

# “ProHand - Stockperson training in professional handling of pigs”

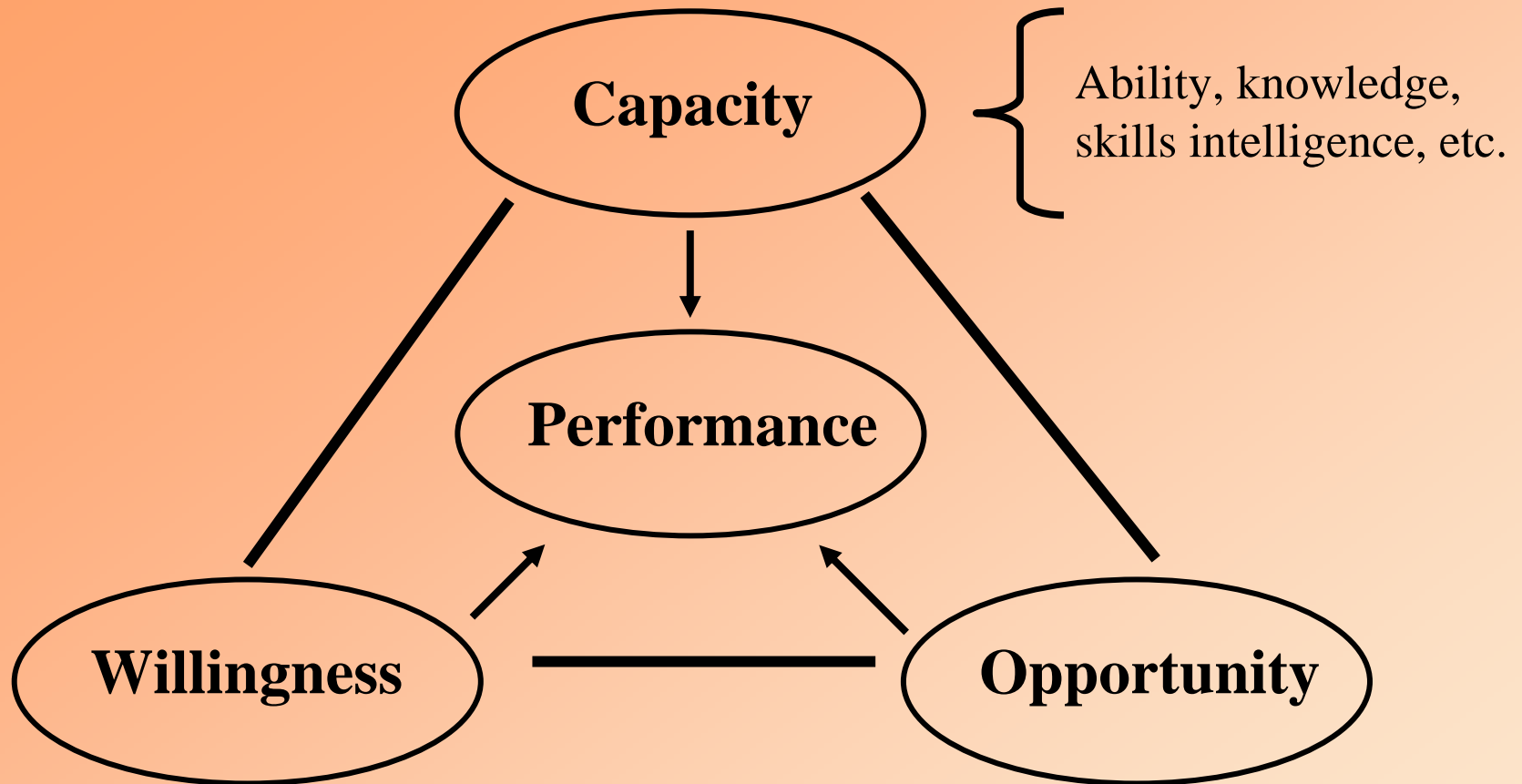
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British Codes of Recommendations for the Welfare of Farm Livestock (Ministry of Agriculture, Fisheries and Food, 1983):

**“Stockmanship is a key factor because, no matter how otherwise acceptable a system may be in principle, without competent, diligent stockmanship, the welfare of animals cannot be adequately catered for”.**





Ability, knowledge, skills intelligence, etc.

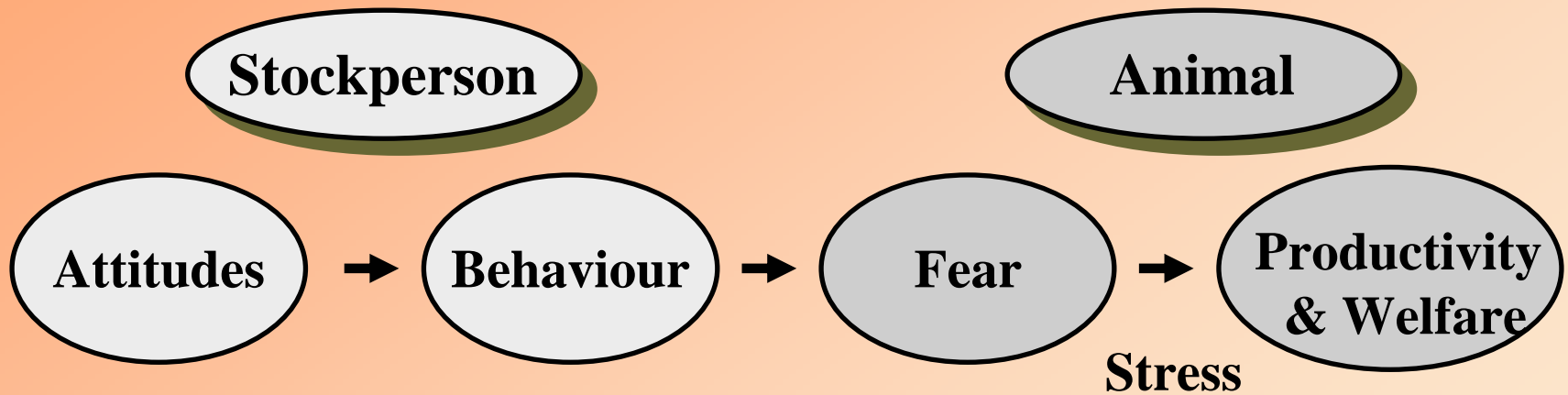
Motivation, job satisfaction, job status, self-image, personality

Tools, equipment, materials, and supplies, working conditions, mentorism, organisational policies, time, pay, etc.

From Blumberg and Pringle (1982)



# Sequential human-animal relationships



# The human-animal relationship

The relationships that exist between humans and farm animals in livestock production (and between humans and companion animals in domestic situations) are true relationships in that the interactions

1. are frequent and often intense and, more importantly,
2. have reciprocal effects on the partners.





# Our topics for discussion are:

1. Relationships between pig fear and productivity
2. Relationships between human behaviour and pig fear
3. Relationships between human attitudes and human behaviour
4. Model of human-animal interactions
5. Training stockpeople



# 1. Fear – productivity relationships



# Fear

- a powerful emotional state
- normally gives rise to defensive behaviour or escape and activation of the autonomic nervous system and the neuroendocrine system.

