

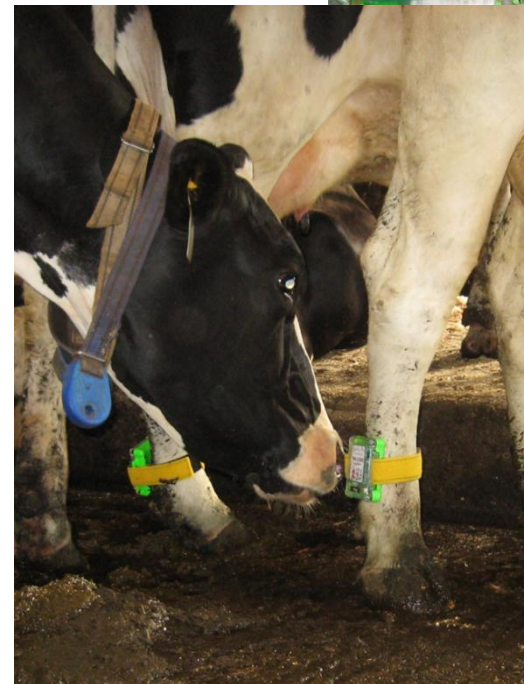
# Assessing cattle personality and welfare in dairy cattle through activity monitors: fear and social behaviours

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# Commercial Activity Recording Systems

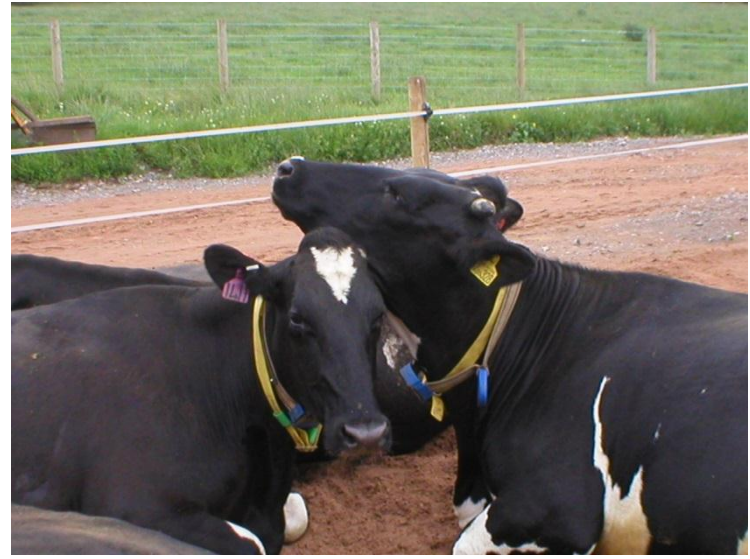
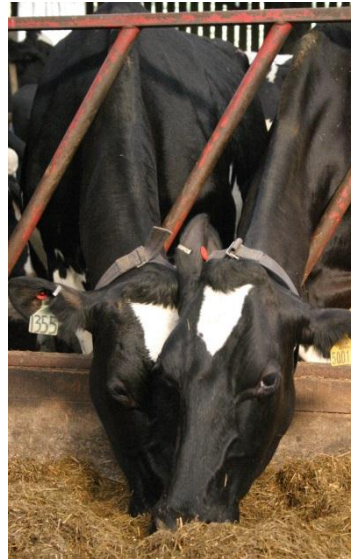
- Many commercial systems utilise tri-axial accelerometer-based activity monitors
- This results in long term continuous recording of activity data
- This information is currently primarily used to detect oestrus and increasingly to detect disease
- The recordings could be used to tell us more about the cow



# Personality/temperament and welfare

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- What is personality?
  - A set of responses to stimuli or situations that characterises an individual and is stable over time
  - e.g. fearfulness, aggressiveness, sociability



# Personality/temperament and welfare

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- How can personality relate to health and welfare?
  - Individual level: fearful animals more disturbed by new events, take longer to adjust to changes in housing, feeding re-grouping
  - less sociable or aggressive animals may withdraw from crowded feeding and lying areas. Feed intake and resting may be affected
  - Farm level: high levels of fear may indicate poor stockhandling

