

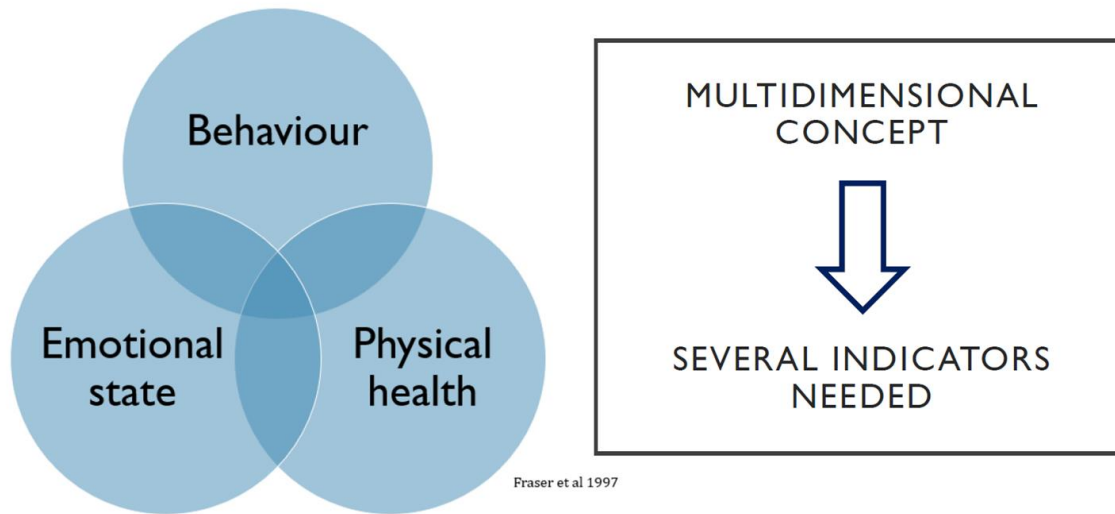
Welfare and zoos

Hilde Vervaecke, Odisee University College

Commission des parcs zoologiques de Wallonie, 26-09-2019

Welfare definition (Fraser, 1997)

- basic health and functioning of the animal - physical health
- affective state of the animal - mental health
- ability to live in a way that suits the animal's adaptations - naturalness



Approaches to animal welfare			
Criteria	Naturalistic	Functional	Subjective experience
Definition	The welfare of an animal depends on its being allowed to perform its <u>natural behaviour</u> and live a life as natural as possible	Animal welfare is related to the <u>normal functioning of physiological and behavioural processes</u>	The <u>feelings of the animal</u> (suffering, pain and pleasure) determine the welfare of the animal
Concept	Animals should be raised and kept in a natural environment and be allowed to behave in natural ways.	Concentrates on biological functioning of an animal	This approach involves psychological well-being as <u>subjective experiences</u> of animals
Research method	<ul style="list-style-type: none"> • Study of <u>behaviour of animals in wild</u> of semi-wild state and comparison with similar animals living in captivity 	<ul style="list-style-type: none"> • Quantifying growth, productivity and <u>reproduction</u> • Veterinary epidemiology and <u>pathology</u> • Measurements of suppression of the <u>immune competence</u> 	<ul style="list-style-type: none"> • Operant conditioning experiments • Preference <u>tests</u> • <u>Behavioural measures of</u> psychological well-being • Stereotypes • Conflict behaviours
Advantage	This approach intuitively appeals and fits with popular opinion (call for animals to be raised in more natural environments)	Changes in biological functioning are easier to demonstrate scientifically	Understanding the subjective experience of animals is a great challenge and hard job for scientists in the field of ethology
Disadvantage	This approach idealizes natural environment and neglects the fact that animals are able to adapt to artificial environment	The link between biological functioning and the welfare is not always apparent. It is difficult to draw conclusions about welfare if different measures of biological functioning disagree	The feelings and emotions of animals, like the movement of subatomic particles, cannot be observed directly

TABLE 2.2 Three Conceptions of Animal Welfare and Typical Measures Used to Provide Positive Evidence of Animal Welfare

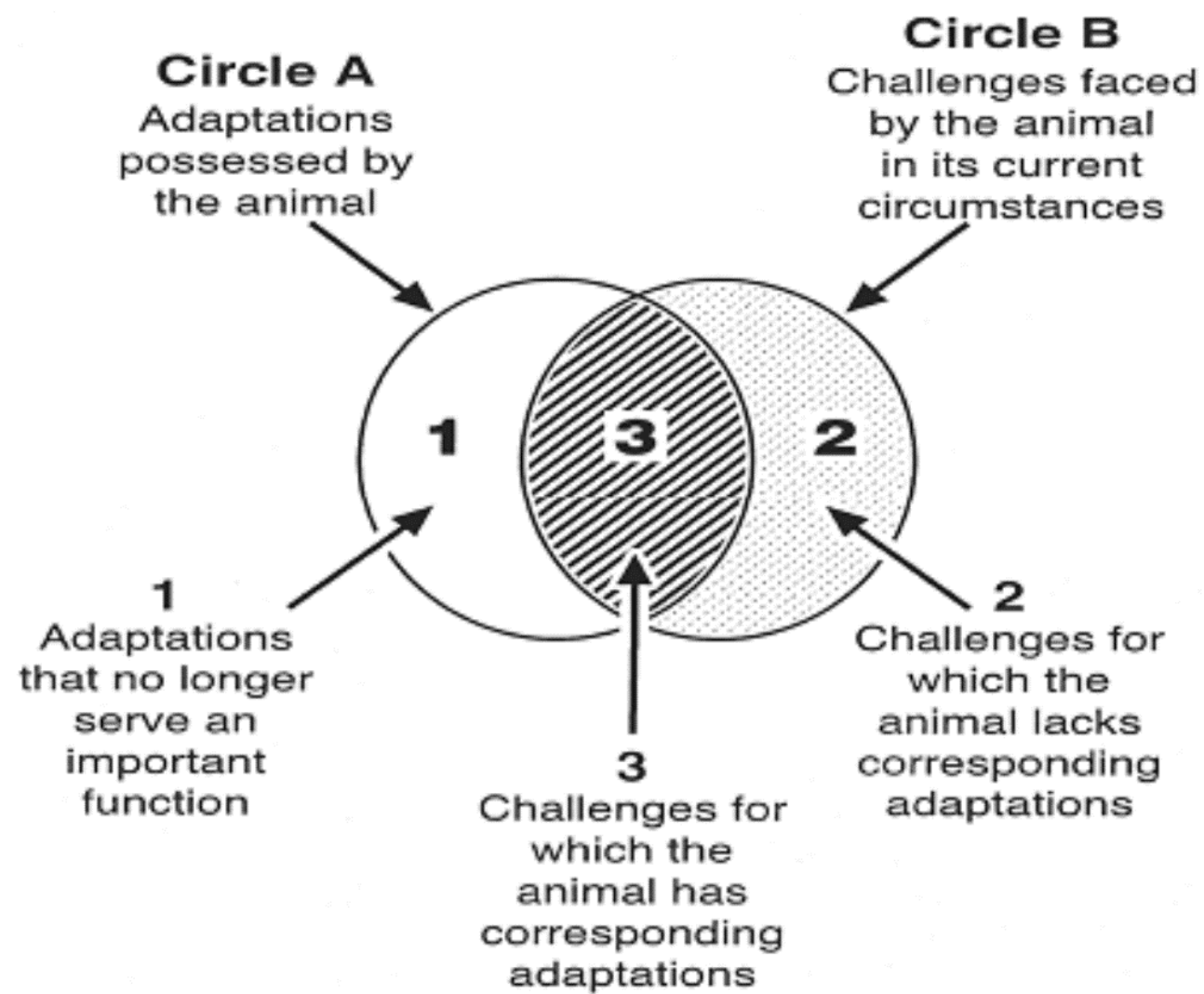
Conception of animal welfare	Typical measures
Biological function	Increase in stress hormones (–) Reduction in immune competence (–) Incidence of disease and injury (–) Survival rate (+) Growth rate (+) Reproductive success (+)
Affective states	Behavioral signs of fear, pain, frustration, etc. (–) Physiological changes thought to reflect fear, pain, etc. (–) Behavioral signs of aversion or learned avoidance (–) Behavioral indicators of comfort/contentment (+) Performance of behavior (e.g., play) thought to be pleasurable (+) Behavioral signs of approach/preference (+)
Natural living	Performance of natural behavior (+) Behavioral/physiological indicators of thwarted natural behavior (–) Performance of abnormal behavior (–)

