Marino, Lori. (2013). "Humans, dolphins, and moral inclusivity." In: R. Corbey & A. Lanjouw (eds.), *The politics of species: Reshaping our relationships with other animals*. Cambridge University Press, 95 - 105.

# Humans, Dolphins and Moral Inclusivity

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There is abundant scientific evidence for complex intelligence, self-awareness, and emotional complexity in dolphins. Dolphins possess large complex brains second in relative size only to those of modern humans. They have demonstrated prodigious cognitive abilities in such areas as language understanding, abstract thinking, and problem solving. They recognize themselves in mirrors, understand the relationship between their own body and that of others, and can reflect on their own thoughts, showing that their sense of self is not unlike our own. Moreover, their complex sociality and cultural traditions are well documented from ongoing field studies. These findings provide strong support for recognizing their status as individuals with basic rights comparable to those of humans. Yet, dolphins (and whales) continue to be treated as non-sentient objects, commodities, and resources. Egregious examples of this are the many dolphin and whale slaughters that occur around the world and the exploitation of dolphins in entertainment parks, research facilities, and the “dolphin therapy” industry. I will discuss the consequences of mistreatment for suffering in dolphins, the reasons for their continued abuse and exploitation, and new efforts to recognize dolphin personhood and its implications. I will argue that dolphins present an extreme challenge to our ability to consider similarity and difference simultaneously (a prerequisite for inclusivity) in our moral stance towards other animals.

## Cetacean Brains and Psychology

### *The Massive Cetacean Brain*

Both absolute and relative brain size account for some of the variance in different aspects of intelligence (Marino, 2006 for a review). Modern cetacean brains are among the largest of all mammals in both absolute and relative size. The largest brain on earth, that of the adult sperm whale at an average 8000 g (Marino, 2009), is six times larger

than the human brain.

Because brain and body size are positively correlated they are often expressed as an Encephalization Quotient or EQ (Jerison, 1973). EQ is a value that represents how large or small the average brain of a given species is compared with other species of the same body weight. Species with an expected brain size relative to body size have an EQ of 1. Species with brains larger than expected for their body size possess EQs greater than one, and so on. The EQ for modern humans is 7.0; modern human brains are seven times the size one would expect for a species with our body size. Almost all odontocetes (toothed whales, dolphins and porpoises) possess above-average EQs compared with other mammals. Many odontocete species possess EQs in the range of 4 to 5, that is, their brains are 4 to 5 times larger than one would expect for their body weights. Many of these values are second only to those of modern humans and significantly higher than any of the other primates (Marino, 1998). The EQs of mysticetes, it is important to note, are all below 1 (Marino, 2009) because of an uncoupling of brain size and body size in very large aquatic animals. However, mysticete brains are large in absolute size and exhibit similarly high degrees of complexity and progressive elaboration as the odontocetes (Oelschlager and Oelschlager, 2002).

*The "New" Cetacean Cortex*

Cetacean brains have been on an independent evolutionary trajectory from their closest relatives, the even-toed ungulates, for at least 52 million years (Gingerich & Uhen, 1998) and from the last ancestor with primates for about 92 million years (Kumar

& Blair Hedges,1998). During that time they evolved a unique combination of features. However, the most important point to make about cetacean brains is that despite being different from primate (including human) brains in several ways, they are comparable in complexity.