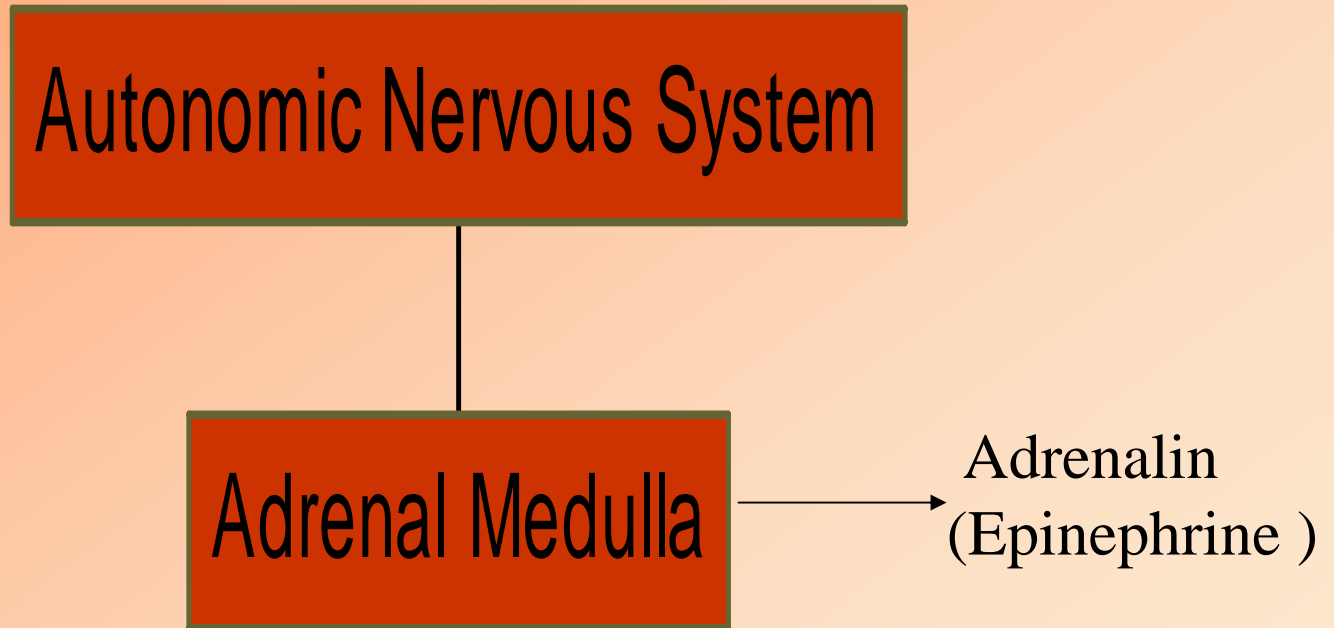


# Development of fear of humans

The two types of learning, conditioned fear responses and habituation to humans, occurring both early and subsequently in life are probably the most influential factors affecting the behavioural responses of domestic animals to humans.



# SAM (Sympatho-adrenal system) AXIS



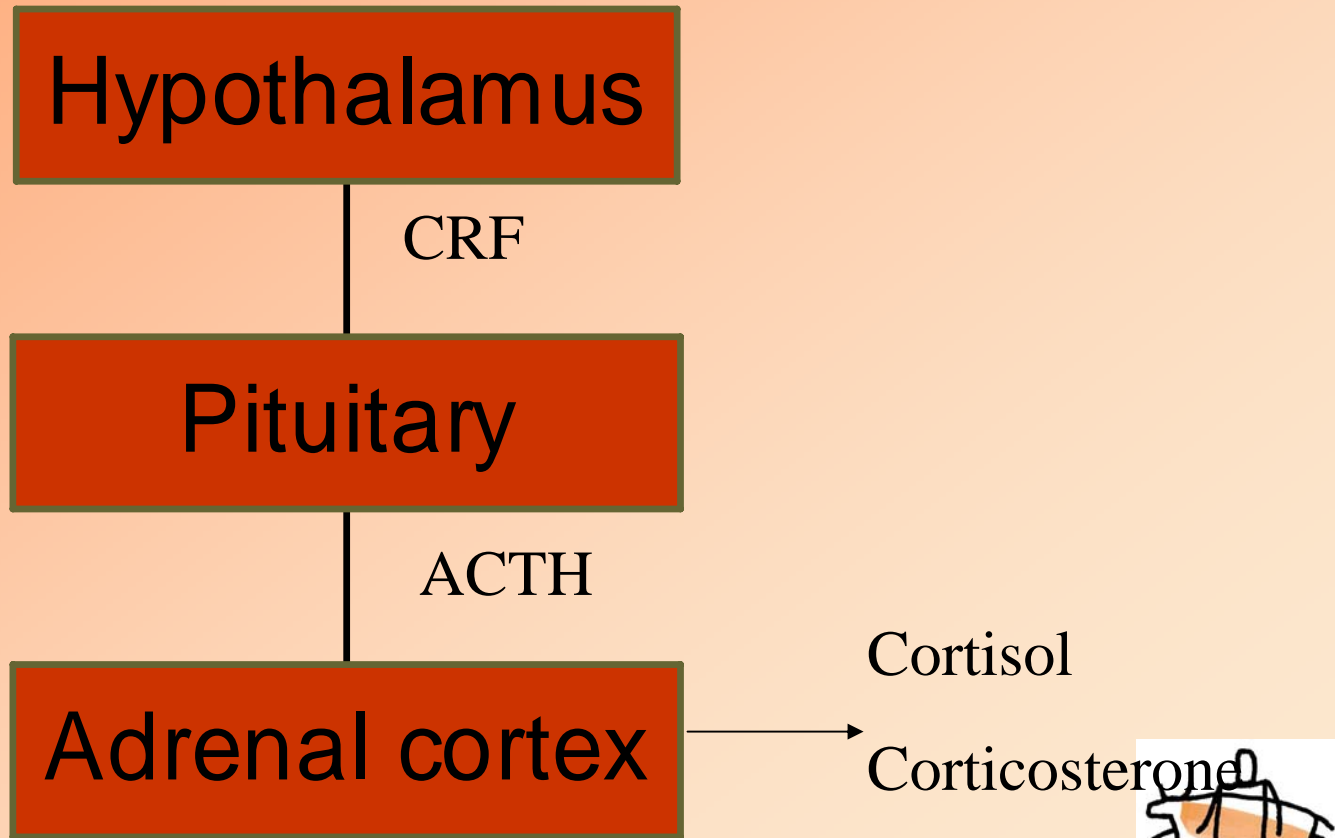
# Activation of the SAM axis (flight or fight response)

This response assists the animals in dealing with short-term challenges or stressors through:

- **mobilisation of energy** - adrenalin results in the release of glucose from the liver and muscle glycogen (glycogenolysis), and free fatty acids from adipose tissue (lipolysis).
- **cardiovascular and respiratory changes** - increased heart rate and respiration rate, redistribution of blood to skeletal and cardiac muscle, etc.
- **stimulate some cognitive functions** - attention narrowing and shifting, increased memory formation and increased memory recall.



# HPA (hypothalamo-pituitary adrenal) AXIS



# Activation of the HPA axis

Chronic activation of the HPA axis comes at a physiological cost:

- decreased metabolic efficiency - catabolic effects of ACTH and corticosteroids (eg **gluconeogenesis** – this process provides glucose from non-carbohydrate sources, particularly protein (from muscle or food)),
- reduced reproductive performance,
- impaired immunity &
- morbidity and mortality.



# Fear

- Fear of humans can be assessed on the basis of the behavioural response of the animal to an experimenter in a standard test.



