

The Anthropomorphic Bias: How Human Thinking is Prone to Be Self-referential.

— Luke Strongman

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Abstract

This working paper attempts a synthesis of contemporary research into anthropomorphic bias. It provides an explanatory distinction between the concept of anthropocentrism and the more specific applications of anthropomorphism, as well as a critique of existing anthropocentric concepts and theories. The paper enters into analysis of some of the philosophical assumptions behind the related concepts of anthropocentrism and anthropomorphism. It provides a critical survey of the current literature and makes the argument that anthropomorphic bias can be understood as an innate existential tendency of human embodied thought, thereby presenting a potential problem to the fields of the philosophy of science and embodied cognition, and to social scientific experimental design and interpretation.

The paper is divided into eight sections dealing with selected areas of discussion of anthropomorphic bias, involving summary explanations of experimental situations and everyday life behaviours: (1) Anthropocentrism and anthropomorphism: Definitions, ontologies, problematics and reflections; (2) Anthropocentrism and ecology; (3) Deep anthropocentrism and counter-environmentalism; (4) Anthropomorphism and human and animal differences; (5) Anthropomorphism and quantum physics; (6) Anthropomorphism and robotics; (7) The problem of anthropomorphism; and (8) Attitudinal solutions to anthropocentric bias involving new attitudes in scientific and everyday life behaviours. These areas of focus are chosen as they comprise the clearest categories of research for the concept of anthropocentrism at the current time.

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What are anthropocentrism and anthropomorphism?

Anthropocentrism is a term used to describe the condition of being humankind-centric, emphasising the need to protect the interests of humans and thus assessing the importance of other ecological entities in terms of their usefulness to humankind. Although the concept of humanity is constantly evolving, the term may carry a normative value. Anthropomorphism is a descriptive term used largely to ascribe human properties to non-human things such as cars, ships, buildings and landscapes. Anthropomorphism denotes specific instances and usages of the anthropocentric concept. In this paper the terms will not be used interchangeably, but rather denote either broader conceptual meanings or more specific applications. Anthropomorphism is also sometimes used in the context of human-like descriptions of animals, which theoreticians of embodied cognition regard human beings as existing on the same continuum with (Anderson, 2003). However, the ascription of animal-like qualities to animals is known as zoomorphism.

Although cognitive linguists such as Lakoff and Johnson (1980, p. 4) have argued that reason is evolutionary and should not be considered as an essence in itself that separates us from other animals, the anthropic view can be conceived of as one of the emergent properties of being that are endemic to humanity. Arising from anthropological and environmental discourse, anthropomorphism has informed human culture and thinking from the moment of collective and individual awareness of humankind as a distinct species. Denis Diderot referred to it in *The Encyclopedie* in 1755 (Diderot, 1992). The contention is that, community, society and consideration of ourselves as humans necessarily predisposes us to an anthropocentric bias which, when considered from different perspectives, may be both beneficial and harmful to ourselves and to society.

Anthropomorphic bias is a second-order problem in the field of embodied cognition. If the focus of research into embodied cognition (Anderson, 2003) emphasises that cognition is a highly embodied or situated activity and that thinking beings are acting beings, then anthropomorphic bias arises as a consequence of our consciousness of selves and others as embodied beings. It emerges as an abstraction of our embodied cognitive states. For example, anthropocentrism may underlie our thinking at a level beneath that of motivated reasoning. Motivated reasoning occurs as a mental bias that follows from human reasoning. Ziva Kunda (1990, p. 495) points out, “people are more likely to arrive at those conclusions that they want to arrive at . . . unrealistically

positive views of oneself and the world are often adaptive . . . [b]ut motivated illusions can be dangerous when they are used to guide behaviour and decisions, especially in those cases in which objective reasoning could facilitate more adaptive behaviour”.

Kunda’s quotation establishes that compared with the notion of ‘objective reasoning’, motivated illusions may be dangerous if they are used to guide behaviours inspired by irrational self-beliefs. Leaving aside the question of motivated ‘objective reasoning’, anthropocentrism points to a deeper problem. Anthropocentric predispositions are at a deeper level than motivated illusion and ‘conclusions that people want to arrive at’. Anthropocentrism denotes an influence on thought and behaviour that is not necessarily what people want to do, but is just what they *do* do (or can’t not do).

Anthropomorphic bias is a potential problem for both the classical Newtonian view of the world and for quantum mechanics, because it is a largely scientifically unaccounted for influence on human thought and social organisation that is causally, but not necessarily logically, unavoidable. More research in identifying types of anthropocentric behaviour may make us more aware of how it affects us as individuals and as cultures, and place rational presuppositions on what we can and can’t not do in acting and thinking in human ways. It may also reveal hidden influences on people’s objective reasoning that may be both beneficial and harmful in different circumstances.

The argument is here made that anthropomorphism is instantiated in both individual and social biases that follow innately from the human mind’s embodiment, the effects of which can transcend both human physicality and the features of human consciousness known as ‘qualia’. It is evident in the fundamental attribution error, for example, in which personality-based explanations for behaviours are over-emphasised at the expense of situational explanations (Langdridge & Butt, 2004).

Anthropocentric bias is inescapable in the human condition but is also one of the least well understood innate psychosomatic, existential and cultural properties that belong to people, following from a functionality of their being. There may be adaptive advantages of anthropocentric bias, such as social empathy, and disadvantages of being non-anthropocentric, such as environmental degradation and sociopathy. Adapting from Lakoff and Johnson (1980, p. 17), we need to explore the consequences of: “. . . not just the innocuous and obvious claim that we need a body to reason; rather . . . the striking claim that the very structure of reason itself comes from the details of embodiment”. Consciousness of embodiment is problematic. Awareness of human selves and others involves anthropocentric predispositions.

By contrast, non-anthropocentrism (Panda, 2006) emphasises the cause of non-human entities, which may be sentient or otherwise, and recognises their significance regardless of their usefulness to the world of mankind. Non-anthropocentrism therefore involves consideration of the environment apart from the interests of mankind. This becomes relevant especially in current debates of global climate change and environmental ethics, which are concerned with the effects that human beings bring about upon nature and the balance of our ecosystems (and ultimately with the survival of the earth's biosphere.)

The question remains whether non-anthropocentrism or anti-anthropocentrism is in fact achievable at all by humans. Even if people abide by preservationist ethics in their interaction with nature, nature becomes thereby affected with humanistic values. More than this, by extension, the anthropic principle holds that the universe was designed for the perpetuation of a human intelligence to which the natural world is often seen as secondary. To bring the problem a little closer to hand, regardless of whether economic growth is best served through ecological protection, anthropocentrism remains inescapably problematic, in so much as it is an intrinsic although largely unquantified and unqualified property and effect of being human.

Anthropomorphism is implied in the understanding that, as Thomas Nagel (1989, p. 254) has suggested, there is no "view from nowhere". Even the most apparently objective of observers cannot but see through their own eyes. The question becomes: Is it possible therefore for people to decontextualise themselves at all from their environment, and how and in what ways might this be achieved whilst maintaining beliefs that are beneficial to human life and environment?

Artificial intelligence and human cloning are two attempts to distance humanity from existent human ontologies and/or to replicate human functioning in other existential modes. However, it is arguable that in the design of artificial intelligence and in the division of human cloning, humans are merely extending functions of their human selves by a factor of remoteness into their environment, whereby the human form is cast into something less familiar. Human beings cannot but be situated in the contexts and environments in which they function and interact, although the nature of this contextualisation is less clear with anthropomorphic robots and clones. It is only in the late twentieth century that space exploration, biomechanical and virtual technologies have extended the human environment into remoter realms, each of which may be subject to an anthropocentric view.

Human perception is influenced through the psychosomatic feedback loops belonging to the sensory functioning of the perceiver in the environment as part of an autopoietic system in which the observer creates reality in the act of observation. Such reflexive feedback in living systems follows from a function of their being. This is scientifically observable in the biosensors of medical data, and more remotely in biophysical solutions to engineering and scientific problems such as infrared and thermographic cameras, sonar (sound navigation and ranging) and radiocarbon dating (a radiometric dating method using the isotope carbon-14 to determine the age of carbonaceous, once living, materials up to the age of approximately 60 000 years).

