

The Ethics of Animal Research:
The Dilemma and Alternative Approaches

Steve Joordens
University of Toronto Scarborough

In every country that has established codes of conduct defining what constitutes ethical scientific research, a species-based double standard is explicitly applied. Procedures considered too invasive to be ethically conducted on humans are routinely performed on non-human species. These procedures might include intentional brain lesions, vivisection, and the creation of animal models of disease. By most codes, these methodologies are considered ethically justified if a potential exists for the benefit of mankind, either in terms of direct application or in terms of providing an enhanced knowledge database that could lead to future benefit.

The dilemma is that while the scientific community behaves according to this double-standard, it espouses a belief system that is inconsistent with such a double standard. This belief system is called evolution theory it holds that there is no qualitative distinction between human versus non-human species. Species may differ in terms of complexity, and humans can be seen as the most complex especially in terms of the behaviour, but this difference is quantitative. It is not at all clear that a more complex species should be worthy of a higher ethical code of conduct.

The primary purpose of the present paper is to explore this dilemma in more detail. It is roughly comprised of three sections, each focussed on a rather strong claim. In the first section I will discuss possible bases for the current double-standard and will ultimately argue that all of these are wanting, and that current data and theory are inconsistent with current practices. That is, I will argue that our current practices are unjustified. In the second section I will examine the forces driving our use of a double-standard and argue that there are alternative approaches that can service these forces in a more effective manner. Thus, I will argue that our current practices are unnecessary. In the final section I will envision a future where there is only one ethical standard in place and will highlight how this future, while requiring some sacrifice, would represent a necessary step forward in terms of how humans interact with their planet and the others species that inhabit it.

The Current Double-Standard is Not Justified

In 1864 shortly after Darwin released the Origin of the Species, Benjamin Disraeli proclaimed the following words in a speech given at Oxford University “What is the question now placed before society with the glib assurance which to me is most astonishing? That question is this: Is man an ape or an angel? I, my lord, I am on the side of the angels”. Note the clear tie-in drawn to religion; the notion that humans possess some special relationship with an almighty power not possessed by our species-based brethren. Many humans may retain this belief, and might be tempted to argue that it is because of this special relationship that humans are worthy of a higher level of ethical treatment.

However, science is about data, not about faith. It is not sufficient within the sciences to accept a premise, especially one with far-reaching ethical implications, on the basis of belief alone. In fact, as highlighted above, acceptance of a species-based double-standard seems particularly troublesome in the face of a strongly supported theory like evolution which explicitly denies such a distinction. While a spiritual argument may hold some sway with the lay public, it should hold no purchase in the sciences. Instead, we let the data speak, and form our positions on the basis of what it says.

So what does the data then say concerning any justification for the differential ethical treatment of humans versus nonhumans? It is possible that as humanity evolved we gained some cognitive ability that indeed makes us worthy of a higher ethical standard. What would this be and how could it be

documented? Comparative psychologists focus on just this question, literally comparing cognitive capacities across species, the human species included. The data to date are interesting indeed.

When considering what sort of cognitive ability could be uniquely human, the ability most often mentioned would be the ability to see oneself as an independent life form, and the ability to entertain conscious thoughts relative to that self such as thoughts of the future or the past (Lewis & Brooks-Gunn, 1979; Gilbert 2006). These sorts of abilities are assumed to underlie our creativity as a species, our use of symbolic communication, but also our ability to deceive one another (Johnson, Barnacz, Yokkaichi, Rubio, Racioppi, Shackelford, Fisher & Keenan, 2005). If anything makes us uniquely human, it is perhaps the possession of conscious experience related to the self.

Is conscious experience a uniquely human trait? One early attempt to answer this question was provided by Gallup (1971) who began hanging mirrors on the cages of the many animals in their research lab. Initially, most animals reacted to the reflected image of themselves as though it represented a new member of their species introduced into the cage. With experience, most animals grew to ignore the reflection via habituation. That is, when the presence of some stimulus predicts neither positive nor negative outcomes, that stimulus is often ignored, much like the creaks in your house caused by the heating system. Some animals, however, went further. They began using the mirrors as tools to inspect themselves; looking into their mouths, or at their rear ends – things they can not see without the aid of a mirror. To Gallup this suggested that these animals had a sense of self and were interested in inspecting the self further via its reflection in a mirror.

