USING EXISTING ON-FARM MONITORING SYSTEMS TO IDENTIFY POSITIVE WELFARE

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Leading the way in Agriculture and Rural Research, Education and Consulting

Dairy Sensors

- Relate sensor information from monitoring technologies to manually recorded behavioural information
- Enhance understanding and creation of indexes of cow welfare in ways that are easier, cheaper and more reliable
- Key indicators for welfare aspects that can contribute to accepted farm assurance standards and reassure consumers

Data Collection

Farm Data

- Data collected from 17 farms, 3 sensor companies
- Neck mounted, leg mounted and eartag sensors
- Rumination and eating, activity (steps, lying time, standing time)

Qualitative Behavioural Assessment (QBA)

- Data collected from 8 farms (4 Welsh, 3 Scottish, 1 English)
- 4 at pasture and indoors

What is QBA?

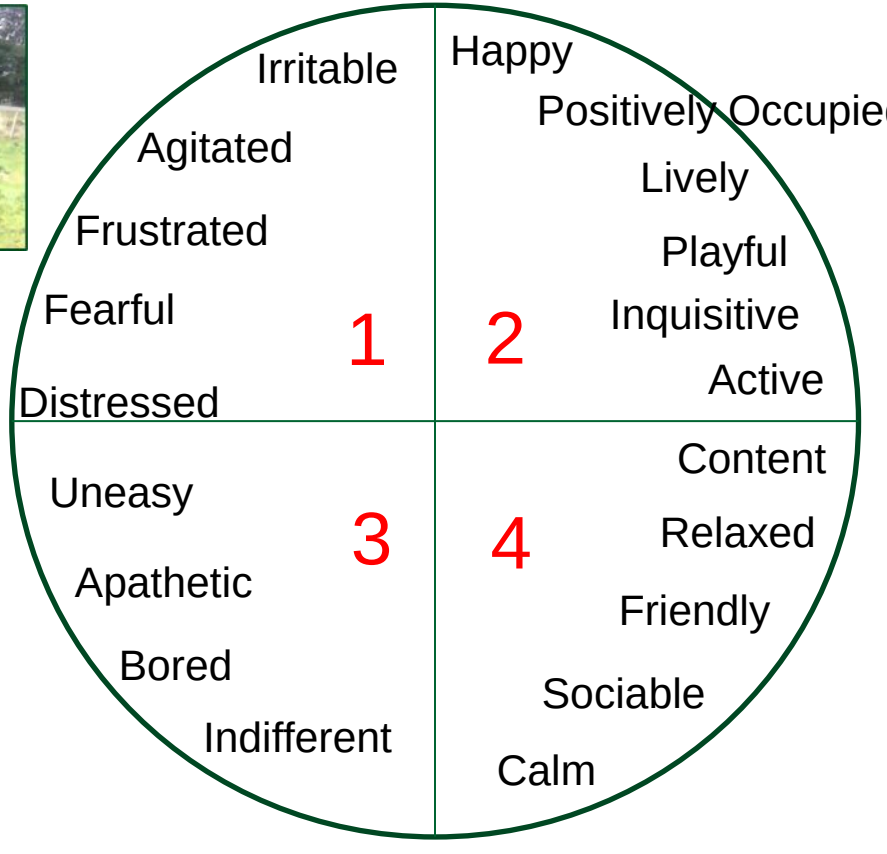
Method of capturing and quantifying the behavioural expression of animals:

- Body language – not what it is doing but how it's doing it

e.g., swishing its tail in a relaxed or aggressive manner

- QBA is one of the very few validated ways of assessing positive welfare

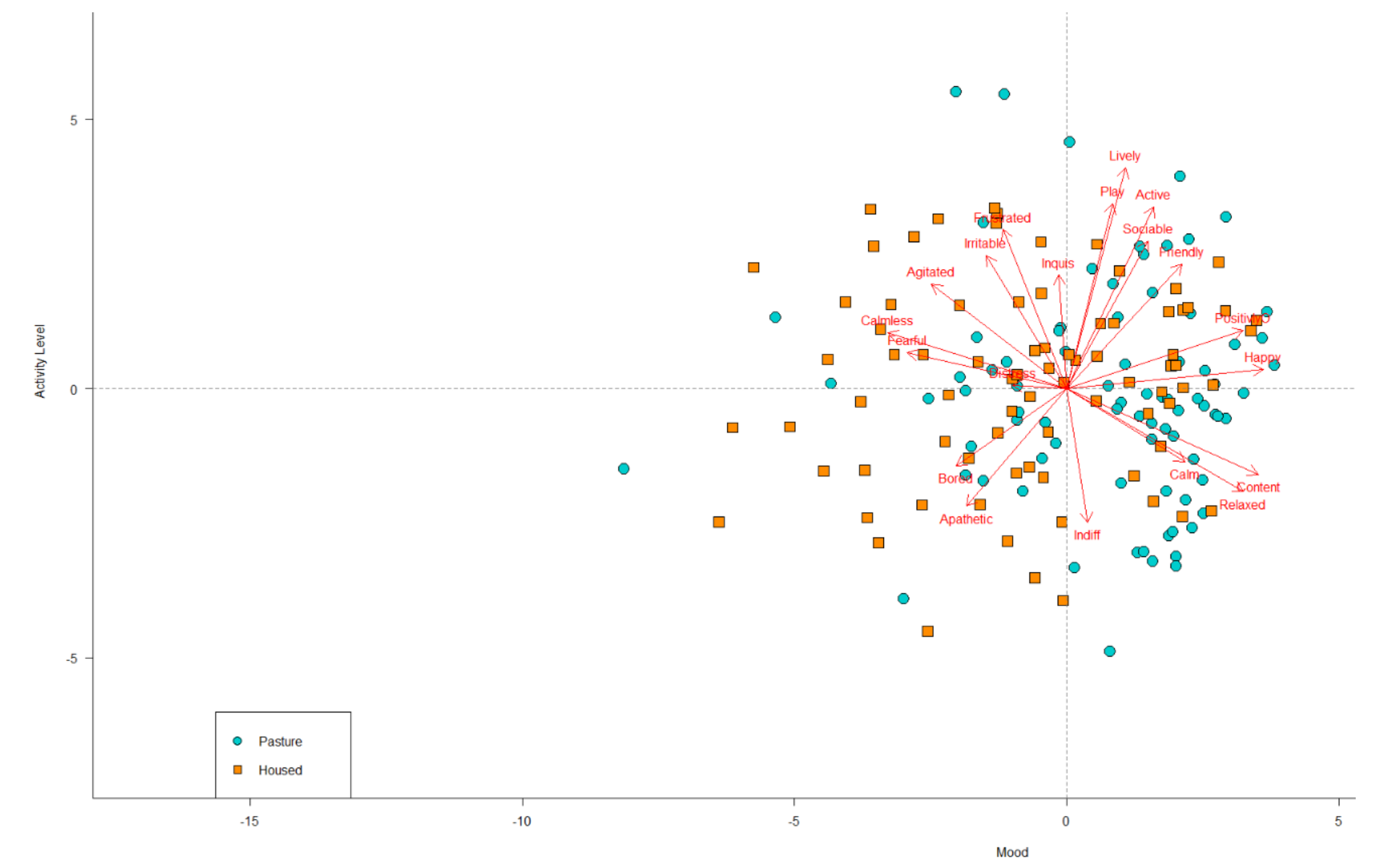
What is QBA?