Source: D. Fraser and D. M. Weary. 2005. Applied animal behavior and animal welfare. In *The Behavior of Animals: Mechanisms, Function, and Evolution*, edited by J. J. Bolhuis and L.-A. Giraldeau, Table 15.1, p. 364. Malden, MA: Blackwell Publishing.

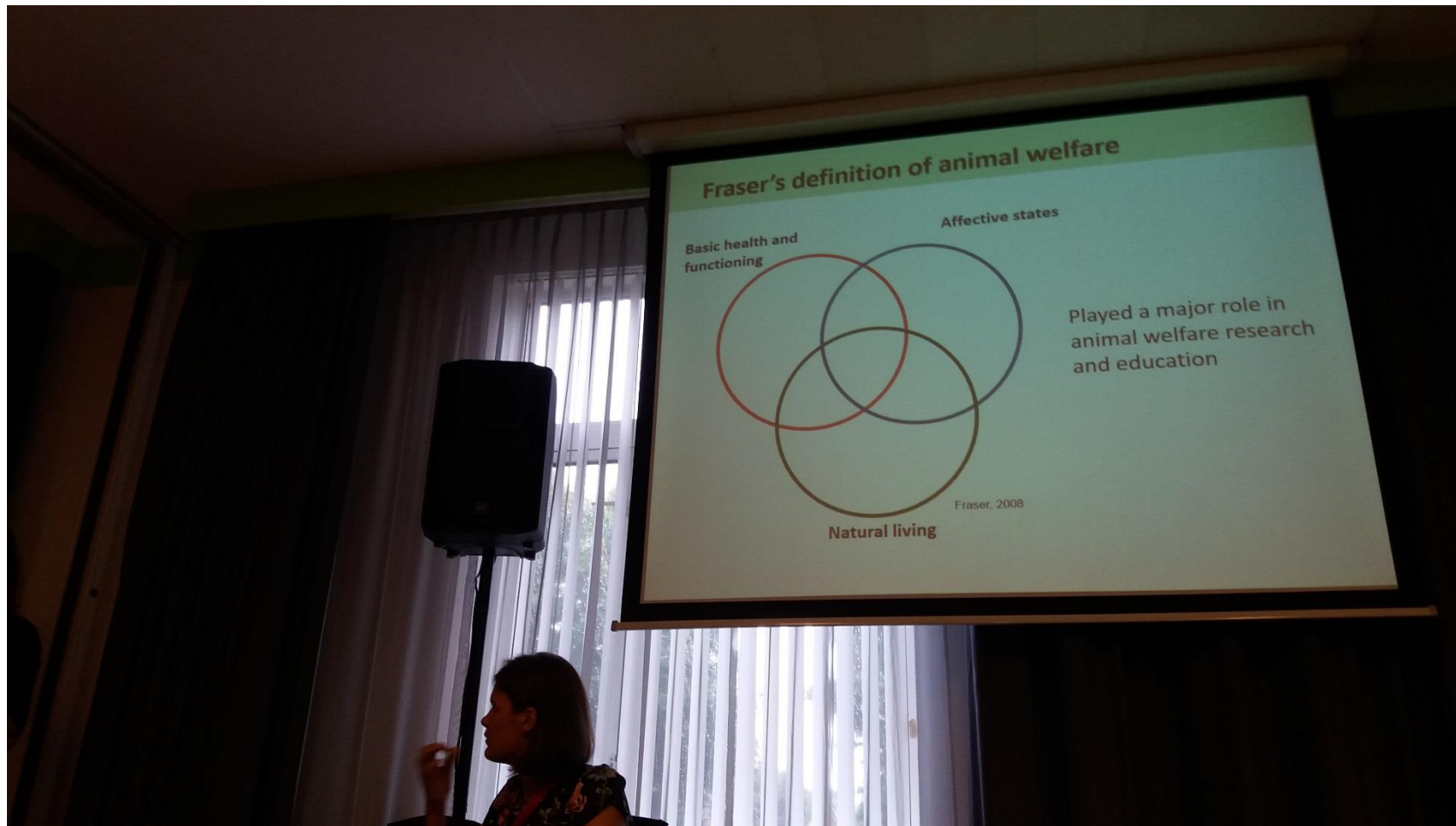
Paradigm shift & shift in fields with most important current contributions

TABLE 2.2 Three Concepts to Provide Positive Animal Welfare Measures Used	
Conception of animal welfare	Typical
Biological function	Int
Affective states	Gro Reproductive system Beh (-) in, etc. (-) (-) (+) Perform thought to be pleasurable (+) Behavioral signs of approach/preference (+) Perf
Natural living	Perf
	natural behavior (-)

Source: D. Fraser and D. M. Weary. 2005. *Applying the Five Domains Model to the Behavior of Animals: Mechanisms, Function, and Evolution*, edited by J. J. Bolhuis. *Journal of Animal Science* 15.1, p. 364. Malden, MA: Blackwell Publishing.