Classical experimentation in the Newtonian paradigm is influenced in its design by the scientific determinations of the experimenter. The results of any given experiment are also interpreted by a set of any given human pre-dispositions. Likewise, in quantum experimentation (Bohm, 1990), the position of the observer has been shown to actually influence events in the quantum world. As Zabierowski (1988, p. 338) puts it, “. . . the possibility of the physical description of the world is connected inseparably with that of the observer”. What these debates and findings point to is that a fundamental anthropomorphic bias can be investigated in which there can be no view that is unaffected by the position of the viewer at the classical Newtonian level or in the account provided in quantum mechanics. Looking at the mind itself changes the nature of the mind.

Anthropocentrism and anthropomorphism: Definitions, ontologies, problematics and reflections

A key problematic concern of anthropocentrism is the assumption that any attempt to explain experience must start from a human perspective. Anthropocentrism and anthropomorphism assume a temporal preoccupation in which human experience arrives to us before experience of all else. There is a temporal ontological priority of beingness that gives humans pre-eminence over their interaction with environment.

As Tom Tyler (2003, pp. 268–269) observes, there are three ways of exercising anthropomorphism conceptually. The first is the literal practice of attributing physical form to a non-human entity. The second is attributing distinctly human qualities to real or imaginary creatures, and the third applies to science in attributing mental states including intentionality (thoughts, beliefs or feelings), purpose or volition to creatures that we assume do not have these states. For animal behaviourists and evolutionary theorists, the terminology of anthropocentrism and anthropomorphism demarcates a particular aspect of a species narcissism that has been vitalistically or teleologically ‘working toward’ some ideal type or interpretation. In this sense it shares conceptual ground with evolutionary biology; an incremental process that is distributed across all populations at all times.

Like evolutionary directiveness, anthropocentrism suggests a quality that is difficult to isolate, for it is difficult to see mankind’s evolutionary development separately from within that development. The conscious striving of humankind to interpret and replicate its experience and to assess future probabilities is dependent on a perspective within current cultures and circumstances. Thus anthropomorphism shares conceptual ground with evolutionary biology; it is an inescapable quality of our being.

Embodiment biases humankind’s view of human society toward the individual’s own perception, which may itself be an abstraction of the societal whole. There is no conscious state of pure perceptual experience that is uninfluenced by a person’s recognition of experiencing, interpreting or perceiving independently of that experience. That is, we need language and concepts in which to fit experience. If anthropomorphism is an inescapable fact or effect of life for the embodied human being, and anthropocentrism for the larger social milieu, then the question becomes one of: In what ways might anthropic view be influencing our modes of thought, especially the belief that a classical Newtonian world is accessible to us in an objective form?

John S. Kennedy (1992) casts himself a neobehaviourist (neobehaviourist learning theories and models are based on the belief that changes in behaviour are the result of environmental influences acting with innate predispositions). He argues that the term anthropomorphism confuses function with causes, which is a fatal mistake for scientific inquiry, but he agrees with the claim that anthropomorphic thinking is built into us.

Kennedy (1992, pp. 9, 158, 199) and Budiansky (1998, pp. 25–36) argue that ‘mock’ anthropomorphism is a useful explanatory metaphorical mode which, while it confuses teleology (the purpose of things) with explanation (the idea of how things work), nevertheless provides a useful shortcut to meaning in everyday conversation. Pinchas Tamir and Anat Zohar (1991, p. 57) argue that there appear to be two kinds of relationships engendered between anthropomorphic and teleological reasoning. In the first, non-teleological reasoning is combined with total rejection of anthropomorphism regarding non-humans. Non-human forms are regarded as having less or more obscure purpose than human forms. Here, functionality must too be ascribed as a property of human reasoning before it can be attributed to others, including non-humans. In the second relationship, teleological reasoning is independent of anthropomorphism in the sense that it does not attribute consciousness to goal-directed behaviour. Instead it is based on the assumption that biological systems are structured functionally, so that they are adapted to the needs of individual organisms. In this sense teleological reasoning is associated with overarching biological themes, such as complementarity between structure and function. Tamir and Zohar, (1991, p. 65) also point out that a non-human entity cannot necessarily be described as functioning with an awareness of its own volition.

Furthermore, Tamir and Zohar (1991, p. 65) establish that most high school students can distinguish between anthropomorphic formulations and factual explanations. They also claim that adults can more readily distinguish between anthropomorphic expressions than can children. They argue that many of them support anthropomorphic formulations as a means of making concepts and processes more comprehensible. Tamir and Zohar (1991, p. 66) also argue for the existence of a clear developmental sequence regarding anthropomorphic reasoning that superficially corresponds to the vitalistic ideas of Aristotle, especially with the belief that life is associated with some unique force that does not exist apart from it.

In some of its popular usages, anthropomorphism implies that human traits are being attributed to creatures to which they do not belong. These traits often take the form of a belief in shared communication between humans and animals (and possibly humans and machines) and the ascription of intentional states to a non-human entity. Heidegger, however, argues that ‘hands and

language' serve to differentiate mankind from other creatures, thus preserving a hierarchy in which selected features of anthropomorphism prefigures the human. Heidegger's (1953, 1996, p. 131) concept of 'dasein' provides us with a recognition of one aspect of the anthropomorphic problem:

Attunement discloses Da-sein (or being in the world) not only in its thrownness and dependence on the world already disclosed with its being, it is itself the existential kind of being in which it is continually surrendered to the 'world' and lets itself be concerned by it in such a way that it somehow evades itself. The existential constitution of this evasion becomes clear in the phenomenon of entanglement.

Heidegger's concept of attunement and dasein highlights the embedded nature of anthropomorphic bias as both grounded in human being and as an existential effect that follows from this. Whilst this quotation points ahead to arguments made in a later section of this paper concerning quantum physics and anthropomorphism, Heidegger conceives of the concept of consciousness as 'being' apparent to ourselves only in terms of mentalistic evasion and entanglement.

The implication is that existence does not preserve for itself a pure objectivity of recognition. To further highlight the residual anthropomorphism that haunts Heidegger's (1996, p. 301) text he later states, "the 'before' and the 'ahead of' indicate the future that first makes possible in general the fact that Da-sein can be in such a way that it is concerned *about* its potentiality-of-being. The self-project grounded in the 'for the sake of itself' in the future is an essential quality of *existentiality*". This existential property ascribed to being has the status of potentiality. Therefore Heidegger's account describes an innate predisposition that is grounded in the physical domain which underscores the psychological.

To return briefly to its everyday interpretations, anthropomorphism implies a comparison that is often made in terms of the degree of commonality between humans and non-human entities, which is a projection inappropriate to a particular analytic enterprise. It thereby comes to be seen as an obstacle that obscures the practice of 'good science'. There are two senses in which anthropomorphism is understood to be applied misleadingly: Firstly in the over-attribution of human qualities to non-human entities. This demeans humans by failing to appreciate their unique traits and by misrepresenting what is distinctive and pre-eminent to humanity. Secondly, by concentrating on what the non-human animal shares with the human one, there is a danger of missing all that is peculiar and proper to the animal as the term may imply non-discrimination of the animal's unique traits: the facility of sonar in bats and dolphins, for example.

It is also an error to categorise non-human abilities in terms of human accomplishments. These non-human abilities may require different kinds of thinking altogether. To further explore these common definitions, Caporael (1986) suggests that anthropomorphism may be a kind of 'default' schema applied to non-social objects and Watt (1998) describes the term as bound up in our thinking that inscribes intentional states to non-human entities. For Eddy, Gallup and Povineli (1993), anthropomorphism delineates the attribution of human qualities to animals according to: (a) the degree of similarity between species and mankind; and (b) the degree to which an attachment or bond may be formed. Eddy et al. acknowledge that the term was more prevalent prior to Darwin and there have been successive attempts to dismiss or counter it following evolutionary theory, the behaviourist movement and the functional approach to the mind advocated by John Searle in *The Rediscovery of the Mind* (1992).