# Aim and design

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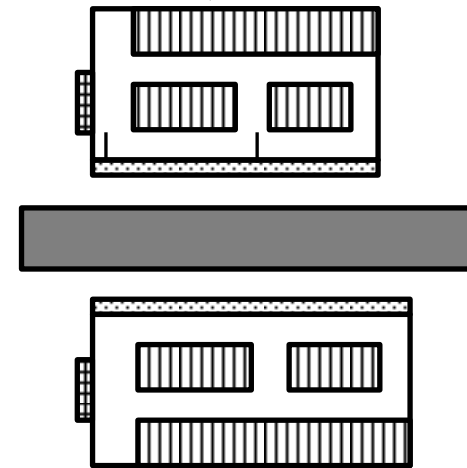
- Aim: can we characterise personality traits relevant to welfare using activity monitors?
- 1. Characterise sociability
- 2. Characterise fearfulness/neophobia
- 3. Relate these characteristics to measures from the activity monitors

# Wageningen Dairy Research Centre



- The Dairy Research Centre in Friesland, the Netherlands, has three herds:

1. MS1. Activity monitors and robotic milkers  $n = 58 \pm 3$  (sd).
2. MS2. Activity monitors and robotic milkers  $n = 46 \pm 1$  (sd) during experimental period.
3. Traditional herd, parlour with no activity monitors.





# Methods

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1. We recorded the activity of MS1 and MS2 in the 40 days prior to testing.
2. Cows in MS1 and MS2 were then given 2 x temperament tests (fearfulness (NANO) and sociability (SOC)).
3. We created personality dimensions from behaviours exhibited in each test using Principle Components Analyses.
4. We looked for significant associations between personality traits observed in testing and spontaneous home pen activity.

# Methods: activity monitors

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- Standing, lying, no. of steps and MotionIndex™ (overall activity) calculated. Downloaded at each milking