Welfare definition



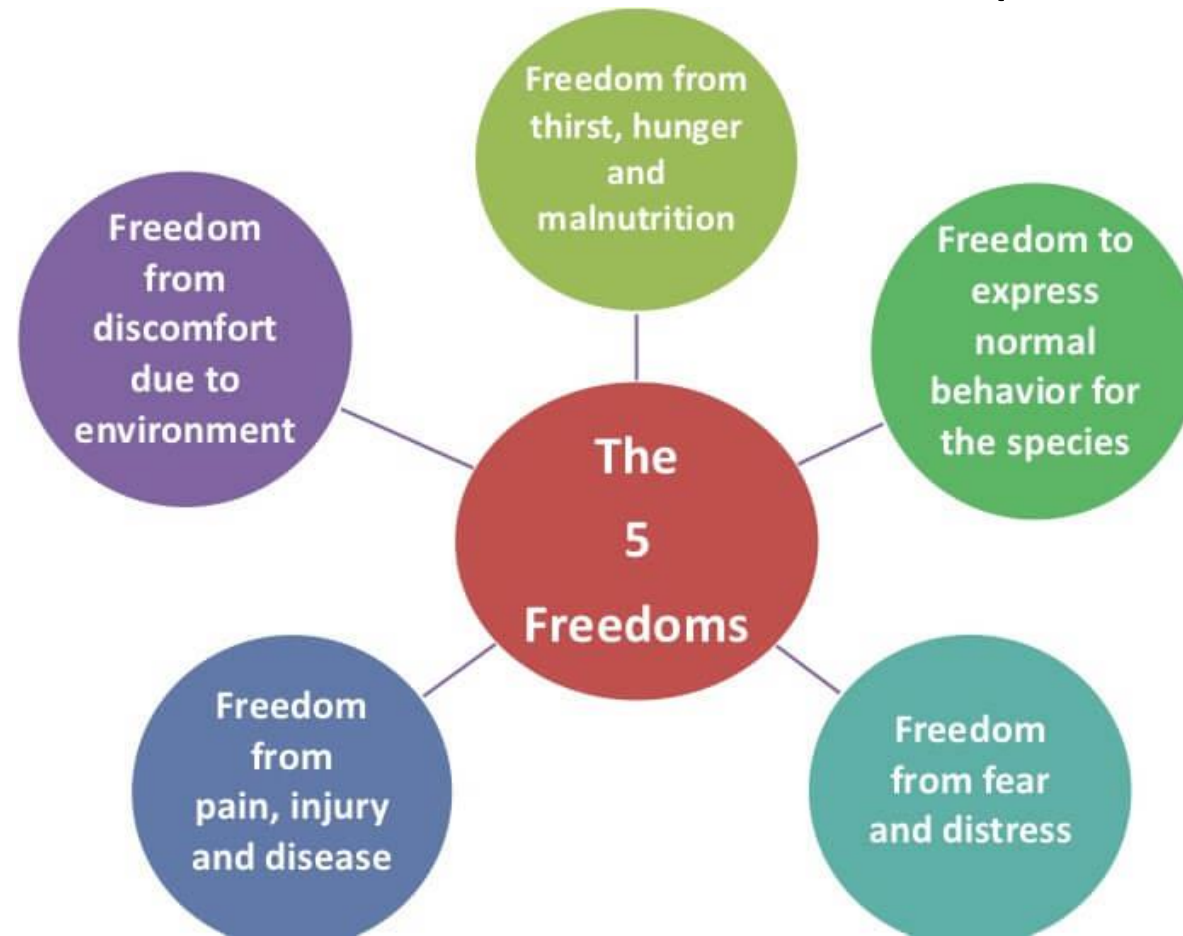
Golden standard of “adaptations & coping”: affective state



- Set of measures to measure emotions in animals eg cognitive bias tests, facial scores, brain scans, etc...
- Multi-disciplinary: applied ethology, neurobiology, ...

Welfare standards (evaluations) started with Brambell Commission five freedoms (1965)

- welfare of intensively farmed animals
- did not encourage positive welfare



Welfare standards grew into multiple Welfare quality protocols

- Minimising negative aspects + optimising opportunities for sufficient positive welfare
- Now: life worth living

Five Freedoms	Welfare quality® criteria
Good feeding	1. Absence of prolonged hunger. 2. Absence of prolonged thirst.
Good housing	3. Comfort while resting. 4. Thermal comfort. 5. Ease of movement.
Good health	6. Absence of injuries. 7. Absence of disease. 8. Absence of pain induced by inappropriate management procedures.
Appropriate behaviour	9. Expression of social behaviours. 10. Expression of natural behaviours. 11. Good human-animal relationship. 12. Positive emotional state.
Protection from fear and distress	13. Absence of general fear/distress/apathy. 14. Ability to seek privacy/refuge. 15. Absence of surgical or physical modification of the skin, tissues, teeth or bone structure other than for the purposes of genuine medical treatment/manipulation/sedation.

Assessment of Welfare in Zoo Animals: Towards Optimum Quality of Life

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Simple Summary: Maintaining a high standard of animal welfare is essential in zoos, and methods of animal welfare assessment should aim to evaluate positive as well as negative states. The indicators that are useful in assessing these are discussed as there is huge variability in the available information about the natural biology for some zoo species. Wild baselines are not always the most accurate indicator of what is right for an animal in captivity, which makes the identification of factors to include within species-specific welfare assessment even more challenging. There is no “one size fits all” welfare strategy as it should account for the range of biological requirements and needs, which it is not possible to define for some zoo species. The different approaches for welfare assessment are reviewed, including the development of the Animal Welfare Assessment Grid which offers an evidence-based tool for continual welfare assessment, using technology where appropriate, to facilitate decision making and lead to improvements in the animals’ quality of life.



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The 24/7 approach to promoting optimal welfare for captive wild animals

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ABSTRACT

We have an ethical responsibility to provide captive animals with environments that allow them to experience good welfare. Husbandry activities are often scheduled for the convenience of care staff working within the constraints of the facility, rather than considering the biological and psychological requirements of the animals themselves. The animal welfare 24/7 across the lifespan concept provides a holistic framework to map features of the animal's life cycle, taking into account their natural history, in relation to variations in the captive environment, across day and night, weekdays, weekends, and seasons. In order for animals to have the opportunity to thrive, we argue the need to consider their lifetime experience, integrated into the environments we provide, and with their perspective in mind. Here, we propose a welfare assessment tool based upon 14 criteria, to allow care staff to determine if their animals' welfare needs are met. We conclude that animal habitat management will be enhanced with the use of integrated technologies that provide the animals with more opportunities to engineer their own environments, providing them with complexity, choice and control.

Cognitive Bias in Zoo Animals: An Optimistic Outlook for Welfare Assessment

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Simple Summary: Cognitive bias testing has emerged as one of the most valid tools in measuring animals' affective states, and while it has been extensively applied in farm and laboratory settings, only a few studies have taken place in zoos and aquaria. This review evaluates past cognitive bias studies on non-domesticated, "exotic" species kept in zoos or other settings and uses their experiences to make recommendations for establishing this research in zoos. The many variables inherent to functioning zoo environments will determine the scope and design of cognitive bias studies, but equally future efforts should be cognizant of the significant and unique benefits for the animals, managers, and scientists involved.

