Modifying stockperson attitudes and behaviour towards pigs at a large commercial farm

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Abstract

Considerable research into the role of the stockperson’s attitude and behaviour on the behaviour, productivity and welfare of commercial pigs has been conducted. Recently, it has been demonstrated that a training program to modify the attitudes and behaviour of stockpeople on small and moderately sized commercial farms results in improvements in these variables and these improvements, in turn, lead to a reduction of fear in pigs and an improvement in reproductive performance. The aim of this study was to determine whether a similar training procedure would be effective in modifying stockperson behaviour at a large commercial farm in which the effects of peer pressure and the consequent increased homogeneity of stockperson behaviour may influence the effectiveness of the training programme. In addition, the effects of these modification procedures on other, job-related variables were investigated. A total of 43 stockpeople from a large commercial piggery participated in the study. They were assigned to one of two groups. The first group received a procedure to modify attitudes and behaviour towards pigs, and the second group received no intervention. Stockperson attitudes and behaviour improved following the training procedure and there was a tendency for pigs’ withdrawal behaviour to be reduced. Surprisingly, 6 months after the completion of the study, the retention rate for employees who had participated in the training program was 61% compared to the rate for those who had not participated (47%). The results of this study confirm that stockperson attitudes and behaviour can be improved in a large commercial farm and that short-term effects on pig behaviour can be observed. Stockpeople who have been trained are also more likely to remain in the job. Taken in conjunction with earlier research, there is a strong case for introducing stockperson training

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1. Introduction

The role of the stockperson in the welfare and productivity of farm animals has received increasing attention over recent years (Seabrook, 1972; English, 1991; Hemsworth et al., 1989, 1993, 1994; Hemsworth and Barnett, 1991; English et al., 1992). While some of the emphasis in this research has been placed on stockperson personality variables such as introversion/extroversion and neuroticism (Seabrook, 1972), the strongest predictors of stockperson behaviour have been found to be stockperson attitudes. Moreover, stockperson behaviour has been shown to be strongly related to fear and reproductive performance in pigs (Hemsworth et al., 1989). It has also been proposed that empathy of the stockperson may be related to the welfare and productivity of animals under the stockperson’s care (English, 1991). In general there are no strong empirical data showing sequential relationships between stockperson personality variables, animal behaviour and productivity.

Considerable research into the role of the stockperson’s attitude and behaviour on the behaviour, productivity and welfare of commercial pigs has been conducted (Hemsworth et al., 1981a,b, 1986, 1987, 1989; Gonyou et al., 1986; Hemsworth and Barnett, 1991). The practical implications of improving stockperson attitudes and behaviour in the pig industry have been demonstrated by the results of a study at 25 commercial farms (Hemsworth et al., 1994). The objectives of this recent study were to examine firstly, whether it was possible to improve the attitudinal and behavioural profiles of stockpeople towards pigs and, if successful, secondly, to examine the consequences of these attitudinal and behavioural changes on the behaviour and productivity of commercial breeding pigs. Two treatments were imposed; an ‘‘attitudinal–behavioural modification’’ treatment, consisting of a cognitive–behavioural intervention procedure designed to modify the behaviour of stockpeople towards pigs, and a control treatment, where no intervention was attempted. The effectiveness of the intervention programme was assessed by monitoring the changes in the attitudinal and behavioural profiles of stockpeople and the behaviour and reproductive performance of pigs at the two groups of farms from an 8-month pre-modification period to a 15-month post-modification period. An analysis of the proportional changes in the attitude, behaviour and production variables from the pre-modification period to the post-modification period revealed significant improvements following the intervention treatment on the attitude and behaviour of the stockpeople towards pigs, the behavioural response of pigs to humans and a trend towards improvement in pig reproductive performance. No such improvements were observed in the control treatment.

Recently, research emphasis has shifted to an examination of the relevance of job-related variables such as technical knowledge and job satisfaction (Coleman et al., 1998). In this study, conducted on a large commercial pig farm, the relationship between
The reduction in correlations was attributed to the greater effects of peer pressure and the consequent increased homogeneity of behaviour of stockpeople in the large farm compared with those on the small, individually-run farms.

