How Welfare is Measured? Why do Scientists Differ?

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Animal Behavior and Welfare Group
ABWG
What is Animal Welfare?

• Biological phenomenon
  ▪ Animal experience

• Social phenomenon
  ▪ Human experience
  ▪ Evidence for the evolution of the human mind
  ▪ A reflection of the current human condition
    ▪ We do well – They gain status
    ▪ They gain status – Increased obligation
    ▪ Social demands
Defining Animal Welfare

- Definitions have varied among scientists
  - How the animal **feels** (Duncan)
  - Pre-pathological state (Moberg)
  - Animal’s attempts to **cope** with its environment (Broom)
  - “**Performance Axiom**” – emphasize sensitive but quantifiable measures like productivity, reproductive performance, etc. (Curtis)
  - **State** of the animal (World Organization for Animal Health)
    - the treatment that an animal receives is covered by other terms such as animal care, animal husbandry, and humane treatment.
“Therefore, others advocate more objectively measurable animal-performance traits as more valid indicators of ASB [animal state of being] today. The reasons for this are the following: what cannot be measured cannot be managed; we can directly, objectively measure productive and reproductive performance but not feelings (e.g., suffering); and performance reductions are early, sensitive indicators that is being compromised.”

S E Curtis, 2007

“Apart from verbal reports of subjective feelings, which are uniquely human, I argue that it is possible to study negative emotions we refer to as suffering by the same methods we use in ourselves. In particular, by asking animals what they find positively and negatively reinforcing (what they want and what they do not want), we can define positive and negative emotional states. Such emotional states may or may not be accompanied by subjective feelings but fortunately it is not necessary to solve the problem of consciousness to construct a scientific study of suffering and welfare.”

M. Stamp Dawkins, 2008
“I can never help a shrewd suspicion that a worship of quantification and despise of perception may occasionally mislead one into thinking that 2 goats plus 4 oxen are equal to 6 horses. Counting the pecks of pigeons in Skinner boxes without observing what the birds really do might occasionally add up to just this.”

-- Konrad Lorenz, 1960
Scientific Training

- Different training and different views

  - 1. Biological function
    - Health, Growth and Reproduction
    - Minimize pain and injury

  - 2. Quality of Life (plus biological function)
    - Biological function + reasonable accommodation of the animal’s nature + minimizing pain and distress

  - 3. Natural life (plus biological function)
    - Animal should be allowed to satisfy most aspects of its nature

- All based on a system of values

(Fraser, 2003)
Funding Scientific Research

- Scientific research is conducted, integrated and applied based upon its value
  - Human expectations for derived benefits
  - Reflected in specifications for funding

- Scientific research can be biased toward specific social values
Multi-Disciplinary

- Physiology
- Immunology
- Affective Neuroscience
- Cognitive Science
- Consciousness

Causation

- PHYLOGENY
- ADAPTATION
- DEVELOPMENT
- PSYCHOLOGY

Animal Welfare

- Applied Ethology
- Ethology
- Behavioral Ecology
- Genetics

(Dawkins, 2008)
## Commonly Used Indicators

<table>
<thead>
<tr>
<th>BEHAVIORAL</th>
<th>PHYSIOLOGICAL</th>
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<tbody>
<tr>
<td>Abnormal / normal behavior</td>
<td>Health measures</td>
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<td>Stereotypies</td>
<td>Stress measures</td>
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<td>Immune function</td>
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<td>Changes in time budgets</td>
<td>Acute phase proteins</td>
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<td>Growth</td>
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<td>Reproduction</td>
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<td>Preferences</td>
<td>Metabolic measures</td>
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SPACE
SPACE REQUIREMENTS

- Use of the space
- The effects of different space allowances
- The quality of space

(J.A.Mench and J.C. Swanson, 2000)
USE OF SPACE

________________________  stand

________________________  turn around

________________________  groom

__________________________  wing flap

(J.A. Mench and J.C. Swanson, 2000)
USE OF SPACE

• Social factors are important
  ▪ 5.5 to 35 inches between hens, depending upon behavior

  ▪ Hens prefer large cages to small (i.e. prefer 242 sq in/hen versus 62/hen)

  • But studies also indicate:
    ▪ hens housed in large cages do not use all the space available - still prefer social contact with other hens

(J. A. Mench and J.C. Swanson, 2000)
Early Studies:

- Adams and Craig (1985)
  - Compared 30 studies with high (42-55 sq in/hen), medium (55-66) and low (67-86) densities
  - Mortality and production decreased as birds were more crowded

Recent studies:

- Included stress measures, feather cover, and fear in addition to mortality and production: agree

Advantage at 72 square inches numerous studies

(J.A. Mench and J.C. Swanson, 2000)
Feeder Space Important

Performance standard: Hens must be able to eat at the same time.

(J.A.Mench and J.C. Swanson, 2000)
SPACE REQUIREMENTS

IF ....

- Productivity
- Standing/Lying Turning around Partial wing flap
- Morbidity/Mortality
- Feather Cover
- Fearfulness
- Corticosterone

Then: 72 SQUARE INCHES (average)

(J.A.Mench and J.C. Swanson, 2000)
SPACE REQUIREMENTS

IF.....

• Additional behaviors also important
  ▪ Wing flap
  ▪ Dustbathing
  ▪ Nesting
  ▪ Perching

• MORE THAN 72 SQUARE INCHES required

(J.A.Mench and J.C. Swanson, 2000)
Why do space guidelines differ?

- If living conditions to accommodate the “nature” of the hen most important
  - Natural postural adjustments and behaviors important
    - Wing flaps and stretch, dust bathe

- If health and production combined with efficiency most important
  - Natural postural adjustments may be minimized in the assessment process (lying and standing)

- Empirical work: supports both cases
Animal Welfare Assessment Models

- Reflect different values
  - Selection of criteria to be measured
  - Interpretation of data

- Result in different conclusions

- Scientific disagreement between value systems
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<th>Non-cage (Barn)</th>
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- $S$ = Recent unpublished data indicate lower mortality may be achievable in large furnished cages
- † = Reduced bone strength, fractures when birds are caught
- * = bones stronger from perch use but increased incidence of deformation of the keel
- ‡ = More fractures during lay despite stronger bones

How well welfare measures are met:

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<td>Small</td>
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<td>Large</td>
<td>Single Level</td>
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<td>Level of egg production and cleanliness</td>
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<td>Bone strength and fractures</td>
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<td>Exposure to disease vectors (e.g., wild birds)</td>
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<td>Internal parasites (e.g., coccidia, roundworms)</td>
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Summary

- Animal Welfare Science is advancing and developing methodologies to measure animal welfare

- Animal Welfare is a multidisciplinary science

- Societal values and scientific training can play a role in determining what is most important

- Scientific design and methods should properly reflect the “question asked”