## Section 1. Fear of humans in commercial pigs: *Information*

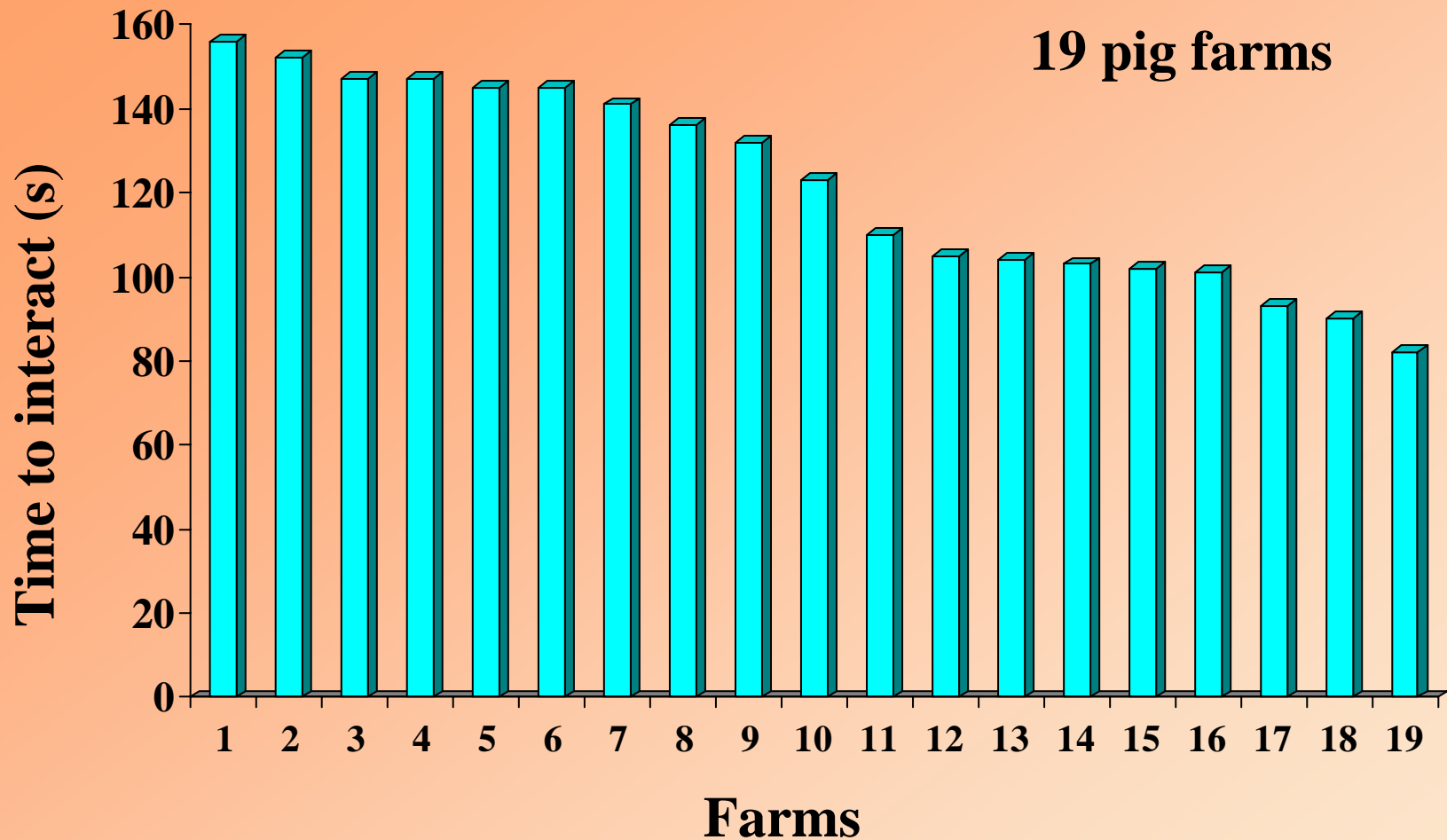


[Click here to start video](#)

## Section 1. Fear of humans in commercial pigs: *Information*



[Click here to start video](#)



**Variation in fear of humans, as assessed by the approach behaviour of pigs to a stationary experimenter, at 19 Australian piggeries (Hemsworth and Coleman, 1998).**



# Fear – productivity relationships

- Consistent negative relationships, based on farm averages, between **fear of human and productivity** found in studies in the dairy, pig and poultry industries.



# Correlations between fear of humans and animal productivity

## Fear & Productivity

### Pigs

Hemsworth <i>et al</i> (1981b)	-0.51*
Hemsworth <i>et al</i> (1989)	-0.55*
Hemsworth <i>et al</i> (1994c)	-0.01

### Dairy cows

Breuer <i>et al</i> (2000)	-0.46*
Hemsworth <i>et al</i> (2000)	-0.27

### Meat chickens

Hemsworth <i>et al</i> (1994a)	-0.57**
Cransberg (1996)	-0.10
Hemsworth <i>et al</i> (1996)	-0.39

### Laying hens

Barnett <i>et al</i> (1992)	-0.58**
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# Handling and productivity

- Handling studies, particularly on pigs, have consistently shown that handling treatments that elicit high levels of fear adversely affect animal productivity.
- A number of these handling studies implicate stress in the deleterious effects of aversive handling on animal productivity.



# Handling and productivity of pigs

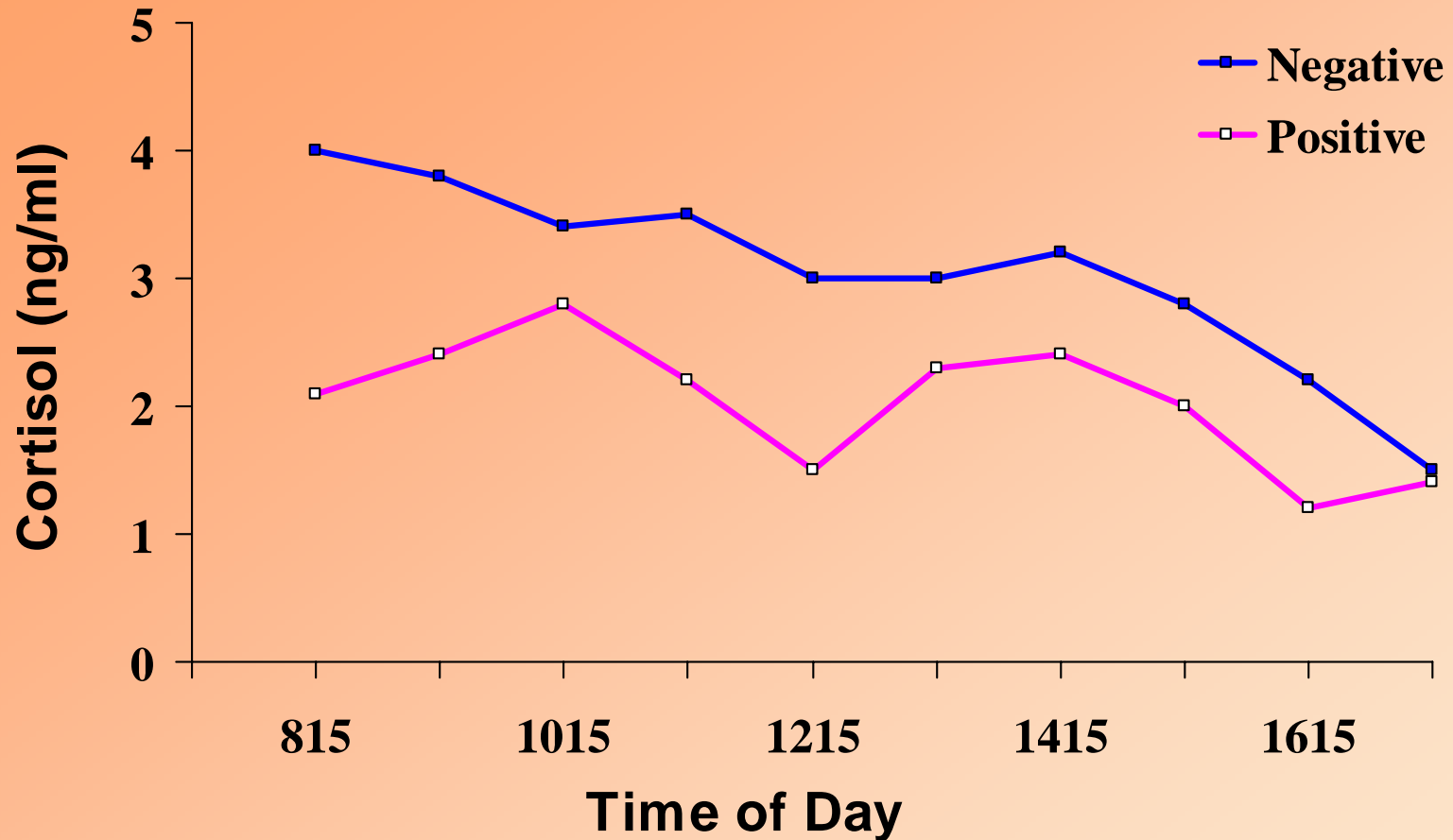
Experiment	-ve handling	P value
<i>Hemsworth et al. (1981)</i>		
Growth rate	↓	0.05
<i>Gonyou et al. (1986)</i>		
Growth rate	↓	0.05
<i>Hemsworth et al. (1986)</i>		
Pregnancy rate	↓	0.05
<i>Hemsworth et al. (1987)</i>		
Growth rate	↓	0.05
<i>Hemsworth &amp; Barnett (1991)</i>		
Growth rate	↓	NS
<i>Hemsworth et al. (1996)</i>		
Growth rate	↓	0.05