In order to establish that training programs based on cognitive–behavioural principles can be used in a range of farm situations, it is desirable to examine whether or not refinements to the modification procedure used on small farms in the earlier study (Hemsworth et al., 1994) would be effective in modifying stockperson attitude and behaviour in a situation where stockpeople work in groups. Therefore, the aim of this study was to determine whether a modification procedure, similar to that successfully used in the earlier study on individual pig farms to improve the attitude and behaviour of stockpeople towards pigs, would be effective in modifying stockperson behaviour at a large commercial farm in which the effects of peer pressure and the consequent increased homogeneity of stockperson behaviour may influence the effectiveness of the training programme. The opportunity was also taken to add a number of refinements to the program to improve both the efficacy of the procedure and the practicability of the procedure for training stockpeople in a formal group setting. In addition, the effects of these modification procedures on other, job-related variables were investigated.

2. Subjects, materials and method

A total of 43 stockpeople drawn from 107 stockpeople working in a large commercial piggery volunteered to participate in the study. The stockpeople were one of two groups who had participated in an earlier study (Coleman et al., 1998). These stockpeople sometimes worked together but often worked individually (e.g., in mating sheds) across five modules at the piggery.

The plausible reason given to the stockpeople for conducting this study was to examine the effects of stockperson training on pig behaviour and performance. They were also told that in studying these effects, changes in their opinions about the job, working conditions and the animals were to be monitored. Ethics approval was obtained for these procedures, and stockpeople were debriefed at the end of the experiment.

2.1. Measurements

The following measurements were conducted in each of the two study periods (Pre-Intervention and Post-Intervention). The pre-intervention job-related data were collected as part of an earlier study (Coleman et al., 1998) which had been completed 6 months before the current study began. The remaining pre-intervention data were collected 1–3 weeks prior to the intervention.

2.2. Attitude and job-related variables

A computerised questionnaire was developed using multimedia techniques in which stockpeople were presented with audio/visual instructions about the nature of the
questionnaire and how to answer questions by using a “mouse” to point to their response choice on a 5- or 7-point scale. The computerised procedure was adopted to standardise questionnaire administration, to simplify procedures for stockpeople who may have had difficulty reading a conventional questionnaire and to permit automatic recording of responses for subsequent analysis. Three stockpeople required additional assistance to answer the questions because of substantial reading difficulty. Several questionnaires, each with several subscales, had been used in the earlier study (Coleman et al., 1998) and are described below.

The first questionnaire was designed to assess general beliefs about pigs and consisted of four subscales. The first subscale consisted of items such as “Pigs are gluttons” and “Pigs are dirty” and was labelled “Negative beliefs”. The second subscale consists of items such as “Pigs are easy to work with” and “Pigs are friendly to people” and was labelled “Working with pigs”. The third subscale consisted of items including “Pigs are intelligent” and “Pigs are easily frightened” and was labelled “Characteristics of pigs”. The fourth subscale included items such as “Pigs are fun-loving” and “Pigs make good pets” and was labelled “Pigs as pets”. In all cases, the higher the score, the more negative the attitude.

The second questionnaire was the behavioural beliefs questionnaire and consisted of items relating to beliefs about the stockperson’s own behaviour. There were three subscales in this questionnaire. The first included those items relating to the frequency of petting oestrus and non-oestrus pigs, and talking to oestrus and non-oestrus pigs. This subscale was labelled “Negative behaviour” because a high score indicated infrequent positive interactions. The second subscale was labelled “Handling non-oestrus pigs” and was composed of those items relating to the amount of physical and verbal effort required and the perceived difficulty in moving pigs not in oestrus. The third subscale consisted of the same items as in the second subscale but related to moving pigs in oestrus and was labelled “Handling oestrus pigs”. For all three subscales, the higher the score, the more negative the attitude.

