

A STUDY OF THREE METHODS USED TO ASSESS STOCKMANSHIP ON COMMERCIAL DAIRY FARMS: CAN THESE BECOME EFFECTIVE WELFARE ASSESSMENT TECHNIQUES?

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Abstract

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The modern dairy industry involves close contact between the stockperson and their animals and thus complex relationships develop between stockperson and cow. This study examines the assessment of stockmanship quality on commercial dairy farms and aims to develop useable protocols for on-farm assessment of stockmanship for inclusion in a quality-assurance scheme. In this study the behaviour of cows was used to assess the quality of stockmanship on fifteen commercial dairy farms, which varied in level of production and intensification. The behavioural reactions of cows to a novel human and the behaviour of the stockperson before, during and after milking were scored, and stockpersons completed a fifty-question psychometric attitude questionnaire, which was made up of seven subgroups of questions. Preliminary results indicated that stockpersons differ in the behaviour they use when handling cows. Stockpersons on zero-grazing farms appeared to use fewer positive tactile behaviours and more severe negative behaviour. The behavioural responses of cows in a novel human approach test differed between farm types. Cows on straw-court farms appeared to be more flighty and less confident in the presence of a novel human. Differences were observed in mean attitude scores for the seven subgroups of questions. Job type appears to have an effect on the extent of the stockperson's positive attitude toward cows, animals in general, job satisfaction and farm economics. The results indicate that there are differences in quality of stockmanship between farms and that the three methods chosen do identify these. They show that the human-animal relationship is a potential source of fear for cows in dairy production and therefore can be used to identify poor stockmanship.

Keywords: *animal welfare, dairy cow, fear, human-animal interaction, on-farm assessment, stockmanship*

Introduction

Research in the livestock industry has revealed significant relationships between the stockperson's attitudes and behaviour towards his/her animals and the behaviour and productivity of those animals. This is particularly true for the pig industry (Hemsworth *et al* 1990, 1994) and to a lesser extent the dairy industry (Boivin *et al* 1992).

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In experiments by Hemsworth *et al* (1990), pigs that were handled aversively showed a greater fear response toward humans compared to those handled gently. This had detrimental effects on growth rates in growing pigs and reproduction in adults, suggesting a chronic stress response. The effect of aversive handling on cows has been expressed in reduced milk yields, increased difficulty in handling and increased fearfulness of people (Seabrook 1994). Housing and management decisions such as housing, parlour and handling pen design, level of automation and amount of human contact also have a key role in fear reactions. Recent work, which aimed to modify the attitudes and behaviours of stockmen through training, improved these variables and in turn resulted in reduced levels of fear in pigs and an increase in reproductive performance (Coleman *et al* 2000).

Common methods used to assess levels of fearfulness in cows on commercial farms include assessing the behavioural reaction of cows during milking and/or during a human approach test, assessing the stockperson's behaviour, and conducting psychometric personality tests of the stockperson (Hemsworth *et al* 1994; Breuer *et al* 2000; Coleman *et al* 2000). The relationship between stockpersons' attitudes and behaviour toward stock and the behavioural responses of animals to human contact seem to have been established under experimental conditions (Hemsworth *et al* 1994; Coleman *et al* 2000). The present study aims to determine whether the same results are true for commercial dairy units in the UK using three preliminary methods: a psychometric personality questionnaire, assessment of the cows' behavioural reactions to a novel human, and assessment of the stockpersons' behaviour.

Materials and methods

Behavioural observations were conducted on 15 commercial Holstein–Friesian dairy farms. The farms were classified as high, medium and low milk production cubicle units, high milk production/zero-grazing units, or medium milk production/straw-court units. The farms are part of an on-going project that aims to compare welfare across farm types.

The behaviour of the stockperson was observed before, during and after two afternoon milkings. Human behaviour was recorded during the following discrete activities: moving the cows from the cubicles/court to the holding yard of the milking parlour; forcing the cows into position in the parlour; cleaning, attaching and removing clusters; and moving cows out of the parlour back to the cubicles/court. During each of these activities the stockperson was scored for the following behaviours: positive tactile interactions (P); moderate negative interactions (N1); severe negative interactions (N2); level of arm waves (W); soft vocalisations (V1); harsh vocalisations (V2); and speed (S) at which cows were moved. The stockmen were scored for P, N1, N2, W, V1 and V2 on a five-point scale, which represented the extent to which each was present; speed was scored on a sliding scale from slowly to quickly.