# Handling and stress physiology of pigs

<b>Experiment</b>	<b>-ve handling</b>	<b>P value</b>
<i>Hemsworth et al. (1981)</i>		
<b>Basal cortisol</b>	↑↑	<b>0.05</b>
<i>Gonyou et al. (1986)</i>		
<b>Adrenal glands</b>	↑↑	<b>0.05</b>
<i>Hemsworth et al. (1986)</i>		
<b>Basal cortisol</b>	↑↑	<b>0.05</b>
<i>Hemsworth et al. (1987)</i>		
<b>Basal cortisol</b>	↑↑	<b>0.01</b>
<i>Hemsworth &amp; Barnett (1991)</i>		
<b>Basal cortisol</b>	↑↑	<b>NS</b>
<i>Hemsworth et al. (1996)</i>		
<b>Adrenal glands</b>	↑↑	<b>0.01</b>





**Basal plasma cortisol concentrations of gilts handled positively or negatively (Hemsworth *et al.*, 1981)**



# Fear & stress

- High levels of fear of humans can induce chronic stress
- This is likely to be the mechanism whereby fear reduces pig productivity & welfare.



# Handling, growth & stress physiology of growing pigs

Variables	Handling Treatments			
	+ve	Minimal	Threat	-ve
Growth rate (g/day)	897 <sup>b</sup>	888 <sup>b</sup>	813 <sup>a</sup>	837 <sup>a</sup>
Adrenal cortex (mm <sup>2</sup> )	23.2 <sup>a</sup>	24.9 <sup>ab</sup>	26.6 <sup>ab</sup>	33.1 <sup>b</sup>

From Gonyou *et al.* (1986)



# Handling and the Productivity & Stress Physiology of Dairy Cows

Variables	Handling	
	-ve	+ve
Milk yield (kg/day)	16.7 <sup>a</sup>	18.0 <sup>b</sup>
Protein (kg/day)	39.3 <sup>a</sup>	52.7 <sup>b</sup>
Flight distance (m)	4.74 <sup>b</sup>	1.96 <sup>a</sup>
Lameness (%)	48% <sup>b</sup>	6% <sup>a</sup>

From B reuer (2000)



# Handling, productivity & behaviour of laying hens

Variables	Handling treatments	
	Minimal	Additional
Hen-day egg production (%)	83.1 <sup>b</sup>	89.4 <sup>a</sup>
Times in front of cage	1.22 <sup>y</sup>	2.12 <sup>x</sup>

From Barnett et al (1994)



# Fear and welfare

## **Welfare concerns for fearful animals include:**

- Fear (undesirable emotion) and stress responses
- Potential for injuries in avoiding humans
- Insufficient surveillance and attention by stockpeople or carers to welfare (and production) problems, particularly in the early stages of their development.



# Conclusion

- Negative fear-productivity relationship found in the pig industry
- Fear accounted for about 20% of variation in reproductive performance between farms
- Stress as a consequence of fear of humans limits pig productivity & welfare



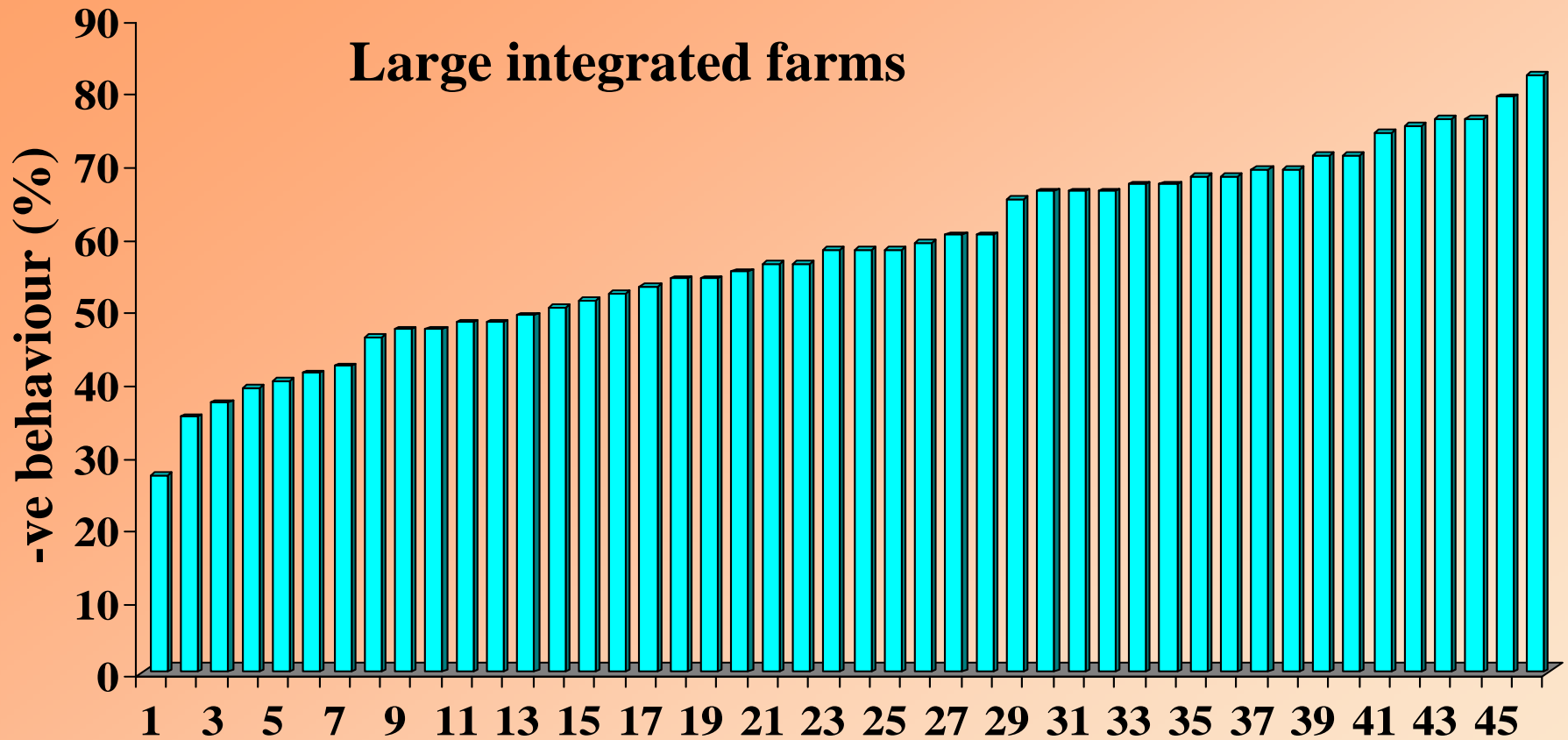
## **2. Stockperson behaviour - fear relationships**



