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Odontocetes ('Toothed Whales'): Cognitive Science and Moral Standing – Are Dolphins Persons?

Sara G. Pettit
Centre for Animal Welfare, The University of Winchester,
Sparkford Road, Winchester, SO22 4NR, UK
PettitSaraG@gmail.com

Steven P. McCulloch | ORCID: 0000-0003-2161-1911
Centre for Animal Welfare, The University of Winchester,
Sparkford Road, Winchester, SO22 4NR, UK
Steven.McCulloch@winchester.ac.uk

Abstract

Odontocetes, or 'toothed whales', have a complex brain structure and possess rationality, self-awareness, sociability and culture. Cognitive science and modern theories of personhood challenge the notion that humans alone are moral persons. This paper reviews evidence from the cognitive science literature relevant to moral personhood in bottlenose dolphins, orcas, and beluga whales. It applies theories of personhood of Peter Singer, David DeGrazia, and Steven Wise, and finds that odontocetes fulfil criteria to be granted at least borderline personhood. The legal implications of attributing personhood to dolphins remains uncertain. Recognition of dolphin personhood may lead to fundamental legal rights against capture, captivity, and killing; alternatively, the courts may continue to restrict legal personhood and associated protections to human beings. Finally, despite the major influence of personhood on morality and law in the West, the biologically more widespread quality of sentience is sufficient for greater moral considerability and legal protections for nonhuman species.

Keywords

animal rights – beluga whale – bottlenose dolphin – legal standing – personhood – odontocetes – orca – sentience

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1 Introduction

There is growing evidence of the advanced cognitive capacities of odontocetes or 'toothed whales'. Odontocetes have complex brain structures and scientific research has demonstrated the possession of rationality, self-awareness and culture (Marino et al., 2007). There has been significant controversy about both keeping cetaceans in captivity and causing harm to those in the wild. There are currently an estimated 3,600 cetaceans in captivity, kept in leisure parks such as SeaWorld (Rose, 2019). High profile documentaries such as *Blackfish* (2013) have fuelled public concerns.

Organisations such as the Non-human Rights Project (NhRP) aim to demonstrate personhood to secure legal standing for cognitively advanced animals, including dolphins and whales, through the courts. The decline in visitors to marine parks has led to the termination of orca breeding programmes in SeaWorld USA. Despite this, the ban does not cover other cetacean species, and the orcas currently held by SeaWorld will remain in unsuitable enclosures until their deaths (Manby, 2016). Furthermore, despite increasing public concern about keeping whales and dolphins in captivity, the practice is increasing in certain parts of the world, including China and the Caribbean (Lott & Williamson, 2017).

Human activity causes substantial harms to both free living and captive cetaceans. Scientific research points to fundamental problems keeping cetaceans in captivity. Aquaria are unable to meet their complex needs, meaning that cetaceans do not cope well in a captive environment (White, 2007). Cetaceans in captivity display abnormal behaviour, stereotypies, aggression to conspecifics and humans, chronic stress leading to immunosuppression, and high mortality rates (Marino, 2018). In the wild, odontocetes face threats from human activity, including inhumane methods of slaughter in live capture and commercial whaling activities. Odontocetes are harmed by the fishing industry (being caught as bycatch), the accumulation of plastic and chemical pollution, loss of prey and habitat, climate change, interference from military sonar and collisions with ships (Butterworth et al., 2017).

Western moral tradition has provided persons with superior moral status, and nonpersons with radically lesser status. Philosophers such as Aristotle, Descartes, and Kant have claimed that higher cognitive capacities, whether rationality, autonomy, language, or moral agency, means that human beings should be considered as persons. As Gruen observes, the concept of personhood refers to a class of morally considerable beings considered to be 'coextensive with humanity' (Gruen, 2017). Since Roman times the law has divided entities into persons, with moral standing and rights, and things (or nonpersons),

without standing and with no such right (Korsgaard, 2013, p. 25). Developments in cognitive science and animal ethics challenge this human/nonhuman binary. Research increasingly suggests that great apes, elephants, and cetaceans possess cognitive abilities that mean they are much closer to humans than we once thought.

This paper investigates whether odontocetes should be considered as moral persons, as well as what the legal implications might be for this. It focuses on bottlenose dolphins (*Tursiops truncates*), orcas, (*Orcinus orca*) and the beluga whales (*Delphinapterus leucas*), as the most populous cetacean species in captivity, as well as the focus of numerous scientific studies. The paper reviews the scientific evidence on morally relevant characteristics of odontocetes and applies theories of personhood from Peter Singer (1993), David DeGrazia (2006), and Steven Wise (2012), three leading thinkers on personhood in nonhuman animals.

Peter Singer is credited with catalysing the modern animal rights movement with his 1975 book *Animal Liberation* (Singer, 1995). Singers' *Animal Liberation* argued that sentient animals should be treated with the equality of consideration of interests. Singer argued that prioritising human pain over the equal pain in pigs, for instance, was speciesist, a form of prejudice based on species membership, which is analogous to racism and sexism. Singer later developed a theory of personhood based on self-consciousness (1993), which is summarised below. David DeGrazia is a US moral philosopher who has proposed a theory of personhood based on clusters of cognitive capabilities (DeGrazia, 2006). DeGrazia's theory permits degrees of personhood, and he also considers the moral considerability of borderline persons. Steven Wise is a practising US lawyer who has challenged the legal status of chimpanzees and some other nonhuman species in the courts. Wise (2012) claims that what he calls 'practical autonomy' is sufficient for legal personhood, and that all animals which have practical autonomy should be considered as legal persons and have moral standing under the law. The paper discusses the theories of these three authors for two reasons. First, they are leading figures who have proposed worked out theories of personhood for nonhuman animals. Secondly, whilst there are some similarities in the theories, there are differences that provide greater insight when applying their theories as frameworks to the scientific evidence on cognitive capacities in odontocetes.

Section 2 provides a summary of the basic biology of the three odontocetes species. Section 3 provides an outline of how these species are harmed by human activity both in captivity and the wild. Section 4 discusses personhood and provides an overview of the theories of Peter Singer, David DeGrazia and Steven Wise. Section 5 reviews the biological characteristics in the scientific

literature that are morally relevant for personhood in these species. Finally, section 6 discusses the significance of recognising personhood for the legal status of odontocetes.

2 Odontocetes Biology

Odontocetes or 'toothed whales' are marine mammals that compromise of at least 71 species of the parvorder Odontoceti, in the infraorder Cetacea. Odontoceti includes the superfamily Delphinoidea (true dolphins, monodontids, and porpoises) of which bottlenose dolphins, orcas and belugas belong. Bottlenose dolphins and orcas are in the family of 'true dolphins' Delphinidae, whilst belugas belong to the family Monodontidae.

Cetacean species have slow life histories with long lifespans and long periods of infant dependency and juvenility. They have sophisticated social abilities and group structures including higher-order alliances, long-term bonds and cooperative networks (Mann et al., 2000), further developed due to their complex communications (Marino et al., 2007). The complex sociability and cooperation of cetaceans may have evolved due to the marine environment, with no shelter, so group living provides protection from predators and is advantageous in hunting (Connor, 2000). The needs of odontocetes are complex; with vast home ranges, they are adapted to travelling great distances and depths. All odontocetes use echolocation for communication and spatial information.