On each farm, ten animals were individually tested in a human approach test for a period of 5 min. The test was conducted in the animal's home pen and the same interactor made the approach test wearing a blue boiler suit and a red jacket each time. The interactor performed a three-stage approach test, which began when he was at a distance of approximately 6 m from the cow. In the first stage a slow approach was used, aiming to approach to within about 3 m of the animal. In the second stage the interactor attempted to fully approach and further interact with the cow. Finally in the third stage the interactor aimed to be in close proximity to the cow, touching and walking around her. The interactor always stopped if the cow

showed any signs of anxiousness or withdrawal. The cows were scored by two observers for the following elements: flightiness (F1); degree of interaction with novel human (I); confidence (C); friendliness (F2); and aggressiveness (A). These were scored on a sliding scale.

Each stockperson was asked to answer a questionnaire consisting of fifty questions designed to assess their attitudes. It was adapted from three previously used questionnaires for sheep/pig farmers (the 75-Scale Sheep/Pig attitude scale, E Austin, I Deary and G Edwards-Jones 2001, unpublished data), sheep/cattle farmers (Willock *et al* 1999) and dairy farmers (Hemsworth *et al* 2000). It could be spilt into seven sections (Table 1). Stockmen were asked to respond to each statement on a five-point scale. The responses to these questions were then grouped and totalled to give a composite score or attitude score for each subgroup, and an overall attitude score, with a low score indicating a more positive attitude.

Table 1 Stockmanship psychometric questionnaire subgroups of questions.

Subgroup Title	Abbreviation	Example
<i>Economic questions</i>	Econ	"I think of my stock mainly in terms of their market value"
<i>Job satisfaction questions</i>	Job	"Farmers enjoy their job"
<i>Farming policy questions</i>	Policy	"Farming policy changes are easy to understand"
<i>Empathy toward dairy cows</i>	Cow	"Dairy cows are stimulating animals"
<i>Empathy toward pets/zoo animals</i>	Anim	"A friendly cat or dog always cheers me up"
<i>Beliefs about animal consciousness/feelings</i>	Cons	"It is important for an animal's psychological needs to be met"
<i>Beliefs about the definition of welfare</i>	Welf	"It is important for animals to be able to perform their natural behaviour"

Statistical analysis

Only descriptive statistics were used because of the low number of farms at this initial stage. In analysing the behaviour of the stockperson, scores for positive and negative interactions, arm waves, soft and harsh vocalisations and speed were calculated for each stockperson. Scores for flightiness, interaction, confidence, friendliness and aggression were calculated for each farm over all cows. Standard errors were calculated on the means of each farm type for the above scores.

To analyse the stockpersons' attitude questionnaire, principal components analysis was used 1) to identify any relationships between the question type and the answers given by the stockmen, and 2) to determine whether any relationships exist between farm type, job or gender and the average attitude score of the stockperson. A final attitude score was calculated for each stockperson which represents the extent of positive attitude they have towards dairy farming.

Results

Differences between stockpersons' behaviour scores were identified across farm types for positive, moderate and severe negative behaviours, soft and harsh vocalisations, and speed at which cows were moved. Stockpersons on low-yielding and zero-grazing farms used more positive and moderate negative behaviours when handling cows. Stockpersons on high-yielding and straw-court farms used less of all types of behaviour in general (Figure 1).