Whilst Watt (1998) argues that anthropomorphism may be endemic to humans, Eddy et al. (1993) argue that it is 'almost irresistible', and Kremenstov and Todes (1991) state that its long history in scientific discussions is inevitable (as cited in Duffy, 2002a). However, Donald Griffin (1978), the discoverer of bat sonar, emphasises that the complexity of animal behaviour and communication implies conscious beliefs and desires. Griffin argues that the anthropomorphic explanation (the degree of likeness to the conscious experience of mankind) is more favourable than an explanation of animal behaviour according only to complex behavioural laws for such explanations and ignoring ethical and social relationships.

From a different point of view, Jeffrey J. Morgan (1995) argues, along with Griffin, Burghardt and de Waal, that appeals to mentalistic intentional states are more explanatorily useful than reductively behaviouristic rules of unimaginable complexity, which attempt to account for the same states. Morgan argues that attempting to design human thought processes by computer in contexts in which they are unwarranted is just as dangerous as assigning anthropomorphic readings inappropriately, presumably, among other reasons, because it is difficult or impossible to encode human values.

John S. Kennedy (1992) argues that a distinction needs to be made between naïve anthropomorphism of the kind in which, for example, one has a conversation with a dog intimating human-like companionship, and the idea of critical anthropomorphism, which represents a conscious move to push the research agenda of human sciences forward. Rivas and Burghardt (2002) argue for anthropomorphism by omission (which involves the frequent neglect on the behalf of the experimenter in putting the self in place of the subject), suggesting that scientific literature is plagued by this anthropomorphic bias, especially in

the areas of behavioural ecology, theoretical ecology, issues in zoo management and decision-making in conservation. Anthropocentric concerns may also be relevant to city planning, industrial design and the topics and ontologies of civic research agendas.

Anthropomorphism stresses the human-like characteristics of animals or animal-like characteristics of ourselves, or the human-like characteristics of objects. Kennedy (1992) suggests that in discussing anthropomorphism one must also be careful to avoid the nominal fallacy (the belief that giving a name to something is the same as explaining it). Watt argues for a kind of projective anthropomorphism in which external entities become chimerae through the supposition of intentional characteristics of the observer, similar to the Freudian strategy of 'assimilative projection' (Watt, 1998). Anthropomorphism is also employed in modelling strategies of human-computational interaction research, which attempts to use computer software to rationalise behaviour in human-like analogies. From the perspective of computer interaction research, anthropomorphism is used to augment the functionality and behavioural characteristics of a figure or program in order to relate to it with a greater ease.

Burghardt (1985) argues that anthropomorphism is a pragmatic strategy to put humans in the place of animals. Such critical anthropomorphism is formulated from data gathered from all manner of sources: such as prior experience, anecdotes, and insights. Primatologist de Waal (2001) called anthropomorphism a 'heuristic device' and Daniel Dennett (1989) has incorporated anthropomorphism into his argument for human reasoning involving an 'intentional stance'.

However, Dennett's notion of the 'intentional stance' can be seen as non-anthropomorphic in so far as it admits a will to view ourselves and others as 'human like' by virtue of adopting such a stance. Dennett's argument raises the question of whether or not there actually is a 'construction' of human form being imposed by humans on others (principally on other humans). The argument is that the human form (as conscious and moral) comes to be created through the imposition (or will) of this adaptive strategy. Thus the intentional stance allows the thinker to conceptualise the possibilities inherent in a deferment of the human form. The existentialism in Dennett's view is apparent in that the imposition of the adaptive strategy of the 'human form' arises out of evolutionary processes which predate it. Therefore there is a subtle difference between 'anthropomorphism' and the intentional stance. Whereas one seeks to describe an effect of human evolution, the other critiques it in the continuous act of 'becoming'.

For Kreuger (2001, p. 19), even the classical scientific methods can be skewed by an anthropomorphic bias. He comments: “The selection of hypotheses, their number, their location on the continuum of possible hypotheses, and their prior probabilities depend on the researcher’s experience, their theoretical frame of mind, and the state of the field at the time of the study”. Kreuger thus suggests that frequently the parameters of experimentation in the classical world are biased by prior states of knowledge on the behalf of the experimenter, even if the experiment itself appears to be free from prior influence.

Similarly, the interpretations of results at the conclusion of the experiment too are prone to bias. From this perspective, for McNeill (1993, p. 25), “it is interpretation or logos itself not anthropos which is the centre and measure of all things”. Humans are not anthropocentric by hierarchy but by pre-eminence, which returns us to the residual anthropomorphism in Heidegger’s analysis in *Being and Time*. For Heidegger (1984, p. 95), human beings are “cornered in the blind alley of their own humanity”. Unlike McNeill, Heidegger does believe there is a hierarchy in the biosphere and that humans are at the summit. Human self-consciousness has erected a barrier between the human and non-human.

Bataille (1989), like Heidegger, finds that we are condemned to see the world only as humans can — anthropocentrism is the starting point and end result of reflection. It is relevant, therefore, to look at the criterion by which humans make judgements about their environment. Moral valuation is linked to the aesthetic experience of natural objects, as well as their utilitarian worth or unique contribution to the environment independent of human society. From a phenomenological as well as ecological point of view, human beings are at a temporal intersection in their engagement with the earth’s biosphere. As Lee points out (2005, p. 236), people are currently constrained by the possibility of having the irretrievable loss of opportunity to have aesthetic experience of nature, and are faced by the need to act to ensure that future conditions make such opportunities possible. Many environmentalists believe that human beings must adjust their attitudes and behaviour to act now or face a virtually barren environment within a century.

As Lee remarks (2005, p. 236), “. . . the conditions that make aesthetic experience possible are precisely those that condition human as well as nonhuman existence. . .”. As Lee suggests (p. 238), following Carlson (2000), it is therefore also relevant that when people are using categories of scientific assignment in which there are no judgements that apply to nature, such categories are not coeval with the objects categorised; similarly there are no artistic intentions in which to judge such categories on the grounds of positive aesthetics. Consequently, the positive and negative aesthetic appeal of nature lies beyond our control under conditions of scientific assignment but not of course the power to alter nature.

Frequently then, 'deep anthropocentrism' exercises not a knowing critical disregard for nature outside of humankind but a predisposition toward logocentrism with regard to nature; humankind is thereby narcissistically blinded to the natural world. Lee's concern is to arrive at an aesthetic criteria relevant to the human experience of nature. She identifies the following as significant (2005, p. 249): Firstly, we can move away from dualistic thinking of 'subject' and 'object' and acknowledge an interdependence with the environment. Secondly, that the division between natural and man-made is not absolute and that the two categories are connected through human use and experience, and further that analysis of aesthetic experience involves analysis of the conditions under which such categories are made possible. Thirdly, that ideas of negative and positive aesthetic experience of the environment are of limited consideration from an instrumentalist viewpoint, and humanist qualities expressed as a relationship with the environment thereby tend to be overlooked.

Consequently, knowledge can enhance human experience, yet is not a prerequisite to experience over perceptual interest. There is a dilemma here in that something can be correct ontologically; yet be insufficiently known (this is a familiar quality of our dealings with animals). However, something can be indigenously anthropocentric in that it can be moulded by perceptual cognition. After all, somatic situatedness is what defines our specific and evolving species membership. As such we need to recognise that in order to alleviate the effects of anthropocentrism we have an interdependent relationship with non-human nature that is frequently rendered secondary to our self-awareness and may seem counter-intuitive in the face of perceived threat or instrumentalist gain.

Following Lee's (2005, p. 249) argument, the belief in a world that exists for us alone turns out to be more anthropocentrically biased thinking than truth and involves the idea that every species may have a place along an inter-related evolutionary continuum, in which it should be recognised that the world exists for no single species alone. The question then becomes, do we need to limit or increase anthropocentric thinking with regard to our environment? It depends on how we conceive of the nature of the relationship. There is nothing in our quantum make-up that distinguishes us from other animals: The separation of human sentience and cognition from the ecosystem can no longer be sustained. However, even if there is a repudiation of human-centeredness, it remains present in anthropocentric ways that affect both classical and quantum enquiry, as we are part of the environment which makes the continuum of aesthetic experience and scientific instrumentalism possible. Can we then modify our environment without also modifying ourselves? What if our anthropocentrism biases our view of nature to our own detriment? These are some of the fundamental ontological questions that contemporary eco-scientific culture now explores.

