

# Use of animal-mounted sensors to identify positive welfare in dairy cattle

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## Background

- Welfare assessment methods often focus on absence of a negative indicator, which is not an indication of “positive welfare”
- The Qualitative Behaviour Assessment (**QBA**) protocol accounts for positive welfare but is time-consuming on farm
- Automated precision livestock farming (PLF) technologies used as management tools have the potential to automate data collection for welfare assessment



## Aim

Test the ability of using data automatically gathered from ankle-mounted accelerometers as an indicator of positive welfare, comparing sensor data with QBA data.

## Methods

Sensor data from ankle-mounted pedometers (IceTag) were collected directly from the sensor company (Peacocks). QBA was conducted following the Welfare Quality® protocol. A single assessor scored 20 animals per farm during the housing period, repeated with another 20 animals during the grazing period.

## Analysis

To compare clustering, two principal component analysis (PCA) were conducted on sensor and QBA data, with pairwise distance matrices computed for both data sets and a Mantel test applied to evaluate correlation between QBA and sensor distance matrices.

## Results

Sensor derived features enabled classification of affective states (positive vs. negative mood) in 61% of observations across four farms.

71% of grazing cows exhibited behaviours associated with positive mood, compared to 33% when housed (Figure 1).

## Conclusions

This study demonstrates use of automated animal-mounted sensor data to assess positive welfare in dairy cattle which does not rely on farmer or processor assessments. This could add value to sensor technologies, support wider industry to inform and gain trust from consumers, strengthen welfare schemes, and support processors in developing added value. Additional data collection from more diverse farms at a higher granularity of sensor data is ongoing.

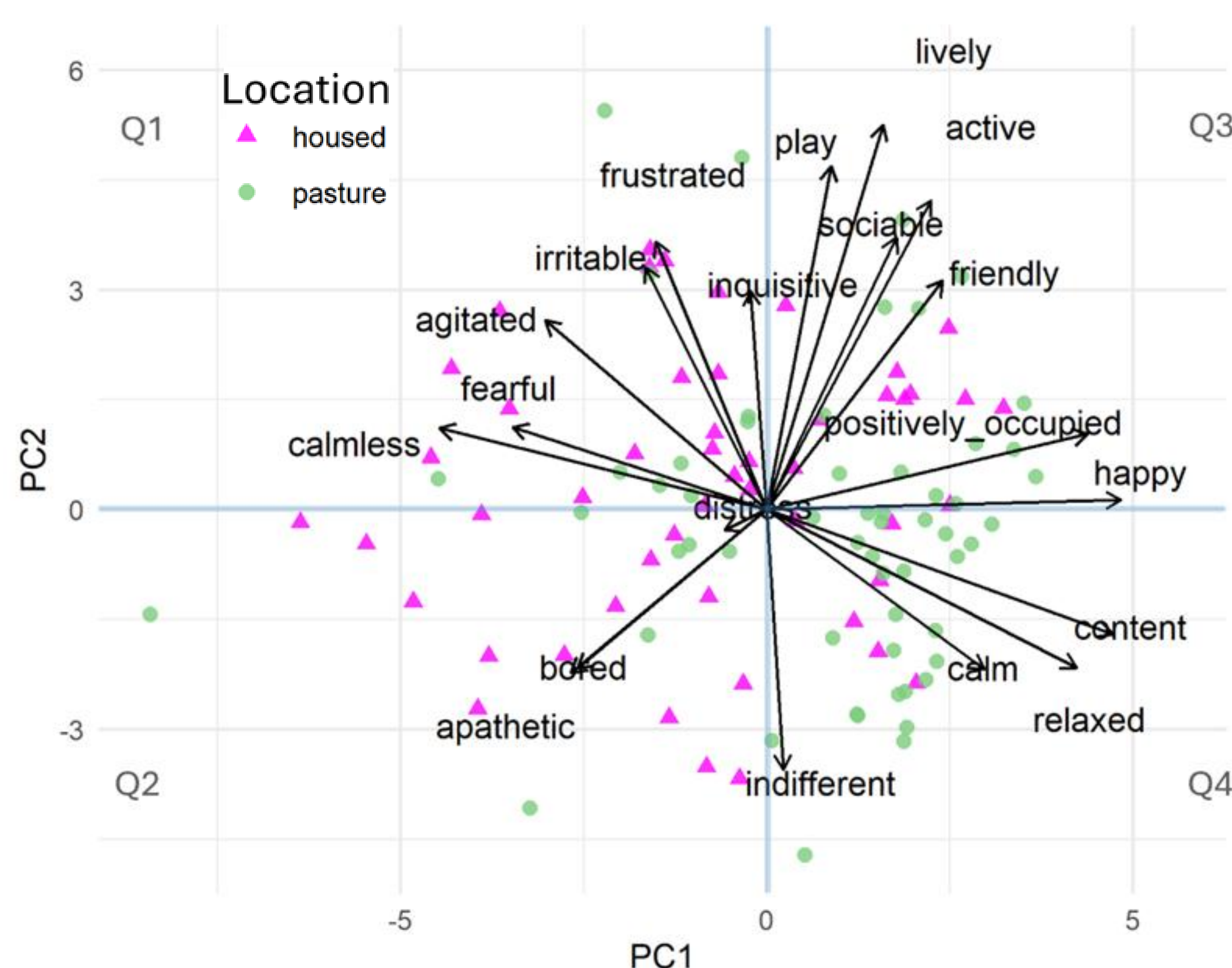


Figure 1. PCA scores plot based on Qualitative Behaviour Analysis (QBA) data, coloured by housing type, with pink triangles and green circles representing data collected when cows were housed and at pasture, respectively (n=107 cows).