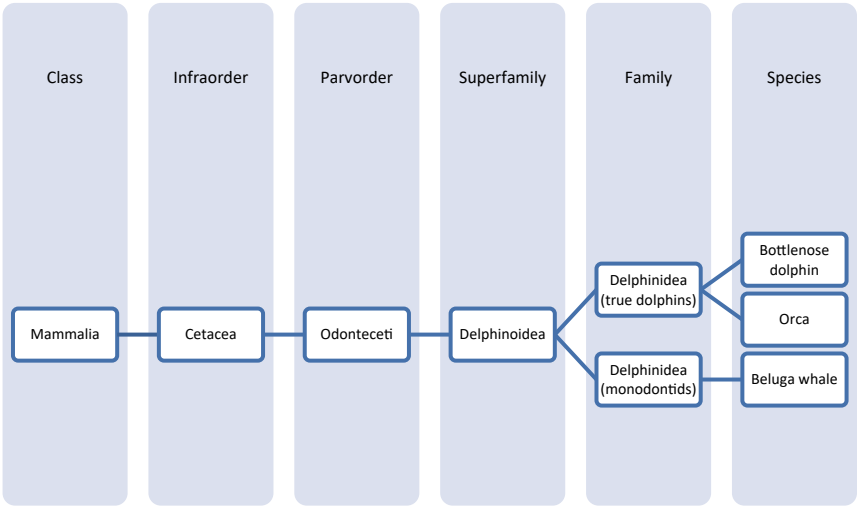

FIGURE 1 Taxonomic classification of bottlenose dolphins (*Tursiops truncates*), orcas, (*Orcinus orca*) and the beluga whales (*Delphinapterus leucas*)

TABLE 1 Key characteristics of bottlenose dolphins (*Tursiops truncates*), orcas, (*Orcinus orca*) and the beluga whales (*Delphinapterus leucas*)

	Bottlenose dolphin (*Tursiops truncates*)	**Orca (*Orcinus orcas*)**	**Beluga whale (*Delphinapterus leucas*)**
Geographic range	Coastal and pelagic three major oceans	Cosmopolitan – worldwide oceans	Arctic and subarctic
Population size	750,000	50,000	200,000
Longevity	Max: male 40+, female 50+	Max: male 70, female 80 Mean: male 31, female 46	Up to 80 years
IUCN status	Least concern	Data deficient	Least concern
Group type	Highly flexible fission fusion societies	Stable life-long bonds	2–10 Lifelong female maternal pod Adult male pod
Natural behaviour	Single calf (Connor et al., 2000) Nurse 3–6 years Daily movements 33–98 km	Single calf, Nurse 1–2 years (Ford, 2009) Deep diving species Swim up to 160 kilometres a day	Single calf, Nurse 2 years (O'Corry-Crowe, 2009) Travel thousands of kilometres in a few months Can swim to depths of 600 to 1000 metres

2.1 *Bottlenose Dolphins*

The bottlenose dolphin (*Tursiops truncatus*) inhabits all three major oceans with a worldwide range of coastal and pelagic habitats in temperate and tropical climates (Wells & Scott, 2009). The worldwide population is estimated at 750,000. They are classified by the International Union for the Conservation of Nature (IUCN) as a species of 'least concern' (Wells, Natoli & Braulik, 2019), although several subpopulations are endangered or critically endangered (Birkun, 2012; Currey, Dawson & Slooten, 2013). The taxonomic status of Tursiops is ambiguous with a separate species *Tursiops aduncus* formally recognised in the early 21st century. Hence, many earlier studies on bottlenose dolphins do not distinguish between the two species, and confusion remains (Wang & Yang, 2009). Bottlenose dolphins have long life histories; females have lived to 57 years and males 48 in the much studied Sarasota Bay population

(Wells & Scott, 1999). Bottlenose dolphins form highly flexible 'fission fusion societies' with fluid composition (Wells & Scott, 2009). These groupings are usually small pods of 2–15 individuals but can be made up of more than 1000. Certain coastal populations have seasonal migrations, long range movements and local residencies (Wells & Scott, 2009). Daily movements of pelagic bottlenose dolphins averaged at 33–98 kilometres, with reports of as far as 4200 kilometres (Tanaka, 1987; Wells et al., 1999).

2.2 *Orcas*

Orcas (*Orcinus orcas*), commonly known as killer whales, are the most widespread cetacean. They have a cosmopolitan geographic range and inhabit all oceans and most seas (Ford, 2009). Orca have a 'data deficient' IUCN classification (Reeves, Pitman & Ford, 2017) as there is a lack of information due to widespread distribution and scarcity in most areas. Minimum population count is 50,000 but the true abundance is expected to be higher (Ford, 2009). Orcas are treated as a single species despite evidence of differences among 'resident' and 'transient' populations, which may merit separate species classifications (Reeves et al., 2017). The mean life expectancy of female orcas is 46 years with a maximum longevity of 80, whilst males have a mean life expectancy of 31 years and a maximum longevity of around 70 years (Ford, 2009). Orcas are regarded as having the most stable groups among mammals (Connor, 2000); resident orcas are the only mammal known where neither sex disperse from the natal pod (Baird & Whitehead, 2000), instead forming solid matrilines with up to four generations and an older female. Matrilines converge to form a pod, with a mean of 18 individuals, that may travel apart for weeks or months (Ford, Ellis, & Balcomb, 2000). Transient orca pods are smaller with a single matriline of one or two generations (Baird & Dill, 1996). Orcas are a deep diving species, swim up to 160 kilometres a day (Baird, 2000), and often partake in synchronised dives with an apparent social purpose (Marino, 2020).

2.3 *Beluga Whales*

The beluga whale (*Delphinapterus leucas*) inhabits the arctic and subarctic waters, with an estimated population of at least 200,000 individuals. The species was last categorised by the IUCN as of 'least concern' (Lowry, Reeves & Laidre, 2017), although certain populations are critically endangered (Lowry, Hobbes & O'Corry-Crowe, 2019). Stewart et al. (2006) have estimated lifespan at up to 80 years, based on the teeth, although this figure has been disputed. Belugas have complex social communities and exhibit a wide range of context-specific group structures, from small pods of 2–10 individuals to

gathering in large herds of 2,000 or more. Beluga studies have revealed that they have a relatively stable community; females remain in the maternal pod for life, whereas males disperse to join an adult male pod, with tight individual interrelations with group members (Krasnova, Bel'Kovich & Chernetskii, 2009). Belugas can travel thousands of kilometres in a few months and swim to depths of 600 to 1000 metres (Richard et al., 2001). The vast repertoire of vocal calls, variety of interactive behaviours and cooperative behaviours suggest the capability for complex social interactions without close physical proximity (O'Corry-Crowe, 2009).