From a political viewpoint it could be argued that anthropocentrism is a natural bias prevalent in scientific discourse and rooted in a regularly reproduced mind-body dualism — it disposes the way we think about human and non-human world toward an anthropological hierarchy and domination in which humans are given pre-eminence. Dualism posits the elevation of the human mind over the body. This is seen as relevant to the way in which human beings dominate and instrumentalise non-human nature and some other human beings.

Plumwood (as cited in Hawkins, 1998, p. 161) argues that dualism has five characteristics; (1) A background of denial; (2) A form of radical exclusion in society or hyperseparation, the division between master and other; (3) An incorporation of relational definition in which the other is defined in terms of lack and only incorporated in society in relation to the master's needs; (4) An instrumentalisation or objectification whereby the identity is treated as an object or resource with no volition of its own; and (5) Homogenisation or stereotyping, which exercises a uniform membership with no individuality.

In this dualistic scenario the delineations of a deep anthropocentrism become apparent, which involve a radical separation of humans from nature and potentially even from one another along arbitrary divisions. That such a separation privileges the human is *a priori*. Under these conditions human epistemologies are indigenously anthropocentric in the sense in which they are contextually constrained by our existential being. In one scenario it may require radically different orders of thought for humans to see themselves and a society without anthropocentric bias, however not necessarily huge adjustments to take the bias into account when thinking about self and the environment — rather, a continuous series of smaller adjustments may be required.

The question then needs to be asked: Does this bias have positive or negative effects over the long term or short term? Are there positive biases that follow from anthropocentrism to the survival of all humans in the short term, in inter-species empathy for example, but negative consequences to the survival of the non-human environment and thus the human species in the long term? One solution that sidesteps or ignores the problem is to continually create technological substitutes to the natural world. In this scenario the reduction of the natural world is not seen as problematic as long as a self-sustaining artificial environment can be built to replace it. This, however, would thereby perpetuate the bias *ad infinitum*, as well as exhibiting deep anthropocentrism with regard to the environment.

Donna Haraway (2001) argues that humans are animals whose claims, valuations and actions cannot fail to be informed by a myriad of factors that 'fetishises' existential conditions — limits of specific circumstances, perceptual apparatuses, culture and gendered experiences, for example. Lee (2005, p. 245),

following Haraway (2001), suggests that situated knowledge is not necessarily anthropocentric in the sense that objectivity is regarded as a special prerogative of some Western cultural influences, yet she argues that one should avoid poles of Western objectivity and radical relativism. This involves rejecting the binary oppositions and dualisms that characterise false dichotomies. Thus the fast distinctions between the subjective and the objective break down and the alternative is to be concisely anthropocentric — to take seriously the claim that: I begin, I (we) know, in this way (Haraway, 2001).

While Haraway's claims are largely from an environmental perspective, from a psychological perspective the anthropic view has not been rigorously studied. Only a few scientists see anthropomorphism as worthy of study in its own right (for example Caporael, 1986; Eddy et al, 1993; Tamir & Zohar, 1991). Anthropomorphism is considered a hindrance when considered in context of scientific observation, rather than studied more objectively and taken advantage of. Caporael argues that if we are unable to remove anthropomorphism from science, then we need to be aware of its presence in scientific assessment. This is a matter of assessing the anthropomorphic bias, as, for example, Thompson and Barton (1994) have done as an attitudinal measure for given social-scientific experiments, but also expressed in the need to accommodate the concept of anthropomorphism into thinking about the design of experiments and to devise strategies for recognising and neutralising the bias.

From a humanistic discursive viewpoint, it is ironic that religion (and belief in a mind outside the self) is one such strategy, but this is too often inverted for anthropomorphic reasons. Guthrie (1993) has posited that all religions originate in the anthropomorphic tendency to over-detect the presence of other humans and thus the self in the natural world. Milloy (2001) argues that while we may fallaciously ascribe human characteristics to non-human entities, anthropomorphism also emerges when the taxonomic legitimacy of the classification of human is under threat, thereby naturally preserving the likeness of species one to another.

Kennedy (1992) suggests that anthropomorphism acts as a 'drag' on the scientific study of causal mechanism. It does so by influencing cause and effect from the position of the observer, which needs to be taken into account when devising experiments and interpreting data. Anthropomorphic bias has to be factored *in* to scientific calculation, rather than factored out, to gain proper analysis of the components.

Anthropocentrism and ecology

Among current political arguments concerning global climate change is the claim that the northern elite have an unsustainable mind (Gladwin, Newbury, & Reiskin, 1997). Heath and Gifford (2006) describe this unsustainability as expressed in the unswayable belief in efficiency and economic growth, and optimism about the ability of technology to sustain our environments. As Heath and Gifford point out, appeals to reason alone are insufficient when dealing with anthropocentrism and global climate change. For example, if moral principle often fails to motivate moral action, it is because it inadequately captures a human-centeredness that is informed as much by embodied contingency as by rational consideration.

Heath and Gifford (2006) also argue that capitalism, Judeo-Christian religion and modern technology are inconsistent with environmental preservation. Not only the economic system itself, but also the values and beliefs associated with the economic system, are inconsistent with environmental preservation. A form of promotion of profit at the expense of the environment is reinforced by the fact that it has been observed that social cooperation decreases in large-scale dilemmas, as the individual's perception that one's cooperation will make a difference decreases in a large group (Hardin, 1968).

Kuhn (2000) argues that when issues of environmental hazard are uncertain, uncertainty is used to justify the discounting of the seriousness of the possible threat. The argument of 'soft' anthropocentrism holds that economic development is by no means pursued at the expense of the environment or interests of future generations, and recognises that people live in other places at other times. However, this remains an anthropocentric view as the interest in protecting the environment is a human-centred one, apparently non-egocentric but nevertheless configured in instrumentalist terms.

There is a sense in which anthropocentrism and non-anthropocentrism occupy positions on a continuum. Anthropocentrism argues for the separation and consideration of nature from the interests of humans and non-anthropocentrism for the separation of humans from the interests of nature. The former of these positions may lead to a solipsistic technocratic instrumentalism with regard to the natural world and the other to a position that is regarded as irresponsible in its apparently religious worship of nature at the expense of the needs of mankind.

Current interpretations of anthropocentric bias are allied to critiques of objectivity, which may obscure the fact that having an anthropocentric bias may come from our deep 'being in the world' (just as a honeybee's 'hymenopter

bias' presumably comes from its being in the world). It is difficult to see how respect for the environment or stewardship (the concept of which may entail limited moral responsibilities) is synonymous with this position, other than to understand that we are co-creators of our habitual contexts. Contrarily, anthropomorphic bias may articulate a caring for the environment which may well need enhancing rather than eliminating. In fact, perhaps the 'ecocentric-anthropocentric' dichotomy is actually a false dichotomy in so far as being human-centric is not necessarily the opposite of being concerned about non-human species or features of the world. It may be possible to hold both positions at different times and in different situations.

Thompson and Barton (1994, p. 149) argue that anthropocentrists may support conservation because quality of life and health may be dependent on a healthy ecosystem. However, ecocentrists judge that nature deserves protection because of its intrinsic value, not only because of its role in enhancing quality of life for humans. Ecocentrists emphasise the connectedness between humans and other aspects of nature that transcends the use of natural resources, and satisfies human needs or wants. For ecocentrists the transcendental aspect of nature is justification for the preservation of nature over and above instrumentalist concerns. Ecocentric individuals will act to support the environment even if these actions involve discomfort, inconvenience, and expense that may reduce their quality of life. The more anthropocentric individuals are, the less likely they are to conserve.