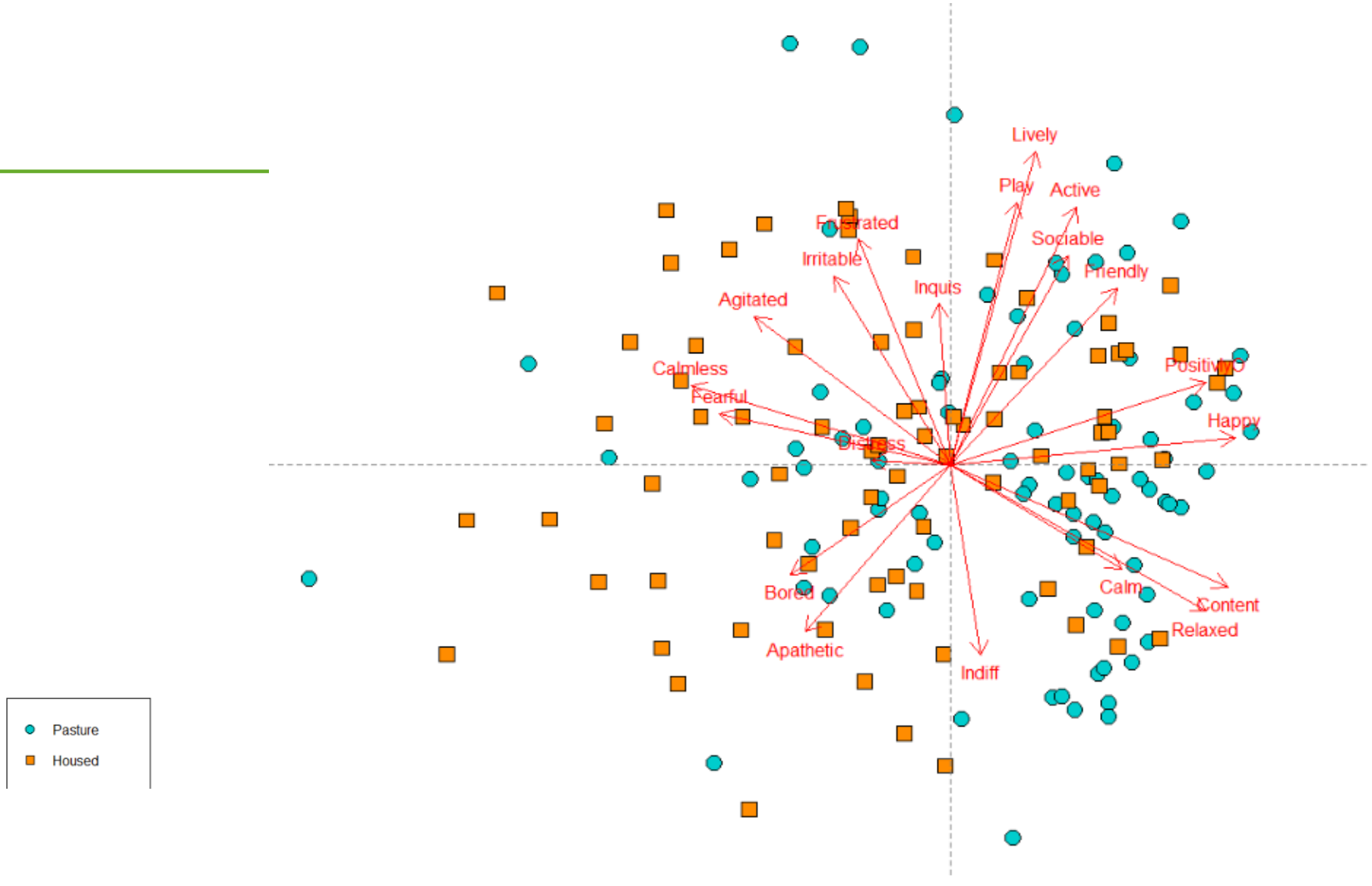

Irritable
Agitated
Frustrated
Fearful
Distressed
1
Happy
Positively Occupied
Lively
Playful
Inquisitive
Active
2
Uneasy
Apathetic
Bored
Indifferent
3
Content
Relaxed
Friendly
Sociable
Calm
4

QBA – Cow Behaviour

- 4 farms visited Feb 2022 indoors
- Revisited June 2022 at pasture
- QBA carried out on 20 animals per farm each time
- Grazing info and images of grazing quality/weed species taken

QBA - Cow Behaviour


Activity Level
Mood
5
0
-5
-15
-10
-5
0
5
Pasture
Housed
Lively
Play
Active
Sociable
Friendly
Irritable
Inquis
Agitated
Calmless
Fearful
Happy
Bored
Calm
Content
Relaxed
Apathetic
Indiff


