Inter-observer reliability of Qualitative Behavioural Assessments (QBA) of housed sheep in Norway using fixed lists of descriptors

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Abstract

Qualitative Behavioural Assessment (QBA) is a whole-animal approach used to quantify the expressive style of animals’ behaviour. The aim of this study was to evaluate the inter-observer reliability of principal components and individual descriptors from QBA of housed sheep in Norway using a fixed list of descriptors. In part 1, eight animal welfare inspectors from the Norwegian Food Safety Authority scored 12 two-minute video clips, using 12 pre-defined terms. In the second part, three of these observers visited ten sheep farms and scored the behaviour using a modified list of eight terms. The scores for all assessors within each part were analysed using Principal Component Analysis (PCA). The level of agreement for the first two components and for individual terms was assessed using Kendall’s coefficient of concordance (W). In part 1, only seven observers were assessed for reliability of principal components due to missing data, and for these observers the agreement was high for PC1 and moderate for PC2. For the sub-group of three inspectors that also participated in part 2, the reliability was high for both components. In the on-farm assessments in part 2, these three observers obtained only moderate agreement for PC1 and low agreement for PC2. Results illustrate that good reliability can be achieved with QBA for housed sheep using videos, but that equally satisfactory reliability is more difficult to obtain using the method on-farm. The result in part 2 may be related to less-controlled circumstances concerning exactly what the observers see when sheep are kept indoors with high stocking densities, observer drift, and limited between-farm variation, which is a challenge for many types of reliability studies in field conditions.

Keywords: animal welfare, behaviour, fixed list of descriptors, inter-observer reliability, qualitative behavioural assessments, sheep

Introduction

Assessment of farm animal welfare is challenging, particularly in terms of developing methods that provide information about the animals’ affective states. Essential requirements for all methods employed in the assessment of animal welfare are that they are feasible, valid and reliable. Qualitative Behavioural Assessment (QBA) is an integrated whole-animal approach used to quantify animals’ expressive style of behaviours (Wemelsfelder & Lawrence 2001). The method integrates and summarises the animal’s dynamic style of interaction with the environment using qualitative descriptors such as sociable, fearful, calm or vigilant (Wemelsfelder & Lawrence 2001). There are two approaches to the method, one allowing the observers to use their own terms (Free Choice Profiling; FCP), analysed using Generalised Procrustes Analysis (GPA), and one based on fixed lists of terms followed by Principal Component Analysis (PCA). The latter approach is more feasible for on-farm assessments (Wemelsfelder et al 2009a,b; Wemelsfelder & Millard 2009) and therefore commonly used. With these statistical approaches, the number of variables is reduced to two or three main components, each comprising correlated behavioural expressions. This provides an integrated pattern of the animals’ behavioural style, and the results can be presented visually in loading plots. Interpretation of the main components involves the identification of the terms that best describe the anchor points at each end.

QBA can be integrated with other indicators of health and welfare into balanced welfare assessment protocols (Wemelsfelder & Mullan 2014) and has been incorporated into the welfare assessment protocols for cattle, pigs and poultry developed by the Welfare Quality® project (eg Welfare Quality® 2009) and, more recently, also for sheep in the Animal Welfare Indicators project (AWIN 2015). Also, QBA may function as a first level of inspection to identify producers with problems in need of a second, more thorough inspection (Brsic et al 2009). The method has the potential to become particularly attractive for routine welfare assessments due to the feasibility of the actual data collection; it