The brain structure most relevant to intelligence and cognitive complexity is the cerebral cortex - the layered (often folded) sheet of neural tissue outermost to the mammalian cerebrum. The phylogenetically most recent part of the cerebral cortex, the neocortex, is differentiated into several horizontal layers of neurons forming vertical microcircuits and other architectural features that enable complex information processing. Functionally, the neocortex is the basis of thought, reasoning, awareness, and communication. The cetacean neocortex is very different from that of primates in that it does not contain all of the same layers as that of the primate brain and the layers are somewhat different in cellular morphology and architecture. These differences led to an earlier view of the cetacean brain as relatively simple and unspecialized, and generally lacking in the prerequisite organizational complexity related to complex cognitive abilities (Gaskin, 1982; Kesarev, 1971). However, modern neuroanatomical techniques have demonstrated convincingly that the cetacean brain, and especially the neocortex, are at least as complex as that of other terrestrial mammals, including human and nonhuman primates (Hof et al, 2005; Hof & Van der Gucht, 2007). Various regions of the cetacean neocortex are characterized by a wide variety of organizational features, i.e. columns, modules, layers, that are hallmarks of complex brains.

There are specific cortical regions of the cetacean brain that are especially notable in their apparent degree of elaboration. The cingulate and insular cortices (both

situated deeper within the forebrain) in odontocetes and mysticetes are extremely well developed (Hof & Van Der Gucht, 2007; Jacobs et al, 1979) and the expansion of these areas in mammals is consistent with high-level cognitive functions such as attention, judgment and social awareness (Allman et al, 2005). Recent studies show that the anterior cingulate and insular cortices in larger cetaceans contain a highly specialized projection neuron, known as a spindle cell or Von Economo neuron (Hof & Van der Gucht, 2007) which is thought to be involved in neural networks subserving aspects of social cognition (Allman et al, 2005). Spindle cells, also found in human, great ape and elephant brains (Hakeem et al, 2009) are thought to play a role in adaptive intelligent behavior of the kind described in the next section.

*Dolphin Intelligence*

Dolphin cognitive complexity and flexibility have been demonstrated abundantly in years of studies with bottlenose dolphins. These findings include the ability to learn a variety of governing rules for solving abstract problems, understanding televised representations of the real world, learning numerical concepts, and innovating motor behaviors. Dolphins are also one of the few species that can imitate arbitrary sounds and behaviors. In addition, they understand the semantic and syntactic features of a human-made symbolic language and understand and employ pointing as a referential gesture. See Marino et al (2008) for a review of these and other findings.

One of the hallmarks of cognitive sophistication on a par with that of our own species is self-awareness, which has been variously described as awareness of one's personal identity, a sense of "I", an autobiographical identity. Self-awareness is related

to metacognition, the ability to think about, or reflect upon, one's own thoughts and feelings. There is substantial evidence for self-awareness and metacognition in bottlenose dolphins (and good reason to argue that these capacities are not limited to this cetacean species). Body awareness has been demonstrated by a dolphin through an understanding of how symbolic gestures refer to her own body (Herman et al., 2001). Also, awareness of one's own behaviors has been demonstrated through a dolphin's ability to repeat a behavior she just performed, in response to a "repeat" command, or to perform a different behavior if so instructed (Herman, 2002; Mercado et al., 1998, 1999). In 2001, Reiss and Marino conclusively demonstrated that two captive bottlenose dolphins were able to recognize themselves in mirrors (Reiss & Marino, 2001) showing that they had a similar capacity for self-recognition as great apes and humans. Finally, dolphins have demonstrated metacognition in a study showing they were able to report on how uncertain they were about correctly completing a discrimination task (*Smith et al.*, 1995). Therefore, dolphins (and likely other cetaceans) possess rather uncommonly sophisticated capacities in the area of self-awareness.

*Social Complexity and Culture*

Many dolphin and whale species live in large highly complex societies with differentiated relationships (Baird, 2000; Connor et al., 2000; Lusseau, 2007) that include long-term bonds, higher order alliances and cooperative networks (Baird, 2000; Connor et al., 2000) that rely extensively upon learning and memory. There is also evidence that individual role-taking has emerged in dolphin societies to facilitate

cooperative relationships (Gazda et al., 2005) and decision-making processes (Lusseau, 2006, 2007).