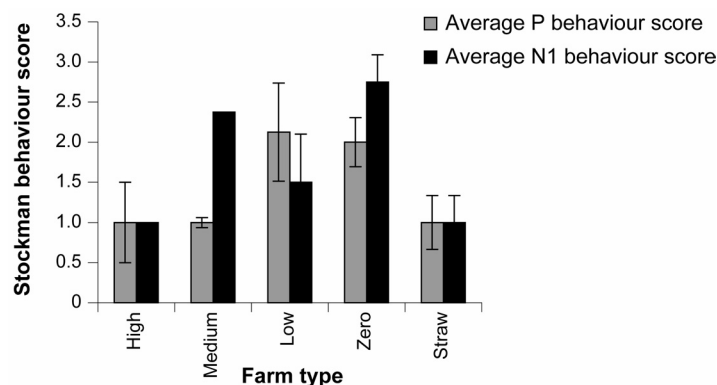


Figure 1 Behaviour scores (mean \pm SEM) for positive tactile interactions and moderate negative interactions across the five farm types.

Differences in the behavioural responses of cows in the novel human approach test were observed between farm types for all of the behaviour traits scored. Cows that had a lower score for flightiness scored higher for confidence (Figure 2). Correspondingly, cows that scored high for friendliness also scored high for interaction and low for aggression. This trend occurred across all the farm types. There was more human–cattle contact on zero-grazing and high- and medium-yielding farms, and cows on these farms types scored higher for confidence and lower for flightiness. In contrast, on straw and low-yielding farms where there appeared to be less human contact, cows scored high for flightiness and low for confidence.

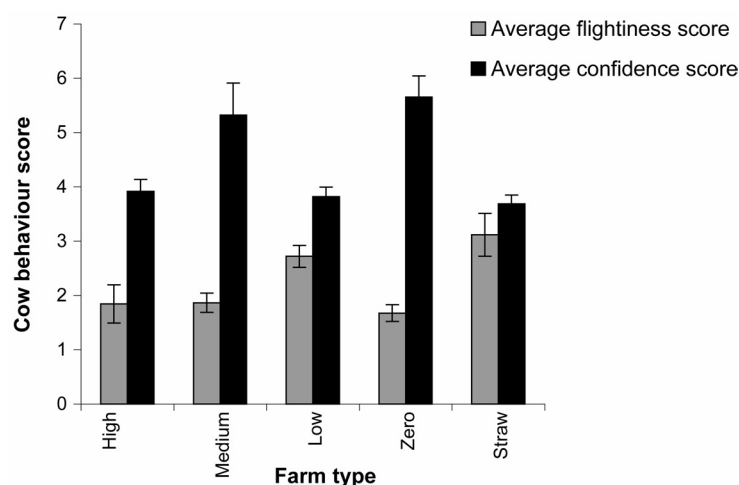


Figure 2 Flightiness and confidence behavioural response scores (mean \pm SEM) for cows across the five farm types.

Stockpersons appeared to differ in their attitudes but were consistent for each person, with questions relating to similar topics being answered similarly. Although the mean attitude scores over all fifty questions were quite similar, the mean attitude score for each subgroup of questions varied between stockpersons. The distribution of the answers to the questions and the distribution of the stockpersons in their attitude scores appeared to be determined by

two factors, which have been labelled an economic component and an empathy for animals component (Figure 3). At this initial stage of this project, these differences in attitude scores between stockpersons do not appear to be a result of the farm type but seem more closely related to job type (Table 2).

