounter a dilemma in the case of predatorial fish, such as the African Catfish. Do we let them carry out their natural tendencies or do we want to protect the potential victims' welfare? Moreover, at fish farms it is expedient to sort fish of different sizes, but this might run counter to natural living conditions of the fish. Which aspect of fish welfare is deemed more important is dependent on one's background ethical theory; an ecocentrist might find it more important to closely mimic natural conditions, whereas a utilitarian might in the first place want to reduce pain and suffering, for example.

Another issue to consider is that public perception of fish welfare can conflict with the perceptions of farmers or fish biologists. For example, for the public, welfare during slaughter appears to be very important, while fish biologists focus more on water quality. This difference may be understood if we consider that animal welfare is not a purely objective biological term, but is a combination of moral and biological norms. Perhaps the general public focuses on the severity of discomfort at one point in time (i.e. the moment of slaughter) whereas biologists tend to perceive of welfare as a cumulative notion over time, e.g. the whole life of the fish. The realization that different notions of animal welfare may inform the public or farmers' or biologists' views on how to humanely farm fish, and that none of these notions is a priori better, might help to avoid unnecessary polarization between these groups. Moreover, if we do focus on humane slaughter it is important to note that a lot is still unclear, as only for a small number of the 362 fish species farmed worldwide in 2016 specifications to achieve effective stunning are available (Chap. 14). Stunning

[12] http://www.fao.org/3/a-i5692e.pdf (accessed 2/7/2018).

[13] http://www.worldbank.org/en/news/press-release/2014/02/05/fish-farms-global-food-fish-supply-2030 (accessed 2/7/2018).

[14] https://www.asc-aqua.org/the-principles-behind-the-asc-standards/ (accessed on 2/7/2018).

devices have been created that render fish unconscious before slaughter, and these can use, for example percussion or electric field exposure (Chap. 14). In general, fish is exposed to air prior to the application of percussive stunning. Exposure to air also occurs prior to electrical stunning after dewatering. Another approach in which the exposure to air can be minimized or avoided, is electrical stunning in water. Various studies show that percussion and electrical stunning in water and outside the water can induce an immediate stun in fish (Chap. 14). Reported studies show that neither of the two approaches is necessarily better (Chap. 14). Obviously, their assessment depends on which physiological or behavioural measurements are used (This underlines our point made above that on the level of measuring welfare value choices have to be made.

As pointed out above, besides welfare issues, other moral issues come up in discussions about aquaculture, raising questions such as 'are we entitled to domesticate fish and thereby change their genetic make-up?', and 'are we allowed to kill fish for consumption in the first place?'. Also, concerns are voiced about increasing intensification of aquaculture, including the fear that we might run into the same kind of objections to the objectification and instrumentalization of animals as we have witnessed in response to conditions in the livestock production sector.

2.7.2 Wild Fisheries

An often-heard reason why some people who give up eating meat choose to still eat fish (so-called pescetarians) is that at least fish have had a good life in the wild. While there is some merit to this position, it disregards suffering that also takes place in the wild, and the suffering fish inevitably experience when they are caught and slaughtered. The main animal welfare issues in wild fisheries revolve around the last moments of the fish' lives (Chap. 17). A recent discussion about methods to catch fish focussed on the welfare implications of pulse fishing. In this technique, a low-frequency electric pulse is applied to the water, which startles bottom dwelling fish such as shrimp and flatfish (Rijnsdorp et al. 2016). From a sustainability perspective, pulse fishing appears to have benefits as fishermen have to use less fuel, it leads to less by-catch and disturbs the sea bottom less than other intensive fishing styles that use trawling. However, discussion exists about the animal welfare aspects; some argue that the fish barely sense the electrical pulse, while others argue that the shock is sometimes so severe that it can break the fish' spine (particularly in the case of larger specimens of cod) (Rijnsdorp et al. 2016). This shows our point in the discussion above, that trade-offs may have to be made between animal welfare and environmental sustainability and therefore value choices have to be made when we want to implement animal welfare measures.

In contrast to fish killed in aquaculture, particularly when they are stunned before slaughter, wild-caught fish will necessarily experience welfare problems from the way they are caught. They are driven together in a net, sometimes they are dragged and compressed for hours, and when they are hauled up from deep water at a high

speed the pressure difference can force their internal organs out of their orifices (Braithwaite 2010). On board they will die of suffocation, freezing on ice, or being eviscerated. In all of these methods, it takes considerable time for the fish to lose consciousness and sensibility, sometimes up to 5 h. Work is being done to develop stunning devices for wild-caught fish, but this is a time-consuming and costly process. This raises the moral question of who should be responsible for investing in such measures; fisheries, the government, or consumers?