Lively
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Calmless
Positive
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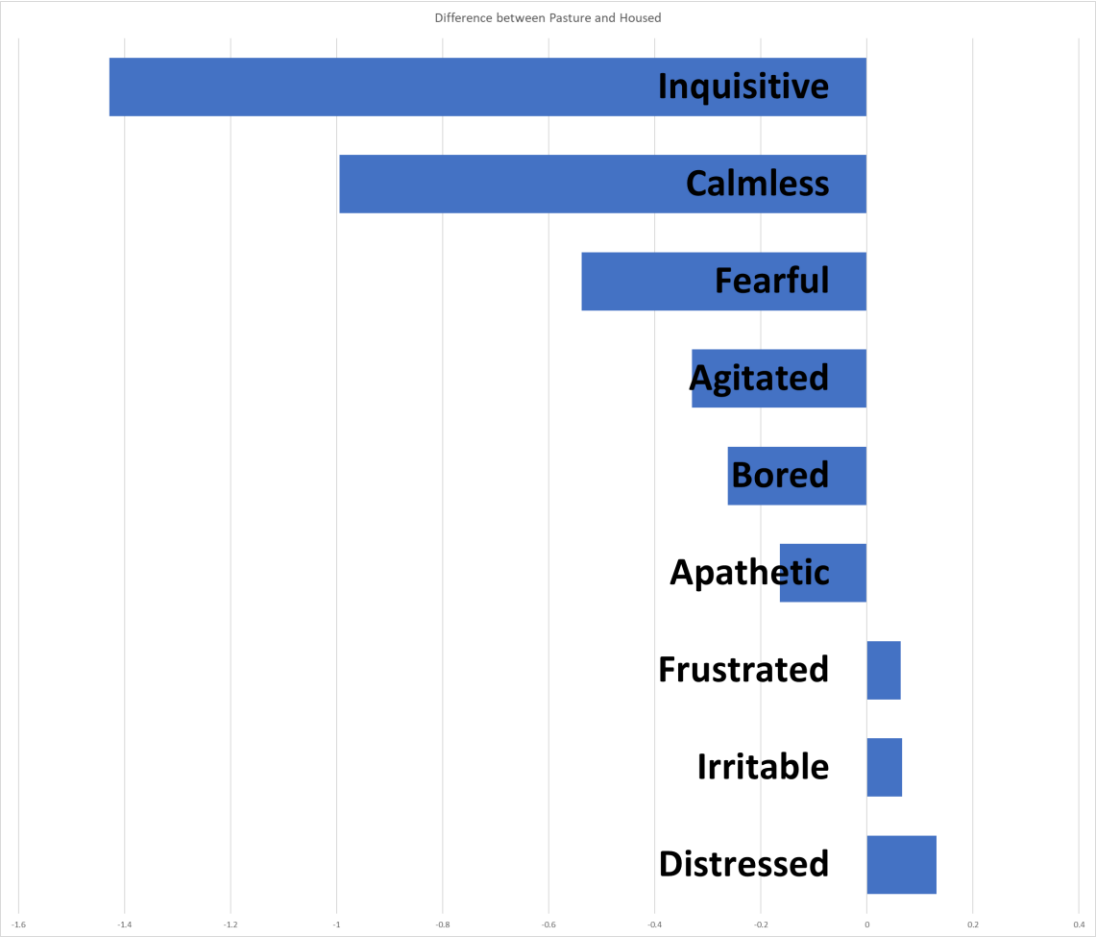
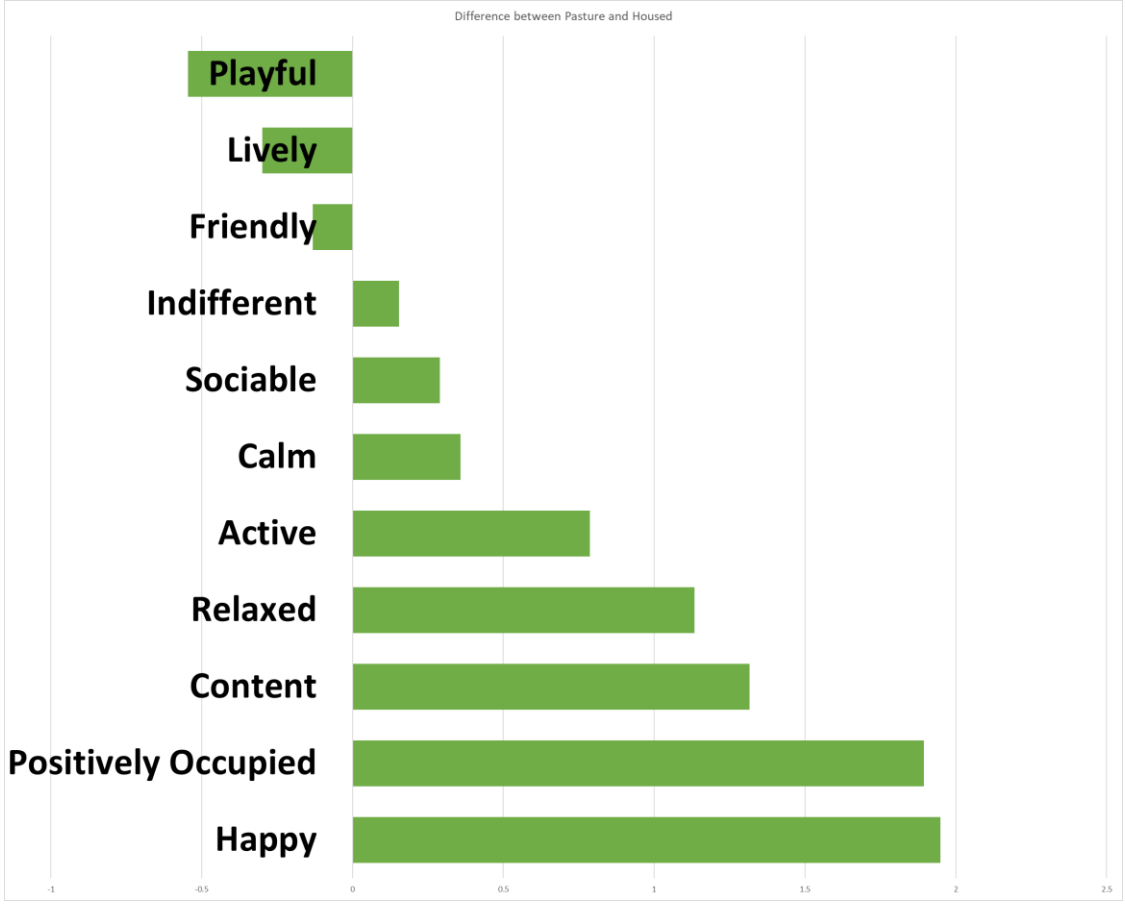
Happy
Distress
Bored
Calm
Content
Relaxed
Apathetic
Indiff
Pasture
Housed