# Measuring stockperson behaviour

- **-ve behaviour** - slaps, hits, shouting, fast speed of movement, unexpected movement, etc.
- **+ve behaviour** - pats, talking, hand resting on back of animal, slow and deliberate movement, etc.





**Variation in the behaviour of 46 stockpeople at large integrated piggeries (Hemsworth and Coleman, 1998).**



# Stockperson behaviour - fear relationships

- Consistent relationships between **stockperson behaviour and animal fear** found in studies in the dairy, pig and poultry industries



# Correlations between stockperson behaviour & fear of humans

## -ve Behaviour & Fear

### Pigs

Hemsworth <i>et al</i> (1989)	0.45*
Hemsworth <i>et al</i> (1994)	0.01
Coleman <i>et al</i> (2000)	0.40*

### Dairy cows

Breuer <i>et al</i> (2000)	0.31
Hemsworth <i>et al</i> (2000)	0.32**

### Meat chickens

Cransberg (1996)	0.43*
Hemsworth <i>et al</i> (1996)	0.32



# Stockperson behaviour - fear relationships

- The results of a series of handling studies in a number of laboratories support these industry findings



# Handling and fear of humans (time to approach)

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<b>Study</b>	<b>+ve Handling</b>	<b>-ve Handling</b>
<b>Hemsworth <i>et al</i> (1981a)</b>	<b>119 s</b>	<b>157 s</b>
<b>Gonyou <i>et al</i> (1986)</b>	<b>73 s</b>	<b>147 s</b>
<b>Hemsworth <i>et al</i> (1987a)</b>	<b>10 s</b>	<b>160 s</b>
<b>Hemsworth <i>et al</i> (1986)</b>	<b>48 s</b>	<b>120 s</b>
<b>Hemsworth &amp; Barnett (1991)</b>	<b>55 s</b>	<b>165 s</b>
<b>Hemsworth <i>et al</i> (1996)</b>	<b>52 s</b>	<b>145 s</b>

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**Need to recognize that some of the stockperson behaviours that elicit high fear if used regularly may be:**

- **routinely used, and**
- **appear intuitively harmless.**

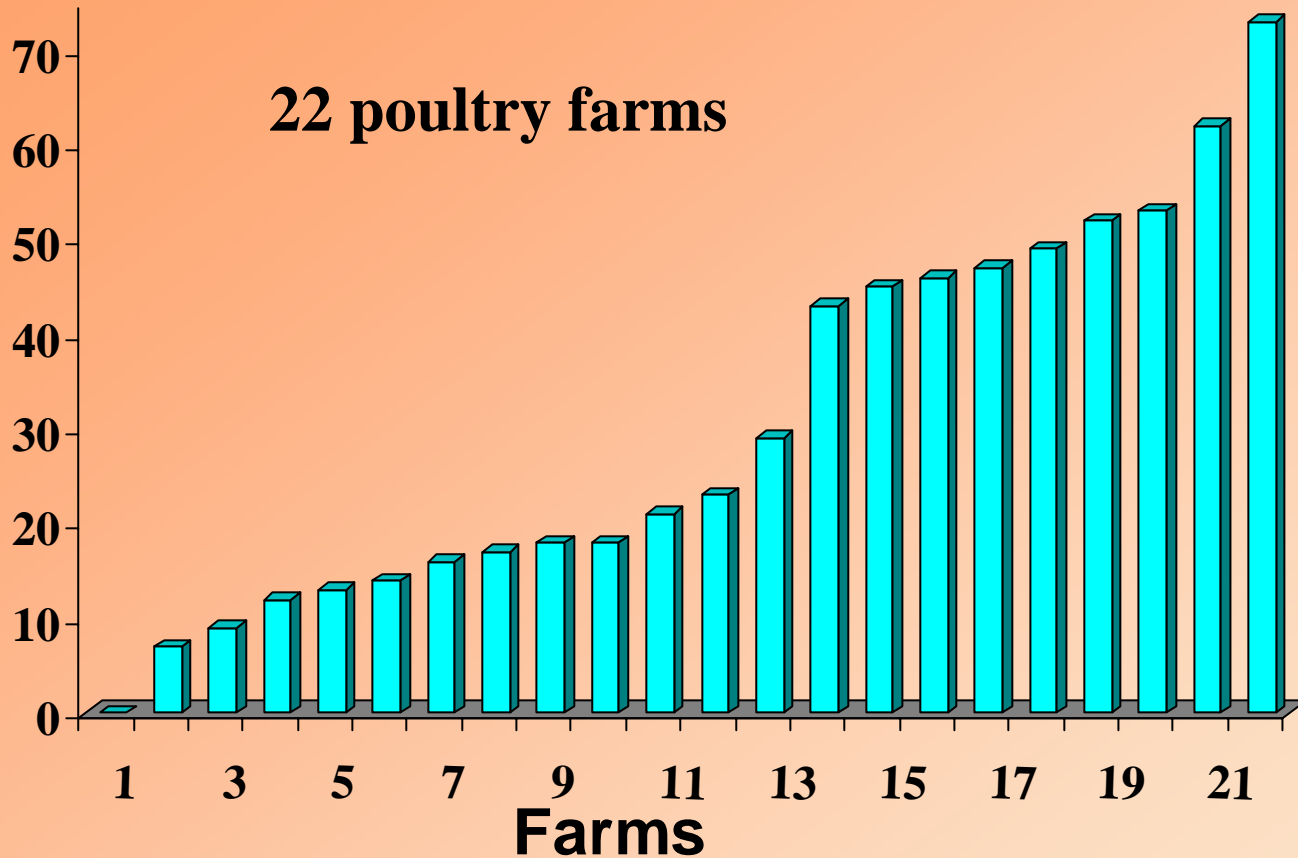
For example

- shouting and fast speed of movement
- moderate hits and slaps.

**Few examples of overt cruelty have been observed.**



**Birds near experimenter per observational scan**



**Variation in fear of humans, as assessed by the avoidance responses to an approaching experimenter, at 22 commercial broiler farms (Hemsworth and Coleman, 1998).**



# Conclusion

- Stockperson behaviour regulates the fear responses of pigs to humans
- Learned fear responses develop as a consequence of associations between the stockperson and aversive and rewarding elements of the handling



# **3. Stockperson attitude – stockperson behaviour relationships**



# Measuring attitudes

- Affect (emotional response – like/dislike)
- Conation (Behavioural tendency)
- Beliefs (Subjective facts)



- Attitude towards behaviour

We mainly measure beliefs because they are relatively less threatening to measure when targeting behaviour.



