Animal welfare science

concepts, measurement and improving
quality of life

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Human animal studies
Outline

• Animal sentience
• What is ‘animal welfare’
• Measuring welfare
• Outcomes of welfare science

Resources / images used from www.animalmosaic.org
Animal rights or animal welfare?

• Animals as moral agents – compelling argument (lecture 2)

BUT

• Majority of society believes human use of animals is acceptable

• ‘Animal welfare’ is the position of science, law and governance
Modern agriculture

- In Europe and North America, farming became more industrialised in 1950s and 1960s
  - focus on production and efficiency ⇒ cheaper food for humans ⇒ better human health
  - housing animals in large numbers ⇒ easier supervision, but increased disease
  - important welfare contribution from veterinary medicine ⇒ vaccinations, treatment
  - Food production specialised ⇒ less contact between the consumer and animals
  - Production mechanised ⇒ less human contact
Meat industry

- Animals produced for consumption in the UK per year
  - Broilers (meat chicken) 850 million
  - Pig 10 million
  - Sheep 15 million
  - Cattle 1.6 million (RSPCA)
- 1961 average consumption 22kg / year
  2007 average consumption 40kg /year (UN food and Agriculture org. )
- Production subsidised by CAP
Sentience

“The fact that the lower animals are excited by the same emotions as ourselves is so well established that it will not be necessary to weary the reader by many details” (Darwin 1872)

- Consideration of welfare is based on assumption of sentience
- Vertebrates and some invertebrates
  - e.g. Pigs but not prawns
- Legal standing
  - EU recognition 1997 treaty of Amsterdam
What is ‘welfare’

Three key areas /approaches

• Physical processing
• Naturalness ‘telos’
• Mental state
Definitions of animal welfare: ‘physical’

“I suggest that an animal is in a poor state of welfare only when [its] physiological systems are disturbed to the point that survival or reproduction are impaired” (McGlone, 1993)
Natural behaviour

• “In principle, we disapprove of a degree of confinement of an animal which necessarily frustrates most of the major activities which make up its natural behaviour” (Brambell Committee, 1965)

• “Not only will welfare mean control of pain and suffering, it will also entail nurturing and fulfilment of the animal’s nature, which I call telos” (Rollin, 1993)
Good welfare?
Definitions: ‘mental’

“… Neither health nor lack of stress nor fitness is necessary and/or sufficient to conclude that an animal has good welfare. Welfare is dependent upon what animals feel” (Duncan, 1993)

“To be concerned about animal welfare is to be concerned with the subjective feelings of animals, particularly the unpleasant subjective feelings of suffering and pain” (Dawkins, 1988).
The Five Freedoms
(Brambell Committee, 1965; FAWC, 1992)

• Farm Animal Welfare Council (FAWC), (1992)
  – Freedom from hunger and thirst
  – Freedom from discomfort
  – Freedom from pain, injury and disease
  – Freedom to express normal behaviour
  – Freedom from fear and distress
The Five Freedoms and animal welfare (Brambell, 1965; FAWC, 1992)

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Welfare as a continuum?
(e.g. FAWC (2009) vs. Veissier & Boissy (2007))

Good welfare

A good life
mainly positive experiences and emotions

Adequate welfare

A life worth living
minimal suffering

Poor welfare

A life not worth living
all suffering
How do we measure welfare?

**Quantitative**

*Physical*
- Observations of physical wellbeing

*Behaviour*
- Observation of natural behaviour
- Choice experiments
- Motivation experiments

*Physiological*
- Biomarkers

*Cognitive*
- Cognitive bias

**Qualitative**

- Behavioural assessment
Measurement of physical functioning

• Poor welfare; gastric ulcers, mastitis, lameness
• Good health; weight gained, offspring born, milk produced

USEFUL; important, efficient, measures health, repeatable, links to profit

BUT only part of the story
Behaviour; in a natural environment

Edinburgh Pig Park
• Modern breed lines
• Semi natural environment
• Complex repertoire of behaviour
• Nest building
Behaviour; stereotypies and misdirection

- Stereotypies
  - Repetitive behaviour
  - Constant in form
  - No obvious purpose in the context

- Indicate past or present frustration
  - Restrictive environment

(Mason, 2006)
Stereotypies: other examples

- Horses: crib-biting (Wickens & Heleski, 2010):
  - Genetics and lack of opportunities to forage
- Hens: feather-pecking (Rodenburg, et al., 2004):
  - Genetics, activity, stocking density
- Companion animals: barking, pacing, etc. (Luescher, 2003)
Behaviour; observing and recording