Gallup (1971) formalized a procedure that could be used to detect the presence of self-awareness, a procedure he termed the mirror test. First the animal is pre-exposed to a mirror for some relatively long time to ensure it has had sufficient experience with it. Later, the animal is anesthetised and an odourless dye is placed on body locations the animal can only see with aid of a mirror. After the animal regains consciousness it is exposed to a mirror and the critical question is whether, upon self inspection, it shows interest in the marked regions by touching the corresponding locations of itself more than it touches matched-control locations. If they do, this suggests they realize that the marks they see in the mirror are actually marks on themselves, which suggests self-awareness. Chimpanzees pass this test, as do orangutans (Suarez & Gallup, 1981), dolphins (Marten & Psarakos), and even pigeons (Epstein, Lanza, & Skinner, 1981; Cardinal, Allan, Barnes, and DeLabar, 1998).

Pigeons aside, those species that pass the mirror test are those we generally see intellectual close to ourselves. Given this, one might be tempted to simply move the ethical line a little. That is, great apes are close cousins that we might be willing to include in our club, and dolphins are also clearly a complex and generally loved species. So perhaps we could simply alter the double-standard to include a few animal species on our side of the ethical divide. While this change would be viewed by many as progress of a sort, such an adjustment is not sufficient as the example below highlights.

Scientists have studied the potential for conscious memory in simple laboratory rats using a device termed a radial-arm maze. This device consists of a central area with a number of arms extending out from it. A rat is typically placed in the centre position, and food is placed at the wells at the end of each arm. An intact rat, when placed in such a device, will visit the arms one at a time and eat the food. If a rat's hippocampal structures are removed from its brain, then its behaviour changes markedly. Specifically, the rat will visit an arm but then, upon its return to centre, it will choose its next arm in an essentially random manner, often revisiting the arm it just visited (Fortin, Wright, & Eichenbaum, 2004). This is fascinating because we know from the human literature that these hippocampal structures are critical to conscious memory in humans (e.g., Delay and Brion, 1969). The rats with removed hippocampal structures are behaving just like they too have lost their ability to consciously remember where they have recently been, which suggests that intact rats have conscious memories, a clear form of conscious experience (see also Eacott, Easton, & Zinkivskay, 2005). Using different procedures,

evidence for conscious memory has also been observed in bird species (e.g., Clayton and Dickinson, 1998).

Taking this all together it becomes clear that at this point in time we simply do not know which animals may have some sense of self, nor the extent to which they might do so. The evidence to date certainly does not support the notion of a qualitative distinction in the cognitive capabilities of human versus non-human species. If anything, the more data we gather the more it seems that many non-human species, even those low in phylogenetic complexity, may indeed possess some cognitive processes similar to those many of us thought to be uniquely human.

The conclusion of this section then is obvious. One would expect that when it comes to issues like differential ethical treatment a very high criterion for justification would be required. Our codes of research ethics suggest a distinction between human versus non-human species worthy of ethical discrimination, but our data and theories are discordant with such a distinction. Thus, the current double-standard in research ethics is simply unjustified.

Alternatives are Available

One counter-argument sometimes raised in response to the position presented above is that Darwin also said the species were in competition, and thus our double-standard simply reflects a natural human dominance of other species. As humans, we see human life as most precious, and if we must do some less than pleasant procedures on animals to the benefit of human life, then we are willing to do so. Within the natural world animals prey upon one another and in our research labs we prey upon them. Moreover, we do so in as gentle a manner possible and our research findings do sometimes benefit species other than our own.

While this sort of `might means right` argument is valid at one level, it is somewhat distasteful at another. It is reminiscent of the sorts of arguments made in favour of wars between nations or the subjugation of peoples. Often when leaders speak of war, they describe it as a last resort; an option one only seriously contemplates when all other options are lost. Can this also be said of our research subjugation of animals? Have other alternatives been seriously considered and found wanting?

To answer this question one must first consider the goals of animal research. To the extent all of animal research can be framed within one central goal, that goal would be to enable humans to live longer and higher quality lives. Some research focuses on this goal in the short-term by seeking out health applications while other research takes a much longer-term perspective by gaining knowledge that might eventually result in applications. But in virtually every case our hope is that by gaining understanding and applications we will be able to make our own existence on this planet longer and better.