# Attitudes of stockpeople measured using questionnaires

**For example:**

- How frequently do you pet your gilts in oestrous?
- How difficult is it to move sows in oestrus?



# Stockperson attitudes & behaviour correlations

+ve Beliefs about Effort & -ve Behaviour

## Pig industry

Hemsworth <i>et al</i> (1989)	-0.47*
Hemsworth <i>et al</i> (1994c)	-0.12
Coleman <i>et al</i> (1998)	-0.10

## Dairy industry

Breuer <i>et al</i> (2000)	-0.50**
Hemsworth <i>et al</i> (2000)	-0.36*



# Correlations between stockperson attitudes & behaviour

## +ve Beliefs about Petting & -ve Behaviour

### Pig industry

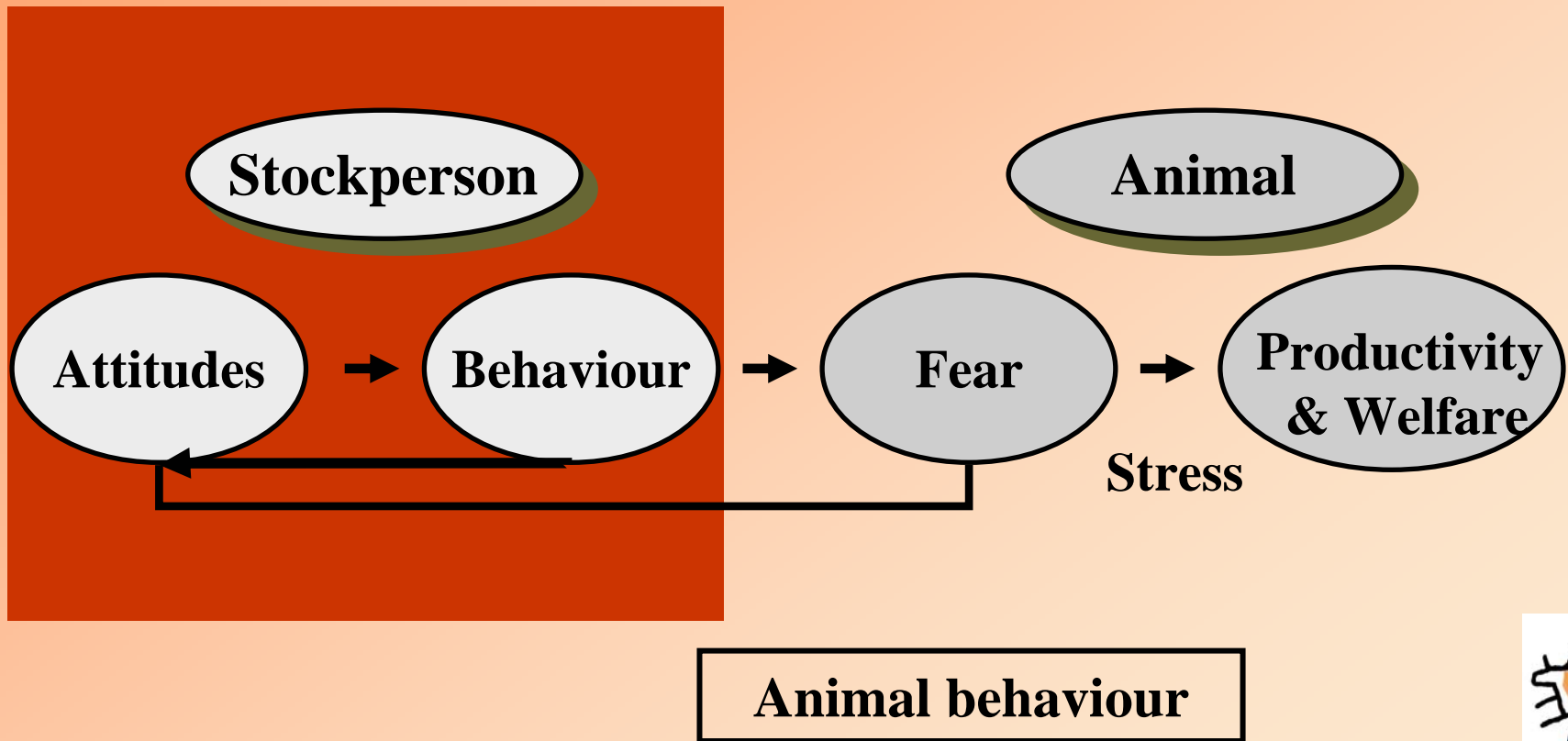
Hemsworth <i>et al</i> (1989)	-0.61**
Hemsworth <i>et al</i> (1994c)	-0.55**
Coleman <i>et al</i> (1996)	-0.20

### Dairy industry

Breuer <i>et al</i> (2000)	-0.50**
Hemsworth <i>et al</i> (2000)	-0.47**



# A model of human-animal interactions in the livestock industries



# Opportunities to improve human-animal interactions

**The sequential relationships between stockperson attitude and behaviour and animal fear, welfare and productivity demonstrate the opportunities to improve animal welfare and productivity through appropriate:**