• Ethology – scientific and objective study of animal behaviour
• Start with preparation of ethogram – catalogue of behaviour
• Welfare emphasis on quantifying behaviour
• e. g. comfort of lying areas
  – Position shifting (per hour)
  – Time spent lying (% of total)
Behaviour; choice experiments

In the T maze animals choose where to spent time

Sows choose
• Bigger space
• Bedding

(Philips et al 1992)
Behaviour; motivation experiments

• Application of consumer demand theory
  – Marian Dawkins
• How much is an animal willing to ‘pay’?
• As cost of items increases only necessities are sort
• Sows are highly motivated to access substrate to nest build
Physiological; biomarkers

• Response to physical or psychological challenges can be detected in release of ‘stress hormones’

• Increased levels in restrained sows.
  – Peak prior to farrowing
Physiological biomarkers; limitations

• Do not indicate if animal’s experience is positive, negative or neutral

• Increased activity from stress

• Measurement itself may be stressful

• Welfare cost (e.g. implanted devices, some lab analyses)
Cognitive bias

• Cognitive = information processing, i.e. attention, learning, memory decision making
• Cognitive processes influence emotion and emotions can influence cognition
• Animals exposed to negative stimulus did not anticipate positive outcome
  (Harding et al 2004)
Qualitative welfare assessment (QBA)

• Do we need quantitative measures to understand animal welfare?
• What do our intuitive beliefs about how other being feel offer to this debate
• QBA is based on careful observations
• Anthropomorphic / centric
  – Animals have different senses / different needs
Validity of qualitative assessment

• Repeatable – by same observers
• Reproducible – by different observer
• Based on the animal not the environment
• Be ‘saying something’ about mental state of the animal
Animal welfare inputs - what affects animal welfare?

Management

Environment

Animal

Animal welfare
Welfare inputs; management

Meets needs
• Food and water
• Shelter / thermal comfort
• Vet care

Intensive production = reliance
Extensive production = greater independence

Fear / human animal relationship
• Positive / negative interactions
• Measureable in approach distance
• Linked to production outcomes; less milk, fewer piglets born etc
Welfare inputs; environment

Policy focus

- Sow crates outlawed UK 2001
  - Elsewhere in Europe 2013
- Cages for laying ‘battery’ hens 2011

Welfare assessment

- Resource based

Needs to go beyond this
Welfare inputs; animal’s genetics

• Milk production; doubled in last 30 years = chronic mastitis and lameness
  (National Milk Producers Federation 1996)

• Weeks to produce a broiler chicken = limb damage
  1923 = 16 wks vs 1993 = 6 1/2 wks (Maudlin, 1995)

• Belgium Blue muscle development = high % of caesarean
  (Broom, 1993)
Summary

• Animal welfare is a young science
• Concerned with the ‘private’ experiences of sentient animals
• Consensus is developing that good welfare is ‘a life worth living’
• Range of quantitative and qualitative techniques used to understand and measure welfare
• Aim is to improve animal welfare
• Progress made?
Qualitative behavioural assessment (QBA)

Thanks to François Wemelsfelder / Marianne Farish
SRUC Scottish Rural collage for providing the video resources used
QBA task

Phase 1.
• Watch video clips (several times if you like)
• Write down terms that in YOUR view best sum up the expressive qualities of that animal(s) behaviour

Phase 2.
• Using terms devised above
• Score animals behaviour with respect to these terms on a continuous rating scale
Behaviour welfare /terms

- You are free to choose new terms for each new animal or use terms chosen for previous animals

- Concentrate on choosing the best terms for each individual animal
How would these data be analysed?

- Generalized Procrustes analysis (GPA) can be thought of as a pattern-matching mechanism.
- Based on the assumption that even if observers use different terms the differences / similarities between animals will be comparable.
- GPA detects the level of consensus between observer assessment patterns not on the basis of fixed terms, but on the basis of the (multidimensional) intersample distances specified by each observer (i.e. how each observer uses his/her terms to score animals behaviour).

(Wemelsfelder, 2007)
Questions; quantitative vs. qualitative methods

• What was it like to attempt QBA?
  – Individual vs. groups
  – Settings

• Is it necessary to measure welfare quantitatively?

• Is qualitative assessment of value in the scientific study of animal welfare?