As Thompson and Barton (1994, p. 151) suggest, the anthropocentric view is largely utilitarian — it argues that people are less likely to act to protect the environment if other human-centred values such as material quality of life or the accumulation of wealth conflict with this. Thompson and Barton (1994, pp. 151, 156) also argue that ecocentrism and anthropocentrism make independent contributions toward explaining apathy toward the environment, conservationist behaviours, and membership of environmental organisations. They also suggest that individuals who support environmental issues for ecocentric reasons may respond to different appeals to those who have more anthropocentric reasons.

Thompson and Barton (1994, p. 155) have devised statistical scales to measure for ecocentrism and anthropocentric attitudes towards environmental issues. Here they posit that individuals may exhibit both behaviours at different times. Thus, programs that attempt to foster interest in supporting environmental action for utilitarian, human comfort, and survival reasons may be counter-productive. A better approach may be to emphasise the intrinsic rewards of being in natural settings through experience in nature and the appreciation of wildlife.

To take up another historical example in current literature, the deforestation of Easter Island as described in Jared Diamond's *Collapse* (2005) presents the argument of the need to urge people to break away from the failures of anthropocentrism. Diamond (2005) suggests that people need to take upon themselves the role of nature's protector, in which they seem no-longer the necessary centre of their environment. However, this raises the question of whether the attempt may simply defer or extend the anthropic bias to a point of further remoteness or perpetuation. Whether this is a successful extension of human values to include nature, or to exhibit a pathology of personification which extends the boundaries of anthropomorphism, will depend on the detail and strategy deployed.

Ecocentrics, however, might see their own attitudes as a form of holistic caring for the environment that recognises a care of the human self within it in contrast to the instrumental separation of humankind from the natural environment. Ecocentricity is thus conceived as something which is separate to a technocratic belief in the possibilities of mankind to synthetically shape the environment, and which assigns no moral value to the natural world apart from the purposes of mankind, and thereby devalues the uniqueness of natural systems. However, it can be argued that environmental protection is conducive to producing population quality.

Heath and Gifford (2006) found that perceived knowledge about global climate change was positively associated with the belief in human causes and the belief in the negative consequences of global climate change, but negatively correlated with anthropocentrism (that humans are the most important factor) and environmental apathy, while not significantly correlated with ecocentrism (the view that the environment comes first) or behavioural intention (an inclination to act in a certain way). This indicates a dichotomous reasoning: The anthropocentric view tends to deny that mankind is at the centre of global climate change, reflecting an inherent bias that potentially blinds the population to the ideas of real world effects or to the capacities of individual agency.

Anthropocentrism frequently implies that human kind is the highest purpose of existence in the world; other species are of value only as an extension of the human use of them. Following Heidegger: "being (as *Ereignis*) needs beings so that being may unfold" (1996, p. 31). From the anthropomorphic perspective, human interest is the basis for everything. Protecting human values and rights is the fundamental criterion — human beings fulfil a progressive role in human history. As de Beistegui (2003) suggests, following Heidegger, the human is *itself* only by *being* (transitively, creatively grounded in an instituting act). Arguably this imprint or trace of presence that follows from conscious awareness is what tips the scales in the direction of anthropomorphism, which leads to

imbalance and anthropocentric bias in the way we view and manipulate the world distributed across the population. This is to take in the Heideggerian phenomenological understanding of man to its 'natural' limit. As de Beistegui (2003, p. 277) suggests, "if there remains a trace not of humanism, but of anthropocentrism in the Heideggerian account, it is irreducible".

Deep anthropocentrism and counter-environmentalism

The position of 'deep anthropocentrism' (Jacques, 2006) argues that in contrast to the importance of human development, nature is unimportant. Deep anthropocentrism is the view that humanity is utterly independent of non-human nature, that moral obligation is dependent upon what is relative to humans and of immediate benefit, and that there is no obligation for human concern with regard to the environment. This perspective sees humans as fully exempt from ecological principles, influences and constraints, arguing for a deep division between non-human nature and civilisation, and further that this is inherent to a good society. As Peter Jacques (2006, p. 85) puts it:

The stark modern Hobbesian dichotomies that allow for the simultaneous exploitation of both non-human nature and non-dominant human groups institutionalised by the dominant social paradigm between nature and civilization, "savage" and civilized, wild and rational, developed and undeveloped, are fully embodied and strongly held in deep anthropocentrism and the environmental scepticism which hosts it.

Deep anthropocentrism argues that humanity is the centre of concern and analysis and human welfare is prior to environmental concerns. Nature does play a part in deep anthropocentric conceptualisations, but only in strict instrumentalist terms. Indirect relationships between human welfare and non-human nature, as well as notions of interdependence, are dismissed as soft and invalid.

Deep anthropocentrism does not see non-human nature as important in absolute terms, and only in thin instrumental terms is non-human nature considered relatively important. For the deep anthropocentric, nature, unlike anthropocentric environmentalism, is excised utterly from society. For the deep anthropocentrist, humanity is the centre of concern and the analysis of the environment is predicated on human welfare.

The established psycho-economical effects of this can read either as micro-stages in a larger anthropocentrism or as measurements of inherent inclinations toward bias in human socio-economic relations with the environment. Perhaps it is better to argue for a citizenship in or 'stewardship' rather than dominion and exploitation of, nature, however the moral terrain of this concept is undefined. In this respect, a milder version of anthropocentrism, enlightened anthropocentrism or anthropocentric environmentalism, argues for a concern of mankind with the environment that is not necessarily focused on direct benefits.

If humanity is not interdependent with nature, and humanity has no obligation to nature itself, then human society is released from any expectation or obligation to consequences that may result from changing nature. Consequently, there is no rational ecological citizenship under deep anthropocentrism or environmental scepticism. More importantly, these discarded global environmental problems cannot threaten modernity or its institutions if they are conceptually alienated from society. Such a view also has a moral consequence for people of limited agency in challenging their human rights.

As Jacques (2006) has argued, as long as ecological policies cannot show a direct impact of lives saved relative to other mortal threats (such as eating poorly), an ecological criterion falls outside of what is a reasonable and economical course for action.

Anthropomorphism and human and animal differences

According to Bataille (1989), one of the major differences between humans and animals is expressed in the continuity that he sees being shared between animals and the environment. Humans, presumably by comparison, are simultaneously phenomenologically disrupted and enabled by the experience of consciousness and temporality. Memory and Heidegger's isolation of the human feature of hands and the construct of language allow humans to transcend experience in time.

Michael Corballis (2004) has written on the topic of this historical intersection, defined in terms of the moment of 'modernity' signified by the transition between hand-signed and spoken language. Heidegger also (1984) makes the point that anthropomorphism presupposes that one must assume that one knows 'ahead of time' what human beings are. Any examination of the anthropomorphic effect needs to take into account what it is about human beings in themselves that makes them who they are. Tom Tyler (2003) points out that the term 'humanisation' by itself does not make sense, for in attributing human qualities to non-humans we have begun to attribute some quality of being human without specifying what it is.

One common tendency to anthropomorphise is evident in our relationship with animals. For Bataille (1989), there is perfect continuity between the animal and the environment. However, human consciousness is frequently invoked as a measure of human/ animal difference as well as the use of language and the ability to record and manipulate time. Does this mean therefore that the life of the animal is closed to us? Are we condemned forever to our own human and unique perspectives?

Heidegger has suggested the temporal pre-eminence of humans may be involved in anthropomorphism, however he acknowledges that comprehension depends on awareness and it is difficult to bring out into the open that which is hidden in our being. For Heidegger (1992, p. 84), the hand and language are the distinguishing marks of the human. Ironically, even this conclusion is prone to the bias it describes. However, for Heidegger there is no hierarchy of cause on the animal mind: Animals are pure being, their memories are hard-wired as instinct. The hand and its involvement in the development of language points to the difference between humanity and animality.

Derrida (2002, p. 408) has questioned Heidegger's efforts to mark a limit between a living creature and a human. For Derrida there is an absence of meaning outside a system of differences: Human consciousness is a recursive, fractal process involving the navigation through signs. If meaning is embedded in difference, then the anthropomorphic quest becomes one of attempting to provide meaning in its apparent absence. The fact of human being and the way of being necessitate anthropocentrism regardless of meaning.

