Scientists use technology to look at the personalities and predictability of farmed calves

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Using state of the art sensor technologies, experts at the University of Nottingham have found that calves reared on farms not only vary significantly in their movement and space patterns, but also that some

calves are more predictable in their behavior compared to others.

The research indicates the presence of exploratory and active personality types in farmed calves.

The study, which is published in *Royal Society Open Science*, was led by Professor Jasmeet Kaler from the School of Veterinary Medicine and Science at the University.

Changes in animal behavior have been monitored in several animal species over time. In farm animals, differences in behavior can impact animal welfare and productivity, and identifying changes in an individual's personality (behavioral expressions), or changes in its predictability (individual variability of those behaviors), can be used as early warning for disease, and as indicators for the welfare status of the animals.

However, in cases where each individual has a different baseline behavior, using group mean threshold as an indicator of potential sick or stressed animal can lead to mislabeling. Therefore, measuring between and within individual variability in farm animal behavior and understanding what behaviors show variability or consistency, and under what circumstances, is extremely important in moving towards individual health and welfare planning for the animals.

Whilst previous studies have looked at farm animal personality using behavioral tests, they still lack wider generalizability as they don't observe animal behavior in their natural environment. In addition, they have failed to quantify both between and within individual variation.

This is the first livestock study to use detailed and extensive data on the space use and movement as they occur under normal management of farm-housed calves collected via sensors to indicate the existence of

"exploratory" and "active" personality traits in farmed calves.

The team used precision livestock technologies, particularly ultra-wideband sensors, to measure individual movement patterns and detect variation, between, and within, individual levels, of 60 calves at the University of Nottingham farm, Centre of Dairy Science Innovation.

The aim was to investigate whether the calves display different personality types by measuring and investigating patterns over time for different measures of movement and space use—e.g. total distance traveled, core area used, total area used, site fidelity, and average time spent in the feeder area.

They also investigated potential differences in predictability (within individual difference), and looked at the relationship between these variables to uncover the presence of behavioral syndromes, and the relationship between personality and predictability of the different measures.

"Our results indicate that differences not only occur in behavior expression between calves (i.e personality); but that calves also vary in how predictable or unpredictable they are in terms of their movement and space use patterns. It is possible to speculate that unpredictable animals might be less affected by changes in the environment and therefore more resilient, while animals that rely on a more consistent pattern of behavior might struggle to cope with changes," says Kaler.

Kaler is currently leading a project that uses a "wide range of individual and social behaviors measured via sensors and camera technologies to understand and define resilience and use these for early detection of disease and [to] have indicators of positive welfare."

More information: Francesca Occhiuto et al, Personality and

predictability in farmed calves using movement and space-use behaviours quantified by ultra-wideband sensors, *Royal Society Open Science* (2022). DOI: 10.1098/rsos.212019