QBA - Cow Behaviour



- Behaviours classed as negative generally higher in indoor cows, except frustrated, irritable and distressed
- *Could be frustration at us following them round the field? Could be heifers not used to people in fields?*

QBA - Cow Behaviour



- Behaviours classed as positive generally higher in pasture cows, except playful, lively and friendly
- *Could be due to "more to do" outside, people are more interesting indoors – more friendly etc?*

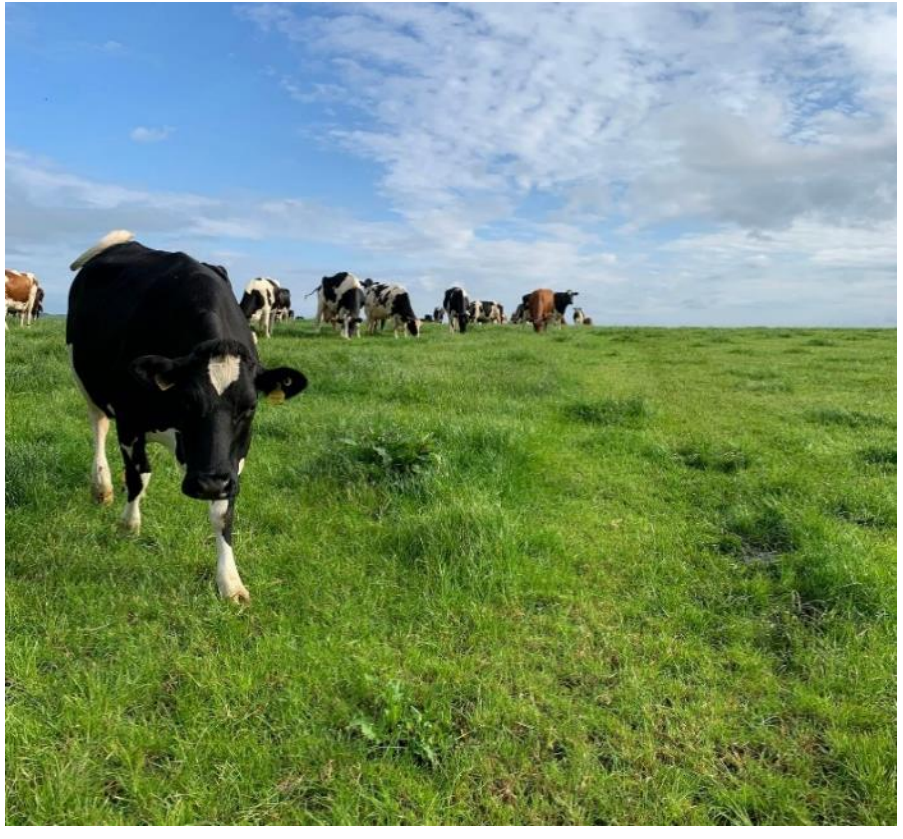
QBA - Cow Behaviour

- Indoor: 61% on the “negative” side of the plot

e.g., fearful, agitated, bored etc.

