Recognising & Assessing Positive Welfare: Developing Positive Indicators for Use in Welfare Assessment.

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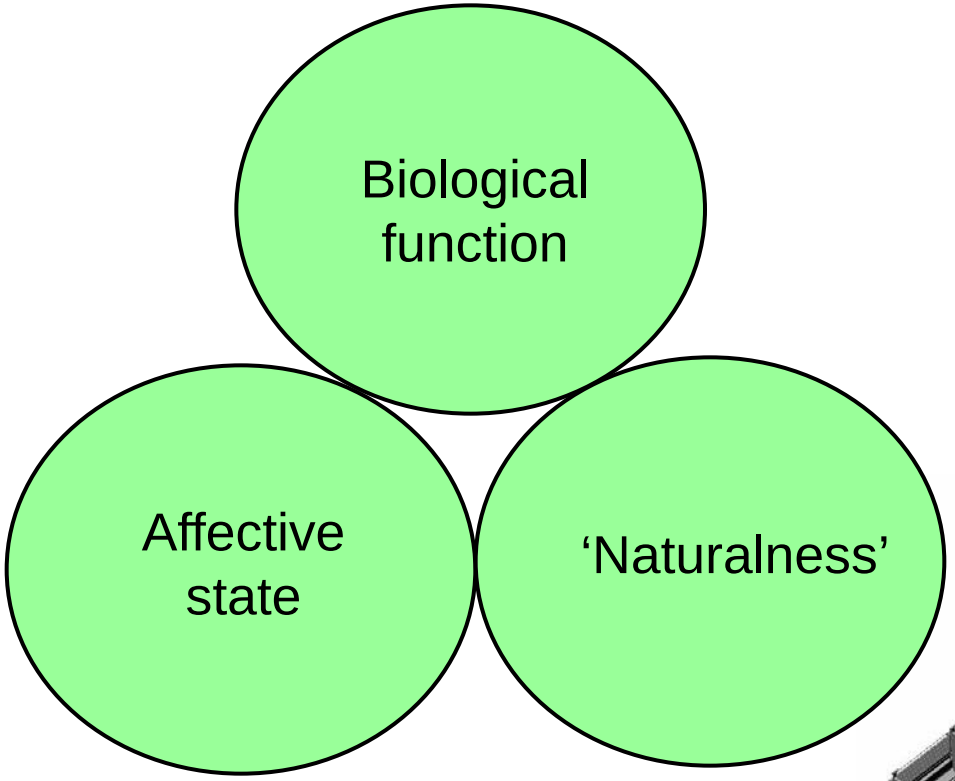
Assessing Animal Welfare

- Focus has been on negative indicators.



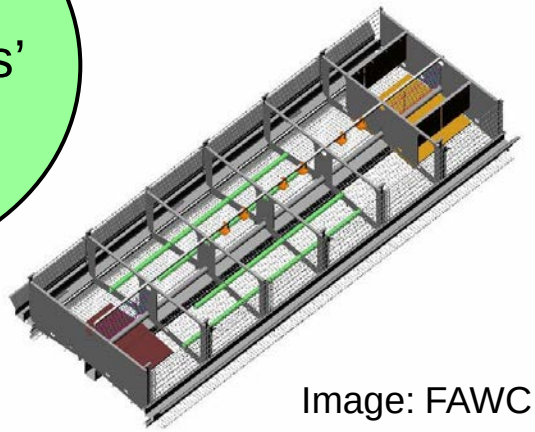


Image: FAWC

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Positive Welfare Indicators: A Proactive Approach

- 3 main approaches:
  - Indications of contentment / pleasure
  - Luxury behaviours
  - Behaviours that support the ability to cope with challenge

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Indications of contentment / pleasure.

- Good welfare = absence of negative experiences + ability to experience positive affective states.
- Controversial – evidence of emotions debated still in many species.
- Recent advances in neuroscience have been used to evidence the existence of positive affective states in animals with regards to behaviours such as positive anticipation (Spruijt *et al.*, 2001).
- More evidence / ability to test for common lab species but impractical in other animal sectors.

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Luxury behaviours.