Tyler claims that by employing the term anthropomorphism, one has already adopted a set of unexamined assumptions about human beings. The question then becomes how can we conceive, describe, qualify or quantify this specifically human (anthropomorphic) quality? As Tyler (2003) points out, it is misleading to suppose that the attribution of behaviours 'belong' to creatures that display them, for they are partly constructed by the onlooker who may project a form of species-bias. Einarsson (1993, pp. 78–79) suggests that questioning the continuum or divide between humans and animals plays a major part in moralising the natural world through human metaphors, which he acknowledges is a key rhetorical device in environmental campaigns. Xenophanes (580BCE) argues in *Fragments* (2001) that anthropomorphism can complicate simple distinctions between the human and non-human, but in so doing it can help us cope with unfamiliarities.

The recognition that anthropocentrism, and more locally, anthropomorphism, are an inescapable residual of being, a tendency of the senses to register themselves predicated by their use, raises the question of what sort of adjustment is required to think in a non-anthropomorphically biased way? This would need to involve not just thinking as others, but thinking also as others conscious of a non-human world. However, this is to acknowledge that such a conception, which remains mediated by current human perception, may be all but impossible. In this respect, anthropomorphism may be characterised by a kind of species narcissism prioritising human concerns over those of any other species. As Tyler (2003, p. 277) points out, it tends to obscure the difficult question concerning the concept and essence of human nature, and assumes that it has already been answered.

The argument of convergent evolution suggests that while human beings and animals are not constituted mutually and simultaneously, the implications of this dualistic argument preclude the possibility of recognising new human-animal-technological constructs. While some have argued that animals experience kinds of consciousness, the argument is largely made that most animals are unable to distinguish the difference between themselves and anything else. While the human idea of the animal is both familiar and unfathomable, to conceive of a world without humanity is to conceive of nothing.

Eddy, Gallup and Povineli (1993), following a survey in which they canvassed the attributions of similarity and cognitive function to various animals, revealed a similar pattern of covariation as emergent. This corresponded approximately to phylogenetic group membership, with additional recognition for pets and primates. Thus, anthropomorphic qualities were assigned to animals according to their genetic similarity to humans. Eddy et al. (1993) found that personal similarity was positively correlated to the phylogenetic relatedness of animals to human beings. The more evolutionarily recent animals are, the more likely they are to have higher cognitive functioning. The shape of generalisation gradient in inferring mental status to other creatures is thus thought to follow a classical pattern.

A further claim for anthropomorphism is that it is cross cultural, species typical, and almost irresistible. With the advent of behaviourism, anthropomorphism was seen as something to be avoided in discussion of human and animal behaviour. Rivas and Burghardt (2001) argue that the term is useful if it leads to testable hypotheses and Gallup, Marino and Eddy (1997) contend that anthropomorphism is a by-product of a unique form of intraspecific selection that gives rise to self-awareness.

According to Gallup et al. (1997, p. 88), anthropomorphism involves some form of introspective modelling capacity. If the organism can conceive of itself, and can infer the experiences of others by using own experience as a model, then this implies not only an experiential overlap between people, but also empathy and the attribution of intentional states to others.

Gallup et al. (1997) state that self-recognition in an organism allows the organism to: (a) situate itself in time; and (b) reflect on its own mental states. This may also entail functioning in competitive introspectively based social strategies such as gratitude, sympathy, empathy, sorrow, intentional deception and other emotions. Emotional continuity between humans and animals is thus more likely than intellectual continuity. For animals, the world is immediate and immanent. We therefore need to ask if human transcendence is illusory? Does our temporal perception and apparent ability to manipulate time make us distinct from animals? According to Bataille (1989, p. 19), "the animal can be regarded as a subject for which the rest of the world is object". We are therefore justified in asking non-anthropocentrically, are there any other creatures that make inferences about the mental states in other creatures? This possibility denotes the concept of zoomorphism.

Nicholas Humphrey (1976) argues that the neural hardware of human beings makes most people natural psychologists. Humphrey argues that in an organism that is capable of inferring the mental experience of co-specifics, such as deception or empathy involved in social strategy, then anthropomorphism may be expressed in the social attributions of cognitive abilities to self and others, such as emotions and communicative efficiency. Here, Humphrey acknowledges the problem of anthropomorphic cognition — the attribution of communicative and emotional abilities to creatures that may not feel such qualities. In this case, we need to be mindful of the false consensus effect, in which we may potentially overestimate the tendency of others to feel as we do and to share our beliefs.

According to Rivas and Burghardt (2001), Daniel Dennett's model of intentionality goes some way to identify the nature of anthropomorphic thinking. Dennett identifies four levels of intentional order in cognition: The first order is 'zero-order' intentionality, which attributes enough intentional thinking for minimal mental functioning, then follows 'first-order' intentionality (an example of which is subjective feelings projected onto another organism). Next are the second to third orders of intentionality. The second intentional order may be instantiated when an organism wants another entity to believe that he or she wants something, and the third order may involve still more complex intentionality, for example, when someone fears that another will discover that he or she wants him or her to believe something.

Thus, anthropomorphism in cognitive states involves the attribution of mental processes that are not only reflexive in nature, but are also equal to or greater than second-order projected intentionality. Rivas and Burghardt argue that animals do not engage in intentional behaviour higher than second-order intentionality.

Anthropomorphism and quantum physics

There are at least three possible ways in which anthropomorphism is evident in the quantum physics of the mind. The first begins with the fundamental understanding that quantum physics offers proof that the world we are part of, the world we observe, and our position as observers, brings the world into being. The second way anthropomorphism emerges in quantum theory is as a product of the holism of the 'Many Minds' theory, and the third is evident in the theoretical speculation that anthropomorphism can be quantified in the 'white noise' effect of the modified Schrödinger equation (the fundamental equation of wave mechanics which relates wave formation to the allowed energies of wave function).

At the quantum level, the world and ourselves are made of the same stuff. We are constituted in, and part creators of, the world we live in. While in quantum science it is clear that the world observed is in part created by the observer, it is not clear to what degree the observed world is dependent on the unique biological identity of the observer, or rather dependent on their classical position as an observer. Peter Jackson (2002, p. 7) offers a useful synopsis of the role of consciousness in quantum theory:

In the transition from the probabilistic quantum realm to the classical realm, a fundamental change occurs, and that appears to be brought about by the experience of the observer. This change takes the technical name of *decoherence*, in which the probabilities described by the wave function collapse to certainty (100% prob). In their unmeasured superimposed state, there are only probabilities, no actualities. But, as soon as we make a measurement, we create a certainty.

The question then becomes: Is it consciousness that brings about the collapse of the wave function in quantum physics? Wigner (Esfeld, 1999) claims that the content of consciousness is the fundamental reality and it cannot be denied for the individual. The reality of physical objects is, however, relative to their constitution in consciousness. This accords with Heidegger's view of *dasein*, but not with the arguments of internalism or direct realism (a theory of perception, which argues that we have direct awareness of the external world through our senses). This is in contrast with indirect realism and representationalism, which posits that we are directly aware of only our internal representations of the external world.

Wigner's view is that the existence of physical objects is useful to make sense of the content of consciousness. The content of consciousness is only accessible to the individual; therefore, other individuals are constitutionally equivalent to physical objects. Yet we know from empathy, the human emotions and

intraspecific communication that people seem to be more than physical objects — we are predisposed to view each other with an anthropomorphic bias. Thus following Wigner's view, we are physically separate entities with anthropomorphic features. Our embodied cognitions are independent yet have emergent physical and symbolic qualities.

As Esfeld (1999) points out, in quantum physics experiments concerning the collapsing of the wave function as a result of the interaction between the object and the measuring instrument, there is entanglement between the object and the instrument. Consequently, the object is not in an *eigenstate* (a quantum state that is left unchanged after observation corresponding to a particular operator) of the measured observable. The measuring instrument does not indicate a definite numerical value of the observable. This is known as the 'measurement problem' as it precludes the possibility of a reduction to an eigenstate of the observable.