3 Welfare Issues in Captive and Wild Odontocetes

3.1 *Captive Odontocetes*

Odontocetes are kept in captivity for entertainment purposes, but also for scientific and military research. It is widely considered that keeping odontocetes in captivity is problematic due to the impossibility of satisfying their behavioural needs and maintaining positive welfare (White, 2007). They are unable to cope with the artificial environments and suffer from stereotypies, an increase in morbidity, neonatal mortality, and a dramatic decrease in life expectancy (Lott & Williamson, 2017; Marino, 2020). Odontocetes are not able to exhibit their natural behaviours or social structures; for example captive calves are removed from their mothers unnaturally early, with the earliest orca calf removal from SeaWorld at 10 months old (Hargrove & Chua-Eoan, 2015). Marine park tanks are designed for maximum visibility for visitors and not the welfare of the individuals (Rose & Parsons, 2019), with an average size of 444 square metres, and the minimum US standards for depth at just four metres (Marino, 2020; Rose & Parsons, 2019).

Stress is caused by trauma related to capture, transport, confinement, training and performances (Rose & Parsons, 2019). Stress can compromise health, leading to increased susceptibility to disease and health problems, and anti-social behaviour, including aggression (Marino, 2018). Abnormal aggressive behaviour, particularly in orcas, is also a threat to human welfare, as evidenced by the death of four humans at marine parks (Lott & Williamson, 2017). Among odontocetes, there are interspecific and intraspecific differences in the interaction with their natural environment, but captivity cannot adequately replicate the complexity, vastness, and choice (Lott & Williamson, 2017) for their natural foraging, socialising, and cultural behavioural needs (Marino, 2020).

3.2 *Wild Odontocetes*

Wild cetaceans are also harmed by human activity. At least three quarters of all odontocetes species have been recorded as bycatch, causing widespread welfare consequences from affecting quality of life and loss of conspecifics disrupting the social group (Reeves, McClellan & Werner, 2013). Odontocetes are vulnerable to ship strikes and experience stress from anthropogenic noise such as military sonar and whale watching tours. They are susceptible to bioaccumulation of contaminants, due to their high trophic level in the food web and long-life span (Desforges et al., 2018). Desforges et al. (2018) predict that over half the worldwide population of orcas are at risk of collapse due to the negative effects of polychlorinated biphenyls (PCB) pollution on reproduction and immune function. Climate change exacerbates the risks to odontocetes through changes to ecological interactions and human activity (Alter, Simmonds & Brandon, 2010).

Live captures for captivity still occur in several global locations; bottlenose dolphins are captured in Japan, and orcas and beluga whales are captured in Russia (Rose & Parsons, 2019). Drive hunts are particularly contentious, when small odontocetes are driven into shallow water using loud noises. Between 2017 and 2018, 96 bottlenose dolphins were removed for the entertainment industry, and 541 other dolphins were killed for meat consumption or fertiliser, often slowly and inhumanely (Butterworth et al., 2017; China Cetacean Alliance, 2015). Live capture is a threat not only at the individual level, but also on a species level, as removal of individuals threatens wild populations and group cohesion. For example, the loss of key individuals in orca communities from live-captures and whaling can radically weaken social networks, breaking communities into isolated groups (Williams & Lusseau, 2006). Research into the welfare issues in captive and wild-living cetaceans is extensive and this is only a brief summary of the issues faced. See Rose and Parsons (2019), Simmonds and Eliott (2009) and Wright et al. (2016) for further reading.

4 Moral Personhood

4.1 *Human Exceptionalism and Historical Accounts of Personhood in the Western World*

Human exceptionalism is the doctrine that humans have unique characteristics which other species lack, for instance rationality, autonomy, self-consciousness, language, and moral agency. These traits mean a human is a moral person, and they have moral standing in the law. Nonhumans, according

to human exceptionalism, lack such morally relevant characteristics, so do not have moral standing. Since Roman times, the law in the West has considered humans as legal persons, and animals as legal things. Humans, as moral persons, are protected by the law; animals as legal things are considered as the property of humans have no or minimal protections.

Human exceptionalism can be traced back to Aristotle (1976). Aristotle claimed that humans possess reason and were moral beings. In Aristotle's teleological world view, animals are sentient but lack rationality; since everything is made according to a purpose, animals are made for the purpose of man. Saint Augustine, influenced by Aristotle, later argued that only man has a rational soul created by the breath of God, and we have no direct duties toward animals (Cochrane, 2010). Thirteenth century theologian Saint Aquinas, hugely influential in the Catholic Church, also denied moral standing to nonhumans (Aquinas, 2005).

In the modern era C17 French rationalist René Descartes went further, claiming that nonhuman animals were not only irrational, but were insentient, and more like automata, since they could not speak (Descartes, 2005). The English philosopher John Locke claimed persons can be understood as possessing lives with a particular complex form of consciousness and psychological continuity (Locke, 1978). Finally, Immanuel Kant argued that humans are rational and autonomous beings, and act according to the moral law. Since humans are autonomous and act according to the moral law, Kant argued that humans must be not treated as merely means, but always as an end in themselves. In contrast, because animals could not act according to the moral law, animals could be treated merely as means to an end alone (Kant, 2005). Kant writes the following to distinguish humans from animals:

> The fact that the human being can have the representation "I" raises him infinitely above all the other beings on earth. By this he is a person … that is, a being altogether different in rank and dignity from things, such as irrational animals, with which one may deal and dispose at one's discretion.
>
> KANT, 2006

Kant's view, however, is problematic; as Gruen (2017) has stated, personhood is not coextensive with humanity. Babies and young children, as well as severely mentally disabled, do not have the rational and self-reflective capacities that are required for Kant's notion of personhood. The following section moves on to discuss thinkers who have challenged such anthropocentric accounts of moral personhood.

4.2 *Posthumanist Accounts of Personhood*

Contemporary authors such as Peter Singer (1993), David DeGrazia (2006) and Steven Wise (2006) have proposed theories of personhood based on a rejection of human exceptionalism. These and other authors argue that some nonhuman species are moral persons based on their morally relevant biological characteristics. The following section briefly describe the theories of personhood of Singer, DeGrazia and Wise (2012).

4.3 *Singer, Speciesism and Self-Consciousness*

Singer (1993) opposes the human exceptionalism view. He follows a Lockean conception of persons as 'self-conscious beings aware of itself as a distinct entity with a past and a future' (1993, p. 90). Singer's fundamental argument is that species membership should not determine the moral standing of an individual. To discriminate based on species alone is, according to Singer, 'speciesist', a prejudice analogous to racism and sexism (Singer, 1995). Singer (1993) argues that certain nonhuman animals, such as Koko the gorilla, who has demonstrated higher cognitive abilities and language with her vast vocabulary, may be moral persons. Furthermore, some humans do not qualify as moral persons, for example those with severe cognitive impairments, for instance advanced Alzheimer's disease. For Singer, these so-called 'marginal cases' demonstrate the speciesist logic of the traditional sanctity of life principle, and he proposes an alternative doctrine of the 'sanctity of personal life' (1993). If human life has special value, then this is only because they are persons.

For Singer, the interests and lives of nonhuman persons should be treated with the same worth as human persons. He claims that sentient animals are entitled to equal consideration of comparable interests (Singer, 1993). Whilst, for Singer, sentience alone is sufficient for moral considerability, sentience alone does not grant moral personhood, and moral persons have more potential value in their lives than non-persons. It would be inherently worse to kill a person than a non-person, for instance, because moral persons have a biographical life; they can conceptualise their own futures and they have conscious interests to continue living. To prevent this through death is a frustration of such interests, which does not occur in individuals that are sentient alone.