- **training stockpeople**
- **selection of stockpeople.**

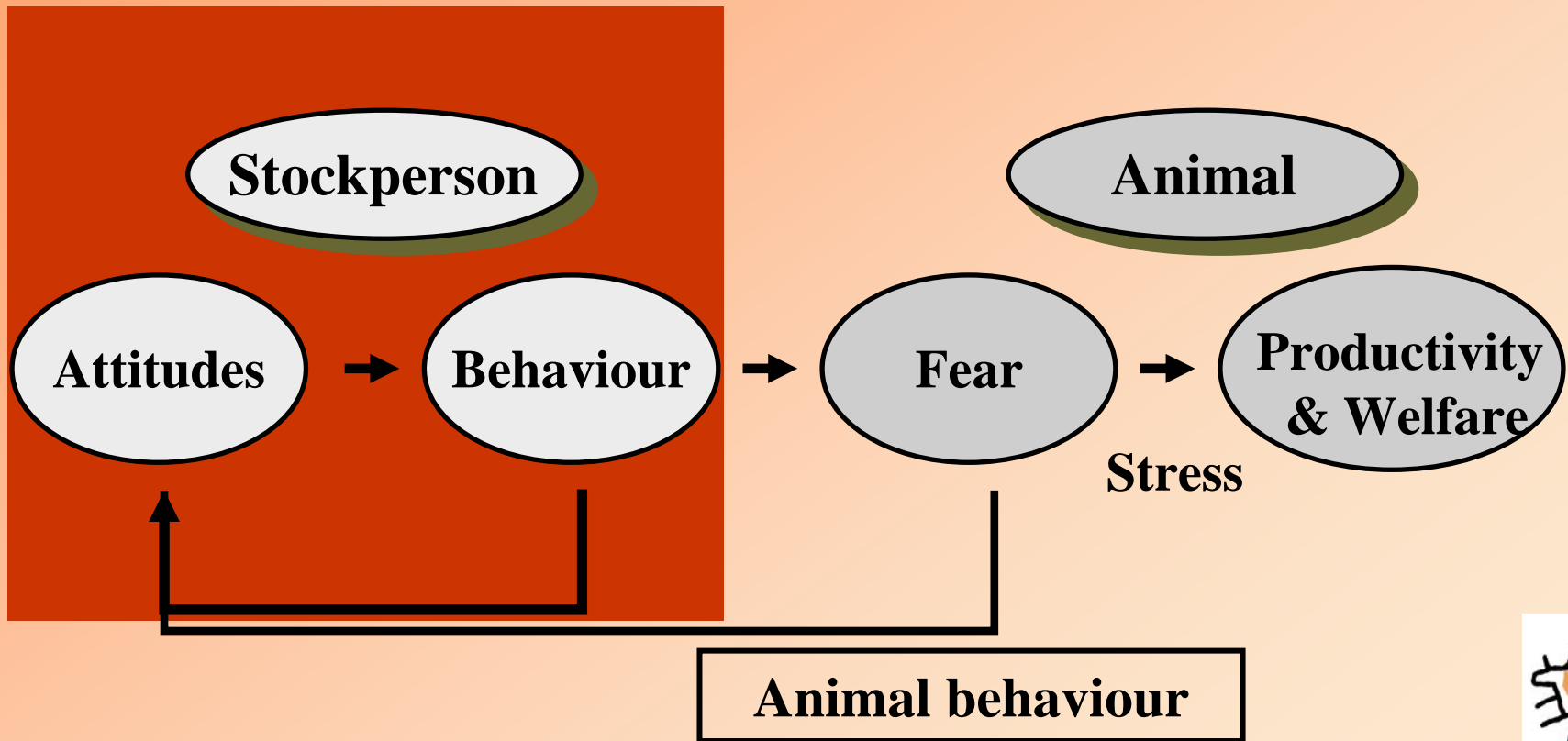


# Cognitive-behavioural training

- To change the behaviour of farmers towards pigs ultimately requires:
  - targeting the **beliefs** that underlie the behaviour,
  - targeting the **behaviour** in question, and
- then maintaining these changed beliefs and behaviour.



# A model of human-animal interactions in the livestock industries



# Attitude formation and change

- Vicarious learning
- Effects of behaviour on attitudes
- Resistance to attitude change



# Modifying behaviour

## Options for training

- Manuals
  - Low compliance
- Classroom teaching
  - Intolerance for formal classroom situations
- Mass communications
  - Fail to induce large scale behavioural change
- Cognitive-behavioural training
  - Proven to be effective



# Inducing behavioural change involves:

- imparting knowledge and skills,
- changing established habits,
- altering well-established attitudes and beliefs,
- targeting denial, offence, counter-arguments, counter examples, etc.,
- preparing the person to handle stressful situations and reactions from others towards the individual following change.



# Targeting beliefs (cognition)

For example,

- **sensitivity** of pigs to handling, especially -ve handling
- importance of petting (ie +ve attitudes to **petting**)
- importance of avoiding excessive effort in handling (ie +ve attitudes to **verbal and physical effort**)
- effects of handling on both pig (eg ease of handling) and the stockperson (eg job satisfaction).



# Targeting behaviour

For example,

- recognising **the difference** between –ve and +ve interactions
- appreciating when to use -ve interactions, minimise use of **–ve interactions** (slaps, hits, shouting, fast speed of movement, unexpected movement)
- maximise use of **+ve interactions** (pats, talking, slow and deliberate movement)

# Targeting animal behaviour

For example,

- recognising fear responses
- seeking feedback on the behavioural responses of animals to handling.



# Maintaining change

- Posters
- Newsletters
- Follow-up training



# An intervention study – establishing causality and validating training in the pig industry

## **Two treatments imposed:**

- **Intervention** - cognitive-behavioural intervention procedure, targeting key stockperson attitudes and behaviour
- **Control** - no intervention was attempted.



# Measurements

- **Stockperson attitudes** - behavioural beliefs about handling animals.
- **Stockperson behaviours** - number and percentage of negative tactile behaviours.
- **Animal behaviour** - behavioural response to humans.
- **Animal productivity** - piglets/sow/year.



# Analysis of covariance

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Variable	Farms	
	Control	Intervention

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## Stockpeople Attitudes

Beliefs about petting	89.2 <sup>a</sup>	102.9 <sup>b</sup>
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## Stockpeople behaviour

-ve behaviour (%)	55.8 <sup>y</sup>	38.6 <sup>x</sup>
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Hemsworth *et al.* (1994)



# Analysis of covariance

Variable	Farms	
	Control	Intervention
<b>Pig behaviour</b>		
Time near experimenter (s)	15.6 <sup>a</sup>	21.9 <sup>b</sup>
<b>Pig productivity</b>		
Piglets born/sow/year	22.2	23.8

Hemsworth *et al.* (1994)

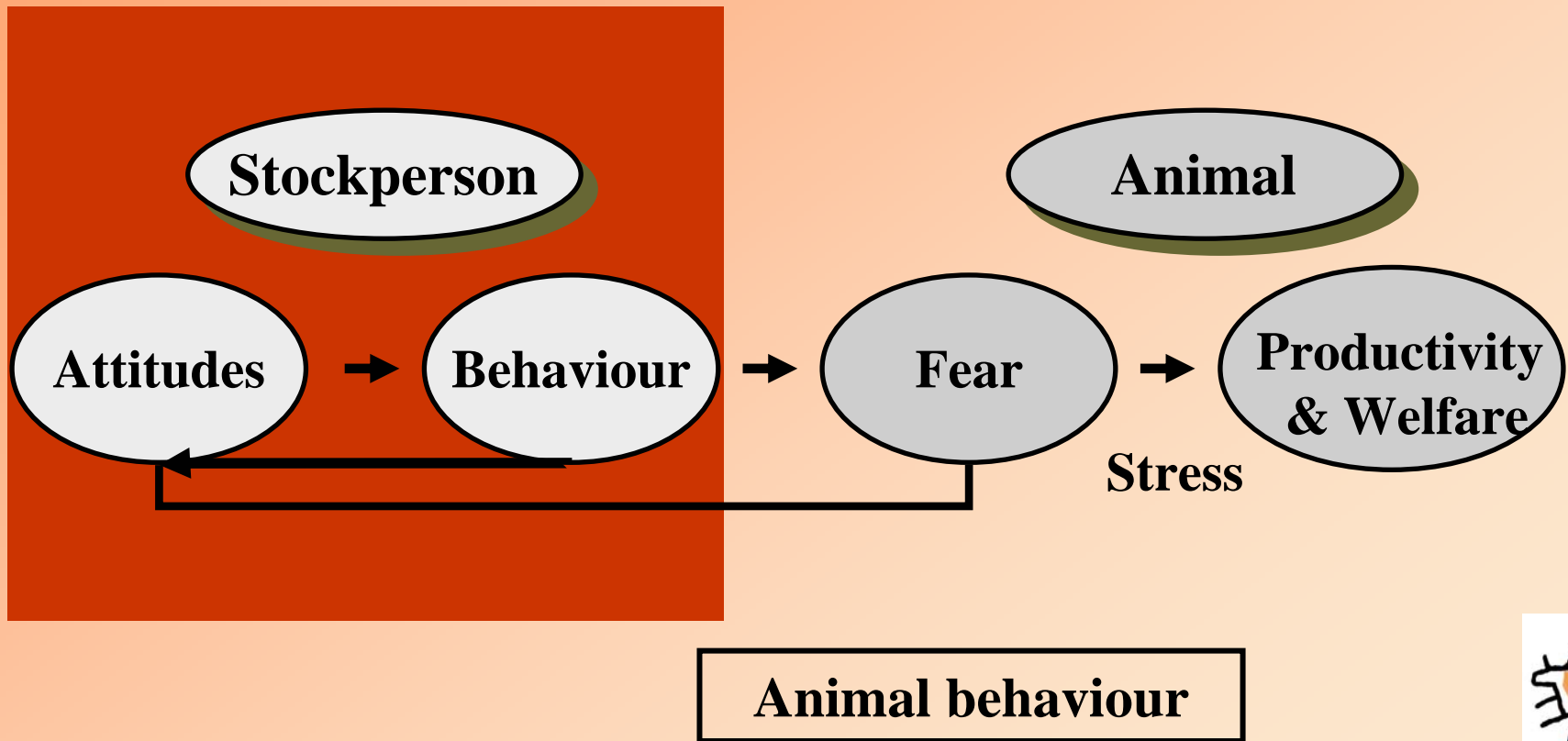


# Analysis of Covariance

Variable	Means		P value
	Control	Interv.	
Milk yield (l/cow/mo)	551	580	0.02
Protein (kg/cow/mo)	17.7	18.5	0.03
Fat (kg/cow/mo)	22.8	23.8	0.04
Milk cell count (,000)	241	224	0.38