Field studies have documented impressive cultural learning of dialects, foraging sites, and feeding strategies in cetaceans. Culture, the transmission of learned behaviour from one generation to the next, is one of the attributes of cetaceans that most sets them apart from the majority of other nonhuman species (Whitehead, 2011) and is likely underpinned by complex social learning abilities. Cultural attributes have been identified in many species of cetaceans but principally in those best-studied: the bottlenose dolphin, the killer whale, the sperm whale, and the humpback whale (Whitehead, 2011). Even cultural tool use has been documented among bottlenose dolphins, who use sponges to probe into crevices for prey (Krûtzen et al., 2005). Therefore, there is abundant evidence that not only are cetaceans socially complex in terms of their relationships and societal dynamics but are culturally sophisticated in a way we are just beginning to understand.

The current scientific research on the intellectual and emotional abilities of dolphins and other cetaceans shows that they are self-aware, unique individuals with distinctive social roles and autonomy. As such, it has been suggested that dolphins and other cetaceans are “nonhuman persons”’ who qualify for moral standing as individuals with basic rights (White, 2007, 2011). Whether one agrees to recognize the formal classification of dolphins as persons or simply accepts the current evidence for person-like mental abilities in dolphins, the current way in which we regard and treat cetaceans, as nonsentient commodities, is entirely inconsistent with who they are and, as such, is morally indefensible.

## Human Use of Dolphins and Whales

Our professed affection for dolphins is somewhat belied by the fact that we still treat them as property, as nonsentient objects, as a means to an end. Tens of thousands of dolphins and whales are slaughtered each year around the world for meat and alleged cultural reasons. Thousands die each year as a result of human fisheries practices and anthropogenic degradation of the environment. And, hundreds are held in captivity for our entertainment, scientific curiosity, use in military operations, and "therapy". Thus, the bottom line is, when it comes to our attitudes towards and treatment of dolphins and whales, they are still, in the end, thought of and treated as commodities.

### *Dolphins and whales as food and bycatch*

The fact that most people who consider it cruel to harm a dolphin directly largely tolerate cruelty towards them at the hands of others indicates that we see them as different enough to be excluded from moral concern on a par with other persons. Even today a constant battle wages between protection and conservation efforts, on the one hand, and commercial interests on the other. Various forms of dolphin and whale slaughter continue to occur around the globe. These include the customary hunting of large whales by Greenland, Iceland, Japan, Norway, Canada and other nations and the slaughter of dolphins and smaller whales in Japan, the Faroe Islands, the Solomon Islands, and other places. Dolphins and whales are slaughtered primarily for meat but are also considered competitors for fish and they are recurrent victims of incidental killing by the fisheries industry. The main approach to dolphin slaughter is through

dolphin drive hunting, also called dolphin drive fishing, a method of hunting dolphins and other small whales by driving them together with boats into a bay or onto a beach where they are killed with knives, harpoons and various other deadly instruments. Many die from the acute stress.

The pursuit, capture and killing of whole groups of dolphins and whales – families, social units – is, by even the most relaxed standards, brutal and inhumane. But there is a more insidious and, not unrelated, form of abuse and exploitation that generally goes unrecognized and, indeed, is supported by the general public - that is, the use of dolphins in captivity for entertainment, research, military purposes, and even “therapy”.

*Dolphins and whales in research*

Although a great deal of research on dolphins and whales is conducted in the field in a way that does not negatively impact the individuals under study, some research – particularly on cognitive abilities – has been and continues to be done with dolphins held in captivity. Research done in captivity affords a level of experimental control not easily achieved in the field setting. On the other hand, the results from studies of captive dolphins, particularly those that yield negative findings, may be limited in generalizability because of the psychological constraints and trauma associated with captivity (see below). Today there are few dedicated dolphin research labs; most of the dolphins used in some of the major studies of dolphin intelligence and learning in the past two decades are deceased, victims of a captive lifestyle. Therefore, there is a current effort to create a new paradigm of research on dolphin cognition that excludes

captivity and is shaped by the needs and desires of wild cetacean individuals who choose to interact with humans on their own terms (Marino and Frohoff, in press).