The third questionnaire consisted of questions relating to aspects of job satisfaction and consisted of four subscales. The first subscale was composed of five items including “How boring is your job?” and “How long do you think you will continue in the pig industry?” and was labelled “Job enjoyment”. The second subscale consisted of two items: “When you go away for holidays, do you go with a member of your family?” and “Who normally supervises your children when you are not able to?”. This subscale was labelled “Family”. Two items comprise the third subscale: “How much do you look forward to tea and lunch breaks?” and “How much do you look forward to the end of the working day?”. This subscale was labelled “Work breaks”. The fourth subscale, also comprising two items: “I often have to work in cramped conditions” and “The air is clean at work”, was labelled “Working conditions”. High scores mean high job satisfaction for all subscales.

The final questionnaire consisted of two subscales and assessed technical knowledge and willingness to learn. Four items comprised the first subscale including “How often do you discuss work methods during tea and lunch breaks?” and “Would you attend training courses in your own time if they were available?”. This subscale was labelled “Learning”. Three items comprised the second subscale, including “How much do you
know about diseases in pigs?’ and ‘How much do you know about factors which affect reproduction in pigs?’. This subscale was labelled ‘Knowledge’. Low scores mean low technical knowledge and willingness to learn.

2.3. Stockperson behaviour

A team of four trained observers, who had not been involved in collecting the questionnaire data, recorded the nature of the behaviour of stockpeople during handling activities with breeding female pigs in five mating sheds or units. These observations concentrated on the number and proportion of negative or aversive behaviours utilised by stockpeople in moving breeding pigs. Each stockperson was observed by each observer for a minimum of five handling bouts which involved moving one or more breeding females to and from boars for oestrus detection and mating. Two behaviour variables were defined; the first was the total number of negative behaviours towards the pig by a stockperson (NEG) and the second was the percentage of such negative behaviour relative to the total number of positive and negative behaviours (%NEG).

It was important that these observations were conducted without the stockpeople being fully aware of the true nature of the observations. The plausible reason given to the stockpeople for conducting these confidential observations was that these observations were part of a study examining the relationships between the sexual behaviour and reproductive performance of pigs. Ethics approval was also obtained for these procedures, and stockpeople were also debriefed on this aspect of the study at the end of the experiment.

The interobserver reliability was assessed by comparing the independent records of each observer of the stockperson interactions captured on video footage of stockperson behaviour. Kendall’s Coefficient of Concordance (Sokal and Rohlf, 1981) was used to compare the agreement between observers and was found to be very high (W = 1.00), indicating excellent interobserver reliability.

Each stockperson was observed by each observer during 5 to 12 handling bouts in which female breeding pigs were taken to and from a boar for oestrus detection and mating. Observations were recorded on notebooks and only one stockperson was observed at any time by one observer.

2.4. Pig behaviour

For the purposes of assessing pig behaviour, 10 recently mated female pigs, housed in stalls, which had been supervised and recently assisted to mate by each stockperson were tested 3 weeks post-mating. In most of our previous research, the behavioural response of pigs to humans was assessed in a standard test in which the approach behaviour of the pig to a stationary experimenter in an arena was measured. It was not possible to conduct this test because of the amount of time needed and the costs of setting up specific arenas at various locations. A simpler test, which has been shown to be predictive of the above test in a commercial setting (Hemsworth et al., 1981b), was used in this study and basically involved measuring the withdrawal response of feeding gilts and sows to an experimenter approaching in a standard manner. Pigs were fed at
0700 to 0730 h and one experimenter conducted the test at 1300 to 1500 h as follows. About 100 g of food (commercial lactating sow ration) was placed on the floor in the front of the stall and then the experimenter withdrew about 2 m back down the front corridor. After 5 s of feeding (defined as the sow’s snout within 5 cm of the feed), the experimenter slowly approached the front of crate, attempting to avoid startling the sow, and leaned over the front of the stall and placed her hand about 5 cm adjacent to the snout of the sow. The test commenced when the experimenter’s hand was adjacent to the sow’s snout and the sow’s behavioural response to the close presence of the experimenter was recorded over the subsequent 30 s. If the sow had failed to approach the tray with food within 30 s of presentation of the feed, the experimenter approached the stall slowly and placed her hand in an imaginary position where the sow’s snout would have been if the pig was feeding and the test commenced. Over the 30 s test, an observer standing at least 2 m from the animal recorded the following behavioural variables:

1. Whether or not the pig withdrew (score of 0 or 1). Withdrawal was defined as withdrawing more than 5 cm from the feed and withdrawal could occur any time within the 30 s. If a sow failed to approach the feed prior to the test, this was recorded as a withdrawal.
2. If withdrawal had occurred, the time taken to return to within 5 cm of the feed. If a sow failed to withdraw or return, she was recorded as returning at 0 and 30 s, respectively.