Abstract: Cognitive bias testing measures how emotional states can affect cognitive processes, often described using the "glass half-full/half-empty" paradigm. Classical or operant conditioning is used to measure responses to ambiguous cues, and it has been reported across many species and contexts that an animal's cognitive bias can be directly linked to welfare state, e.g., those in better welfare make more optimistic judgements. Cognitive bias testing has only recently been applied to animals and represents a key milestone in welfare science: it is currently one of the only accurate methods available to measure welfare. The tests have been conducted on many farm, laboratory, and companion animal species, but have only been carried out in zoo settings a handful of times. The aims of this review are to evaluate the feasibility of cognitive bias testing in zoos and its potential as a tool for studying zoo animal welfare. The few existing zoo cognitive bias studies are reviewed, as well as those conducted on similar, non-domesticated species. This work is then used to discuss how tests could be successfully designed and executed in zoo settings, which types of tests are most appropriate in different contexts, and how the data could be used to improve animal welfare. The review closely examines the many variables are present in the zoo which cannot be controlled as in other settings, termed here the Zoo Environment (ZE) Variables. It is recommended that tests are developed after consideration of each of the ZE Variables, and through strong collaboration between zookeepers, managers, and academic institutions. There is much unexplored potential of cognitive bias testing in the zoo setting, not least its use in investigating animal welfare in zoos. It is hoped that this review will stimulate increased interest in this topic from zoo managers, scientists, and industry regulators alike.

Keywords: affective state; animal-based measures; animal welfare; cognitive bias; zoo animals

ARTICLE



My Reflections on Understanding Animal Emotions for Improving the Life of Animals in Zoos

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ABSTRACT

Scientists are often reluctant to attribute emotions to nonhuman animals that are similar to human emotions. When the author published her early studies, reviewers prohibited the word *fear*. Fearful behavior had to be described as agitated. The core emotional systems described by Panksepp may provide a useful framework for people who work hands-on with animals. The core systems are fear, rage, panic (separation distress), seek, lust, nurture, and play. Some scientists who deny that animals have real emotions often fail to review important areas of the literature. The areas that are sometimes left out are the effects of psychiatric medications on animals and genetic influences on differences in animal behavior. In both people and animals, genetics has an influence on both fearfulness and novelty seeking. Visualizing the seven core emotional systems as separate volume controls on a music mixing board may help zoo professionals determine the motivation of both normal and abnormal behavior. It may also help them to design more effective environmental enrichments.


KEYWORDS

Animal welfare; zoos; emotions; fear; exploratory behavior; separation distress

ARTICLE



Advances in Applied Zoo Animal Welfare Science

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ABSTRACT

Nonhuman animal welfare science is the scientific study of the welfare state of animals that attempts to make inferences about how animals *feel* from their behavior, endocrine function, and/or signs of physical health. These welfare measurements are applicable within zoos yet inherently more complex than in farms and laboratories. This complexity is due to the vast number of species housed, lack of fundamental biological information, and relatively lower sample sizes and levels of experimental control. This article summarizes the invited presentations on the topic of “Advances in Applied Animal Welfare Science,” given at the Fourth Global Animal Welfare Congress held jointly by the Detroit Zoological Society and the World Association of Zoos and Aquariums in 2017. The article focuses on current trends in research on zoo animal welfare under the following themes: (a) human–animal interactions and relationships, (b) anticipatory behavior, (c) cognitive enrichment, (d) behavioral biology, and (e) reproductive and population management. It highlights areas in which further advancements in zoo animal welfare science are needed and the challenges that may be faced in doing so.

KEYWORDS

Research; behavior; human–animal interaction; cognitive enrichment; management

There Are Big Gaps in Our Knowledge, and Thus Approach, to Zoo Animal Welfare: A Case for Evidence-Based Zoo Animal Management

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There are gaps in knowledge that hinder our ability within zoos to provide good animal welfare. This does not mean that zoos cannot or do not provide good welfare, only that currently this goal is hindered. Three reasons for these gaps are identified as: (1) there is an emphasis on the identification and monitoring of indicators that represent poor welfare and it is assumed that an absence of poor welfare equates to good welfare. This assumption is overly simplistic and potentially erroneous; (2) our understanding of how housing and husbandry (H&H) affects animals is limited to a small set of variables determined mostly by our anthropogenic sensitivities. Thus, we place more value on captive environmental variables like space and companionship, ignoring other factors that may have a greater impact on welfare, like climate; (3) finally, whether intentional or not, our knowledge and efforts to improve zoo animal welfare are biased to very few taxa. Most attention has been focused on mammals, notably primates, large cats, bears, and elephants, to the exclusion of the other numerous species about which very little is known. Unfortunately, the extent to which these gaps limit our ability to provide zoo animals with good welfare is exacerbated by our over reliance on using myth and tradition to determine zoo animal management. I suggest that we can fill these gaps in our knowledge and improve our ability to provide zoo animals with good welfare through the adoption of an evidence-based zoo animal management framework. This approach uses evidence gathered from different sources as a basis for making any management decisions,

Gap: Current Housing and Husbandry Practice Is Based Largely on Promulgation of Myth and Tradition

A review of national and regional zoo association H&H guidelines found that **most recommendations for best practice are based on “current” practice and not supported by empirical evidence** [Melfi et al., 2007].

“Much zoo husbandry and housing provision is based on what has worked previously (or is working currently) and this “**status quo**” is then adopted into **best-practice guidelines**, instead of from an evidence-based approach.” (Wolfensohn et al., 2018)

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Born to choose: the origins and value of the need for control

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Belief in one's ability to exert control over the environment and to produce desired results is essential for an individual's wellbeing. It has repeatedly been argued that perception of control is not only desirable, but is also probably a psychological and biological necessity. In this article, we review the literature supporting this claim and present evidence of a biological basis for the need for control and for choice—that is, the means by which we exercise control over the environment. Converging evidence from animal research, clinical studies and neuroimaging suggests that the need for control is a biological imperative for survival, and a corticostriatal network is implicated as the neural substrate of this adaptive behavior.