*Dolphins and whales in the military*

Since 1960 the United States Navy has maintained dolphins and other marine mammals in captivity in order to use them in defense maneuvers, mine detection, and develop better submarine and sonar weapons. About 75 dolphins and small whales, e.g., pilot whales, orcas, are held in the program, many of which were captured in the infamous Taiji, Japan drive hunts. In addition to using the dolphins in high risk military situations, the Navy has, throughout the years, conducted invasive physiological research on dolphins in order to learn more about their brain function, sleep, and echolocation. This long history of essentially terminal military research on dolphins is generally not known by the public.

*Dolphins as Entertainment*

By far the majority of captive dolphins and whales around the world are used for entertainment and recreation. Despite the claims of the zoo and aquarium industry, there is no evidence that dolphin and whale displays are educational or result in increased conservation attitudes or efforts (Marino et al., 2010). The truth is that dolphin shows and displays are commercial amusements equivalent to any theme park diversion. There is also a longstanding and intimate connection between the dolphin captivity industry and dolphin hunting around the world, and, most notably in Taiji, Japan (http://www.savejapandolphins.org/). These kinds of associations reflect the fact

that the dolphin circuses represented by places like Sea World and other captive facilities are not as benign as they would like the public to think.

Dolphin displays and shows are often accompanied by swim programs where the public can pay to pet, swim with or interact in some way with the animals. It is apparently no longer satisfying to the public to be able to watch dolphins and whales performing tricks. The new trend is to make physical contact with them. These kinds of activities grade into yet another form of dolphin exploitation called Dolphin Assisted Therapy or DAT.

*Dolphins as therapists*

Dolphin-Assisted Therapy (DAT) is an increasingly popular form of animal-assisted therapy marketing dolphin swims and interactions as a cure or form of therapy for a variety of psychological and physical illnesses in children (autism, developmental delay, attention deficit hyperactivity disorder, etc.) and adults (depression, multiple sclerosis, cancer, etc.) (Brakes and Williamson, 2007). Proponents claim that dolphins have healing abilities; curative mechanisms cited include the supposed effects of echolocation on disease processes and changes in brain waves. None of these proposed explanations are supportable (Brakes and Williamson, 2007) and there is no existing evidence that DAT has any therapeutic value (Humphries, 2003; Marino and Lilienfeld, 1998, 2007).

DAT typically involves several sessions either swimming or interacting with captive dolphins often along with more conventional therapeutic tasks. The standard cost of DAT, whose practitioners are not required by law to receive special training or

certification, is exorbitant, often averaging $3,000 - $5,000 for a few brief interactions or swims with dolphins. DAT has grown into a highly lucrative business with facilities all over the world, including the United States and, like the standard recreational “swim with the dolphin” programs, DAT is not regulated by any authority overseeing health and safety standards for either humans or dolphins. As such, there are many risks to both humans and dolphins during DAT that include injury, disease transmission, opportunity loss for participants, and encouraging the capture and confinement of the dolphins (Marino, 2011).

The specific forms of exploitation and abuse described above all produce a unique set of ordeals for dolphins and whales. Yet, they are all connected by a common thread – captivity and its devastating effects.

**The Effects of Captivity on Dolphins and Whales**

Ironically, the very characteristics of dolphins and whales that are so appealing - complex intellect, emotional sensitivity and self-awareness, are the same that make them highly vulnerable to the psychological impact of captivity. Furthermore, because of the complexity and inter-relatedness of dolphin and whale social relationships whole social groups can be destroyed even when a small number of individuals are captured (Lusseau, 2007; Reeves et al., 2003). Captivity impacts social relationships, degrades autonomy through the imposition of an enforced schedule of activity and behavior, causes boredom produced by a relatively sterile and unchanging environment, induces frustration, and inhibits incentives and abilities to carry out natural behaviors such as

hunting and traveling. The abundant evidence for stress, disease and increased mortality in captive cetaceans attests to these effects.