2.5. Cognitive behavioural intervention procedure

The procedure used in this study was similar to that successfully used in the Australian pig industry by Hemsworth et al. (1994). However, a number of refinements were made to improve both the efficacy of the procedure and the practicability of the procedure for training stockpeople in a formal group setting. These refinements included small group (2–3 stockpeople) discussions and question and answer sessions. This procedure was designed firstly, to modify the beliefs of stockpeople about the sensitivity of pigs, handling pigs and the consequences of aversive handling on the ease of handling and productivity of pigs and secondly, to educate stockpeople to observe and handle pigs properly to avoid these adverse handling effects. An important component of this training procedure was a detailed series of reviews and discussions of the subject utilising data and observations from our earlier studies emphasising the important relationships between stockperson attitude, stockperson and pig behaviour and pig stress and productivity. In addition, a booklet summarising the procedure and specialised video footage, showing examples of appropriate and inappropriate behaviours by stockpeople and the accompanying behavioural responses by pigs, were presented. This video and written material was also used for revision purposes by the stockpeople.

2.6. Experimental design

At the commencement of the study (i.e., pre-intervention for all stockpeople), the attitude and behaviour of all stockpeople were assessed and the behavioural response to humans of a sample of pigs assisted to mate by these stockpeople were assessed 1–2
weeks later. The cognitive–behavioural modification intervention procedure took approximately 1 h and was conducted on half of the stockpeople 1 month after the study commenced (Modification) while the remaining stockpeople were subjected to a control procedure which merely involved the experimenters visiting to discuss work practices (Control). Stockpeople were taken through the modification procedure in groups of three to facilitate group discussion and peer support. Subjects were allocated to Modification or Control groups on the basis of which breeding unit they worked in. Stockpeople in units 1, 2 and 3 were assigned to the Control group ($n = 25$) and those in units 4 and 5 were assigned to the Modification group ($n = 18$). Following this, attitudes and behaviour of the stockpeople and behaviour of the pigs were assessed.

Repeated measures analyses of variance were conducted on the attitude subscale scores with the two measurement occasions as the repeated factor, and the groups of stockpeople (Modification vs. Control) as the independent factor.

It can be argued that the experimental unit in procedures of this kind should be the module on the grounds that stockpeople interact in the workplace and, therefore, replicates are not independent observations. However, in the situation described here, there are limited opportunities for people to interact in the workplace because stockpeople have their individual tasks to perform. To the extent that peer pressure acts to facilitate behavioural change, this is an integral part of the intervention procedure. Further, stockpeople were drawn from five separate modules. If there is an effect of stockperson interactions on the data, it would be expected that there would be a reduction in variance from pre- to post-intervention in the modification group. So long as there is no marked decrease in variance in the experimental treatment form pre- to post-intervention, it can be argued that individual stockpeople can be treated as the experimental unit.

3. Results

From Table 1, it is clear that there is no decrease in variance from pre- to post-intervention in the modification group on any of the questionnaire subscales.

A number of measures of attitude towards stockperson behaviour showed significant treatment by modification stage interaction effects (Table 1). In particular, there was a significant improvement in stockperson attitude towards working with pigs in the modification group compared to the control group ($F_{1,34} = 4.19$, $p = 0.05$). A similar improvement occurred in attitude towards handling oestrus pigs ($F_{1,34} = 9.11$, $p < 0.01$) and a trend in the same direction was observed for beliefs about positive interactions with pigs ($F_{1,34} = 2.74$, $p = 0.11$).

No significant changes were observed in job-related measures although there was a tendency for stockpeople in the modification group to report increased knowledge compared with those in the control group ($F_{1,34} = 2.70$, $p = 0.11$).