- First behaviours to be lost during challenging situations.
- Need to identify appropriate luxury behaviours for each species, e.g. play, allogrooming, certain vocalisations (Donaldson *et al*., 2002; Thornton & Waterman-Pearson, 2002; O'Connell *et al*., 1989; Schön *et al*., 2004).
- **Problem**: Most legislation focuses on meeting 'fundamental' behavioural needs (Jensen & Toates, 1993) so situation may never exist for luxury ones to occur.
- **Possible solution:** Behavioural diversity to assess spread across behavioural repertoire and avoid potential over-recording of self-rewarding luxury behaviours, e.g. allogrooming.

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Shannon-Weaver diversity index

- Developed as a biodiversity index in ecological research – indicates relative spread of subspecies within a sample area.
- Increasingly employed in zoo collections to determine spread of individual behaviours within an activity budget (McCormick & Melfi, unpublished).
- Can identify more subtle changes in activity budgets as a result of different housing & husbandry aspects.

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$$H = -sum(P_i log[P_i])$$

Shannon-Weaver diversity index

- Morning enrichment caused a significant increase in behavioural diversity for both elephants whether training was present or not (Duchess: df=1, F=9.04, *p*=0.008; Gay df=1, F=8.30, *p*=0.011).
- Husbandry altered to provide enrichment earlier in the day when most effective at creating spread of behaviours.

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Behaviours that support the ability to cope with challenge.

- Stress is ‘natural’ and often unavoidable so the key is the ability to cope.
- Animals unable to ‘cope’ with stressors experience allostatic overload.
- Important to identify behaviours / situations that allow coping.
- Limited evidence linking positive affective states to coping but connection to negative ones shown:
  - In rats, negative affective states are associated with faster startle responses and reduced anticipatory behaviours (Boissy *et al.*, 2007; von Frijtag *et al.*, 2000)

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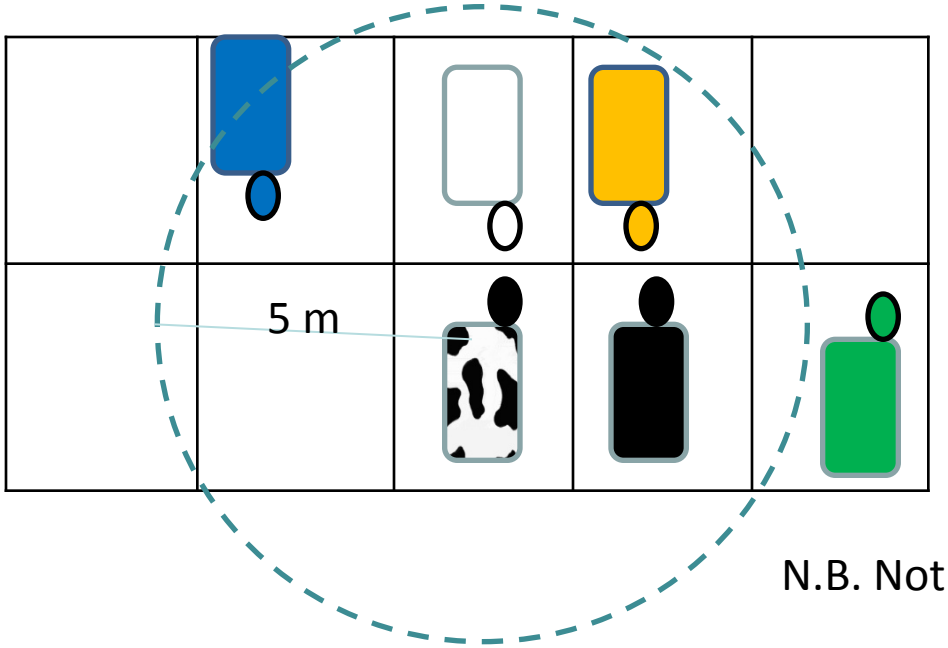
Social support in dairy cattle

Large, dynamically managed, dairy cattle herd.

Krista McLennan



N.B. Not to scale

Heifers (52%, n=34) were significantly more likely to have one or more preferred partners compared to cows (32%, n=12) (X^2 = 8.210, df=1, p=0.004) with relation to the probability of being associated with a particular individual.