4.4 *DeGrazia, Capabilities and Degrees of Personhood*

DeGrazia (2006) suggests that personhood exists in degrees, instead of the categorical and binary person/non-person distinction. He is critical of the 'all-or-nothing' nature of Singer's approach, where an individual is either a person, or a non-person (DeGrazia, 1997). DeGrazia cites Charles Darwin's evolutionary theory to support his own theory of personhood. Darwin wrote that the difference between humans and other animals 'great as it is, is certainly one

of degrees and not kind' (Darwin, 1871, p. 85). Following Darwin's differences in degrees, DeGrazia claims that there are borderline persons in-between full moral persons, and those without personhood. DeGrazia contends that human and nonhuman borderline persons should have the same right to life as persons (DeGrazia, 2006).

DeGrazia suggests that personhood should be categorised as a cluster of properties, including 'autonomy, rationality, self-awareness, linguistic competence, sociability, the capacity for intentional action, and moral agency' (2006, p. 42). These properties can be further specified, for instance the concept of 'self-awareness' can be divided into bodily, social and introspective awareness, each of which can be possessed in degrees. Introspective self-awareness, the consciousness of the individuals own mental states, for example, is more complex than bodily awareness. This mental reflexivity may require the concept of language, although this is inconclusive (DeGrazia, 2009). DeGrazia claims that not every faculty is required to be granted personhood; however only possessing one is insufficient, there must be 'enough' properties. This is a vague concept, but for DeGrazia, personhood is vague and with blurred boundaries. It is ambiguous where the distinction could be drawn between persons and borderline persons as there will never be a line drawn that will not be arbitrary. However, as Andrews (2020) states, this is reflective of society, and though it may be a limitation, it should not be considered a flaw. Cluster concepts are beneficial as they do not lead to practical and moral dilemmas concerning the status of humans who may not possess essentialist criteria. Andrews writes how typically, all humans are considered to be persons, though all humans do not have all properties on the list. So, Andrews contends, marginal cases, such as humans with language impairments, are considered as rights-bearing persons, despite lacking certain relevant properties (Andrews, 2020).

4.5 *Wise, Practical Autonomy and Legal Personhood*

The lawyer Steven Wise (2012) presents a pragmatic legal argument to progress the application of moral personhood to grant legal personhood for certain nonhuman animals. Wise argues that just as society has moved on from the acceptance of slavery, as social morality continues to change, social policy should evolve with it. For Wise, persons must have 'practical autonomy', defined as the ability to desire, to act intentionally and possess some sense of self with sentience and consciousness implicit (Wise, 2006). Regardless of species, Wise contends that practical autonomy is sufficient for personhood, which should guarantee the basic legal right to bodily integrity. Wise scores personhood according to autonomy values assigned to a species on a scale of zero to one, based on mental complexity and abilities. He argues that to qualify for the basic legal right of bodily liberty, the subject must achieve an autonomy

TABLE 2 Moral personhood based on Singer (1993), DeGrazia (2006) and Wise (2006)

Theorist	Name	Notes
Peter Singer	Lockean self-consciousness	Self-conscious beings aware of itself as a distinct entity with a past and a future. Persons have interests in the future.
David DeGrazia	Capabilities and degrees of personhood/gradualism	Autonomy, rationality, self-awareness, linguistic competence, sociability, the capacity for intentional action, and moral agency.
Steven Wise	Practical autonomy and legal personhood	Desire, to act intentionally and have some sense of self.

score of 0.7 or above (Wise, 2006). According to this, Wise argues that six species clearly qualify as persons: adult humans (score of 1), gorillas, bonobos, chimpanzees, orangutans, and bottlenose dolphins.

Wise (2006) argues that a moderate use of the precautionary principle should be utilised if it is unclear to what degree a species has practical autonomy. For example, a species with a score below 0.7 but above 0.5 may possess practical autonomy. There may be doubt due to scientific uncertainty, for example, from incomplete or absent data and the confusion of cause and effect. According to Darwinian evolution, there is a natural continuum of mental abilities in nature, and it is unclear at which taxonomic point, the criteria of practical autonomy will no longer be demonstrated. For this reason, the strength of the claim to legal rights and personhood depends on the certainty held. Wise therefore argues that legal personhood and the basic liberty right, should therefore be granted proportionally to the degree that practical autonomy presents itself.

Table 2 summarises the conceptions of moral personhood of Singer, DeGrazia and Wise.

5 Cognitive Science and Morally Relevant Characteristics of Odontocetes

5.1 *Neuroanatomy*

Cetaceans possess neuroanatomical features required for the foundations of complex cognitive capacities. Neuroanatomical studies of the absolute and

relative size and structure of the brain can be utilised as a basic indicator for cognitive capacity (Simmonds, 2006). Odontoceti brains are anatomically sophisticated, but dissimilar to those of terrestrial mammals. This is due to evolutionary distance and taking an alternative neuroanatomical trajectory to evolve complex intelligence (Marino, 2018). Despite this, cetaceans possess cognitive and behavioural complexities that are evolutionary convergent with the faculties of humans and great apes (Hof, Chanis & Marino, 2005).

Cetaceans have among the largest mammalian brains in both absolute and relative size (Marino, 2007). Expressed by the 'encephalization quotient' (EQ), it has been hypothesised that deviations from the expected brain size correlate to cognitive abilities (Jerison, 1985). The EQ of the Odontoceti parvorder is second only to modern *Homo sapiens* (Marino, 2007). This substantially reduces the human-nonhuman animal border and demonstrates potential for complex cognitive capacities. Bottlenose dolphins for example, have a higher EQ than the archaic human species *Homo habilis*. Furthermore, Marino (1998) has claimed that the true EQ of odontocetes may be higher than previously assumed, due to their body weight consisting of proportionally more blubber than hominids, without an increase in neural tissue, potentially distorting the EQ. Fox et al. (2017) suggest that an increased brain size is due the 'social intelligence hypothesis', which holds that the evolution of these unusually large brains occurred due to the demands of sustaining and coordinating cohesive social groupings.

Cetacean brains are complex as well as large; research using advanced imaging and histological techniques suggest extensive multi-level changes in organisation and structure (Marino et al., 2007). The forebrain of modern cetaceans, as measured by the 'gyrification index' is the most convoluted of all mammals, with orcas the highest of all (Ridgway et al., 2016), demonstrating an extensive neocortical volume and surface area (Marino, 2007). The expansion of the neocortex is believed to allow complex cognitive abilities, including communication, self-awareness, problem solving and sensory-perceptual integration (Marino, 2018). Additionally, Marino (2020) explains how well-developed areas deep within the forebrain are associated with complex socio-cognitive capacities such as attention, prediction, empathy, and social awareness. Although neurobiological research is of major significance, an explanatory gap remains between the neurophysiological processes and behaviour (Bekoff, 2005). Additionally, the usefulness of GI to demonstrate complex cognition may be limited, with ungulates more gyrencephalic than primates due to a lower cortical thickness allowing easier folding (Pillay & Manger, 2007). Comparative studies of absolute and relative brain size are only indicators of cognitive capacities, a more favourable way to evaluate odontocetes abilities may be to study their behaviour.