When stockpeople were followed up 6 months after the completion of the study, there was a tendency for more stockpeople who had been through the modification program to remain in the company. Of the 42 people from the modification group and for whom information was available (1 person could not be traced), 30 were still employed by the
Table 1
Means and standard deviations for changes in stockperson training variables following training

<table>
<thead>
<tr>
<th>Variable</th>
<th>Modification group</th>
<th>Control group</th>
<th>F-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
</tr>
<tr>
<td>Negative beliefs</td>
<td>22.5 (2.9)</td>
<td>21.1 (4.0)</td>
<td>21.7 (4.2)</td>
</tr>
<tr>
<td>Working with pigs</td>
<td>12.6 (2.4)</td>
<td>11.8 (2.7)</td>
<td>12.5 (2.6)</td>
</tr>
<tr>
<td>Characteristics of pigs</td>
<td>8.2 (2.0)</td>
<td>8.5 (1.9)</td>
<td>8.5 (2.5)</td>
</tr>
<tr>
<td>Pigs as pets</td>
<td>8.8 (1.9)</td>
<td>9.1 (2.0)</td>
<td>8.2 (1.9)</td>
</tr>
<tr>
<td>Negative behaviour</td>
<td>17.3 (4.9)</td>
<td>16.2 (4.5)</td>
<td>17.6 (6.0)</td>
</tr>
<tr>
<td>Handling non-oest. pigs</td>
<td>6.4 (2.2)</td>
<td>5.7 (2.3)</td>
<td>6.3 (2.7)</td>
</tr>
<tr>
<td>Handling oest pigs</td>
<td>10.4 (2.5)</td>
<td>9.6 (2.2)</td>
<td>11.1 (2.9)</td>
</tr>
<tr>
<td>Job enjoyment</td>
<td>21.0 (6.2)</td>
<td>21.1 (6.1)</td>
<td>20.4 (6.0)</td>
</tr>
<tr>
<td>Family</td>
<td>7.6 (3.0)</td>
<td>7.8 (3.1)</td>
<td>6.1 (3.0)</td>
</tr>
<tr>
<td>Work breaks</td>
<td>4.4 (2.5)</td>
<td>5.1 (2.7)</td>
<td>4.2 (2.5)</td>
</tr>
<tr>
<td>Working conditions</td>
<td>6.1 (1.9)</td>
<td>6.1 (1.7)</td>
<td>4.8 (2.0)</td>
</tr>
<tr>
<td>Learning</td>
<td>18.9 (4.2)</td>
<td>17.7 (4.4)</td>
<td>17.7 (5.8)</td>
</tr>
<tr>
<td>Knowledge</td>
<td>14.2 (3.9)</td>
<td>14.2 (3.2)</td>
<td>13.9 (4.1)</td>
</tr>
</tbody>
</table>

Means and variances for stockperson behaviour and pig behaviour are given in Table 2. There was a significant decrease in the proportion of negative interactions with pigs (%NEG) by the modification group compared to the control group \(\left(F_{1,35} = 4.25, \ p = 0.05\right)\) and a non-significant trend in the same direction for total number of negative interactions towards pigs (NEG) \(\left(F_{1,34} = 2.07, \ p = 0.16\right)\).

Table 2
Means and standard deviations for changes in stockperson and pig behaviour and pig production following stockperson training

<table>
<thead>
<tr>
<th>Variable</th>
<th>Modification Group</th>
<th>Control Group</th>
<th>F-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
</tr>
<tr>
<td>Percentage of stockperson negative behaviour (%NEG)</td>
<td>70.94 (12.8)</td>
<td>55.23 (11.4)</td>
<td>54.25 (17.2)</td>
</tr>
<tr>
<td>Stockperson negative behaviour (NEG)</td>
<td>1.09 (0.28)</td>
<td>0.88 (0.18)</td>
<td>0.82 (0.40)</td>
</tr>
<tr>
<td>Pig time to return</td>
<td>1.67 (1.7)</td>
<td>0.97 (1.2)</td>
<td>1.06 (1.6)</td>
</tr>
<tr>
<td>Pigs feeding</td>
<td>98.24 (3.9)</td>
<td>100.00 (6.0)</td>
<td>92.72 (23.4)</td>
</tr>
<tr>
<td>Pig withdrawals</td>
<td>28.88 (19.2)</td>
<td>17.71 (17.8)</td>
<td>10.89 (13.1)</td>
</tr>
<tr>
<td>Piglets per sow</td>
<td>11.19 (0.94)</td>
<td>10.97 (0.95)</td>
<td>10.44 (1.20)</td>
</tr>
<tr>
<td>Stillbirths</td>
<td>0.68 (0.19)</td>
<td>0.73 (0.15)</td>
<td>0.62 (0.26)</td>
</tr>
<tr>
<td>Farrowing rate</td>
<td>0.93 (0.08)</td>
<td>0.94 (0.07)</td>
<td>0.86 (0.14)</td>
</tr>
</tbody>
</table>
4. Discussion

