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Purpose of this talk

A single point of view is not enough to understand animal welfare

Welfare is a wide term that embraces both the physical and mental well-being of the animal (Brambell report 1965)

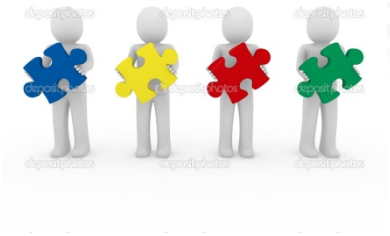
- Animal welfare is a complex object:
  It includes not only adaptation but also perception
- Its study requires knowledge and methods
  from several scientific disciplines
- It is best understood by multidisciplinary approaches

A brief history of animal welfare science(s) will show how studies carried within the framework of unique disciplines progressively evolved into multidisciplinary research.

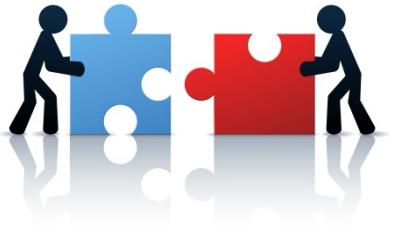
Animal Welfare: Towards transdisciplinarity

Isabelle VEISSIER – Mara MIELE

Early studies: separate disciplines,
animal welfare not directly addressed



Animal welfare becoming an object of research
use of methods previously designed for other purposes

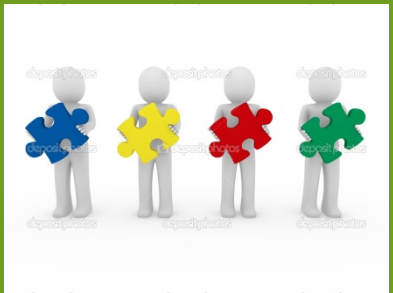


Bridging disciplines
to understand animal affects

Interdisciplinary approach
to develop a welfare assessment system

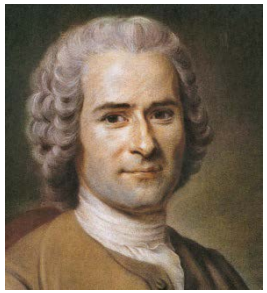
Next step: Transdiciplinarity
to address facts & values

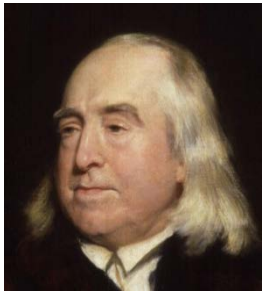
1



EARLY STUDIES
several disciplines,
animal welfare not directly addressed

Philosophy: the moral status of animals





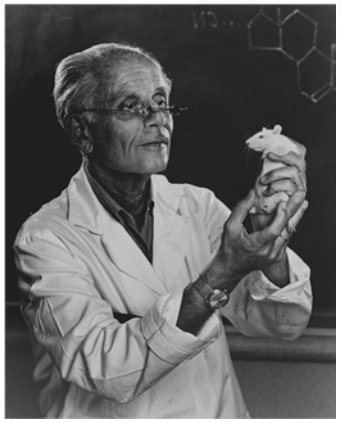
Rousseau, Bentham (18th): Animals are sentient and this confers them a moral consideration

*The question is not, can they reason?, nor Can they talk?, but, **Can they suffer**? (Bentham 1781)*

- We should treat animals according to their ability to suffer

Still what affects the animals could feel was not defined

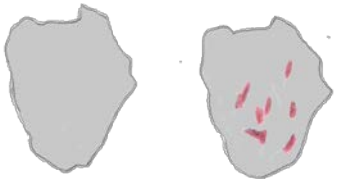
Physiology: **stress syndrome**



(Selye 1936)

adrenals hypertrophy

thymus atrophy



gastric ulcers

electric shocks
cold
infections ...

catecholamines
corticoïdes

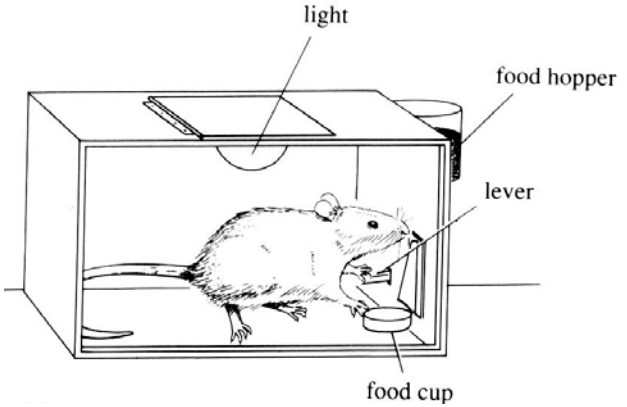
Stress: unspecific response of the body to an aggression that helps restore homeostasis.
No mention of how the aggression is perceived

Psychology: behaviourism

Watson (1913): new approach of psychology based on observable events

stimulus → **Black-box** → response

Operant conditionning: Skinner box
The behaviour of the animal is shaped until the desired response is obtained