# Methods: fear testing protocol



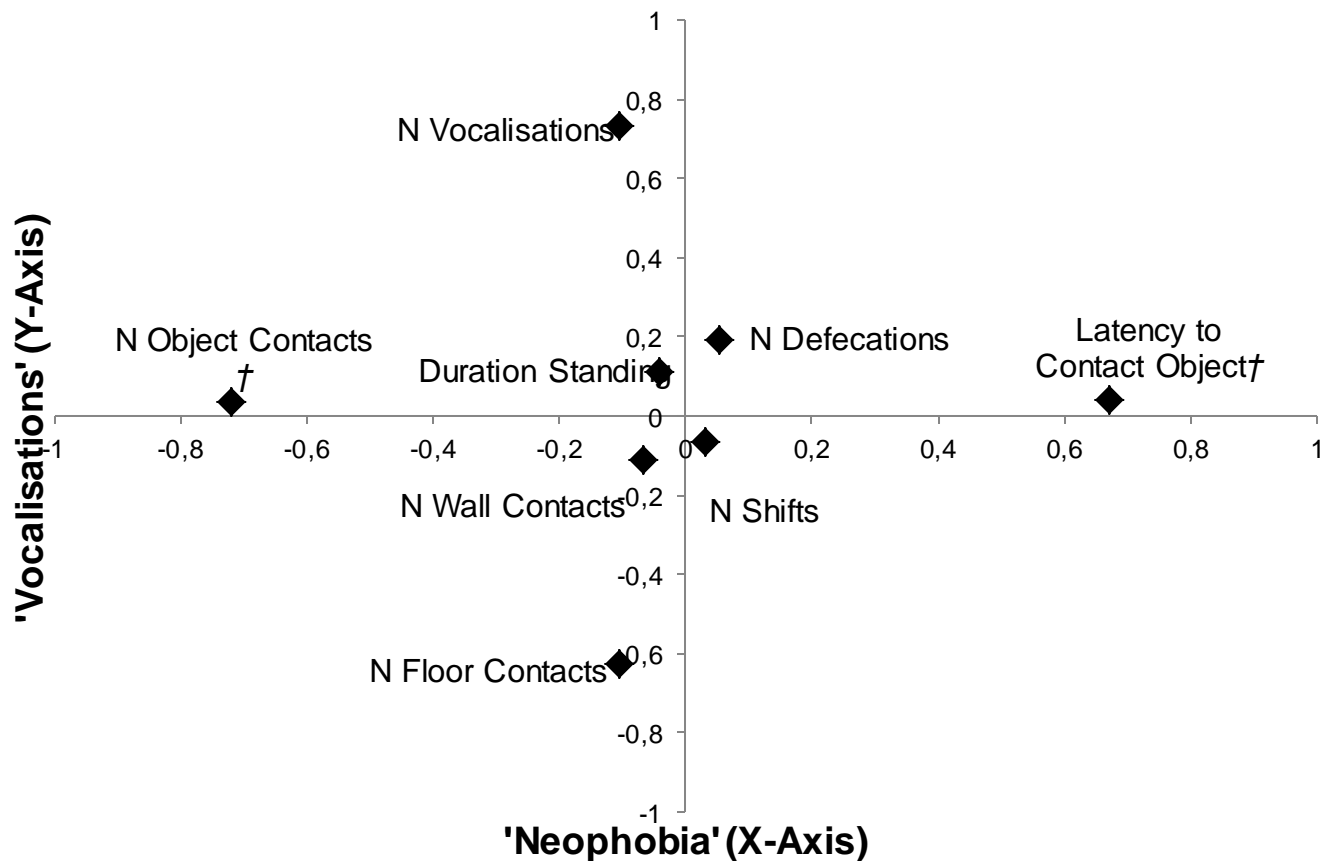
# Methods: sociability testing



# Fearfulness test dimensions 1&2

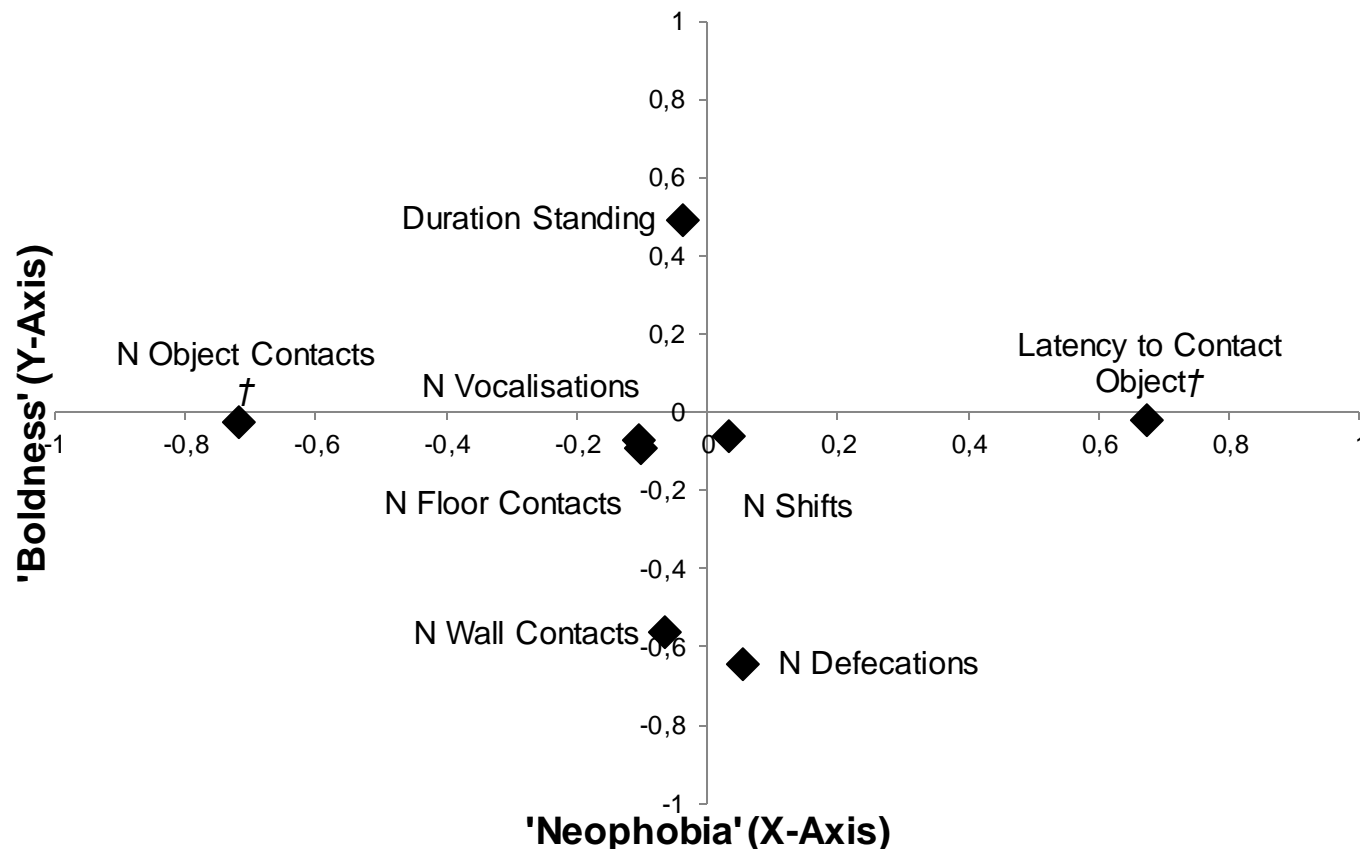


***Principle components 1 and 2: 'neophobia' (fear) and 'vocalisations'***



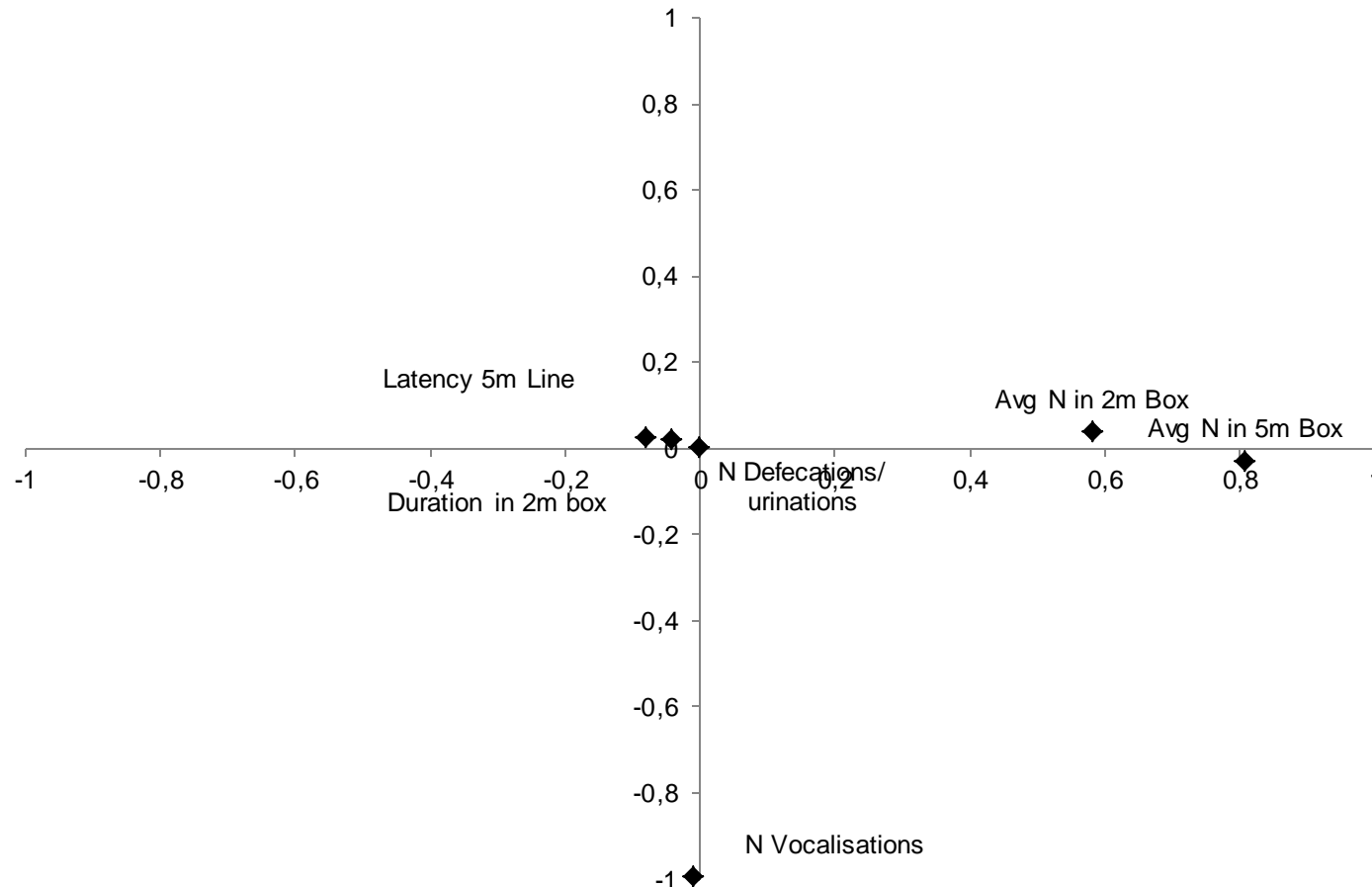
# Fearfulness test dimensions 1&3

## *Principle components 1 and 3: 'neophobia' (fear) and 'boldness'*



# Sociability test dimensions

***Principle components 1 and 3: “response to social isolation” and ‘vocalisations’***





# Results

## fearful

*(few object contacts, high latency to contact object)*