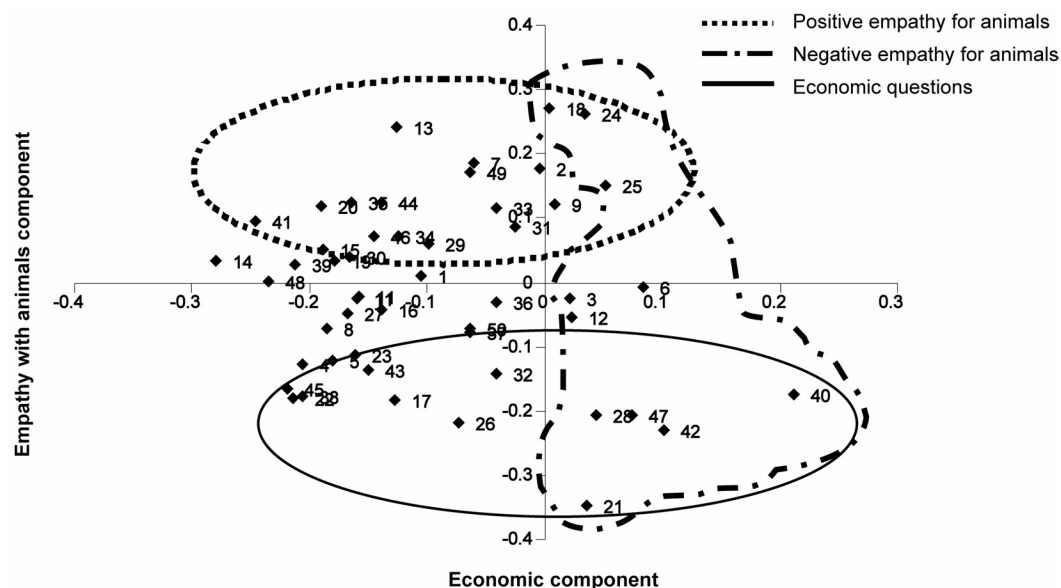


Figure 3 Principal components analysis of all fifty attitude questions.

Table 2 Attitude scores (mean \pm SEM) for overall attitude and for the seven subgroups of questions across job type.

Job Title	Av Att	SEM Att	Econ	SEM Econ	Job	SEM Job	Policy	SEM Policy
<i>Dairyman</i>	2.4	0.07	2.8	0.05	2.5	0.13	2.9	0.08
<i>Manager</i>	2.4	0.18	2.7	0.12	2.4	0.46	3.0	0.13
<i>Owner</i>	3.0	0.06	0.1	0.11	0.1	0.11	0.1	0.10
Job Title	Cow	SEM Cow	Anim	SEM Anim	Cons	SEM Cons	Welf	SEM Welf
<i>Dairyman</i>	1.8	0.09	2.4	0.17	1.6	0.12	2.9	0.16
<i>Manager</i>	1.7	0.15	2.4	0.18	2.1	0.19	2.6	0.42
<i>Owner</i>	0.1	0.09	0.1	0.12	0.1	0.06	0.1	0.12

A low score indicates a more positive attitude.

Av Att = Mean attitude score for all questions; Econ = Mean economic questions; Job = Mean job satisfaction questions; Policy = Mean farming policy questions; Cow = Mean empathy toward cow questions; Anim = Mean empathy toward animal questions; Cons = Mean consciousness questions; Welf = Mean welfare questions.

Discussion

Although only preliminary, the analyses suggest that cows on the zero-grazing farms that received more severe negative interactions from their stockperson appeared to be less likely to interact with a novel human and less friendly toward a novel human. Similar results were also shown by Hemsworth *et al* (2000), who demonstrated a significant negative correlation between number of forceful, negative tactile interactions and percentage of cows that

approached within 1 m of an experimenter. On the straw-court farms, stockpersons generally used less of all the behaviour types when working with cows; in the human approach test, cows on these farms seemed more flighty and less confident in the presence of a novel human. Reduced human contact could explain the behavioural responses of cows on these farms.

Overall, the differences suggest that there is a relationship between the behaviour of the stockperson and the behavioural response of cows to a novel human; this result is in accordance with Rushen *et al* (1999), who found a relationship between the nature of the stockperson's behaviour toward cows and the cows' fear of humans.

Results are also suggestive of a relationship between stockperson attitude and job type, with owners having a more positive attitude toward cows than dairymen and managers. This could be related to job satisfaction, with owners achieving higher job satisfaction as a result of working conditions. Seabrook (1973) suggested that attitudes and beliefs are related to how motivated we are as individuals to work. Correspondingly, the number of hours worked, the weather and the working environment are likely to have an effect on attitude.

Animal welfare implications

These results on a small number of farms indicate that differences in the behaviour and attitudes of stockpersons can affect the welfare of the cows, as shown by the cows' fear response to a novel human. Further analysis is required to discover whether the three measures used here — psychometric personality questionnaire, assessment of cows' behavioural reactions to a novel human, and assessment of the stockpersons' behaviour — are all related. If these relationships are significant, there may be an opportunity for industry to manipulate the human factors regulating the cows' fear response and thus reduce fear levels on commercial dairy farms.

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