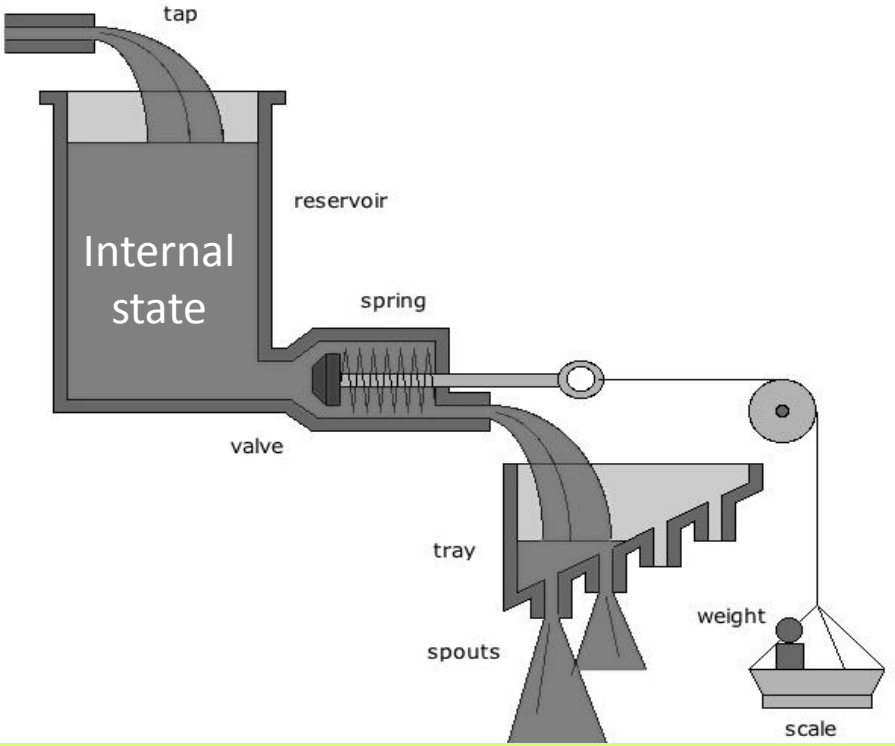


Behaviour: adaptive response of an organism to stimuli from the environment.
What happens in the black-box is impossible to study

Zoology: ethology

Observation of animals in their natural environment

Lorenz



Innate behaviours, behavioural repertoire
Importance of the internal state (motivation)
Animal mind is again a black-box

Veterinary medicine

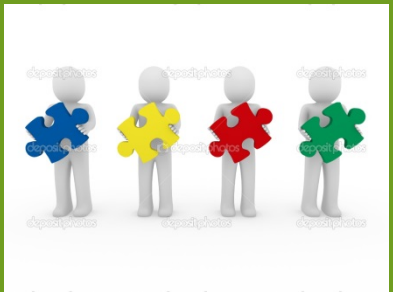
Description of clinical signs
↓
Identification of disorders
↓
Understanding of pathogeny
↓
Medical treatment

The disease is cured
What the animal feels is not taken into account

Early studies

- In philosophy, mental states started to be attributed to animals
- Stress physiology, behaviourism, ethology, veterinary medicine: considered that mental states are not possible to study
- The word ‘animal welfare‘ was not used

2

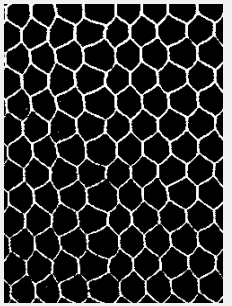


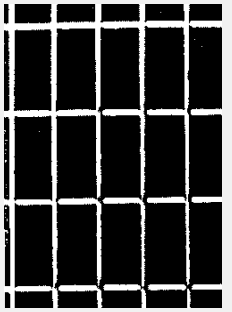
ANIMAL WELFARE BECOMING AN OBJECT OF RESEARCH

Use of methods previously designed for other purposes

Brambell report: We need to use *scientific evidence available concerning the feelings of animals (1965)*

Flooring for hens





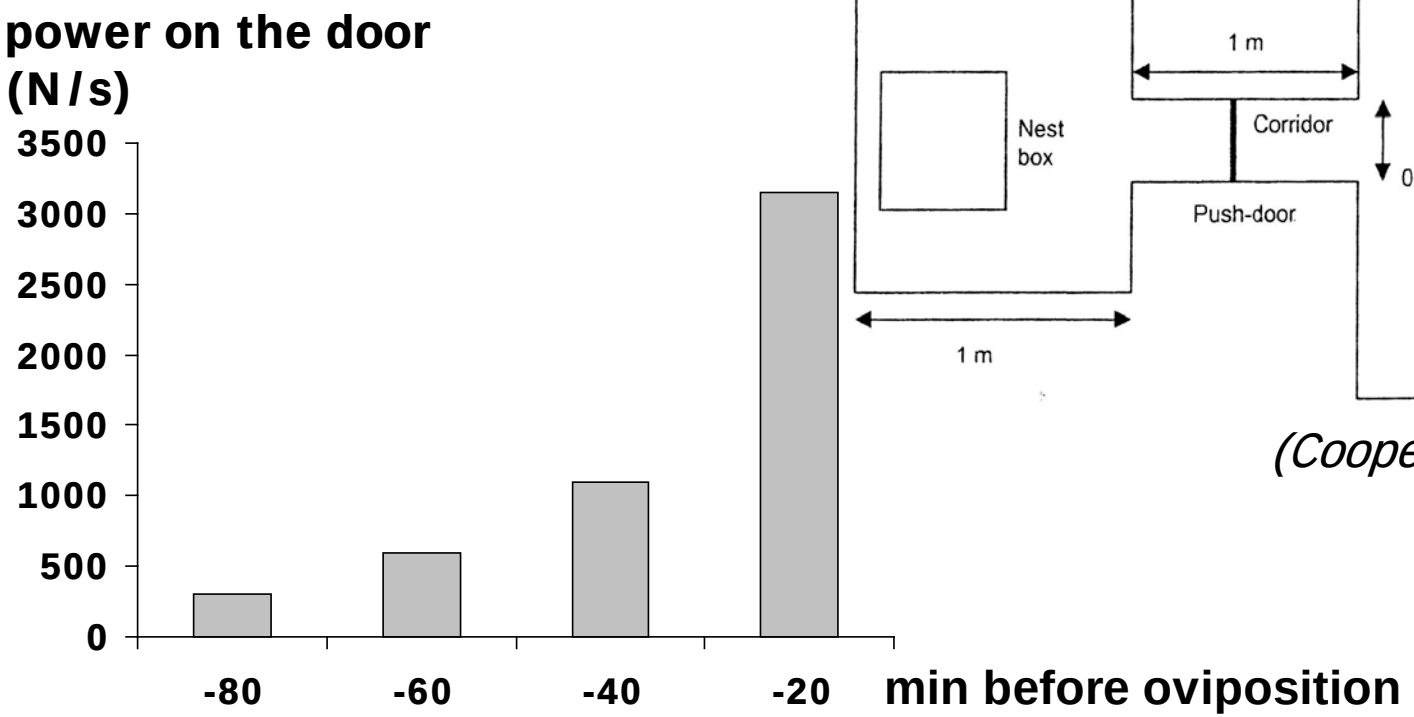
The views of humans (Brambell report 1965)	-	+
The views of hens (Hughes & Black 1975) (time spent on each floor, no. eggs)	+	-