The significance of choice

You have brains in your head, You have feet in your shoes,
You can steer yourself in any direction you choose

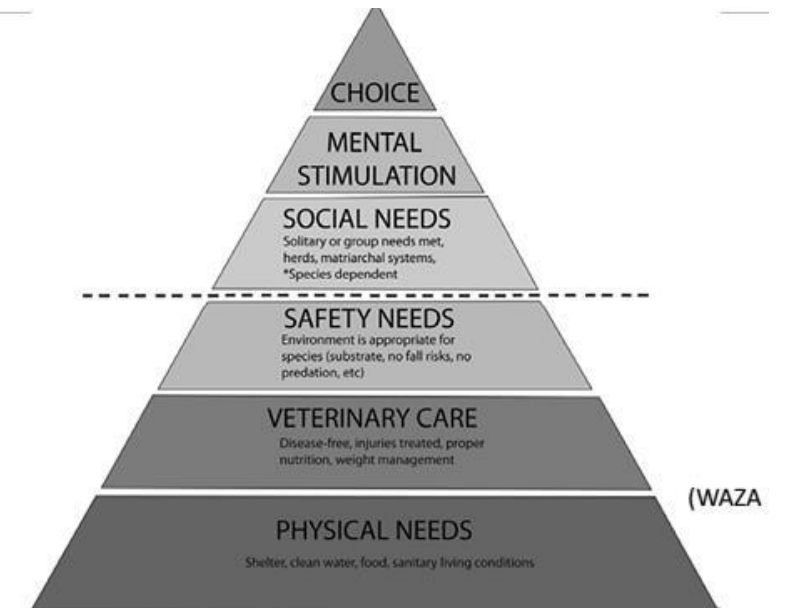
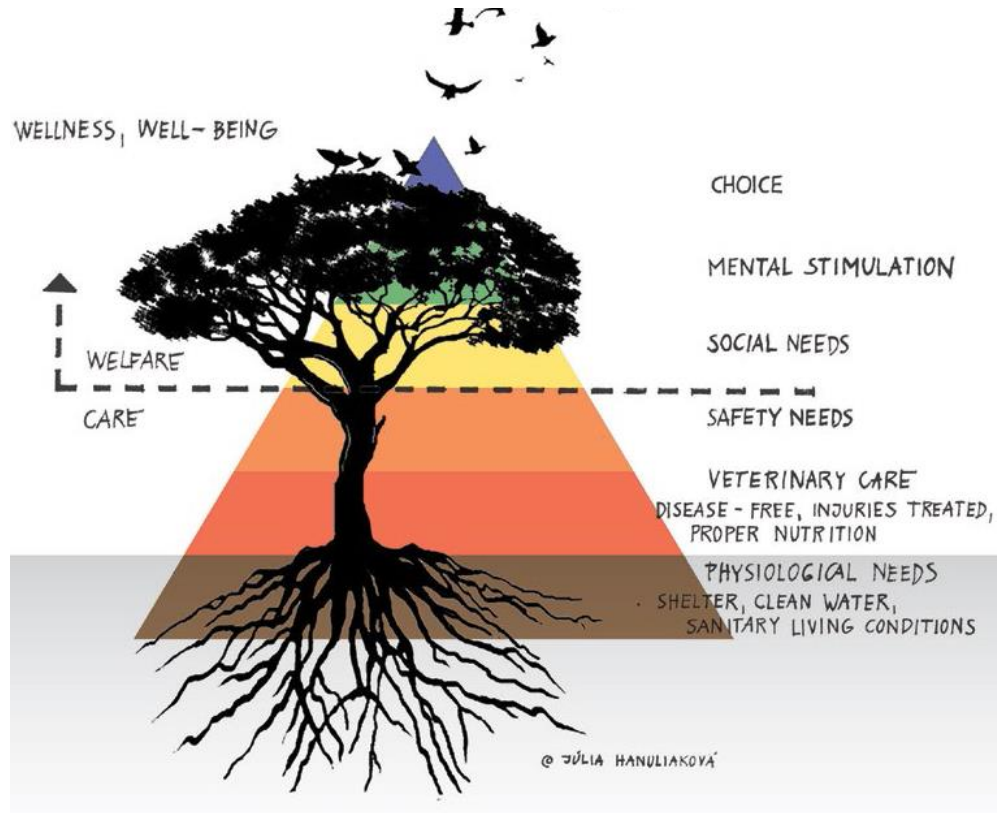
Although there is extensive evidence indicating that perception of control is adaptive across diverse spheres of psychosocial functioning, as well as physical health (see below), there have been no attempts to integrate these findings into a systematic review addressing why people desire choice and control. Here, we present evidence to support the claim that the need for control is biologically motivated, meaning that the biological bases for this need have been adaptively selected for evolutionary survival. First, we summarize the predominant contributions to our understanding of perceived control and its adaptive effects. We then present empirical evidence indicating that the presence or absence of control has a profound impact on the regulation of emotion, cognition and physiology. Finally, we examine the neural substrates of the need for control based on findings from animal studies, clinical populations and neuroimaging research. Taken together, this evidence provides compelling support for a biological explanation of the need for choice.

EAZA & WAZA welfare standards

EAZA is committed to promoting the positive welfare of animals in not only our member institutions but also supporting zoos and aquaria which are currently working towards reaching EAZA's accreditation standards. EAZA Members are proactive in both undertaking and applying animal welfare scientific research, contributing to EAZA being a recognised organisation in animal welfare best-practice.

What is welfare?

Animal welfare refers to the physiological and psychological well-being of animals – effectively, this is how the individual animal is coping, both mentally and physically, at a particularly point in time. This means adopting a multi-disciplined, scientifically evidence-based approach to assure that the animal's needs and wants are met. This should include, for example, the provision of effective veterinary care, meeting dietary requirements, providing individuals with the opportunity to perform their species-specific behavioural repertoire and promoting positive emotional states.



In doing this, WAZA calls on its members and all zoos and aquariums to:

- strive to achieve high welfare standards for the animals in their care;
- be animal welfare leaders, advocates and authoritative advisers; and
- provide environments that focus on the animals' physical and behavioural needs.

“Do we need natural history information?”



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- Natural history
- Adaptive potential
- Behavioural biology

Natural behavioural biology as a risk factor
in carnivore welfare: How analysing species
differences could help zoos improve enclosures[☆]

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Available online 2 August 2006

→ essential for understanding welfare needs

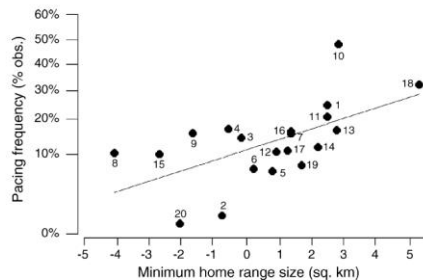


Fig. 1. Minimum home-range size (accounting for body size) and median % pacing frequency in affected individuals. Stereotypy data was arcsine transformed but units on the y-axis are given in the raw form for clarity. Species are labelled as follows: (1) *Acinonyx jubatus*; (2) *Alopex lagopus*; (3) *Caracal caracal*; (4) *Leopardus pardalis*; (5) *Lynx canadensis*; (6) *Lynx lynx*; (7) *Melurus ursinus*; (8) *Mustela vison*; (9) *Oncifelis geoffroyi*; (10) *Panthera leo*; (11) *Panthera onca*; (12) *Panthera pardus*; (13) *Panthera tigris*; (14) *Puma concolor*; (15) *Suricata suricatta*; (16) *Ursus americanus*; (17) *Ursus arctos*; (18) *Ursus maritimus*; (19) *Ursus thibetanus*; (20) *Vulpes vulpes*.