- Pasture: 67.5% on the “positive” side of the plot

e.g., positively occupied, sociable, content, relaxed etc.

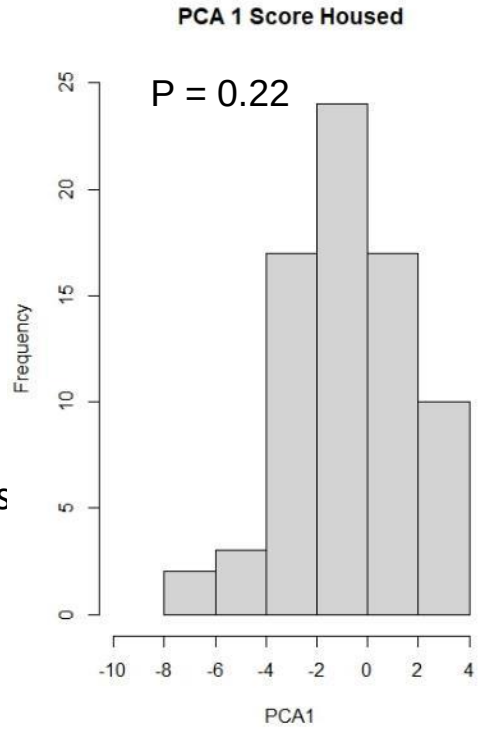


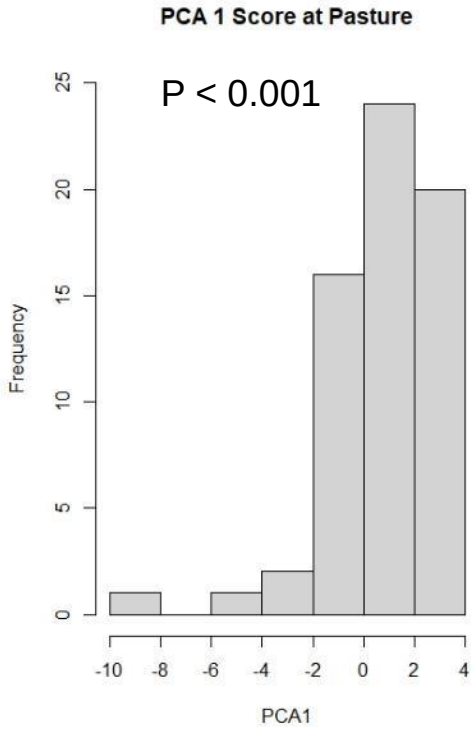
Data Distribution – PCA

Housed = Normal

Pasture = Skewed

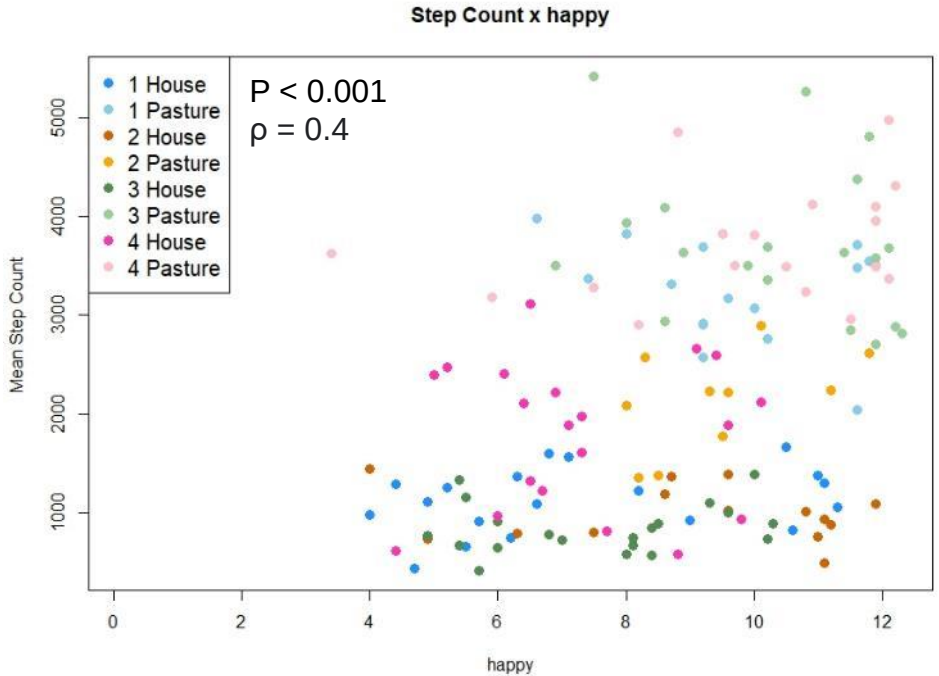
- PC1 Score (negative/positive)
  - Housed sig. diff to Pasture ($p < 0.001$)
    - Housed cows are behaviourally constrained, resulting in a spread across positive and negative behaviours (i.e. normally distributed)
    - At pasture, PC1 scores are skewed towards positive behaviours, indicating that more cows are showing more positive behaviours