The views of hens differ from that of humans!

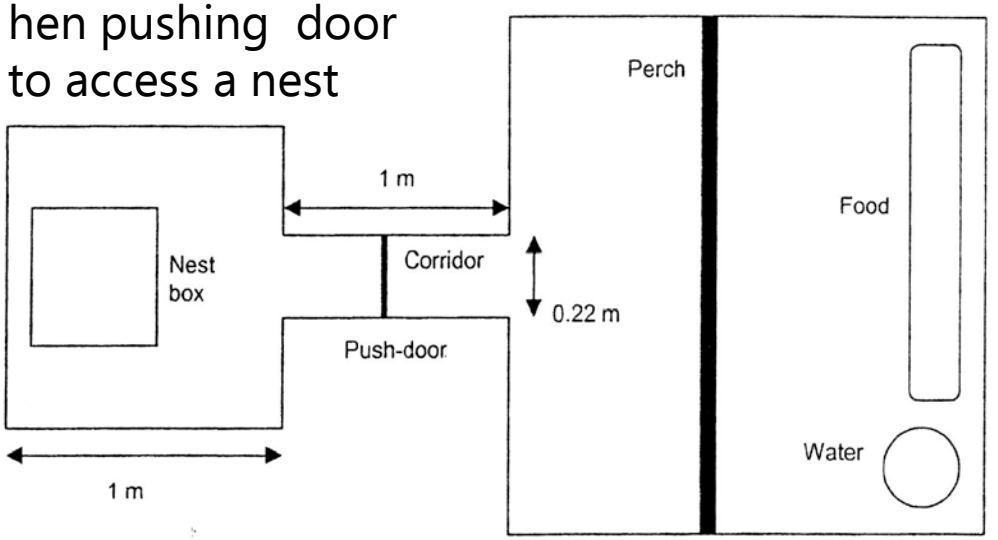
The study of animals' preferences

Use of operant conditioning: animals are required to work to obtain a reward or avoid a punishment

Readiness to work



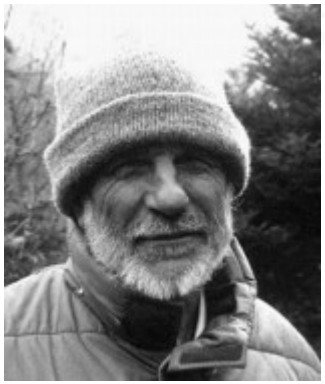
hen pushing door to access a nest



(Cooper & Appleby, 2003)

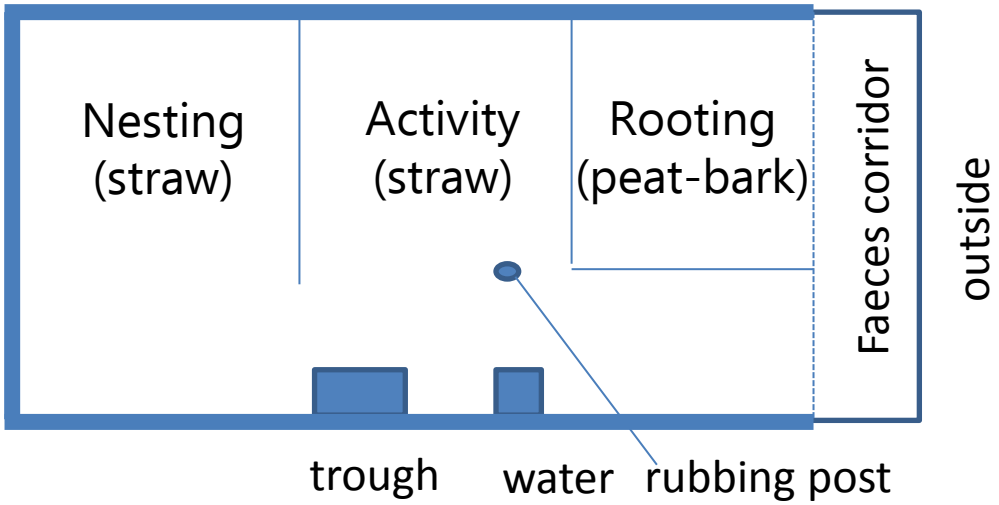
The results are described into preferences, aversions, or needs

Naturalistic approach



Stolba & Wood-Gush 1984

- Observations in natural environment:
  Identification of key features for pigs to express their behaviour
- Reproduction in farm conditions