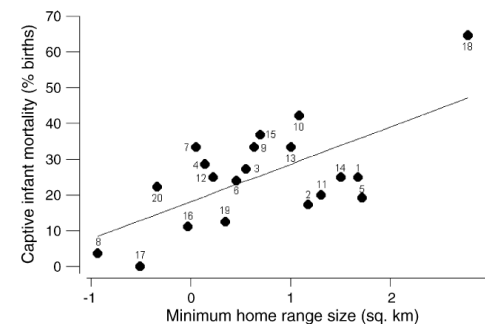


Fig. 3. Minimum home-range size (with body size partialled out) and median captive infant mortality rate over days 1–30. Species are labelled as in Fig. 1.

Review



Species differences in responses to captivity: stress, welfare and the comparative method

Georgia J. Mason

Natural history traits predicts adaptability

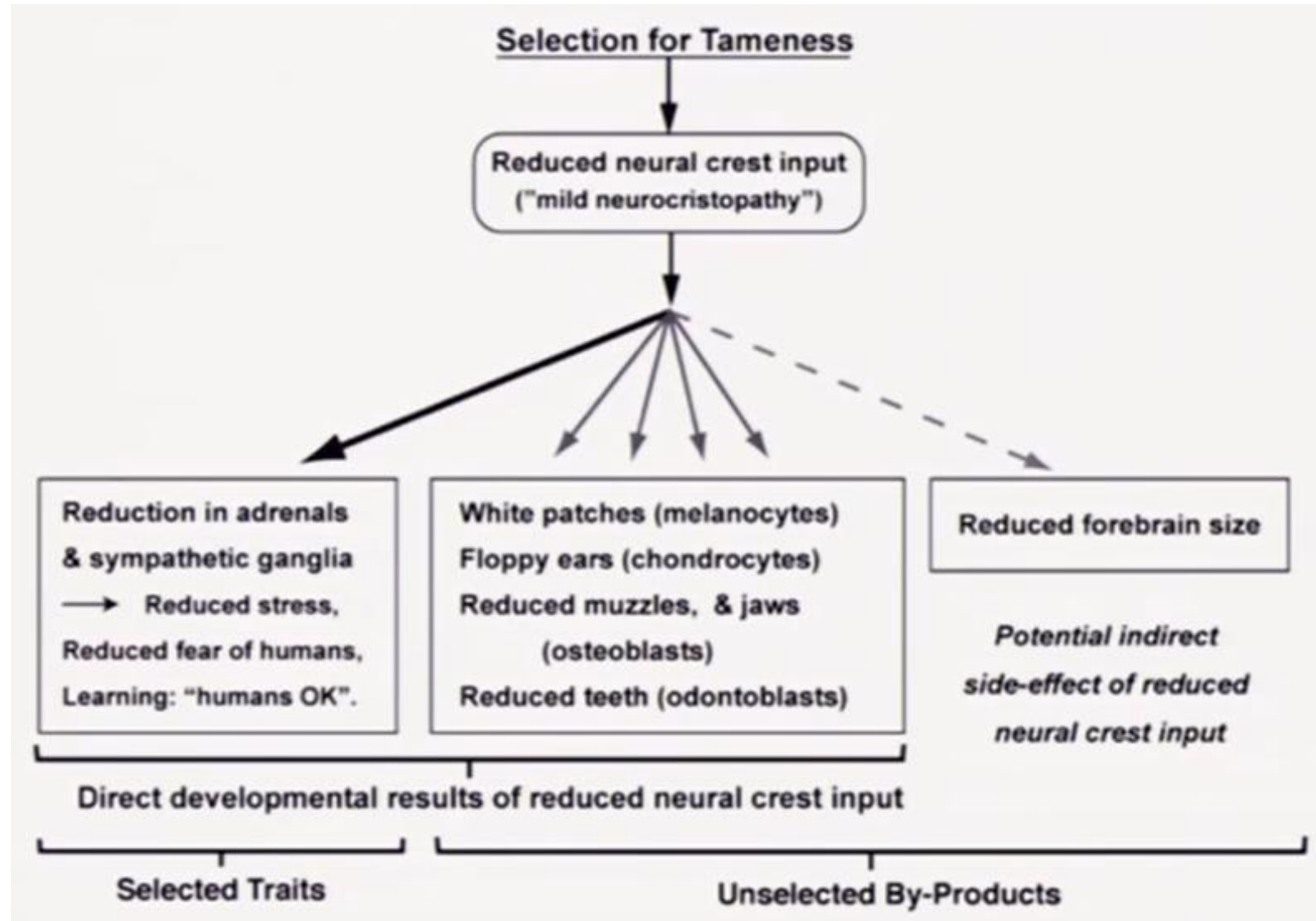
- Boldness, behavioral flexibility and being non-migratory: predicting invasiveness and tolerance of rapid, anthropogenic environmental change in the wild.
- Timidity, a wide-ranging lifestyle and dietary or habitat specialism are similarly unfavorable for successful domestication.
- Do these traits also predict poor wellbeing in captive wild species?

“Are zoo animals domesticated?”

- Domestication: genetic reorganisation of neuro-endocrinological mechanisms that drive ontogeny, selection of lowered aggression towards man resulting in altered aggression and stress regulation, altered gonadal & pituitary-adrenal system (Naumenko et al., 2009)
- Selection for tameness resulting in reduction of stress, behavioural flexibility, aggression, activity patterns, sensorial alertness: decline of environmental appreciation (Hemmer)

Pre-adapatations to domestication

- Relaxed temperament
- Flexible diet (no carnivores)
- Precocial young – fast maturity and growth
- Group living
- Male-female affiliation
- hiërarchy
- Imprinting period
- Reproductive signals – male dominance or promiscuity



- Reduction stress response
- Reduction brain size
- Progenesis
- Neoteny
- Changes in behavioural expression
- Reduction contra-freeloading



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Special Issue

Plastic animals in cages: behavioural flexibility and responses to captivity

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Table 4

Domesticate-like changes in wild animals after multiple generations in captivity and within a single generation in captivity