*Aberrant behavior*

Many captive cetaceans display behavioral abnormalities indicative of distress and emotional trauma. These include stereotyped behavior, unresponsiveness, excessive submissiveness, hyper-sexual behavior (towards people or other dolphins), self-inflicted physical trauma and mutilation, compromised immunology and excessive aggressiveness towards other dolphins and humans (Frohoff, 2004; Stewart and Marino, 2009 for reviews).

*Stress and Disease*

Stress derives from many aspects of captivity, including being transferred into and out of different pools and social groups without choice and being unable to resolve conflict in the way it is accomplished in the wild, that is, through dispersion and adequate social support. These factors eventually lead to reduced life expectancy (Waples and Gales, 2002). The U.S. Marine Mammal Inventory Report) lists numerous stress-related disorders, such as ulcerative gastritis, perforating ulcer, cardiogenic shock and psychogenic shock as ‘cause of death’ (US MMIR, 2010).

*Mortality*

The effects of increased stress and disease in captive cetaceans are evident in shorter lifespans, lower survivorship, and higher mortality. For bottlenose dolphins, survivorship statistics in captivity (6.4%) are not statistically significantly higher than in

the wild (3.9%) (DeMaster & Drevenak, 1988; Duffield & Wells, 1991; Small & DeMaster, 1995; Wells & Scott, 1990; Woodley et al.,1997). However, there are numerous biases in these data; survivorship statistics from captive facilities often exclude periods of sharply increased mortality – those associated with capture and transfer. These biases can easily lead to artificially inflated survivorship data for captivity.

For orcas the discrepancy between captivity and the wild is glaring. The natural average lifespan for male and female orcas is 29.2 and 50.2 years respectively with a maximum longevity of 60 and 90 years respectively (Ford et al., 1994; Ford, 2009; Olesiuk et al., 1990). In captivity most orcas do not survive much past the age of 20 years (Williams, 2001). DeMaster and Drevenak (1988) estimated the annual mortality rate for captive orcas at 7.0%, and two further studies, Small and DeMaster (1995) and Woodley et al (1994) both estimated (captive) annual mortality rates at 6.2% (excluding calves), considerably higher than the 2.3% annual mortality rate figure for wild populations. Furthermore, the evidence for premature death in other dolphins and whales held captive, such as belugas (*Delphinapterus leucas*) is also mounting (Woodley et al., 1997).

The evidence above shows the myriad of ways that we directly or indirectly encourage the continued exploitation and abuse of dolphins and other cetaceans despite our professed attraction to them and the abundant scientific evidence that they are similar to humans in terms of their level of awareness, autonomy and uniqueness – their selfhood. In the next section I will explore a general explanation for these apparent inconsistencies.

**A Challenge to Moral Inclusivity**

The human mind is evolutionarily prepared to include other members of our in-group in our moral circle. Those that appear to be part of an out-group are outside our moral concern. History is replete with this psychological parsing of moral consideration within our own species; differences between groups of people form the foundation of discrimination, objectification and abuse. Successful efforts to eliminate prejudice and exploitation rely upon emphasizing similarities across groups over the differences. The psychological process of doing away with racism, sexism, and all other forms of intolerance is one that requires an ability to take into account similarities and differences simultaneously; we come to accept differences in the context of acknowledging that basic characteristics are essentially the same. The capacity to take into account both similarities and differences at the same time has proven to be difficult even when considering members of our own species. And it is a delicate process that disintegrates when one feels threatened. How much more difficult it is to perform the same mental feat for members of other species.