5.2 *Intelligence*

According to Herman (2006), intelligence is manifested through behavioural flexibility, which provides the foundation for rational behaviour. Bottlenose dolphins, as the focus of extensive captive study, have demonstrated highly flexible behaviour and learning capacities, providing considerable evidence for rational behaviour. Behaviours demonstrated include the ability to grasp abstract rules (Herman, Pack & Wood, 1994) and concepts, such as discriminating between quantities and understanding numerically 'less' (Jaakkola et al., 2005). Bottlenose dolphins have also evidenced declarative knowledge, understanding symbolic representations of absent objects (Herman & Forestell, 1985), and procedural knowledge, the capability to comprehend the way things function and how to manipulate them (Herman, 1986). Bottlenose dolphins have also demonstrated creativity in producing a novel gesture at the researcher's request, further evidence for inferential reasoning and innovative responding. The domains of self-knowledge and social-knowledge also evidence rationality (Herman, 2006).

The cognitive capabilities demonstrated need the foundational capacity of memory, which shows that their auditory, spatial and visual memories are durable and accurate (Herman & Gordon, 1974; Herman et al., 1989; Thompson & Herman, 1977). Additionally, research on bubble ring production of bottlenose dolphins and belugas may indicate foreplanning and anticipatory behaviour, an awareness of past behaviour, and an awareness of the consequences of their actions on the future (Jones & Kuczaj, 2014; McCowan et al., 2000). Although these experiments were conducted almost exclusively on bottlenose dolphins, while speculative, it has been hypothesised that these capacities may also be extended to other odontocetes, due to the shared complex behaviour and brain structures observed (Marino, 2011).

Beluga whales have exhibited the ability for relative quantity judgements in selecting the larger of two quantities (Abramson et al., 2013). Beluga bubble ring production, may indicate foreplanning and anticipatory behaviour, an awareness of past behaviour, and an awareness of the consequences of their actions on the future (Jones & Kuczaj, 2014; McCowan et al., 2000).

5.3 *Language*

There is significant debate about the necessity of language for rationality (Leahy, 2005). Odontocetes have what are considered to be the most complex nonhuman communication systems, including echolocation, vocalisations, visual changes to body posture, tactile behaviours such as flipper touching, and non-vocal auditory behaviours such as breaching (Marino et al., 2007).

Bottlenose dolphins each have a signature whistle equivalent to a name, influenced by vocal learning (Janik, Sayigh & Wells, 2006), suggesting a sense of self (Herzing & White, 1998). This communication maintains group cohesion demonstrating their awareness of conspecifics as well as themselves (White, 2007).

Orcas possess advanced vocal communication using calls and whistles, imitation of conspecifics (Abramson et al., 2018) and pod-specific dialects, transmitted via social learning. Vocal learning transmitted socially is only otherwise found in bird species and humans (Liska, 1993). Orcas also use clicks, pulses of ultrasonic sounds, specifically for the rare sensory modality of echolocation, and it has been suggested that they share information gathered by echolocation (Barrett-Lennard, Ford & Heise, 1996).

Beluga whales have a large repertoire of vocalisations and demonstrate exceptional communicative and mental representational capabilities. They have been shown to understand and produce symbolic lexigrams and sounds, with a comprehension of the bidirectional relationship between the represented object and vocal signal (Abramson et al., 2017). Additionally, beluga whales are able to imitate novel sounds, including spontaneous imitation of human speech and other belugas (Ridgway et al., 2012). In the wild, the vocal signals also share physical features comparable to vowels, which vary geographically across populations (Panova et al., 2019).

DeGrazia (2006), however, has claimed that whilst these are complex communication systems, they may not have the sufficient complexity to constitute language. Potentially, the most complex and important task assigned to odontocetes has been the learning of an artificial language. Bottlenose dolphins learnt to understand the semantic and syntactic features of an artificial gestural and acoustic language, wherein they could produce novel sentences, an advanced linguistic concept (Herman, Kuczaj & Holder, 1993; Herman, Richards & Wolz, 1984). Bottlenose dolphins also demonstrate behavioural flexibility in this context, by operating in a foreign cognitive environment, a further demonstration of their intellectual capacity (Herzing & White, 1998).

5.4 *Self Awareness*

The possible cognitive similarities between cetaceans and humans is highlighted by self-awareness, which can be measured using the mirror recognition test. If successful, this implies that an individual has a concept of self (Gallup, 1970) or at least bodily awareness, which is assumed to be phylogenetically linked to cognitive self-awareness (Smith, 2009) and rationality (Herman, 2006). An adapted mirror test on two captive bottlenose dolphins evidenced

the utilisation of a mirror to investigate their own bodies, suggesting they may possess a sense of self (Reiss & Marino, 2001). Bodily self-awareness in bottlenose dolphins has also been confirmed experimentally by Herman (2001), demonstrated by their capability to comprehend symbolic gestural references to parts of their own body and the novel use of them as requested by the researcher.

Captive orcas have also been studied using the mirror recognition test and displays of contingency checking behaviour were observed, a response highly suggestive of self-recognition (Delfour & Marten, 2001). In comparison, human infants may not reliably pass the mirror test until 18 to 24 months of age (Amsterdam, 1972).

Although mirror tests have not yet been utilised on beluga whales or other captive cetacean species, the positive results in bottlenose dolphins and orcas suggest certain cognitive abilities in adult cetaceans are more advanced than human infants. Furthermore, although both bottlenose dolphins and orcas have well-developed eyesight, it is critical to question the suitability of this test for species that primarily use echolocation, and vision only as a secondary sense. The methodology can lead to species bias as the test was originally devised for visual-based primates (Herzing & White, 1998). Whilst the mirror recognition test is a relevant consideration for self-awareness, there are more aspects to self-awareness that should also be recognised (Gallup, 1970).

Introspection is thought to be the most complex form of self-awareness (DeGrazia, 2009) and one element of this may be to have a theory of mind, to 'consider the mental states, perspectives and intentions of others' (Kuczaj et al., 2001). The social knowledge demonstrated by odontocetes is a precursor to full theory of mind, by the awareness of conspecifics actions and indications. This has been demonstrated in bottlenose dolphins that can attend to the direction of human points and gazes (Pack & Herman, 2007) and using their rostrum and body alignment to demonstrate spontaneous pointing (Xitco, Gory & Kuczaj, 2004). When studied experimentally, captive dolphins succeeded in a false-belief task, a benchmark for theory of mind (Tschudin, 2006); in comparison, human children may not succeed in this test until four to five years old (Tomasello, 2018). Orcas have been reported using some limited tactical deception in 'prank-like' behaviour, also an indicator of theory of mind, however this appears inconclusive (Anderson, Waayers & Knight, 2016).