Domesticate-like changes	Populations captive bred (but not artificially selected) for multiple generations over recent years/decades	Animals developing in captivity (F0 or F1), compared to F0 wild-caught adults placed into captivity
Improved survival	Bank voles, <i>Clethrionomys glareolus</i> (Sørensen & Randrup 1986)	
Improved reproduction (e.g. earlier sexual maturation; more fecund; better infant survivorship)	Pigtailed macaques, <i>Macaca nemestrina</i> (Ha et al. 2000) Golden hamsters, <i>Mesocricetus auratus</i> (Fritzsche et al. 2006) Rhesus monkeys, <i>Macaca mulatta</i> (Casebolt et al. 1985) Atlantic salmon, <i>Salmo salar</i> (Domagala et al. 2005) Various waterfowl (Batt & Prince 1978)	Gorillas, <i>Gorilla gorilla</i> (Ryan et al. 2002) Woolly monkeys, <i>Lagothrix lagotricha</i> (Mooney & Lee 1999) Possibly golden-lion tamarins, <i>Leontopithecus rosalia</i> (De Vleeschouwer et al. 2003)
More docile (e.g. less fearful/friendlier to humans/easier to handle)	Leopard geckos, <i>Eublepharis macularius</i> (Indiviglio 2007) Brook trout (Fraser 2008) Coonstripe shrimp, <i>Pandalus danae</i> (Marliave et al. 1993) Zebra finches, <i>Taenopygia guttata</i> (Ewenson et al. 2001) Diverse snakes (Cheek & Richards 2003)	Pigtailed macaques (Crockett et al. 2000) African striped mice, <i>Rhabdomys pumilio</i> (Jones et al. 2011) European starlings, <i>Sturnus vulgaris</i> (Feenders et al. 2011) Possibly black stilts, <i>Himantopus novaezelandiae</i> (van Heezik et al. 2005) Black rhinoceros, <i>Diceros bicornis</i> (Carlstead et al. 1999) In blue jays, <i>Cyanocitta cristata</i> , less route tracing, a stereotypic behaviour related to being enclosed (Keiper 1969) Marsh deer, <i>Blastocerus dichotomus</i> (Christofoletti et al. 2010) Southern white rhinoceros, <i>Ceratotherium simum simum</i> (Metrione & Harder 2011) African striped mice (Jones et al. 2011) Gilbert's potoroo, <i>Potorous gilbertii</i> (Stead-Richardson et al. 2010) Possibly spider monkeys (<i>Ateles</i> spp.: Ange-van Heugten et al. 2009) Possibly owl monkeys (<i>Aotus</i> spp.: Weller et al. 1994).
Reduced endocrine responses to captivity/restraint etc	Sea trout, <i>Cynoscion nebulosus</i> (Lepage et al. 2000)	Iberian lynx, <i>Lynx pardinus</i> (García-Bocanegra et al. 2010) Gorillas: less coprophagy (Akers & Schildkraut 1985); less regurgitation and reingestion of stomach contents (Gould & Bres 1986)
Healthier and feeding more readily	Coonstripe shrimp (Marliave et al. 1993) Falcons (Müller et al. 2000) Diverse snakes (Cheek & Richards 2003)	
Melanin loss	Coonstripe shrimp (Marliave et al. 1993) Leopard geckos (Indiviglio 2007) Lymnaea snails (Orr et al. 2008)	
Smaller brains	Many species (Price 2002; Guay & Iwaniuk 2008)	Lions and tigers (Yamaguchi et al. 2009) Trinidadian guppies, <i>Poecilia reticulata</i> (Burns et al. 2009) Chickadees: reduced hippocampal volumes (LaDage et al. 2009a, b)
Reduction of antipredator responses (and other behaviours needed in the wild but not in captivity)	Oldfield mice, <i>Peromyscus polionotus</i> (McPhee 2004) Red junglefowl, <i>Gallus gallus</i> (Håkansson & Jensen 2008) Several salmonids (Fraser 2008)	Rhesus monkeys (Joslin et al. 1964) Blue crabs, <i>Callinectes sapidus</i> (Davis et al. 2004) Trinidadian guppies (Kelley & Magurran 2003) Also poorer abilities to process challenging natural foods, e.g. nuts: bank voles (Mathews et al. 2005)
Morphological changes reflecting reduced use (e.g. shorter, lighter intestines)	Shorter, lighter intestines: Squirrel monkeys (<i>Saimiri</i> spp.: Chivers 1991) Brown teal, <i>Anas chlorotis</i> (Moore & Battley 2006)	Smaller, lighter intestines: Grouse and capercaillie (<i>Tetrao</i> spp.: Moss 1972; Liukkonen-Anttila et al. 2000) Shorter limb bones: black-footed ferrets, <i>Mustela nigripes</i> (Wiseley et al. 2005)

“Are animal species in zoos domesticated?”

- Some species show some domesticated traits
- Not pre-adapted
- Not systematically domesticated

“ Do we need ethics” → essential for setting goals

- Zero tolerance for stereotypical behaviour due to bad environments
- Promoting positive welfare (EAZA)

No ethical (or evaluative) conclusion can be validly inferred from any set of purely factual premises

Ethical statements *guide* action in a way that factual statements do not

Assessments of welfare have an ethical component: they say something about what is *good* or *bad* from the point of view of the animals

Biological facts never by themselves say anything about what is good or bad

How do we make ethical decisions (Bas Haring, 2019)

- Utilitarianism
- Principles
- Personal actions and motivations



Expert judgments (Burgman, 2016)

Scientific uncertainty — how should it be handled in relation to scientific advice regarding animal welfare issues?

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Abstract

The provision of advice on animal welfare is an important part of the work of scientists in applied ethology, neurophysiology, veterinary epidemiology and other disciplines. Those who request guidance often expect advice that will help them to make progress in difficult discussions. Scientists want to live up to these expectations, but it is also important for them to clarify any scientific limitations. They are normally aware of limits to their advice, but these limits are sometimes not explicitly stated. Using the phrase broadly, we call this kind of limitation 'scientific uncertainty'. We distinguish between the following four types of uncertainty: 1) Ontological uncertainty, relating to the existence of animal feelings and other states relevant for animal welfare. 2) Conceptual uncertainty, stemming from the fact that some of the concepts used in animal welfare science are value-laden if used outside a narrow scientific context. 3) Lack of scientific evidence, stemming from a lack of scientific data on the problem in question. 4) Uncertainty about priorities, relating to the practical conclusions to be drawn in a situation with an open-ended set of ethical and other practical considerations. Scientific uncertainty is unavoidable. It is therefore essential, when giving scientific advice, to state the assumptions on which the advice is based. This makes scientific advice more objective, but also of more limited value to those who do not share the underlying assumptions.

Keywords: animal welfare, objectivity, openness, scientific advice, scientific uncertainty

Conflicting goals of welfare assessment schemes: a case study

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Abstract

The aim of this article is to discuss the farming industry's development and use of welfare assessment schemes. A welfare assessment scheme developed by the [Danish Cattle Federation \(DCF\)](#) is used as [a case study](#). The declared aim of the DCF scheme is to improve animal welfare, farm profitability and dialogue with the public. It is the purpose of this article to attempt to understand the dilemmas arising from this broad aim. We ask how DCF measures of welfare compare with alternative measures in which economic factors receive less emphasis. We bring in farmers' views on whether the DCF's parameters of welfare track welfare effectively and are economically feasible. We also discuss how the views of the Scandinavian public on animal welfare influences the likelihood that the DCF scheme will improve dialogue with the public. The DCF definition of welfare is broad, but the measures it deploys are more limited and indeed very narrow compared with those in other welfare assessment schemes. [This may not be a problem if the goal is to improve farm profitability](#). However, if the goal is to improve welfare, limited measures are problematic, and this may undermine attempts to improve dialogue with the public.