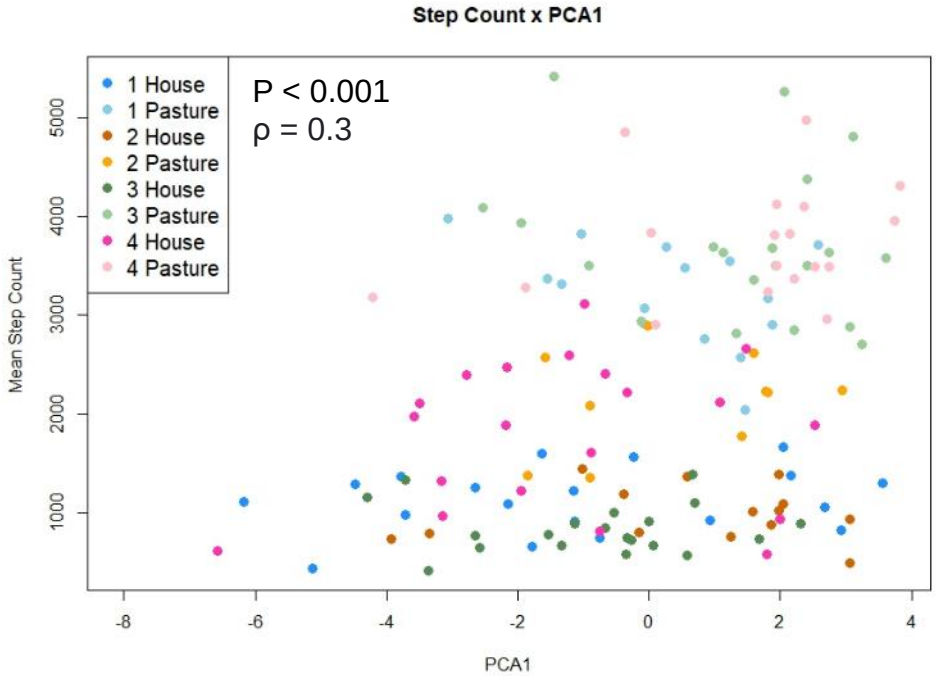




Step Count Correlations

- Positively occupied
- Inquisitive
- Calmless
- Happy
- Relaxed
- Fearful
- Content
- PC1 Score





Summary

- Range of data distribution showed generally QBA and sensor data more skewed - **less variation** - between cows in scores **at pasture**

- Animals **more clustered** at **pasture –** potential **synchrony**

- **More positive** behaviours shown at **pasture**

Summary

- **Correlation** between sensor data and QBA behaviours – e.g. **happiness** and **step** count
- Wider range of farms needed – **extremes** needed
- Exploration of the benefits of **loafing areas** i.e. more steps **indoors** also = happier cows?

Next Steps - Digital Dairy Chain

- Investigate potential synchrony in lying times using more detailed data
- Explore and strengthen correlations noted between sensor data and cow behaviour
- Additional processors (Lactalis, Arla)
- Range of systems, including extremes (good vs bad, large vs small)

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FAS TV S2E16 Backing Beef and Dairy Sensors

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Welcome back to FAS TV and coming up on this week's episode, we hear about the FAS Backing Beef roadshow which has been providing advice and potential options to ensure beef farmers are in the best position to deal with short term challenges and take advantage of future opportunities. We also hear from SRUC researchers about the studies that have been carried out looking at dairy cow behaviour and welfare....

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THANK YOU

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This project was funded by Innovate UK ISCF TFP Science and Technology into Practice: feasibility studies

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