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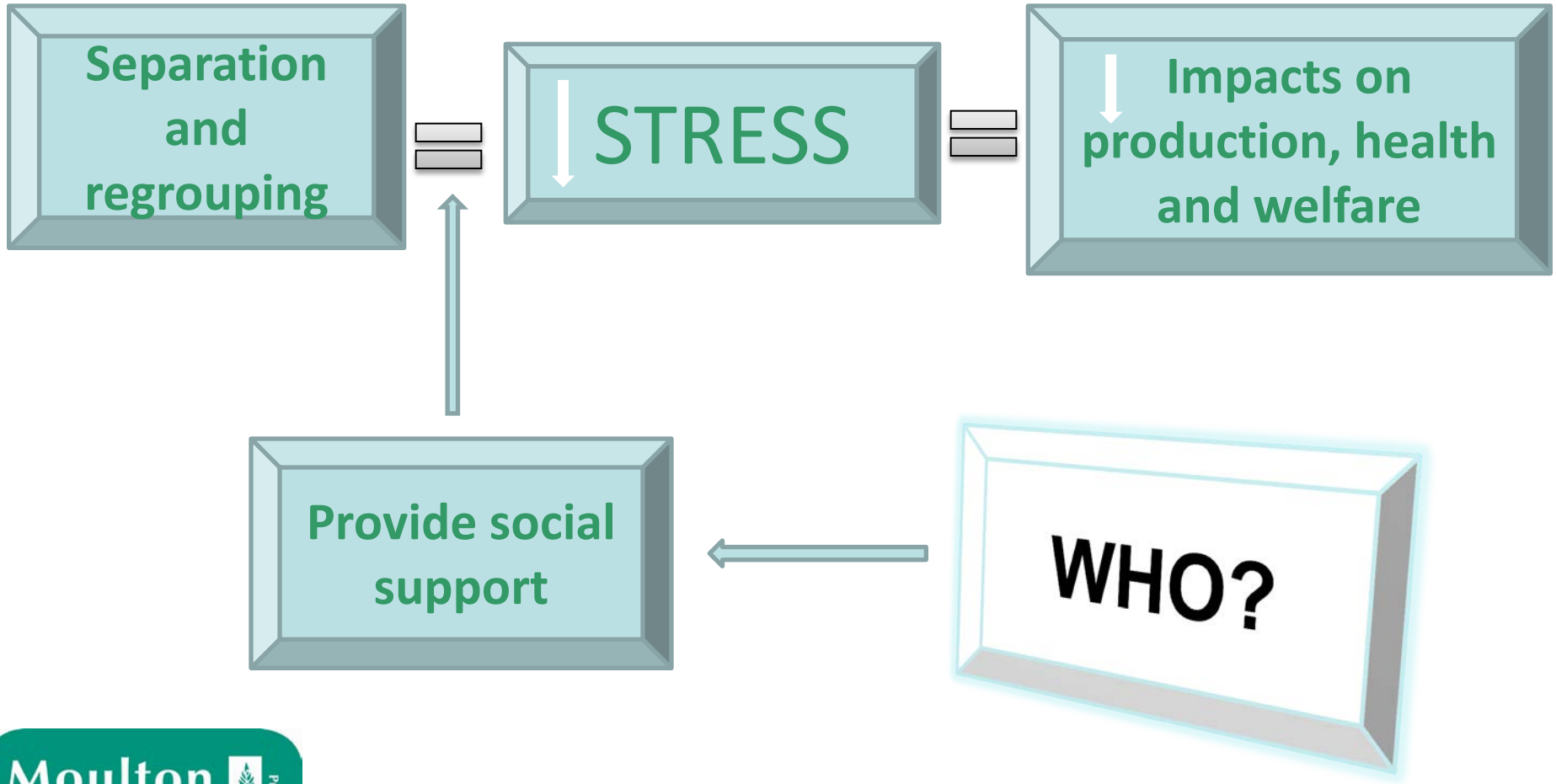
Effects of social separation



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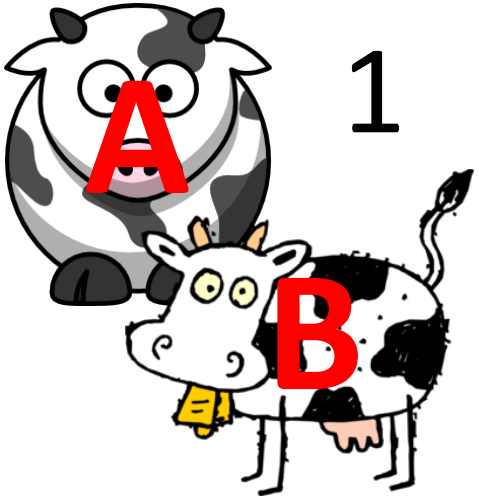
The three stages



