

<p>Institution: Queen's University Belfast</p>
<p>Unit of Assessment: 4</p>
<p>Title of case study: Improving the Psychological Well-being of Captive animals</p>
<p>1. Summary of the impact (indicative maximum 100 words) Thousands of animals are housed in captive conditions worldwide, often to the detriment of their mental well-being. Scientists at Queen's Animal Behaviour Centre have spent the last 20 years developing new ways of improving the psychological welfare of animals housed in captivity. Their research has shown that classical music and scents such as lavender in dog shelters calms the animals, and that shielding zoo-housed gorillas from visitors with camouflage netting over the viewing windows, prevents great apes from becoming agitated. The impact of this research extends to guidelines and regulations set by the American Veterinary Medical Association, the UK's Department for Environment, Food and Rural Affairs, the British and Irish Association of Zoos and Aquariums and the Australian Government's National Health and Medical Research Council. Commercial impact includes CDs of music composed specifically for dogs, now widely available to buy on the open market, and being utilised in 1700+ rescue shelters and by over 150,000 pet owners around the globe.</p> <p>2. Underpinning research (indicative maximum 500 words) The impact reported above stems from research carried out over 2 decades by members of the Animal Behaviour Centre, a research group led by Dr Deborah Wells (Senior Lecturer). The prime focus of the group's work has been to find novel ways of improving the psychological welfare of animals, with a strong focus on those housed in captivity, an environment that can trigger reduced mental well-being [1]. For over two decades, the team have been investigating how changes to the animals' physical and sensory environment can improve the animals' welfare.</p> <p>Between 1993 and 2005, Wells and Hepper (Professor) performed a series of studies, funded by, amongst others, the UK charities <i>Dogs Trust</i> and the <i>Royal Society for the Prevention of Cruelty to Animals</i>, on the behaviour and welfare of dogs housed in rescue shelters. The research concentrated largely on novel ways of improving dogs' mental well-being while housed in captivity. The studies showed, for the first time, that when animals' senses were triggered with the right stimuli, positive improvements in welfare were observed. Triggers could be sounds, smells or images. Classical music [2], and odours including lavender and chamomile [3] were found to be particularly effective in improving canine welfare.</p> <p>The team has since extended their work to include zoo animals such as gorillas and elephants, with funding from <i>Belfast City Council</i>, the <i>British Psychological Society</i> and the <i>Universities Federation for Animal Welfare</i>. Wells found that gorillas housed in <i>Belfast Zoological Gardens</i>, an institution that attracts over 300,000 visitors per year, suffer from stress when exposed to visitors [4]. She went on to discover that the animals seemed much less agitated when they could not see their human audience, with the apes' welfare improving if the zoo visitors watched them from behind screens, in this case, camouflage nets [5]. The work showed that these principles are not species-specific, but can be used to calm many different animals. In 2005, the research led to an award for impact from the <i>British and Irish Association of Zoos and Aquariums</i>.</p> <p>Wells has also worked with pet owners to research ways to reduce nuisance barking in dogs and from eating their own faeces. Specifically, to prevent barking, effective methods included placing calming scents such as lavender and citronella inside the dog's collar [6].</p>

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3. References to the research (indicative maximum of six references)

- [1] Wells, D.L., & Hepper, P.G. (2000). Prevalence of behaviour problems in dogs purchased from an animal rescue shelter. *Applied Animal Behaviour Science*, 69, 55-65. Citations: 102
- [2] Wells, D.L., Graham, L., & Hepper, P.G. (2002). The influence of auditory stimulation on the behaviour of dogs housed in a rescue shelter. *Animal Welfare*, 11, 385-393. Citations: 46
- [3] Graham, L., Wells, D.L., & Hepper, P.G. (2005). The influence of olfactory stimulation on the behaviour of dogs housed in a rescue shelter. *Applied Animal Behaviour Science*, 91, 143-153. Citations: 31
- [4] Wells, D.L. (2005). A note on the effect of zoo visitors on the behaviour and welfare of captive gorillas. *Applied Animal Behaviour Science*, 93, 13-17. Citations: 40
- [5] Blaney, E.C., & Wells, D.L. (2004). The influence of a camouflage net barrier on the behaviour, welfare and public perceptions of zoo-housed gorillas. *Animal Welfare*, 13, 111-118. Citations: 13
- [6] Wells, D.L. (2001). The effectiveness of a citronella spray collar in reducing certain forms of barking in dogs. *Applied Animal Behaviour Science*, 73, 299-309. Citations: 15

Note all citations from Google Scholar

4. Details of the impact (indicative maximum 750 words)

The psychological welfare of animals kept in rescue kennels, zoos, and as pets, in various places around the world (e.g. USA, Australia), has improved significantly as a result of research conducted at the Animal Behaviour Centre. This has resulted from new policies and guidelines that have been put in place as a direct result of the Centre's research and also the development of new commercial products stemming from the Centre's research findings.