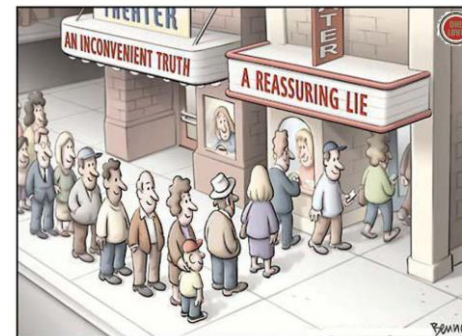
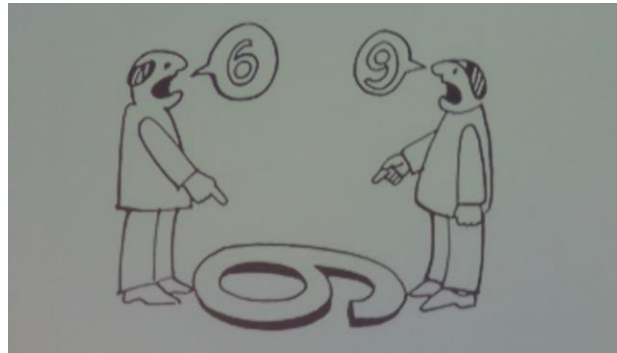
Keywords: animal-based measures, animal welfare, citizens' views on welfare, dairy cattle, farmers' views on welfare, farming industry welfare scheme

What is your personal zone of cognitive dissonance?

= mental discomfort (psychological stress) experienced by a person who holds two or more contradictory beliefs, ideas, or values.






When triggered by situation in which a person's belief clashes with new evidence perceived by the person.

When confronted with facts that contradict beliefs, ideals, and values, people want to resolve the contradiction & reduce their discomfort: they will rationalize, ignore and deny anything that does not fit with the core belief.

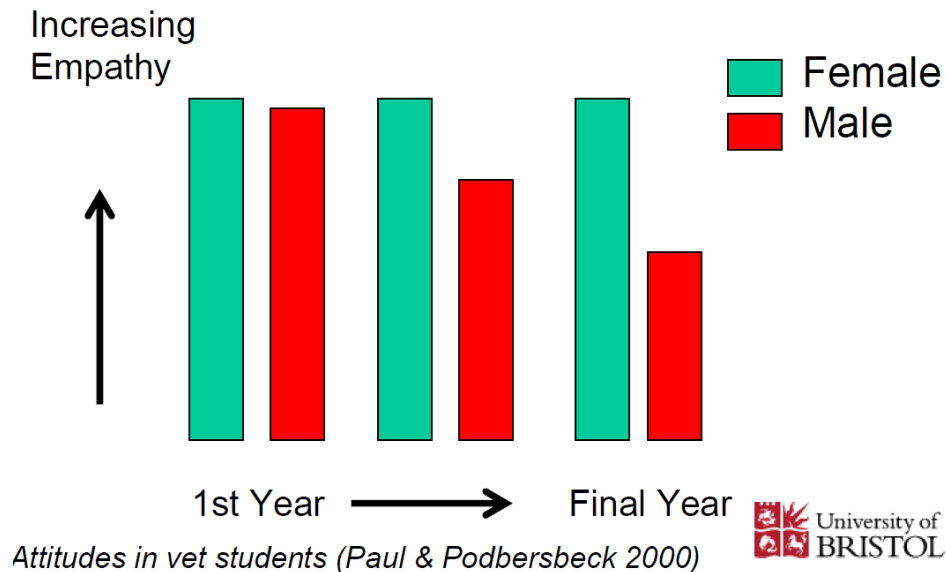


Article

Familiarity and Interest in Working with Livestock Decreases the Odds of Having Positive Attitudes towards Non-Human Animals and Their Welfare among Veterinary Students in Italy

Chiara Mariti ^{1,*} , Federica Pirrone ² , Mariangela Albertini ² , Angelo Gazzano ¹  and Silvana Diverio ³ 

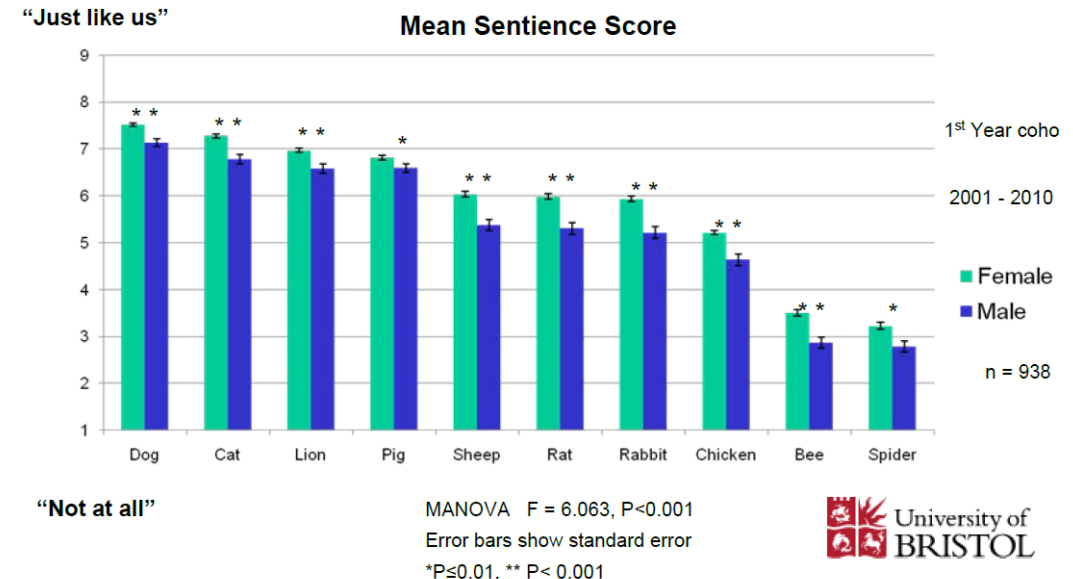
Empathy in veterinary students



Belief in Sentience :
affected by gender

Nancy Clarke, David Main, Elizabeth Paul

WSPA World Society
for the Protection
of Animals



Expert judgments (Burgman, 2016)

- Formez une groupe diverse: jugements basés sur informations multiples
- Soyez clair sur le biais motivationelle. Cherchez à inclure des experts aux positions différentes.
- Clarifiez d'abord les incertitudes linguistiques: définiez les concepts précisément, apportez des informations additionnelles
- Reconnaissez les limites de votre expertise
- Soyez l'expert approprié pour la question ou consultez celui-ci
- Partagez vos informations et connaissances. Explicitiez ce que vous ne savez pas.
- Méfiez votre propre intuition: analysez vos jugements rapides et intuitives.
- Quantifiez vos degrés d'incertitudes: définiez les limites de vos estimations.
- Pratiquez et documentez vos jugements (par ex. ma position éthique,...)
- Cherchez du feedback sur des estimations ou jugements dès que l'opportunité se présente



"The 'truth' results from discussions with friends"
(David Hume, 1711-1776)



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