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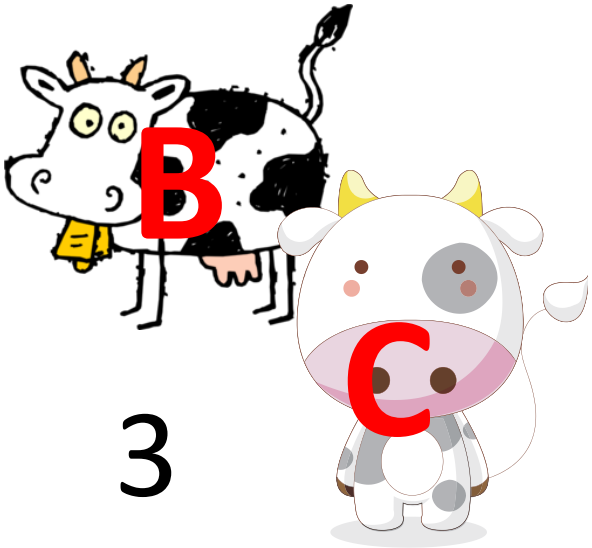

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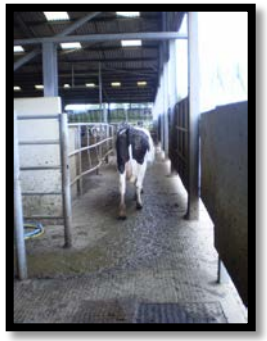
Social separation



- Separated into holding area and Polar (Protrainer 5 Equine RS800) heart rate monitor, adapted for use in cattle fitted.
- HR recorded every 15 sec (after 2-5 min acclimatisation period).
- Cattle behaviour in holding area studied by video, released partner in herd studied using Noldus Observer XT, for 30 min.
- Milk & saliva samples taken.
- Release back to herd - runway test.
- Observe 5 min reunion behaviour.

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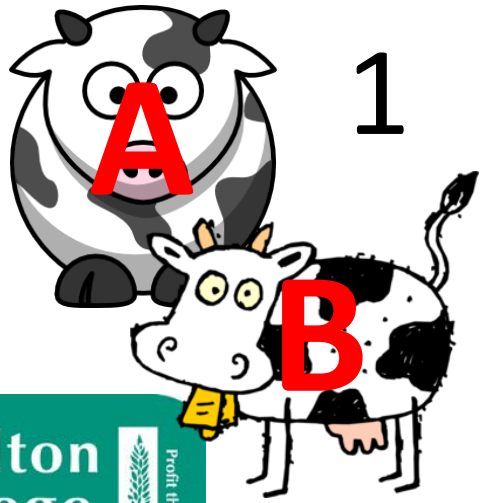
Mean heart rate results – PP vs. PR

82.6 ± 1.85 bpm

HR (bpm)

80.2 ± 1.67 bpm



P<0.001

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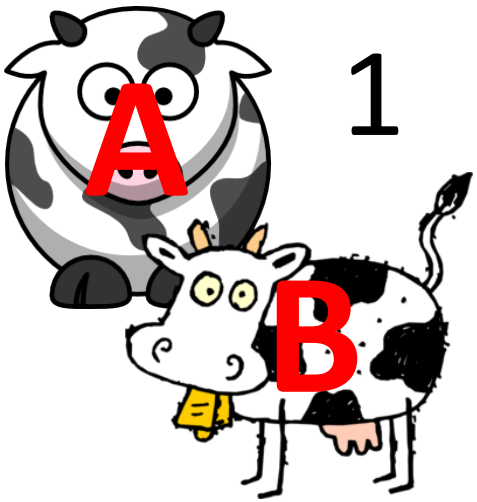
Mean heart rate results – PP vs. RP