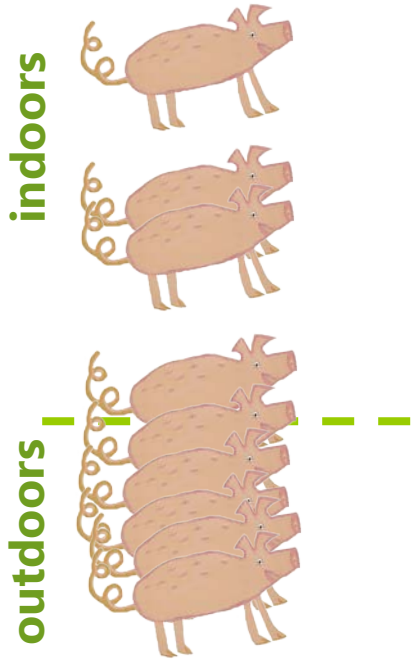


Abnormal behaviour

Welfare is improved
Production is increased

Indices of poor welfare (stress responses)

Gilts in 5 housing conditions



	Cortisol	Abnormal behaviour
Stall + neck tether	↗	3 %
Pair – pen 4mx1.8m	↗↗	3.6
Group – pen 4.1mx3.5m	→	1
Group 15mx15m	↗	0.4
Group Paddock 41mx17m	↗	0.7

Champing
Biting

(Barnett et al 1984)

A prolonged rise in blood cortisol is a sign of poor welfare
(Barnett and Hemsworth 1990)

Animal welfare: a science on its own

Fundamental questions in animal welfare science

1. *To what extent are the animals used by humans capable of emotions? In other words, what affective states can they feel?*
2. *How does an animal perceive its environment? In other words, what are the situations which are perceived negative vs. positive, or what are the elements animals like vs. dislike?*
3. *How can we assess the level of animal welfare in a given situation?*
4. *What are the impacts of the ways we treat animals (during their life or at slaughter) on the welfare of these animals?*
5. *What recommendations can we make as to improve animal welfare?*

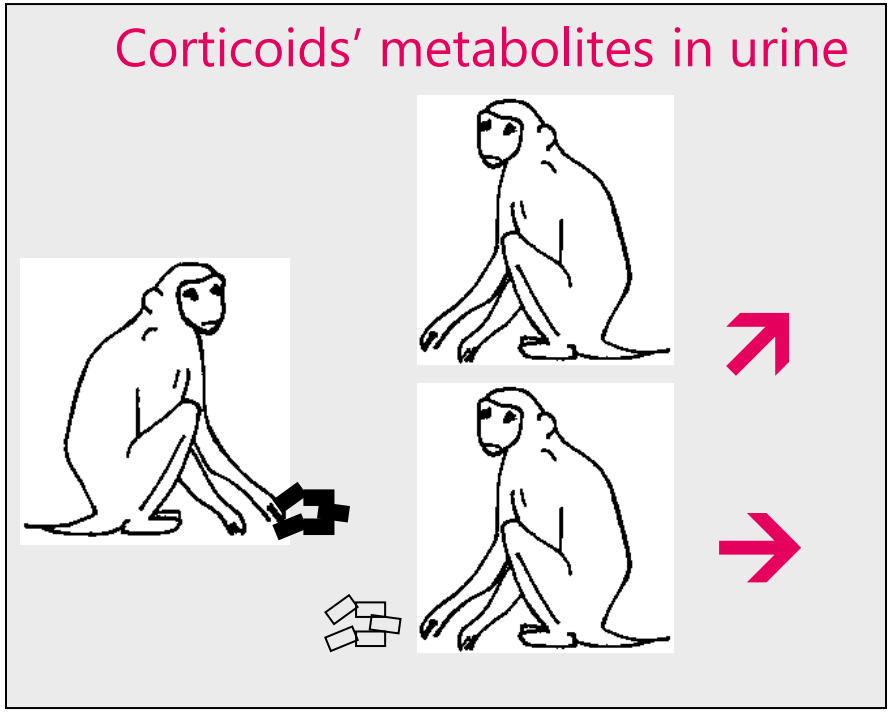
(Veissier & Forkman 2008)

3

BRIDGING DISCIPLINES
to understand animal affects

The stress concept refined

Mason 1971



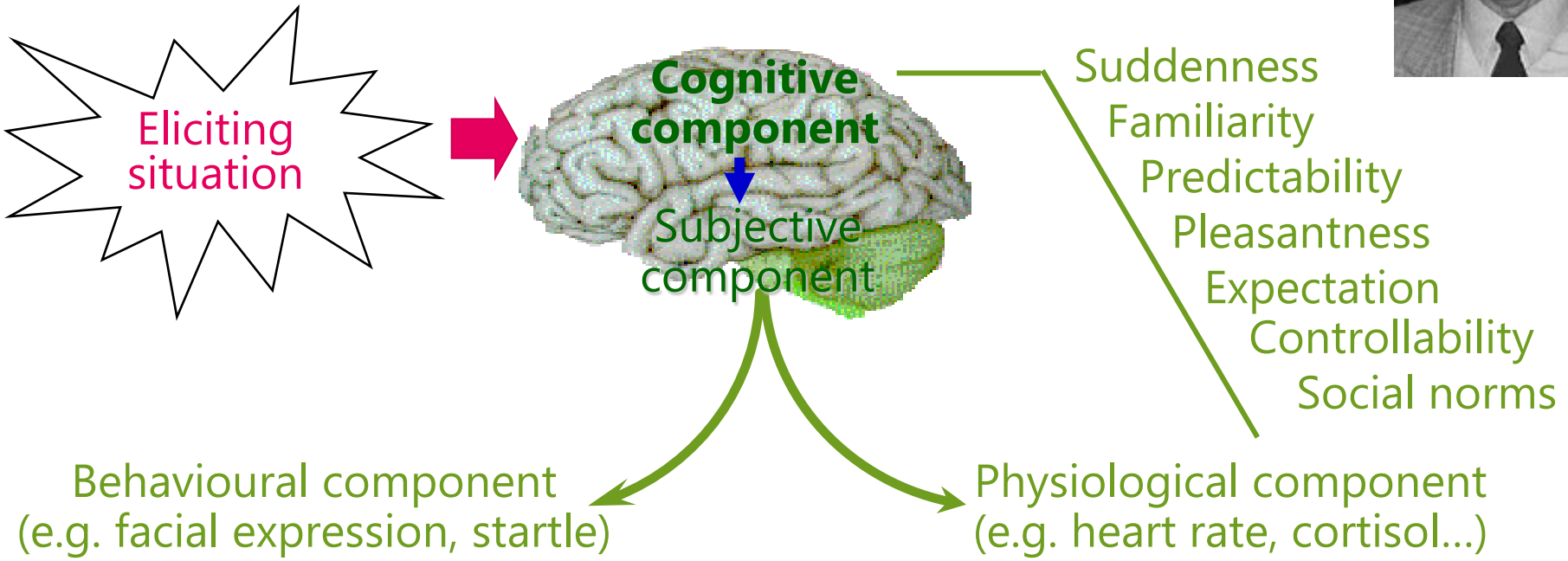
Fastening stresses monkeys only if they are aware of it