- Lying bouts more frequent and variable in length
- 15% of variation in neophobia explained



## Older cows

## bold

*(stood still in test, fewer defecations, fewer wall contacts)*

- Length of lying bouts more consistent
- 11% variation explained

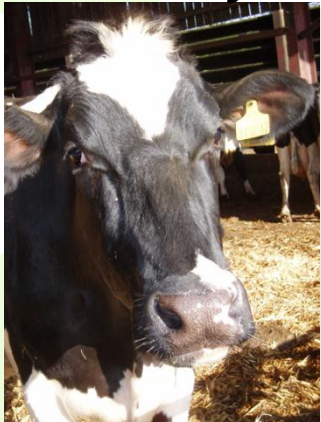




# Results

## fearful

*(few object contacts, high latency to contact object)*



## Older cows

## sociable

*(frequent entry within 5m)*

- Frequent short lying bouts of consistent length; more standing overall
- Lower milk yield
- 19% of variation explained

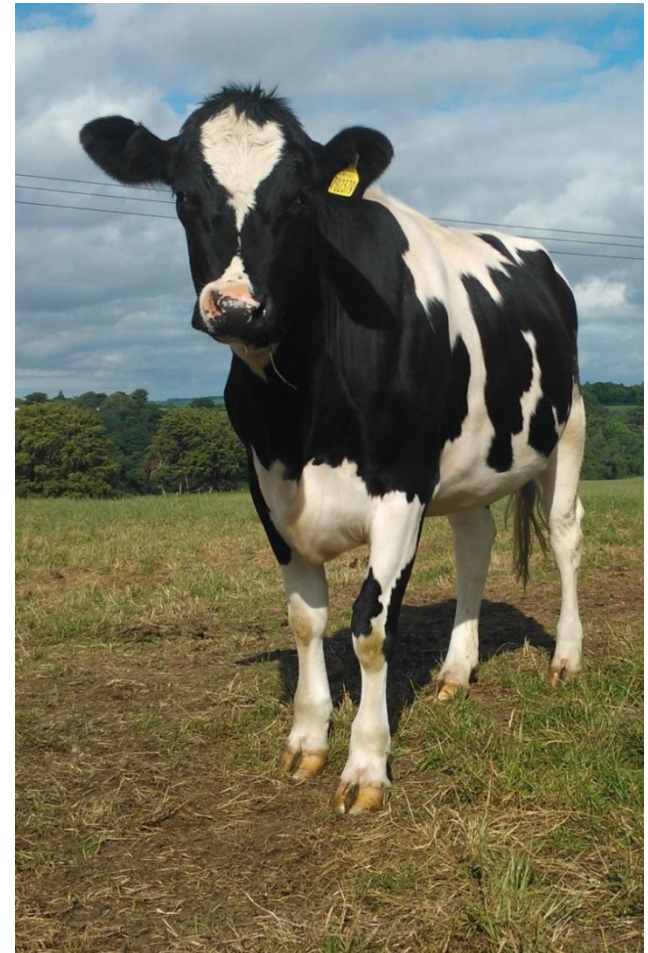
## bold

*(stood still in test, fewer defecations, fewer wall contacts)*



# Conclusions and implications

- Behaviour exhibited in personality tests are significantly associated with spontaneous home pen activity
- Fearful cows have more disrupted activity patterns
- Sociable cows spend more time standing
- *Customise the management of individuals? Increase feed ration to sociable animals, stable environment for neophobes*



# Acknowledgements

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THE UNIVERSITY *of* EDINBURGH

# IceRobotics