Research from the group directly impacted several sets of guidelines about how to best house dogs kept in kennels and shelters, highly stressful environments that can have a negative impact on mental well-being. These guidelines have international reach and include, in 2009, *Australia's National Health and Medical Research Council Guidelines on the Care of Dogs Used for Scientific Procedures* [7], and, in 2010, the *American Veterinary Medical Association's Model Bill and Regulations to Assure Appropriate Care for Dogs Intended for use as Pets* [8].

Since Wells and her colleagues published their research showing that classical music improves the psychological welfare of dogs (having a calming effect), rescue shelters around the world, including Canada, USA, Australia and the UK now routinely expose animals in their care to classical music. Much of the work has been disseminated through media reports and heavily downloaded review papers.

Zoo animals across the globe have also been significantly impacted by the group's research. The group's findings fed directly into zoo research guidelines put forward by the *British and Irish Association of Zoos and Aquariums* in 2005 and still in place for the full REF time frame [9]. These research guidelines refer to Queen's research into the effects of visitors on the welfare of animals, in particular gorillas. As a result, leading zoos including London, Edinburgh, Belfast, Dublin and Paignton, have installed, within the REF period, camouflage netting in gorilla housing after research from Queen's showed that shielding great apes from visitors was better for the animals' psychological well-being.

Pet dog behaviour research from the group has, from 2005, been included in *DEFRA*

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information for dog owners, and today, still continues to shape policies for dog owners designed to help reduce their pets' nuisance barking [10]. A large number of veterinary websites, leading pet food companies (e.g. Purina) and pet health care blogs also frequently refer to Wells' work on the therapeutic effects of psychological therapy for pets (for example:

<http://www.purina.co.nz/Home/All+About+Dogs/Living+Together+Dog/On+The+Move+Dog/Car+Travel+With+Your+Dog.htm>; <http://www.vetstreet.com/dr-marty-becker/do-pets-like-some-kinds-of-music-more-than-others>)

Beyond shaping guidelines and policies, the group's research has also had very significant, and important, commercial impact, influencing product development. Their work on the benefits to animal welfare of being exposed to different sounds, including classical music, has triggered musical composers to produce CDs designed to reduce stress in companion animals. These CDs include 2008's *Through a Dog's Ear* [11] and 2010's *Music My Pet*. These CDs are successfully used to calm animals in rescue shelters, and in the home. This amounts to a very large number of animals benefitting from music designed to improve their welfare. For example, the *Through a Dog's Ear* CD, developed on the back of Wells' research (for support see <http://throughadogsear.com/research/>), is being used in over 1700 dog rescue shelters around the globe (see <http://throughadogsear.com/shelter-program/>). It has been sold to over 150,000 pet owners, amounting to almost £2 million in sales.

More recently, knowledge transfer links with companies such as Devenish, an agrifood company based in Northern Ireland, have resulted in the development of a novel feedstuff that improves the faecal consistency of pet dogs. Devenish, who have recently diversified into the companion animal food market, has recently applied for a patent for the product (*Devi Q*), and the feedstuff is soon to appear on the open market.

5. Sources to corroborate the impact (indicative maximum of 10 references)**Policies and Guidelines**

[7] Australian Government's *National Health and Medical Research Council Guidelines on the Care of Dogs Used for Scientific Procedures* (2009).

http://www.nhmrc.gov.au/files/nhmrc/file/health_ethics/animal/ea25_guidelines_care_of_dogs.pdf

[8] American Veterinary Medical Associations' Model Bill and Regulations to Assure Appropriate Care for Dogs Intended for use as Pets (2010).

http://www.avma.org/advocacy/state/issues/Care_for_Dogs_Model_Act_and_Regs_Backgrounder.pdf

[9] BIAZA (2005). *Zoo Research Guidelines*.

<http://www.biaza.org.uk/resources/library/images/VisitorEffects.pdf>

[10] DEFRA (2005). *Constant Barking can be Avoided: Offering Guidance to Dog Owners*.

<http://archive.defra.gov.uk/environment/quality/noise/research/barkingdogs/constantbarking.pdf>

Product Development

[11] Leeds, J. & Wagner, S. (2008). *Through a Dog's Ear* (with accompanying CD series)

<http://www.throughadogsear.com/research.htm>

Some Examples of Media Coverage

- http://www.abc.net.au/science/news/enviro/EnviroRepublish_1469222.htm
- <http://www.newscientist.com/article/dn2962-dogs-prefer-bach-to-britney.html>

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- <http://www.guardian.co.uk/science/2008/nov/17/elephants-zoos-classical-music-elgar>

Individual users who could corroborate claims

- Director, *Belfast Zoological Gardens*, Antrim Road, Belfast, BT36 7PN
- Director, *Zoological Society of London*, Regent's Park, London, NW1 4RY
- Director, *Animal Behaviour and Welfare Consulting*, PO Box 45529, Westside RPO, Vancouver, British Columbia V6S 2N5, Canada
- Music Producer, *BioAcoustic Research, Inc.*, 1428 Windsor Street, Ashland, Oregon 97520, USA