The un-specificity of stress responses comes from the common emotion that triggers them

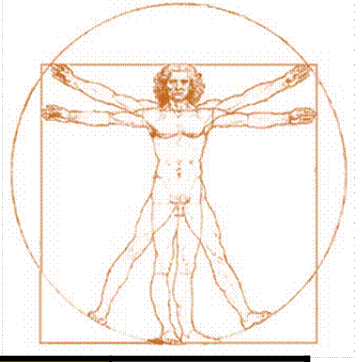
Psychology helps understand physiological reactions

The study of emotions (1/4)

✓ Cognitive psychology
An emotion is triggered by the <u>evaluation</u> of the situation according to a series of checks
(*Lazarus 1984, Scherer 1999)*



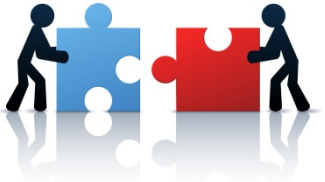
The study of emotions (2/4)



Checks

Suddenness	High	H	L	H	VL	L		L	
Familiarity	Low	L		VL	H				L
Predictable	L	L	Medium	L	VH	M			L
Pleasantness	L	open				VH			VL
Consistent to expectation	L	L		VL	H	H			
Control	L	H	H	VL	M				
Social norms		L	L				H	L	
Emotion	**Fear**	**Rage**	**Anger**	**Des pair**	**Bore dom**	**Happi ness**	**Pride**	**Shame**	**Disgust**

(Sanders et al., 2005)



The use of appraisal theories to study sheep

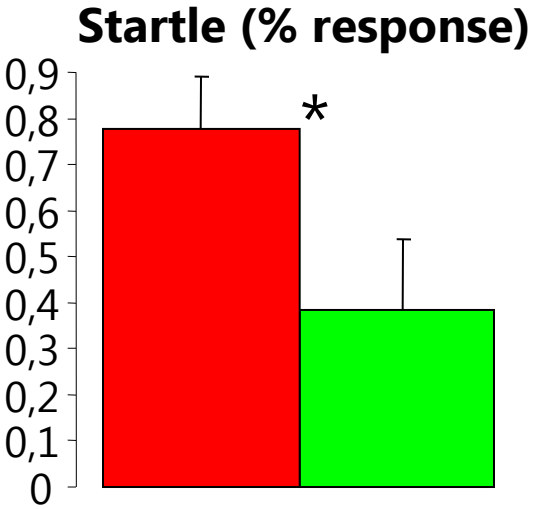
Ex: Relevance of the check Predictability

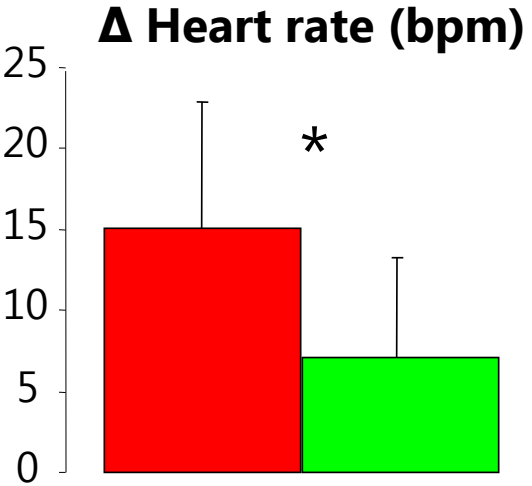
at random

signalled

Experimental paradigm

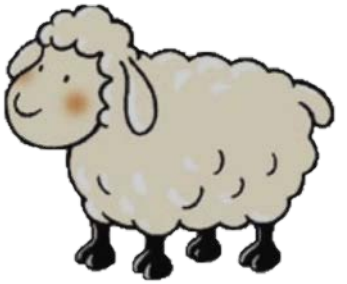
Lamb eating concentrates
Object falling suddenly behind the trough
The fall is preceded or not by a light signal





(Greiveldinger et al 2007)

Sheep emotions (4/4)



Checks Outcome of checks experimentally manipulated

Suddenness	**High**	**H**	Low	**H**	VL	L		L	
Familiarity	L	L		VL	**H**				L
Predictable	L	L	**Medium**	L	VH	M			L
Pleasantness	L					VH			VL
Consistent to expectation	L	L		VL	**H**	**H**			
Control	L	H	**H**	VL	M				
Social norms		L	L				**H**	L	
Emotion	**Fear**	**Rage**	**Anger**	**Des pair**	**Bore dom**	**Happi ness**	**Pride**	**Shame**	**Disgust**