Those members of other species who enjoy *some* level of protection and moral consideration (pets, primarily) are typically those that we consign to be less autonomous individuals who need to be safeguarded. This attitude has resulted in both positive and negative consequences for domestic pets depending on the circumstance. But there are few other animals that qualify for this peculiar relationship and most are regarded as either pests or resources and sometimes a combination. Even animals that we acknowledge to be beautiful or majestic or interesting, i.e. dolphins, polar bears, elephants, tigers, chimpanzees, etc. are still – in the end – considered not on their own

terms but as resources for our amusement, aesthetic appreciation, for the ways they make the world more enjoyable and more beautiful for ourselves and human generations to come. As such we make some effort to conserve these animals for our own sake but clearly exclude them from true moral concern as autonomous individuals in their own right.

Dolphins and whales easily fall into the category of animals that brighten our world and, as such, most people give lip service to the idea that they should be conserved. But, as philosopher Thomas White points out, our relationship with them is fraught because we cannot comprehend their similarity to us in the face of their difference (White, 2011). Their intelligence, self-awareness, emotional bonds, and social complexity means that they are similar to us in that we both experience life as "persons". But they (unlike great apes, for instance) look and move differently, lack changes in clearly recognizable emotional expressions, communicate in strange modalities, live in a very different physical environment and seem to possess a level of social cohesion foreign to us. Therefore, cetaceans – probably more than any other animal - represent extremes of similarities and differences that challenge our ability to recognize them as moral equals. That is, probably more than any other animal, cetaceans are the most vulnerable and the most bewildering.

Our inability to take these two dimensions into account at the same time has resulted in extreme objectification, exploitation and abuse at our hands. Although other animals (great apes, elephants, etc.) too are victims of these biases there are often enough similarities in the way they look and express themselves that provides a basis for recognizing their emotions, i.e., distress, fear, affection, excitement. For instance, it

is difficult to understand how we can continue to tolerate the mass slaughter of dolphins and whales in the Taiji, Japan or Faroe Island drive hunts where hundreds of individuals are herded together and hacked to death in water red with their blood. The dolphins call out to each other and thrash about in pain and panic. I would argue that the same atrocity done annually to great apes, or elephants*, in as visible and wholesale a way as is done in dolphin drive hunting* would result in a more dramatic human response. Great apes, elephants and other animals are still subject to horrific brutality and slaughter but we more readily recognize their emotional response, their cries for help, their body language – which are all more similar to our own than those of dolphins. When dolphins are being slaughtered they whistle and “smile”. Those of us who know dolphins can recognize the sounds of panic and fear in their whistles. And the ever-present “smile” of the dolphin even under the most horrendous of circumstances is a deception that appears to minimize our concerns for them. And we tolerate and even support more insidious types of abuse in the form of captivity without realizing that the very personhood of dolphins makes them among the most vulnerable of victims to this and other forms of exploitation.

This is why dolphins represent an extreme challenge to moral inclusivity and why we must find a way to internalize the notion that dolphins (and other animals) can be very different from us in many ways and yet on a par with us when it comes to the dimensions that are important for moral consideration. The captivity industry knows how difficult this challenge is and exploits it at every turn. For instance SeaWorld publishes online information booklets (Animal Info Books) on bottlenose dolphins, orcas, beluga whales and other animals in their circuses (SeaWorld, 2011). These pamphlets and

other information resources, such as their teacher's guides, are littered with inaccuracies – all aimed at biasing perceptions of dolphins and other cetaceans as interesting enough to pay admission to see but not so intelligent and like us as to give credence to any concerns about their captivity. Like the last bowl of porridge in the Goldilocks fairytale dolphin intelligence is *just right*.

Against a backdrop of the human need to create a separation between ourselves and the other animals, to uphold our so-called superiority, and to assume that other animals do not experience life with the same richness and intensity, dolphins and whales have the great burden of being so like and so unlike us at the same time that they are, simultaneously, among the most beloved and the most abused and vulnerable of all animals. Our response to this realization – as for all the other animals - will depend upon our ability to rise to the challenge of thinking about others in a more complex way than ever before.

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