In the past, one could make a strong case that animal research has resulted in great strides in human extent and quality of life. In the 19th and even most of the 20th centuries, humans were the victims of many diseases resulting primarily with their interactions with nature or, at times, industry. Animal research provided insights into these diseases, and the average life expectancy of Americans nearly doubled to its current statistic of approximately 77 years old.

However, it is not as clear that animal research continues to be as relevant with respect to life expectancy now as it was then. Table 1 was taken from the report Health, United States, 2006 distributed by the US Department of Health and Human Services. In the five year period from 1998 to 2003, life expectancy increased by less than one year. In the period since 1990 it had increased by just over 2 years. Thus, from 1900 to the 1990s, life expectancy increased by more than 25 years but since, it has increased by about 2 years. Clearly the time-scales are not equivalent but the basic point is this: new treatments or procedures appear not be as relevant today as they once were in terms in enhancing life expectancy on a large scale.

In this context, the following news story is both shocking and highly relevant. On March 16, 2005 the National Institute of Health released a story with the following headline “Obesity Threatens to Cut US Life Expectancy, New Analysis Suggests”. The initial paragraph reads “Over the next few decades, life expectancy for the average American could decline by as much as 5 years unless aggressive efforts are made to slow rising rates of obesity, according to a team of scientists supported in part by the National Institute on Aging (NIA), a component of the National Institutes of Health (NIH) of the Department of Health and Human Services (DHHS).” If expectancies declined by 5 years that would essentially reverse almost 30 years of increases in life expectancy.

I see this fact as revealing a critical factor when one considers the role of animal research, especially in the medical setting. The species-centric nature of our animal research procedures do not simply reflect us exploiting animals such that we can lead longer and better lives but, rather, they involve us exploiting animals in attempts to counteract the results of behaviours we engage in, often fully knowing that those behaviours will reduce our longevity and quality of life. Thus we eat high-fat foods, smoke cancer-causing cigarettes, abuse alcohol and other drugs, and all the while hope that if these behaviours do result in health issues later in life, medical research will have progressed to the point where it will be there to “bail us out”.

The obesity issue also introduces the first alternative to animal research I wish to highlight: prevention. We currently spend huge sums of money to house and perform research on animals, what if that money were instead spent on prevention? Given the NIH story described above, if we could tackle the obesity issue head on, that effort alone could prevent a loss of 5 years in life expectancy. How many years of animal research would be needed to accomplish the same feat? It appears very reasonable to assume that a serious shift of resources away from researching the latest procedures and towards prevention provides one clear alternative that could have a very strong impact on life expectancy and quality.

Add to this a second alternative to animal research: accessibility. Given what we already know about medicine, if we worried less about pushing the boundaries of medicine and more about getting the current practices and medicines to those who need them we could have a very strong effect on life expectancy and quality. For example, according to the World Health Organization, average longevity in the US is about 78.2 years. In terms of international rates, that ranks it 38th. Japan ranks first at 82.6 years, likely attributable to a much better diet concordant with the obesity discussion above. The other countries that rank above the US include places like Switzerland, Australia, Spain, Sweden and my home country Canada (which ranks 11th at about 80.7 years). Many of the countries above the US on the list do not have better health care and certainly are not generating more medical advances. What they have is more accessible health care. The public in general has open and free access to health care, and this allows issues to be caught sooner, and treated with more success and less cost.

How much of an impact would a focus on prevention and accessibility have, relative to the gains we are currently experience thanks to animal research? The globally-based life expectancy is currently around 67.2 years. Again, Japan leads the world at 82.6 years, and that number is based primarily on good eating, and not so much on accessible health care. If accessibility were increased further, and if other sources of preventable health issues were tackled, then there is every reason to believe that longevity could be even higher. If these practices were employed on a global level, they could potentially increase global life expectancy by as much as 15 or 20 years. In this context an earlier point bares repeating; In the period since 1990 longevity had increased by just over 2 years thanks to our current approach of focussing on discovering new medical breakthroughs.