(Veissier et al 2009)

Human psychology helps understand animal affects

Affective states and diseases

Force-swimming test:
when ill
mice move more
but stop moving earlier

Stressful event

↓

Appraisal → Behavioural despair
Depressive-like symptoms

↓

Emotional arousal ← *Cytokines* ← *Physical illness*

↓

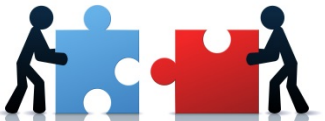
Defensive behaviour

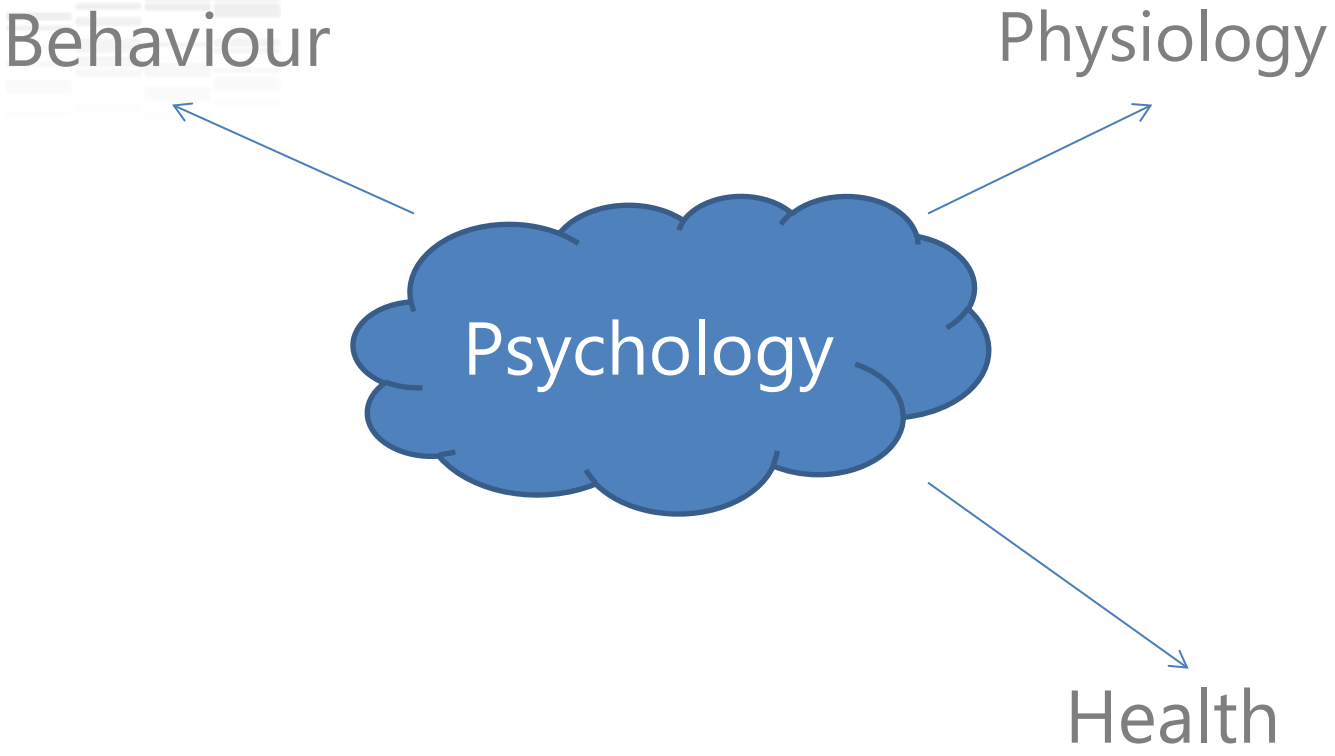
↓

Failure

(Renault & Aubert 2006)

Health helps understand behaviour & vice versa





Disciplines need to talk to each other

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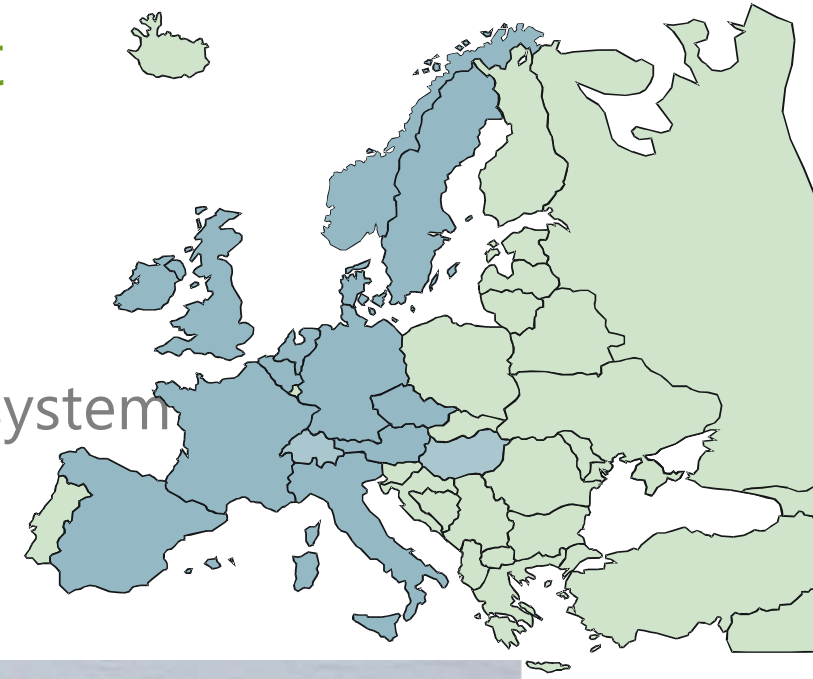
INTERDISCIPLINARY STUDIES to develop a welfare assessment system