Von Neumann extends this chain up to an observer. The observer's body and brain are entangled with the object and instrument. But if we take an observer into consideration, we end up with a description according to which the body of the observer, including his or her brain, is entangled with the instrument and object. The measurement problem can be formulated as the question of how a state reduction to one of the eigenstates of the measured observable can occur in this chain. Either way we need a way of explaining this link between classical and quantum worlds. The 'Many Worlds' view argues that there is a wave function for the whole universe and no measurement problem as the experience of the observer causes a branching into another world. The Many Minds view postulates a decoherence in which one quantum state is revealed in one of many possible minds and the universal wave function carries on evolving (Jackson, 2002).

As Esfeld (1999) points out with the Schrödinger equation, a possible solution is that a state reduction is supposed to occur as an objective event in the physical realm before the von Neumann chain reaches the consciousness of the observer (a premeasurement of quantum entanglement established between the system and observer achieving decoherence by interaction with the environment). However, the existence and entanglement of the observer changes the observation. It is not considered a useful option to assume that consciousness causes state reductions, yet the quantum state applies to all physical systems — the quantum mechanical physical reality needs to be reconciled with experience at the Newtonian classical level of the world.

It may be that humans (as generally thought of in one of our existential modes to be describable as analogical Newtonian classical measuring instruments) are prone to comprehend scale in terms of state reductions, as the classical

realm with no entanglement may be the only way nature can appear to human observers (Esfeld, 1999, p. 151). Yet from remote experimentation, we know that this view doesn't capture how appearances come into being. The Many Minds theory offers a way out of this impasse that also accounts for anthropomorphic bias. Quantum mechanics without state reductions describes the whole of physical reality by assuming that the observer has many minds, in which the observer abstracts from an entanglement what is objectively present (Jackson, 2002).

Von Neumann has suggested it requires consciousness at the point of measurement to collapse the wave function, given that the experimenter and that which is measured are all made of quanta that the classical and quantum realm entangle in consciousness. In the Many Minds theory, the process of decoherence, the collapsing of the wave function to produce one result, does not quantify at that measurement point alone, given that there is no necessary intervention by the consciousness of the observer. In this view there is no problem of measurement, because the experience of the observer does not contradict the quantum states. In one or an infinity of many possible minds the wave function predicts a yes and no, and all the probabilities in between (Jackson, 2002). Neither is this to contradict the role for consciousness in classical experiments where outcomes are thought not to be dependent on the observer. Again to state a paradox, such outcomes could not be known without the presence of an observer. Perhaps it is better to view this as one form of measurement (classical) working towards the outer limits of the exclusion of consciousness, and the other form of measurement (quantum) to the inner limits of inclusion.

For von Neumann, everything is regarded as being quantum, including the brain of the observer, which corresponds to a mentalistic and positivistic view of reality. Von Neumann found that only consciousness could hold the privileged immaterial position in which consciousness is not part of physical universe but *res cogitans* (a thinking thing). Wigner (1964) argued that the consciousness of the observer led to a collapse of wave function, and probability into measurement. Bohm (1990) postulates an implicate and explicate order. The former is a substrate for all reality, while the latter is the world of space and time unfolded from implicate order. Acceptance that all is made of quantum stuff does not necessarily entail that consciousness is *res cogitans*, but that it is a different order of thing.

As Jackson (2002) points out, the orthodox view of the probabilities of quantum physics suggests that the electron's indefiniteness is transferred to the measuring apparatus, but, at the collapse of wave function, the measured state goes into the eigenstate corresponding to the result obtained. The Many

Minds view also assumes that the entire universe has a quantum state. As Jackson (2002, p. 14) explains, this quantum state is a superposition of states corresponding to many different macro realms, where all realms are actual: “The idea is that the world splits at each measurement, like a tree into branches, with ‘daughter’ worlds for each result.”

However, the question becomes if all of the realms are actual, then why can't we see them? The Many Worlds theorists argue that after splitting, these realms have no access one to another. However, the Many Minds theory is not closed to this idea. Anthropomorphism enters the picture because each of the many minds representing different probabilities of the eigenstate may not be entirely closed to one another. There will be probabilistic traces of the other in each, and these traces collectively represent a measure of bias inimitable to the individual's experience — the anthropomorphic trace of the individual for any given state.

The Many Minds theory poses a difficulty for the Cartesian, in that there is no sharp distinction between subject and object within the theory. As Bilodeau (1996) reasons, our analytic habits are more to do with how our minds appear to function to us than any necessarily direct natural correspondence. It may be that our notion of the workings of a physical substrate needs to change as we register the shift in our comprehension of our inhabitation within classical and quantum worlds. Yet there are as yet no precise experimental coordinates to the end-point of this objective. Bilodeau (1996) argues that phenomenal consciousness offers an inconsistency in the way we are capable of perceiving our world. However, this dividability into properties and spatial relationships may be entering its final phase. This is known as the ‘hard problem’. To transcend this we need a non-classical ontology, which is neither physicalism (everything which exists is no more than its physical properties), idealism (the only things knowable are the content of consciousness) or dualism (mental phenomena are non-physical properties of physical substances).

As Bilodeau points out (1996), we cannot necessarily expect that the qualia the mind produces are of the same order as that which produces the mind. There is more to mind's relationship to the quantum world than epiphenomena superimposed on patterns of information processing. Rather, in the Many Minds theory, each possible eigenstate is correlated with at least one mind. Each mind sees an outcome in the classical world, yet does so containing the possibilities of other minds. Yet as each mind sees an imprint of possibility of the other, distinguishing between minds is not the same as distinguishing between possibilities as there may be many millions of possibilities for any given mental state. Consequently our inhabitation is probabilistic and the weight of probability entails the anthropological bias.

Squires (1998) has argued that since quantum physical equations do not contain what we observe, they are either wrong or new equations are needed. If we take Squires as correct at the representational level, then he/we need to add non-linear elements to the Schrödinger equation to account for all the effects of wave function collapse. Because stochastic or non-determined processes are involved in quantum physics, a random white noise process may be identified in the modified Schrödinger equation. This random white noise may theoretically register the imprint of anthropomorphism in the quantum mechanical view; it carries the trace of anthropomorphic bias for each individual eigenstate of many possible minds. As Jackson (2002) points out, instead of proposing infinity of worlds, we could ascribe every sentient being with a continuous infinity of simultaneous minds, which differentiate over time. In this understanding, one mind per person is expressed as a kind of multimind. In this Many Minds theory, anthropomorphism is the cumulative effect of the recognition of one mind to the other. Thus, a glimpse into the field of quantum consciousness offers further evidence for anthropological bias.

Anthropomorphism and robotics

A further context of anthropomorphising involves the idea of projective intelligence. This concerns not the question of whether a system is fundamentally intelligent, but rather whether it displays attributes that facilitate or promote people's interpretation of the system as being intelligent and possessing human qualities. Joseph Weizenbaum (1966) created ELIZA, a computer program that parodied a Rogerian therapist, which in the 1960s convinced many people of ELIZA's intelligence and humanity until thematic redundancy was registered as people found repetition in the program. Furthermore as Kiesler and Gotz have illustrated, people interacting with robots showed strong correlations with the interactions of people making people-people judgements. Thus human empathy can be enjoined with non-human entities, provided these entities are in some degree human-like. Anthropomorphising ascribes non-human intelligence to a form based on observation, which explains behaviour in a social environment in human terms. As we have already seen, Daniel Dennett's intentional stance (1989, p. 400) involves consideration of the behaviour of an entity by ascribing to it the intentional states (beliefs and desires) of a rational agent.

The anthropomorphism of robotics also raises the question: Could a device be built that is more effective than humans in performing the same functions we do, and would such a device be evolutionary? Shneiderman (1988) implies that people employing anthropomorphic principles to robotics compromise in design, which leads to issues of unpredictability and spatial vagueness in the modelling of imperfect agent theory. This is seen not as the fault of anthropomorphic features, but as a fault of HCI (human computer interaction), in which designers, in not attempting to understand people's tendency to anthropomorphise, indiscriminately apply certain anthropomorphic qualities to their design ideas from the perceived expectation of users.