There is also a third alternative to animal research that could potential affect human life expectancy more than any other; peace. Life expectancy in many countries in Africa is less than 50 years. As has been publicized by people such as U2s Bono Vox, many of these deaths are in want of very basic health

care and medicines. But that lack of accessibility to health care is partly due to a generally chaotic situation that often contributes to death in a much more direct way. Perhaps describing peace as an alternative will seem overly idealistic to many, but I mention it here because it sets the stage for the third section of this paper.

Living with a Single Ethical Standard

In the previous sections of this paper I have argued that the double-standard currently applied to human versus non-human research ethics is unjustified and unnecessary given that alternatives exist that could help us reach our goals more efficiently. The current section is meant to paint a picture of a world wherein we have a single research code applied to all species. The hope is that this will allow a consideration of some of the costs, but also of the potential benefits, that could be part and parcel of such a change. The scale will be somewhat grandiose, but that does not make the consideration any less valid.

To set the stage, it is useful to consider three factors that could influence longevity and quality of life and the manner in which they do. I argue that our current system has emphasized the factor of medical advance supported primarily by a willingness to conduct invasive animal research. This factor can and has enhanced both longevity and quality of life, but its ability to do so decelerates with success and has led to only small gains in recent decades. Accessibility to current health care techniques is another factor that can enhance both longevity and quality of life, and I argue that great gains are still available to be had with respect to this factor, especially in less developed countries. The third factor is the human tendency to engage in eventually self-destructive behaviour, and this factor decreases both longevity and quality of life. It can be counteracted preventively, as I highlight as most desirable, or after the fact via medical advance targeting the effects of these behaviours.

With these three interacting factors at play, one can now consider what might happen if we were to eliminate the double standard in research ethics and, instead, have a single ethical code, a code that requires informed consent for any procedure deemed too invasive to conduct unilaterally. At first blush, it would seem that this change in ethics would immediately slow medical advance, hence the need to focus on prevention and accessibility to counter this effect. But will it slow medical advance and, if so, by how much?

Under the current system, various drugs and procedures cannot be tested on humans until they have first been tested extensively with animals. While we share a great deal of our physiology with animals, there are also distinct differences across species. What might happen if a researcher interested in, say, a cure for AIDS could only test her potential cures on actual AIDS patients? First, I suspect she could not test things in a loose way but, rather, the patients in question would require that there be good reasons to believe a certain procedure or drug has potential. This would force researchers to be extremely rigorous in their background research and understanding of relevant physiological systems and processes at the outset, and that rigor itself may suggest possibilities that would not be considered when one can instead simply try things out on non-consenting animals. Second, because the human species is the most similar species to itself, there would be no doubt about the transferability of those findings to humanity. We would be experimenting with the same system we hope to affect and research findings would be more directly relevant. In addition, there would be enhanced motivation for considering novel ways of achieving medical advance such as, for example, the use and testing of computer simulations of complex systems. Perhaps breakthroughs await us via novel approaches, but we are missing them due to a reliance on traditional methods.

I am not arguing that no decline in medical advance would result from a change in ethical code, it may. However, the extent of that decline is not clear and may not be as great as one would initially think.

It is my assertion that if one were able to do the mathematics the reduction in longevity and quality of life linked to the decline in medical advance would be more than offset by the gains possible through accessibility to current health care practices, and by a focus on the prevention of eventually self-destructive behaviours. Medical advance may slow, but the goal of medical advance will accelerate; more people will live longer and better lives.

There also exists a larger ethical issue related to the wisdom of focussing on breakneck medical advance. Newscasts are rife with stories on stem cells that might produce human organs, cloning of animals for research or consumption, facial transplants, the potential cloning and perhaps artificial aging of humans. Many of these advances bring with them ethical issues that have never before been considered by humanity. We often feel uncomfortable with some of the possibilities of such work, but have trouble making our discomfort explicit. An argument can be made that slowing these advances may not be such a bad thing as it would give us time to consider the implications of new procedures in more detail, and to make considered decisions about how certain procedures should or should not be used. As Einstein himself learned with respect to nuclear weapons, science can move from theory to practice at a rate that exceeds our abilities to control it. Perhaps we should be in less of a hurry to find new procedures and concentrate on the effective implementation of the procedures we understand.