Another aspect of introspective awareness is metacognition, or the awareness of the individual's own mental states (Marino, 2007). Experimentally, abstract thinking and metacognition have been displayed by captive bottlenose dolphins (Smith et al., 1995), with bottlenose dolphins demonstrating the ability to indicate their degree of certainty to which sound is the higher pitch. This high-level capacity requiring conscious accessing of their memory,

awareness of their own knowledge, and potentially suggests a reflective consciousness. Metacognition has not been studied experimentally in a cetacean species other than the bottlenose dolphin so generalising would be speculative, although it is thought that metacognition is foundational for the cognitive processes of cooperative action (Frith, 2012), behaviour that as well as bottlenose dolphins, orcas and belugas both display (O'Corry-Crowe, 2009; Pitman & Durban, 2012).

Emotional responses can also be an indicator of self-awareness (Hart & Karmel, 1996). Despite the significant interspecies interpretation barriers, cetacean emotions observed include joy, grief, and anger (Herzing, 2000a, b; Schusterman, 2000). Emotional responses can be observed through epimeletic or 'care' behaviour, observed in wild and captive cetaceans. For example, frequent anecdotal evidence of grief of dead conspecifics suggests 'nurturant' behaviour. A pod of bottlenose dolphins keeping a deceased calf afloat (Fertl & Schiro, 1994), and a captive beluga whose calf was removed from the tank, carried her placenta, and then a buoy for several months (Kilborn, 1994). This can be interpreted as behaviour consistent with the continuation of a parental role, with the carriers often protective over the calf or surrogate object (Bearzi & Reggente, 2017).

There are also anecdotal reports of altruism, suggesting protomorality, such as bottlenose dolphins and belugas helping swimmers in distress (Shapiro, 2006). However, these reports are inconsistent, and may have been the dolphins exhibiting the natural behaviour of pushing objects to the surface (DeGrazia, 2006). Frohoff (2000) argues this behaviour may indicate a multifaceted emotional life with all aspects needing appreciation, not just the anthropocentrically attractive elements. Further research is required to clarify if epimeletic and altruistic behaviour are the correct terms to characterise the complex behaviours displayed (Bearzi & Reggente, 2017).

5.5 *Sociability and Culture*

The social groups of odontocetes are complex and important as discussed earlier in Section 2. Sociability in cetaceans is also demonstrated by cooperation, for example in cooperative hunting in bottlenose dolphins (Gazda et al., 2005), orcas (Pitman & Durban, 2012), and belugas (O'Corry-Crowe, 2009), reliant on learning and memory. In one bottlenose dolphin group, individuals have set roles in hunts, with 'driver dolphins' to drive the prey fish toward the 'barrier dolphins' (Gazda et al., 2005), suggesting social awareness. The individual roles may have evolved to enable cooperative relationships and decision-making processes (Mann et al., 2000). Furthermore, social self-awareness presupposes bodily self-awareness as deliberate social navigation is only possible if the individual is aware of their own agency (DeGrazia, 2009).

Sophisticated social learning in bottlenose dolphins has been demonstrated in captivity (Herman, 2002). Other cetacean species have not undergone this extensive captive research, although there is observational evidence of free-living bottlenose dolphins and orcas in imitation and teaching (Guinet & Bouvier, 1995). This capacity for imitation facilitates social cohesion and may also be a factor in the creation and spread of cetacean cultures (Rendell & Whitehead, 2001) demonstrated in bottlenose dolphins, orcas and beluga whales. Despite the substantial difficulties when studying free-ranging cetaceans, the ethnographic evidence for culture, defined as the 'behavioural variation between sets of animals maintained and transmitted by social learning' (Whitehead, 2009) among these species is strong.

Shark Bay bottlenose dolphins have been ethnographically observed foraging utilising marine sponges as tools. Genetic and ecological explanations for this behaviour were found to be inadequate, and genetic analysis demonstrated the behaviour to be transmitted vertically and matrilineally (Krützen et al., 2005). This behaviour also evidences problem-solving and innovation, with tool use evidence of cognitive capacity, and a trait once thought to be uniquely human (Griffin, 1994).

Sympatric populations of resident and transient orcas demonstrate complex stable vocal and behavioural cultures between subgroups (Boran & Heimlich, 1999). The observed 'intentional stranding' hunting technique, only observed by one community of orcas, is culturally transmitted, involving high skill levels and high parental investment due to risks (Guinet & Bouvier, 1995). Additionally, belugas demonstrate a migratory culture based on social learning between mother and calf (O'Corry-Crowe et al., 2018). Claims for the existence of culture in nonhuman animals have been controversial, but the strong evidence among odontocetes further provides evidence for their complex social abilities and the importance of sociality for these species.

The slow life histories of cetaceans provide the necessary time for the required cognitive complexities for the socioecological demands to develop, learnt from conspecifics (Würsig & Pearson, 2015). Notably, cultural transmission is so important that the menopause, once believed to be a uniquely human trait, occurs in several species of odontocetes, including orcas and belugas. In these matrilineal social systems, menopausal cetacean females have valuable experience and are a source of information for the group, strongly indicating an evolutionary adaptive advantage (McAuliffe & Whitehead, 2005).

5.6 *Summary*

The findings above are summarised in Tables 3, 4 and 5 below for the bottlenose dolphin, orca and beluga whale respectively.

TABLE 3 Examples of cognitive capacities relevant for moral personhood in the bottlenose dolphin

		Examples of cognitive capacities
Brain structure	EQ	4.40 (Ridgway & Brownson, 1984)
	GI	4.47 (Elias & Schwartz, 1969)
Intelligence and cognitive complexity	Behavioural flexibility	Understand abstract rules (Herman et al., 1994)
		Discriminate between quantities (Jaakkola et al., 2005)
		Symbolic representations of object (Herman & Forestell, 1985)
		Creativity (Herman, 2006)
		Tool use (Krützen et al., 2005)
		Demonstration of memory
	Awareness of past and future	Bubble ring production (McCowan et al., 2000)
	Foreplanning	Cooperative hunting (Gazda et al., 2005)
	Social learning	Social learning (Janik et al., 2006)
Self-awareness	Mirror recognition	Utilisation of mirror to investigate own body (Delfour & Marten, 2001)
		Presupposes bodily awareness (DeGrazia, 2009)
		Comprehend symbolic gestural references to own body parts (Herman et al., 2001)
	Imitation	Vocal imitation: Signature whistle (Janik et al., 2006)
		Behavioural imitation (Kuczaj II & Yeater, 2006)
	Introspection/ Theory of mind	Social knowledge precursor (DeGrazia, 2009)
		Attend to human points and gazes (Pack & Herman, 2007)
		Use body to demonstrate spontaneous pointing (Xitco et al., 2004)
		Succeeded in a false-belief task (Tschudin, 2006)
	Metacognition	Ability to indicate their degree of certainty (Smith et al., 1995)
Language	Communication	Signature whistle (Janik et al., 2006)
		Vocal learning (Janik et al., 2006)

TABLE 3 Examples of cognitive capacities relevant for moral personhood (*cont.*)