In Nass and Moon's (2000, p. 20) account of experimentation involving computers, individuals: "Mindlessly apply social rules and expectations to computers", thus replicating anthropomorphic epistemologies in the interpretation of computer functioning. According to Duffy (2002b, p. 4), the stigma of anthropomorphism in the natural sciences is similarly partly based on a reductive rationalisation of animal or plant behaviour premised on models of human intentionality and behaviour. This misappropriation extends to explanations but not necessarily descriptions of non-human behaviour. If the intention of anthropomorphism in robotics is to incorporate the underlying principles and expectations people use in social settings in order to model the

social robot's interaction with humans, Duffy (2002b, p. 5) acknowledges that the complexity of such an attempt would involve sets of solutions, not just a single engineering solution.

Duffy (2002b, p. 5) suggests that the role of anthropomorphism in robotics is to take advantage of robotic-human modelling as if it were a mechanism through which social interaction could be facilitated. The aim is not necessarily to build an artificial human, but rather address the question of the threshold of an 'optimal anthropomorphism' (Duffy, 2002a, p. 5).

According to Duffy (2002a, pp. 2, 4), there are two distinct motivations in building an artificial human: Firstly, the engineering issues of building an artificial entity capable of performing in environments with similar behavioural and cognitive responses as humans, thereby gaining possible insight into the way we might rationalise its behaviour based on humanlike scenarios. Secondly, building mechanisms whereby computational models can be implemented and tested in order to better understand human beings, allowing the development of products or software programs which we may relate to with greater ease.

As Duffy (2002a, p. 2) points out, from a scientific perspective, the use of such terms as "familiar, compelling, natural and intuitive" and qualia and intentional states are as difficult to deal with as the notion of anthropomorphism. It is the psychological affiliation with object that presents interesting challenges. Yet what is this but a mirroring of human anthropomorphic attachment to objects onto robots? Anthropology is prevalent in robotics because of a tendency to need such familiarity. Duffy (2002a, p. 4) claims that robotics continues in the project of building a humanoid not because the humanoid is the most efficient design for any given task, but because of an innate tendency to anthropomorphise.

If a near perfect looking human-machine was built, what would be the experience when the human-machine looks back at one? Would this involve either empathy or decontextualisation? Would the attribution of intentional states to the entity add a further dimension to the interaction? Would this recognition be called artificial intelligence? Duffy (2002a, p. 2) claims that the perceived notion of consciousness may be artificially attained through such anthropomorphising. The artificial attainment of this intentional state may involve mimicry, however, and be shallow or false from an emotion-based communicative viewpoint.

Gong (as cited in Lahtiranta & Kimppa, 2006) argues that introducing human-like features into ICT (information and communication technology) artefacts ensures better user acceptance, and positive user experience in the learning environments in which they are applied. However, he is equally as adamant about the potential risks, negative impact, and creation of unpredictability and 'vagueness' in the user's response to the anthropomorphised artefact.

Lahtiranta and Kimppa (2006) have also attempted to assess the effect of anthropomorphic modelling on the impact of the patient-physician relationship and the quality of patient care. However, as a consequence of the development of computer or artefact to human modelling relationships, humans may be more easily regarded as objects by other humans, rather than as feeling subjects. However, this is balanced against the view that people treat computers and new media as real people and places. While an optimal anthropomorphism would create a balance between positive user experience and complex user expectations, it would also have to mimic the complexities of the human mind, body and communication as well as mechanical functioning. Lahtiranta and Kimppa (p. 16) also note that with current levels of technology it is hard or nearly impossible to mimic the psychological and social behavioural complexity of the human.

The problem of anthropomorphism

The above discussion demonstrates that to be human is, more often than not, to see things in a particular paradigmatic way, which biases our view of ourselves in the environment. Furthermore, a biased view of ourselves in the environment effects our co-creation of it. Anthropocentrism is connected to environmental degradation and the possibility for deep biases in experimental design and interpretation. If we are aware of this predisposition to think and behave in ways that may damage our environment but which seem unavoidably pre-determined, anthropomorphic abstraction may work in our favour by providing appropriate environmental contexts in which we might imagine and co-create life. Studying the mind changes the mind. Analysis of bias may lead to behaviour and experimental modification. The challenge, having recognised an anthropocentric bias, is to identify and assess ways in which anthropomorphic thinking may benefit us or harm us as a species.

Attitudinal solutions to anthropocentric bias involving new attitudes in scientific and everyday life behaviours

Anthropocentric bias may be partly overcome by using critical anthropomorphism as an acknowledgement of the place of human centeredness in our social and environmental thinking, and scientifically in acknowledging the role that the position of the observer has in the design, outcome and interpretation of experimental results. Acknowledging the human-centred constraints on research necessitates the observation of a degree of bias. We can measure this anthropological bias statistically with scales such as those devised by Thompson and Barton (1994). A recognition of 'situatedness' may also contribute to the understanding of anthropomorphic bias. This involves the understanding that an experiment, for example, is not just a system of conditions and outcomes, that there is a performative and ontological component which effects the epistemological outcome, and further, that disinterestedness and detached contemplation when the subject of study is considered without the imprint of the projected self may lead to less self-descriptive experimental outcomes.

Watt (1998) proposes the concept of 'introjective anthropomorphism' in which the observer comes to be, in part, 'a chimera with the observed system'. Watt's idea is distinguishable from anthropomorphism as it involves the modification of a person's behaviour to an observed subject (for example meowing to a cat). This is a promising idea, yet it is possible that in this scenario, we may surrender communicative understanding for 'mere' identification.

The following 14 points present a counter-attitude towards anthropocentrism. We may resist anthropocentrism:

- (1) In recognising that each experience is a perspective and not necessarily an end in itself, there is no 'final version' of experience. The Many Minds (Jackson, 2002) theory of quantum science holds that we occupy any one of an infinite number of states for each given moment.
- (2) In recognising that we are biased to create and perceive in the image of ourselves.
- (3) Through devising scales to measure ecocentric and anthropocentric attitudes towards the environment, such as Thompson and Barton's Anthropocentric Scales (1994), which assist in scientifically recognising the anthropocentric problem.

- (4) In promoting scientific experiment that 'factors-in' the measure of a degree of anthropomorphic bias.
- (5) By overcoming policy description in which our interdependence with environment is obscured, and by promoting policy that recognises our interdependent relationship with non-human nature.
- (6) By 'introjective anthropomorphism' in which the observer becomes a chimera with the observed (Watt, 1998), necessitating the question: Does this limit or redefine possibilities of communication between human and non-human?
- (7) In assessing ways in which anthropomorphism may be of benefit (for example, through interpersonal empathy or assimilative projection) or of harm (through lack of empathy with the non-human environment).
- (8) In 'leaving a light footprint', in being conservative with earth's resources. It is estimated that the imprint of human habitation on the earth would be erased in 100,000 years if humans simply stopped existing and creating (Holmes, 2006).
- (9) In imagining our societies differently, not in a way in which humanity is threatened by the environment, but in a way that acknowledges continuity for future generations.
- (10) By exploring ways of investigation and experimental design that are non-instrumental and not informed by exploitative dislocation or remoteness.
- (11) In acknowledging that there are insuperable difficulties in gaining access to animal 'being', yet in acknowledging that by rejecting the possibility and value of differences, we may avoid assimilating all experiences of our environment to the range of human possibilities.
- (12) In recognising that whilst Charles Darwin's 1859 theory of natural selection sought in part to dispel the anthropocentric view, consciousness of ourselves and others as a species naturally inclines us to preserve an intraspecific bias.
- (13) In recognising that an anthropocentric view inclines us to overdetermine our presence in the environment and at the same time may undermine our relationship with nature, possibly through an unnecessary Heideggerian death anxiety that pre-eminently separates us from our sense of being.
- (14) In recognising that mankind does not yet determine what constitutes a being: Advent of human 'beingness' lies in the destiny of being itself.

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