Perhaps some would argue that my logic is flawed in some manner and the net result of changing our current double-standard would be slower growth of longevity and quality of life that would be possible within the current approach. Obviously, I do not feel this would be the case, but even if it were I would still make the argument I do on purely moral grounds. As Neil Peart, the lyricist and drummer of the rock band Rush states in the song Bravado (Roll the Bones, 1991), there are times when ``we must pay the price and we will not count the cost.`` Perhaps the most salient example of this is most of the world's initial embrace and then rejection of the practice of human slavery. America was among the last of the developed countries to abolish slavery, largely because the practice of slavery brought great wealth and power to their country via the relatively cheap labour force it provided. When slavery was abolished this economic advantage was lost, and yet slavery was abolished. It was abolished out of respect for fellow humans, and acknowledgment that treating some humans as less than others was simply unethical.

We currently live in a world of global warming and the present and future environmental challenges it fuels. If we are ever to move forward as a species we must learn to respect the planet we inhabit, and the other life forms we inhabit it with. We must again learn the lesson of slavery, and extend it to the animals we current exploit for medical gain, as we exploited the slaves for economic gain. Given our relative power within the animal kingdom we could indeed continue our current practices in the spirit of Darwinian competition. But this sort of short-sighted disrespect for our environment will lead us the same eventual rewards as our ability to eat high fat foods because we have the power to do so. Even if there is a cost to treating our species-based brethren with greater respect, and I am not convinced there is, then we must pay the price and not count the cost.

Table 1
Life Expectancy Statistics from 1900 – 2003

Year	Male	Female	Average
1900-1902	47.9	50.7	49.3

1909-1911	49.9	53.2	51.5
1919-1921	55.5	57.4	56.5
1929-1931	57.7	60.9	59.3
1939-1941	61.6	65.9	63.7
1949-1951	65.5	71.0	68.3
1959-1961	66.8	73.2	69.6
1969-1971	67.0	74.6	70.8
1979-1981	70.1	77.6	73.8
1989-1991	71.8	78.8	75.3
1997	73.6	79.4	76.3
1998	73.8	79.5	76.6
1999	73.9	79.4	76.6
2000	74.3	79.7	77.0
2001	74.4	79.8	77.0
2002	74.5	79.9	77.2
2003	74.8	80.1	77.4

Cardinal, C. D., Allan, R. W., Barnes, D., & DeLabar, J. S. (1998). "To hold as't were, the mirror up to nature": Are pigeons really "self-aware?" Paper presented at the Association for Behavior Analysis Annual Conference, Orlando, Florida.

Clayton, N.S. and Dickinson, A. 1998. Episodic-like memory during cache recovery by scrub jays. *Nature* 395: 272-274.

Darwin, C. (1959). The Origin of the Species.

Delay, J. and Brion, S. 1969. *Le syndrome de Korsakoff*. Masson, Paris.

Eacott, M. J., Easton, A., and Zinkivskay, A. (2005). Recollection in an episodic-like memory task in the rat. *Learning & Memory*, 12, 221-223.

Epstein, R., Lanza, R. P., & Skinner, B. F. (1981). "Self-awareness" in the pigeon. *Science*, 212, 695-696.

- Fortin, N.J., Wright, S.P., and Eichenbaum, H. 2004. Recollection-like memory retrieval in rats is dependent on the hippocampus. *Nature*, 431: 188–190.
- Gallup, G. G., Jr. (1970). Chimpanzees: Self-recognition. *Science*, 167, 86-87.
- Gilbert, D. (2006). *Stumbling on Happiness*. Knopf: New York.
- Johnson, A. K., Barnacz, A., Yokkaichi, T., Rubio, J., Racioppi, C., Shackelford, T. K., Fisher, M. L., & Keenan, J. P. (2005). Me, myself, and lie: The role of self awareness in deception. *Personality and Individual Differences*, 38, 8, 1847-1853.
- Lewis, M., & Brooks-Gunn, J. (1979). *Social cognition and the acquisition of self*. New York: Plenum.
- Marten, K., & Psarakos, S. (1995). Evidence of self-awareness in the bottlenose dolphin (*Tursiops truncatus*). In S. T. Parker, R. W. Mitchell and M. L. Boccia (Eds.), *Self-Awareness in Animals and Humans: Developmental Perspectives*, pp. 361-379.
- Suarez, S. D., & Gallup, G. G., Jr. (1981). Self-recognition in chimpanzees and orangutans, but not gorillas. *Journal of Human Evolution*, 10, 173-188.