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## **Intra-day variation of Qualitative Behaviour Assessment outcomes in dairy cattle**

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### **Abstract**

Qualitative Behaviour Assessment of cattle expression using a fixed rating scale of 20 descriptors is one of the measures of the Welfare Quality® (WQ) assessment protocol for dairy cattle. As for other on-farm measures of welfare, reliability is an important issue especially if farms are to be certified. This study investigated the repeatability of QBA results across three different observation times during the day (early morning, late morning, early afternoon). For this purpose, 13 observers assessed a total of 30 video clips from ten commercial dairy farms using visual analogue scales to score the 20 QBA terms. QBA scores for 'emotional state' were computed according to the Welfare Quality® protocol (WQ\_QBA) and, additionally, a Principal Component Analysis was carried out. The latter revealed two main dimensions which may be described as 'mood' and 'activity', the former thus corresponding to the 'emotional state' score of the WQ protocol. Both for scores derived from the WQ protocol and from PCA, mixed model analysis for repeated measures revealed a significant effect of observation time depending on the farm. Mixed model analysis for repeated measures revealed a significant effect of observation time for three farms out of ten on both the WQ\_QBA score and the PCA 'mood' dimension; a similar effect was found for eight out of ten farms for the PCA 'activity' dimension. These results indicate that observation time potentially affects WQ (and other QBA) outcomes on a proportion of farms. However, given that outcomes for WQ\_QBA and PCA 'mood' were consistent for the majority of farms, procedures suggested in the Welfare Quality® protocol may constitute a reasonable compromise between reliability and feasibility. If the QBA assessment should reflect the 'mean mood', multiple assessments throughout the day may be carried out.

**Keywords:** animal welfare, dairy cattle, observation time, Qualitative Behaviour Assessment, reliability, Welfare Quality®