		Examples of cognitive capacities
	Language	Learnt artificial gestural and acoustic language Understand semantic and syntactic features (Herman et al., 1993) Comprehend novel sentences (Herman et al., 1993; Herman et al., 1984)
Social complexity	Sociability	Set roles in cooperative hunting (Gazda et al., 2005)
	Culture	Vertically and matrilineally transmitted tool use (Krützen et al., 2005)
Emotional	Epimeletic	Pod keeping deceased calf afloat (Krützen et al., 2005) Targeted helping (Cockcroft & Sauer, 1990)
	Altruism	Potentially helping swimmers in distress (Shapiro, 2006) Degree of moral agency (Shapiro, 2006)

TABLE 4 Examples of cognitive capacities relevant for moral personhood in the orca

		Orca
Brain structure	EQ	2.90s ± 0.40 (Ridgway & Brownson, 1984)
	GI	5.7 (Manger et al., 2012)
Intelligence and cognitive complexity	Behavioural Flexibility	Quickly and smoothly switch between multiple threads of mental activity (Anderson et al., 2016)
	Awareness of past and Future	Cooperative hunting (Pitman & Durban, 2012)
	Social learning	Social learning (Janik et al., 2006)
Self awareness	Mirror recognition	Contingency checking behaviour in mirror test (Delfour & Marten, 2001)
	Imitation	Imitate novel actions of conspecifics (Abramson et al., 2018)
	Introspection	Social knowledge precursor (DeGrazia, 2009)
	Theory of mind	Potential use of tactical deception (Anderson et al., 2016)

TABLE 4 Examples of cognitive capacities relevant for moral personhood in the orca (*cont.*)

		Orca
	Metacognition	Potential empathy reflective of cognitive and affective theory of mind (Anderson et al., 2016)
Language	Communication	Pod specific dialects (Liska, 1993) Potentially share information through echolocation (Barrett-Lennard et al., 1996) Long range calling when separated (Miller et al., 2004) Synchronised dives (Marino, 2020)
	Language	
Social complexity	Sociability	Cooperative hunting (Pitman & Durban, 2012) Long range calling when separated (Miller et al., 2004) Synchronised dives (Marino, 2020) Lifelong bonds (Connor, 2000)
	Culture	Pod specific dialects (Ford, 2009) Hunting techniques vary across pods e.g. intentional stranding (Guinet & Bouvier, 1995) Importance of menopause (McAuliffe & Whitehead, 2005)
Emotional	Epimeletic	Female orca carrying her deceased calf (Reggente et al., 2016)
	Altruism	Food provisioning (Hoelzel, 1991)

TABLE 5 Examples of cognitive capacities relevant for moral personhood in the beluga whale

		Beluga whale
Brain structure	EQ	2.3 (Marino, 2018)
	GI	5.23 (Manger et al., 2012)
Intelligence and cognitive complexity	Behavioural flexibility	Relative quantity judgements (Abramson et al., 2013) Recognise rotated objects (Murayama & Tobayama, 1995)

TABLE 5 Examples of cognitive capacities relevant for moral personhood (*cont.*)

		Beluga whale
	Awareness of past and future Social learning	Bubble ring production (Jones & Kuczaj, 2014) Social learning (Janik et al., 2006)
Self awareness	Mirror recognition	No mirror test data
	Imitation	Spontaneous imitation of conspecifics and human speech (Ridgway et al., 2012)
	Introspection	Social knowledge is precursor (DeGrazia, 2009)
	Theory of mind Metacognition	
Language	Communication	Exceptional communicative and mental representational capabilities Understand and produce symbolic lexigrams and sounds (Abramson et al., 2017) Comprehend bidirectional relationship between represented object and vocal signal (Abramson et al., 2017) Imitate novel sounds (Ridgway et al., 2012) Physical features of vocal signals comparable to vowels, vary across populations (Panova et al., 2019)
	Language	
Social complexity	Sociability	Cooperative hunting (O'Corry-Crowe, 2009) Lifelong bonds (Krasnova et al., 2009)
	Culture	Vocal signals share physical features comparable to vowels, vary across populations (Panova et al., 2019) Migratory culture (O'Corry-Crowe, 2009) Importance of menopause (McAuliffe & Whitehead, 2005)
Emotional	Epimeletic	Beluga with removed deceased calf, carried placenta, and then a buoy for several months (Kilborn, 1994)
	Altruism	Potentially helping swimmers in distress (Shapiro, 2006)

6 Discussion

6.1 *Are Dolphins Persons?*

Singer has defined the criteria for personhood as rational and self-consciousness beings (Singer, 1993, p. 87). There is substantial scientific evidence, reported in Section 5, that odontocetes are rational and self-conscious beings. There is experimental evidence for rationality in captive bottlenose dolphins and to an extent the rationality of belugas has been demonstrated. Both bottlenose dolphins and orcas pass the self-recognition mirror test, indicating self-consciousness. For bottlenose dolphins, orcas and beluga whales, imitation and emotional and linguistic indicators suggest self-consciousness (Hart & Karmel, 1996).

Singer's theory dictates that the attribution of personhood to odontocetes does not mean that they should have rights equivalent to humans, based on his argument for the equality of consideration of interests. Instead, for Singer, the species-specific needs of both persons, as well as those that don't meet criteria for personhood, should be met. The needs of odontocetes cannot be met in captivity as it is impossible to provide an adequate captive environment (Corkeron, 2009). Furthermore, the current practice of using odontocetes, such as bottlenose dolphins, orcas and beluga whales for human entertainment, may reinforce the view that sentient animals are simply objects for human entertainment, further reducing utility.

Based on Singer's 'doctrine of the sanctity of personal life', the lives of bottlenose dolphins, belugas and orcas would be protected (Singer, 1993). This would mean the abolition of whaling, drive hunts, and live captures due to the risk of death, and measures to prevent them harm from other human activity. These practices would not only be abolished on the grounds of welfare and the inhumane methods of killing, but because the evidence may suggest these cetaceans have an interest in their continued life.

The potential future planning demonstrated by bottlenose dolphins and orcas may suggest that they have an interest in the continuation of their life (McCowan et al., 2000). However, the evidence of a perception of future is limited, and further research is required in wild-living dolphins and other species of odontocetes.

DeGrazia (2006) argues that personhood exists on a continuum, with degrees of personhood, instead of the categorical and binary person/non-person distinction. DeGrazia suggests that personhood should be categorised as a cluster of properties, including 'autonomy, rationality, self-awareness, linguistic competence, sociability, the capacity for intentional action, and moral agency' (2006, p. 42). DeGrazia (2006) claims that bottlenose dolphins are borderline

persons due to their overall self-awareness, sociability and cognitive complexity. DeGrazia has stated that not all capabilities in the cluster concept must be reached, only most of them. Therefore, based on the evidence reviewed in Section 5, DeGrazia's theory of personhood would arguably consider orcas and beluga whales to be moral persons.

Orcas and beluga whales demonstrate levels of bodily and social awareness, with the potential for introspective awareness. Additionally, they demonstrate the capacity for intentional action, and belugas potentially even moral agency, although further research is required to confirm this. Despite this, orcas and beluga whales do not reach the full personhood due to their natural communications being insufficient to be described as language (DeGrazia, 2006). The bottlenose dolphins involved in Herman et al.'s (1993, 1984) language studies are the exception, having more evidence of their linguistic competencies to qualify as possessing language, and therefore be full persons (DeGrazia, 2006).