2.7.3 Experimental Use of Fish

The number of fish used in animal experimentation is increasing. Even though fish are vertebrates and using them for experimentation purposes is therefore subject to ethical review (Chap. 16), there appears to be a common conception that using fish in research is less problematic than using mice or other mammals. Sometimes fish are even regarded as a replacement alternative to mice or rats. This conception could be based on the fact that less is known about pain and suffering in fish than in mammals. However, one would be conducting the fallacy of ignorance when assuming that just because we do not know what a fish experiences, it, therefore, experiences less than other animals. It has been argued that fish are not sentient animals, due to the difference in brain structure to mammalian brains (Rose et al. 2014). The next step is to argue that it is more morally permissible to use less cognitively complex animals (such as zebrafish) than more complex animals (such as dogs) in experimentation. Even though it is reasonable to assume that consciousness comes in degrees, and more conscious animals may often have richer experiences, it is not self-evident that cognitive complexity will always make suffering worse. Even though there are forms of mental suffering that fish will not experience—for example suffering from an existential crisis—it may also be possible that fish may experience some kinds of more acute suffering as worse than for example humans. Yeates (2011) casts doubts on the idea that more complexity necessarily leads to more pain. In fact, more cognitively complex animals can in some cases cope better with pain, if the pain is short and the animals realize the pain will be over quickly. On the other hand, when they realize the pain is chronic, they might not cope as well, as they know the pain will continue.[15]

Besides causing discomfort, a morally problematic aspect of animal experimentation is that the animals are routinely killed after the experiment (cf. Franco and Olsson 2016). In animal experimentation committees (AECs) it is generally assumed that painless killing is morally unproblematic. At least, the fact that the animals are killed is not meant to be part of the ethical assessment. However, if our arguments

[15]These arguments are explained in more detail in Bovenkerk, B. & Kaldewaij, F. (2014). 'The Use of Animal Models in Behavioural Neuroscience Research', in: G. Lee, J. Illes, and F. Ohl (eds), Current Topics in Behavioural Neuroscience. Berlin: Springer, pp. 17–46.

above about the harm of death for fish are valid, painless killing is not morally neutral and should become a separate concern for AECs.[16]

2.7.4 *Recreational Fishing*

While hunting animals such as deer or boar raise public moral concern in many countries, recreational fishing seems to be an accepted activity. Recreational angling is an extremely popular pastime, with approximately 47.1 billion fish that are caught by recreational fishermen annually (Cooke and Cowx 2004). This sheer number raises moral concerns on its own, but in principle many people do not seem to find fishing problematic, especially when they release the fish back into the water. About two-thirds of fish caught this way are released back into the water. However, this 'catch and release' system of fishing that is practiced in many countries (Bartholomew and Bohnsack 2005, Chap. 19), raises several moral concerns. Fish that are severely wounded by the hook often die a slow and painful death after they have been put back into the water. This raises the question of whether it would be better practice in these cases to kill the fish quickly while it is still captive or to give it another chance to survive. In the latter case, it can be recaptured and if this happens multiple times over several days, there is a strong chance the fish will become chronically stressed, potentially altering the stress physiology of the fish such that the fish becomes immunocompromised (Barton 2002). This increases the chance that the wound where the hook pierced the fish's skin becomes infected, or the overall capacity for the fish to cope with future capturing and handling, or other environmental challenges such as the threat of predation, becomes impaired. Again, it depends on one's normative framework on how one deals with this dilemma and whether one puts more emphasis on fish welfare or on survival.

2.8 Conclusion

In this chapter, we argued that questions about fish welfare cannot be answered without ethical reflection and that one's ethical framework will influence how welfare is assessed. Empirical evidence requires a normative framework in order to become action guiding in practices of aquaculture. We furthermore argued that in a moral discussion on how to relate to fish we also need to take into consideration concerns beyond welfare. We discussed two of these: the question of whether killing fish—even if painlessly—constitutes a moral harm, and the question of how we

[16]Of course, one could argue that in assessing for replacement alternatives to an experiment, the fact that animals are killed is indirectly assessed. However, replacement in practice does not seem to have the highest priority for those carrying out experiments. See Franco et al. (2018).

should deal with the inevitable consequence of farming fish that they become domesticated. Some of the moral issues that we raised are highlighted in our discussion of practices involving fish: how should we deal with conflicting notions of animal welfare in aquaculture? What trade-off should we make between fish welfare and other values in wild fisheries, such as sustainability? Who is responsible for improving fish welfare during slaughter? Is it justified to assume that it is worse to use mammals for experimental purposes than fish? Is a catch-and-release system in recreational angling justified? While we have not provided clear-cut answers to these difficult questions, we hope to have given the reader enough ethical background to continued reflection on them.

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