Welfare Quality® project

- 2004-2009, 40 partners
- One core objective: to design an on-farm welfare assessment system for cattle, pigs, poultry



Interdisciplinarity in Welfare Quality®

Initial organisation

Year 1-3

Social scientists
Societal expectations

Animal scientists
Farm assessment

Appl ethol
Physiology
Vet med
Animal prod …

Year 4-5

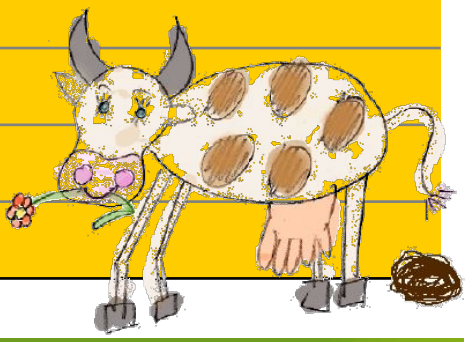
Together
Implementation

Steps

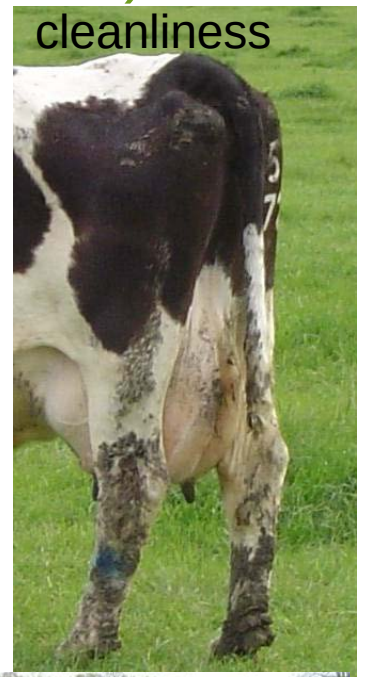
1. Definition of welfare dimensions
2. Definition of welfare measures
3. Design of a scoring model

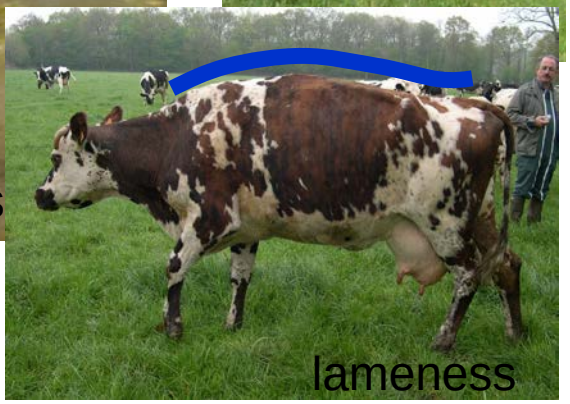
Step 1: welfare dimensions to be covered

Principles	Criteria
Good feeding	1. Absence of prolonged hunger
	2. Absence of prolonged thirst
Good housing	3. Comfort around resting
	4. Thermal comfort
	5. Ease of movement
Good health	6. Absence of injuries
	7. Absence of disease
	8. Absence of pain induced by management procedures
Appropriate behaviour	9. Expression of social behaviours
	10. Expression of other behaviours
	11. Good human-animal relationship
	12. Positive emotional state

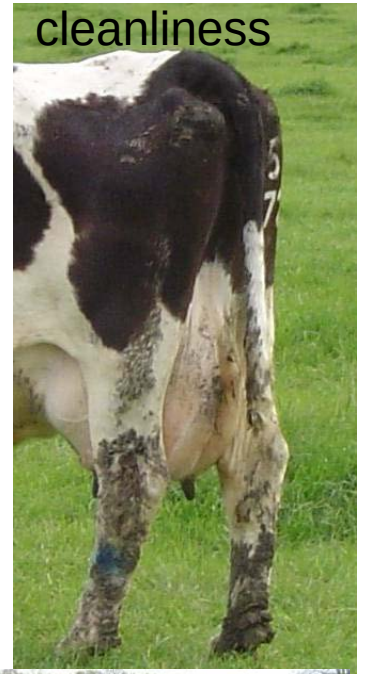


Step 2: Definition of welfare measures (priority is given to measures on animals)

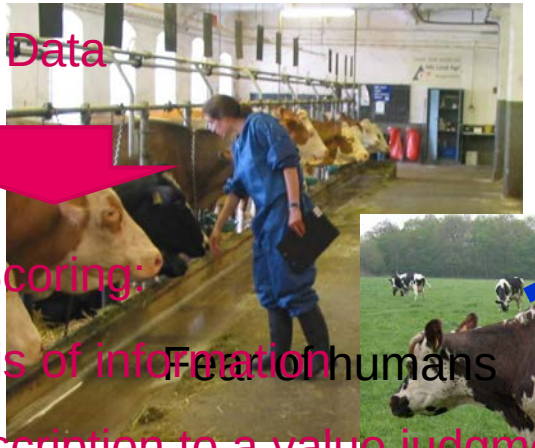




Step 3: Design of a scoring model



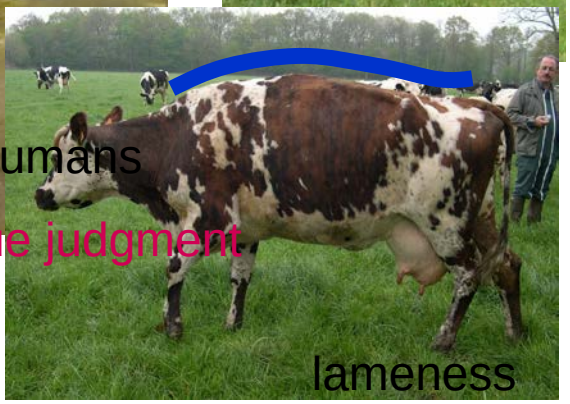
Data



Scoring:

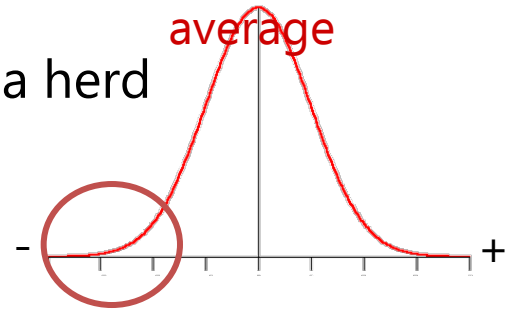
A synthesis of information

Going from a mere description to a value judgment



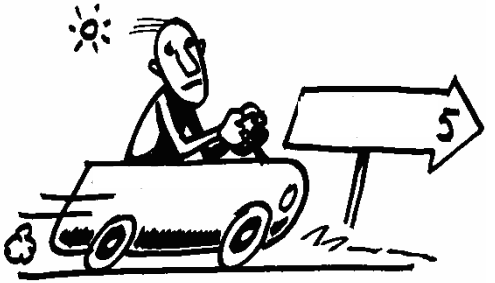
Value-based questions

1- Shall we consider the **average** state of animals in a herd vs. put more attention on the **worse animals**?



2- Can one aspect of welfare **compensate** for another?

3- Shall the judgement be based on what seems good welfare in theory or on what can realistically be achieved in practice?



Interdisciplinarity in Welfare Quality®

Final organisation

Year 1-3

Social scientists — *Animal scientists*

Societal expectations — Farm assessment

Year 1-4

Year 4-5

Together
Implementation

Year 5-6

- Common tasks
- Integration workshops
- Survey among all scientists to set acceptability levels
- …

Interactions between scientists and society to design the welfare assessment system in Welfare Quality®

Social scientists ⇄ *Animal scientists*

Societal expectations ⇄ Farm assessment

Together Implementation

Society

- Citizens
- Producers
- Retailers

- websites, newsletters
- meetings, workshops, conferences,
- interviews, focus groups, citizen & farmers juries
- Advisory committee…

What did we gain from these interactions?

Naturalness is put forward by citizens

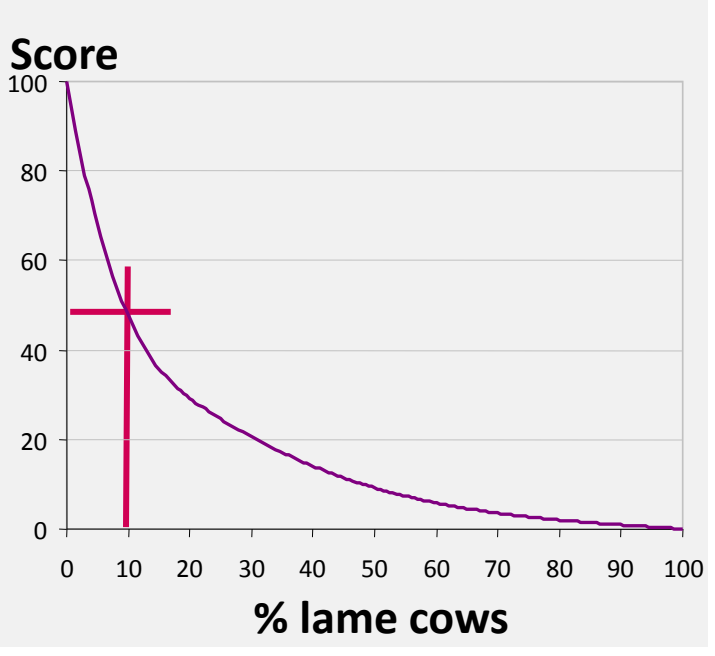
- Access to pasture was added for cattle

Citizens want to go beyond absence of suffering

- Investigation of measures of positive affects

Values underlying the scoring system were made clear

- The animals in poor states are given priority
- Some criteria are given more importance (thirst > hunger)
- Little compensation between criteria
- Overall assessment based on theoretical objectives and pragmatic rules



Veissier & Miele, ISNH-ISRP 2011

FINAL WORDS

A mandated science

Our understanding of animal welfare is both values-based and science-based. [...] animal welfare is like many other topics of "mandated" science such as food safety and environmental sustainability where the tools of science are used within a framework of values (Fraser 2008)

- Assessing animal welfare requires a transdisciplinary approach where scientists from various disciplines – specially animal and social scientists – work together and with society
- People need to discuss both **facts** and **values**

Transdisciplinarity

'a specific form of interdisciplinarity in which boundaries between and beyond disciplines are transcended and knowledge and perspectives for different scientific disciplines as well as non-scientific sources are integrated'

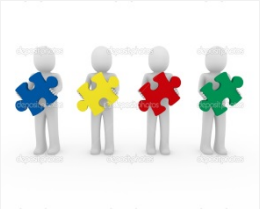
(Flinterman et al 2011)

Further steps towards transdiciplinarity

- Scientists should be ready to
  - quit their disciplinary home, at least for the time of a project
  - try to reason with the framework of other disciplines
  - engage in common tasks with scientists from other disciplines and non-scientists

- Researches should be evaluated not only on publications (usually within disciplines) but also on impacts

Early studies: separate disciplines, animal welfare not directly addressed



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For a complete picture of animal welfare


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Thank you for
your attention