80.2 ± 1.67 bpm



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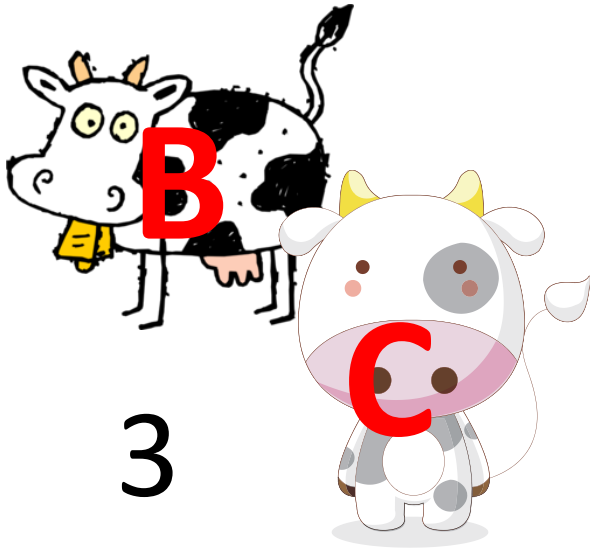
HR (bpm)

79.87 ± 1.17 bpm



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P>0.05

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Mean heart rate results – PR vs. RP

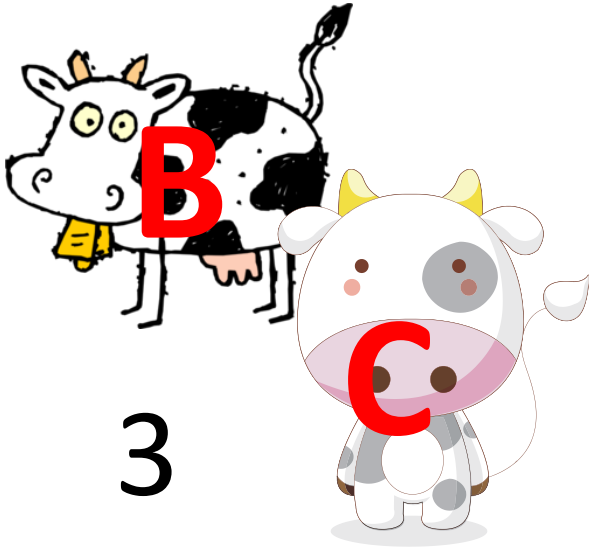
Median 82.3 bpm

2

HR (bpm)

P<0.0001

Median 79.6 bpm



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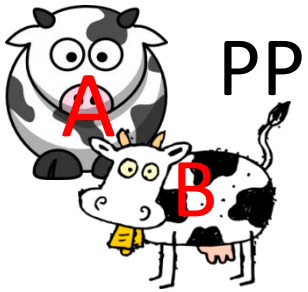
Cortisol Results – PP vs PR

Milk

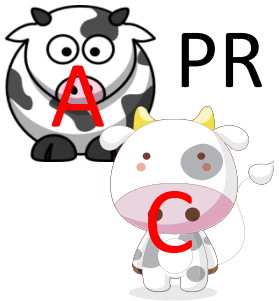
- No significant difference
  - Z= 4, P > 0.05

2.04 ± 5.39 ng/mL



PP

1.04 ± 1.60 ng/mL

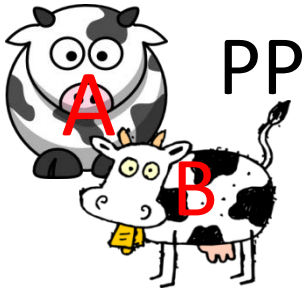


PR

Saliva

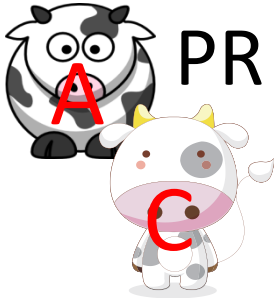
- No significant difference
  - T= -2.33, P > 0.05

2.84 ± 4.80 ng/mL



PP

3.66 ± 5.05 ng/mL



PR

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Study conclusions

- Commercial dairy cattle can form preferential social bonds.
- In short term social isolation, the presence of a preferred partner can help an individual cope.
- Some individuals appear to benefit more from social support than others.
- More work may be needed to allow the development and maintenance of social bonds in commercial settings to improve welfare.

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Potential use in lab animal welfare assessment

- Researchers working on animal welfare in farming and captive exotic settings have started to employ techniques from other scientific fields.
  - The Shannon-Weaver diversity index provides a fairly straight-forward way to assess the potential for an animal to perform a greater behavioural repertoire within a given setting.
  - Although more time consuming initially, identification & maintenance of the factors that improve coping (such as social bonds) will allow for the development of higher welfare systems.

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Questions

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