Consistent with results from our previous research (Hemsworth et al., 1989), stockperson attitudes improved following the training procedure. In the modification group, mean responses on attitude towards working with pigs decreased scores, indicating that attitudes improved while in the control group. Similarly, mean scores on beliefs about petting and talking to pigs decreased for the trained stockpeople, indicating an improved attitude, while those for the control group increased. Scores for beliefs about handling non-oestrus pigs increased in the modification group compared to the control group, also indicating an improvement in attitudes in the trained stockpeople. It is interesting to note that all of the attitudes which showed improvement were directed towards behaviour. Given that the aim of the training program was to change stockperson behavioural beliefs, this was a desirable outcome. It is possible that changes in attitude score could reflect the fact that stockpeople in the modification group were aware of what was required, and simply answered in a way that was consistent with the experimenters’ expectations.

However, stockperson behaviour, which was assessed by independent observers, also showed a decrease in negative behaviours (%NEG and NEG) towards pigs. Given that stockpeople were not aware of the way in which their behaviour was being assessed, these changes in observed behaviour indicate that a genuine change in stockperson attitudes and behaviour had occurred. Furthermore, there was a trend ($F_{1,33} = 2.78$, $p = 0.11$), consistent with this improvement in stockperson behaviour, for pigs supervised and assisted to mate by stockpeople in the modification group to show less withdrawal to an approaching experimenter. No such effect was evident in the control group. This indicates that, despite the fact that the gilts and sows in this large commercial farm had been exposed to several stockpeople, there may have been some influence on their behaviour (when tested during early pregnancy) exerted by the stockperson who was involved. It is also important to note that pig behaviour was assessed 3 weeks after mating by which time the effects of handling may have diminished. In our earlier research (Hemsworth et al., 1987), one stockperson was predominantly responsible for supervising and assisting mating activities at each farm. Therefore, consistent with results from our previous research (Hemsworth et al., 1989), stockperson attitudes and behaviour and, to a lesser extent, pig behaviour improved following the training procedure. It is important to appreciate that regular handling of a predominantly positive nature is required to reduce fear responses in pigs. Furthermore, the period required to reduce fear levels in those animals experiencing high levels of fear will be considerable, perhaps months (Hemsworth et al., 1981a). While changes in fear levels may be observed in the short-term, a greater period of time may be required before stress responses, either acute or chronic, in those highly fearful animals are reduced to the extent where reproductive performance is not limited. It was not possible to monitor changes in the long term in this study, as in our earlier study (Hemsworth et al., 1994), because stockpeople were regularly moved to different units of production at the commercial farm.

Nevertheless, the results of this study confirm that stockperson attitudes and behaviour can be improved in a large commercial farm and that short-term effects on pig
behaviour can be observed. Given the peer pressure operating on individual stockpeople by workmates in the same unit and the pressures that the unit manager would exert to produce conforming behaviour by stockpeople, this is a very encouraging result. The study also demonstrated that this training programme is a practical one and the results of the present study and the earlier one indicate that the training programme is effective on a wide range of stockpeople working in a variety of situations. Indications are that a training program such as that used in this study may also reduce staff turnover. Certainly, taken in conjunction with our earlier research, there is a strong case for introducing stockperson training courses in the pig industry which target the attitudes and behaviour of the stockperson.

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