Steven Wise argues that the demonstration of 'practical autonomy', the abilities to desire, act intentionally and possess some sense of self, is sufficient for granting legal personhood. According to Wise, this leads to the legally enforceable protection of inviolable rights to bodily liberty and right to life. Wise scores species on a scale of zero to one, with a fully rational adult human scoring 1. Wise (2012) scores bottlenose dolphins at least 0.9 due to their success in the mirror test, therefore classing them as possessing practical autonomy. Based on the scientific evidence, Wise's theory should also attribute practical autonomy and legal personhood to orcas and beluga whales. This is based on scientific evidence demonstrating intentional actions and sense of self, plus social behaviour such as cooperative hunting, social learning, cultural transmission, and bubble ring production. For Wise, bottlenose dolphins, orcas and beluga whales demonstrate practical autonomy and ought to be considered as 'legal persons', and not 'legal things', providing enforceable inviolable basic rights to bodily liberty and life.

6.2 *Extending Personhood to the Odontocetes Parvorder*

Reasonable application of the precautionary principle could broaden the attribution of moral and legal personhood to the parvorder odontocetes and cetaceans. Although experiments investigating cognition and intelligence were conducted almost exclusively on bottlenose dolphins, Marino (2011) has hypothesised that these capacities may also be extended to odontocetes, due to the complex behaviour and brain structures observed. Although this paper focuses on three species of the parvorder Odontoceti due to their prevalence in captivity, other odontocetes could be examined, as well as characteristics of

the alternative parvorder Mysticeti, or the 'baleen whales'. Similar to odontocetes, they are socially complex with highly developed neuroanatomy and are also threatened by human activity, particularly from whaling and the impacts of commercial fishing, and so may benefit from this recognition. Extending personhood to the parvorder odontocetes may mean that some species are considered as moral persons, when their biological reality does not support this. Despite this, arguably erring on the side of caution in the face of an incomplete evidence base, with the objective to prevent severe harms to what are potentially, and very likely, person like humans, seems justifiable.

6.3 *Significance of Dolphin Personhood and Implications for Legal Protection*

DeGrazia has written of the relation between personhood and moral considerability in the Western world. He writes how persons have a 'radically superior' moral status, with nonpersons having a 'radically inferior status' (DeGrazia, 2006, p. 49). Furthermore, moral tradition has considered there to be no beings between persons and nonpersons, and no nonhumans are considered as persons. Given the protections that human persons are afforded in law, it might be argued that the attribution of moral personhood to dolphins might results in far greater legal protection for them.

Despite this, it is not inevitable that the recognition of moral personhood in dolphins will result in legal standing, including the protection of fundamental interests of dolphins. Kurki (2019, 2021) has described the orthodox view of legal personhood as meaning that a legal person holds rights and bears responsibilities. Kurki (2021) has described how cases brought by the Steven Wise's NhRP in the US have been unsuccessful because the courts have considered a legal person as a being that has the capacity to bear responsibilities, as well as possess rights. In this respect, it is notable that Singer, DeGrazia, and Wise, discussed above, do not include the capacity to bear responsibilities as necessary condition in their theories of personhood.

Furthermore, Ngaire Naffine has described 'legalist' and 'realist' accounts of legal personhood (Naffine, 2009). Realists hold that there is a strong relation between moral and legal personhood; the recognition of legal personhood is ultimately grounded in the more fundamental concept of moral personhood. As Kurki writes, realists claim that 'legal personhood should track personhood' (Kurki, 2021, p. 57). Legalist accounts, however, consider legal personhood as very distinct from real or moral personhood, and for this reason the recognition of moral personhood would not necessarily lead to legal personhood and greater legal protections.

Kurki (2021) further argues that it is not obvious what the granting of legal personhood would mean for nonhumans (such as dolphins), if a court were to grant it. He writes how legal personhood might mean a companion animal benefiting from a pet trust bequeathed from its deceased owner, a chimpanzee (or dolphin) enjoying freedom and integrity through the protection of a writ of habeas corpus (in the case of Steven Wise's NhRP), or owned animals being provided the status of 'living property', as recommended by David Favre (2009), with associated specified benefits. Ultimately, Kurki (2021) argues that it is problematic to consider that legal personhood should be a precondition of animal rights. He holds this to be the case based on an interest-based account of rights, and he suggests that strategically there may be more chance of success in the courts if personhood is not considered as a necessary condition for rights. Indeed, Kurki argues that nonhuman animals already have rights, although granting legal personhood would much improve their status:

> A court's granting habeas corpus to a nonhuman animal would not transform them from a rightless "thing" to full-fledged legal person. Regardless, such a verdict would considerably improve the animal's legal status by endowing them with certain incidents of legal personhood. Framing the habeas corpus lawsuits on such terms might make the cases an easier sell.
>
> KURKI, 2021, p. 59

Finally, DeGrazia himself questions the relevance of moral personhood. He argues that even if persons do possess some morally relevant capacities that nonpersons do not, the claim that only persons have moral considerability, or radically superior moral status, is 'indefensible' (DeGrazia, 2006, p. 49). DeGrazia goes on to locate the fundamental ground of moral status in sentience:

> Sentient animals have significant moral status in virtue of having a welfare; they are not merely, or even primarily, tools for our use or playthings for our amusement. Even if personhood proves to have some moral significance, sentience is far more fundamental and important.
>
> DEGRAZIA, 2006, p. 49

7 Conclusion

The doctrine of human exceptionalism, whereby humans alone are considered to be moral persons with legal standing, is deeply flawed. Peter Singer, David DeGrazia, and Steven Wise, amongst other posthumanist thinkers, have

persuasively argued that personhood should not be restricted to *Homo sapiens*. In this paper, we have reviewed evidence from the cognitive sciences of morally relevant neurological structures and behaviours of the three odontocetes species: bottlenose dolphins, orcas and beluga whales. There is substantial scientific evidence of cognitive capacities, based on brain structure, intelligence, self-awareness, language, social complexity, and emotional lives, for these species. Based on the theories of Singer, DeGrazia and Wise, all three species should be granted at least borderline personhood. In captivity odontocetes are at substantial risk of poor welfare, exacerbated by their complex cognition, including psychological trauma and ill-health. The sociability of these cognitively rich species suggests that the harm of capture, or death from human activities is not exclusive to the individual, but negatively affects conspecifics and the wider population.

There ought to be a paradigm shift toward the societal recognition of moral personhood for odontocetes, with associated legal protections. Odontocetes such as bottlenose dolphins and orcas should not to be seen as resources for entertainment, as merely means to a human end. Rather, odontocetes, as moral persons, should be recognised as ends in themselves, with their fundamental interests protected in law. Such legal protections should lead to the abolition of captivity for dolphins and orcas in entertainment and harmful activity in the oceans such as whaling. Odontocetes currently held captive for entertainment in poor conditions should be transferred to marine sanctuaries, given that releases into the wild have largely been unsuccessful. Modern science tells us that some nonhuman species possess morally relevant characteristics such as rationality, self-consciousness and sociability. As moral agents, we humans must recognise that some nonhuman species, in this case odontocetes, are, like us, persons.

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