Hemsworth et al. (2002)

# A model of human-animal interactions in the livestock industries



# Training possibilities to improve human-animal interactions

- These results indicate that cognitive-behavioural interventions that successfully target the key attitudes and behaviour of stockpeople that regulate the animals' fear of humans, offer the industry good opportunities to improve the welfare and productivity of their animals.
- Understanding the influential human characteristics that affect human-animal relationships is the key to reducing the limitations imposed by poor human-animal interactions on animal welfare (and productivity) in the livestock industries.



ProHand:  
An Interactive Computerised  
Training program for Pig  
Stockpeople



# Structure of ProHand

- Introduction to entire training package including mouse tutorial.
- Stockperson handling questionnaire and individual feedback
- Cognitive behaviour intervention via individual multimedia instruction and facilitated group discussions

# Structure of ProHand Day 1 (2)

- **Section 1 - Fear of humans in commercial pigs**
  - Summary component
  - Review component
- **Section 2 - The effect of fear of humans on ease of handling of pigs.**
  - Summary component
  - Review component
- **Section 3 - The effect of fear of humans on the productivity of pigs.**
  - Summary component
  - Review component
- **Section 4 - Why are commercial pigs fearful of humans?**
  - Summary component
  - Review component



# Structure of ProHand Day 1 (3)

- **Section 4 - What determines our behaviour towards pigs?**
  - Summary component
  - Review component
- **Feedback to users on questionnaire**
  - Summary component
  - Review component
- **Section 6 - Recommendations for professional handling**
- **Section 7 - Maximising pig productivity by improving stockperson handling behaviours: a study.**
  - Review component.
- **Section 8 - Professional handling guidelines for stockpersons managing commercial pigs.**
- **Section 9 - How to maintain changes in your behaviour.**
- **Conclusion to day 1. Questionnaire and training programme.**



# Structure of ProHand Day 2

- **Stockperson training programme: Day 2**
  - Review of Day 1
- **Part 2 – beliefs and productivity**
  - Technical skill-productivity link;
  - Work ethic-productivity link;
  - Motivation to learn-productivity link;
  - Job satisfaction-productivity link;
  - Attitudes/beliefs-work ethic link;
  - Attitude-work ethic example 1.
  - Attitudes/beliefs-motivation to learn link;
  - Attitudes/beliefs-job satisfaction link;
- **Conclusion to Part 2 - Beliefs and productivity**
- **Conclusion to the entire training programme.**



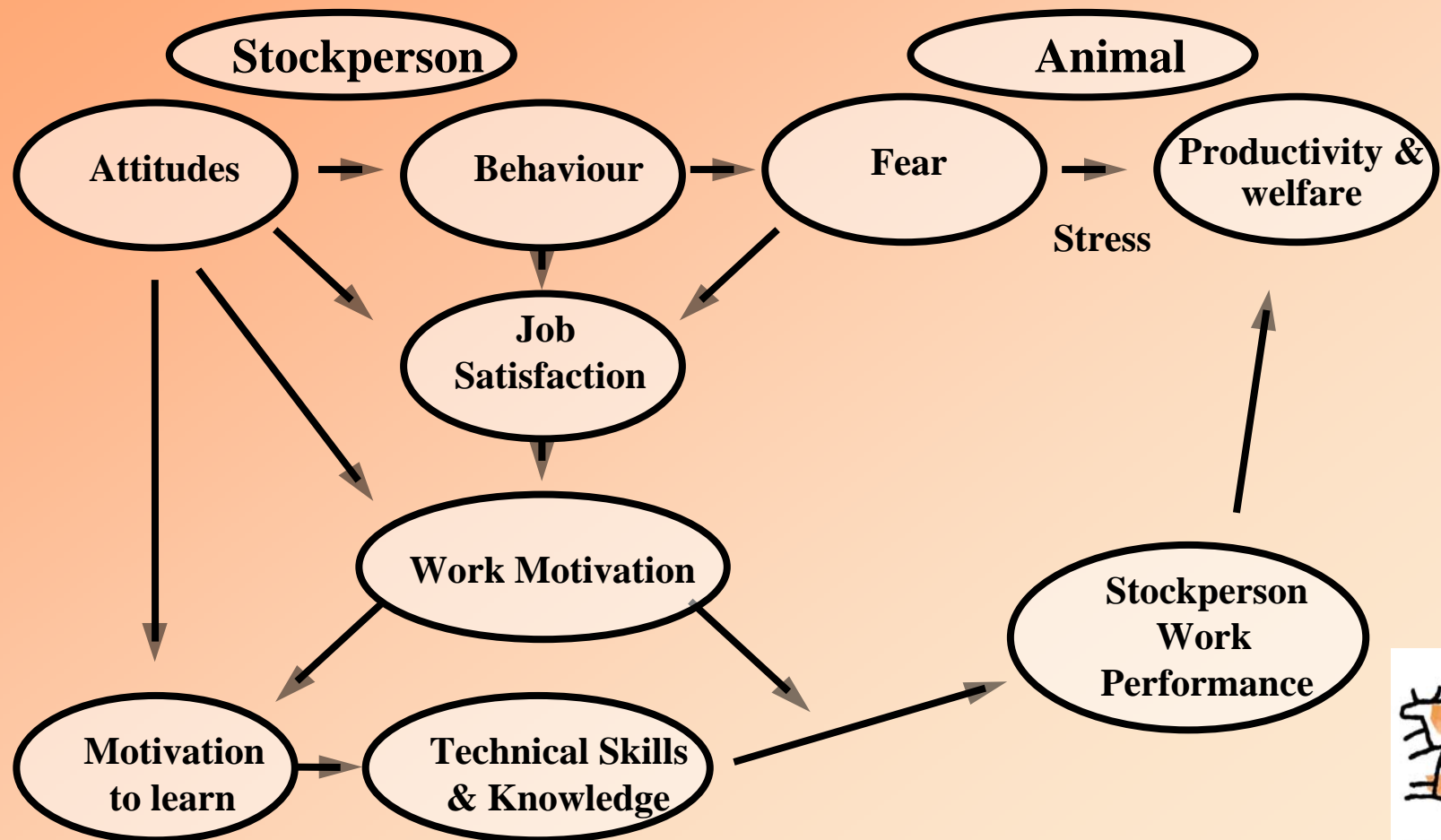
# Opportunities to improve human-animal interactions and thus improve animal welfare

The sequential relationships between stockperson attitude and behaviour and animal fear, welfare and productivity demonstrate the opportunities to improve animal welfare (and productivity) through appropriate:

- **training of stockpeople**
- **selection of stockpeople.**



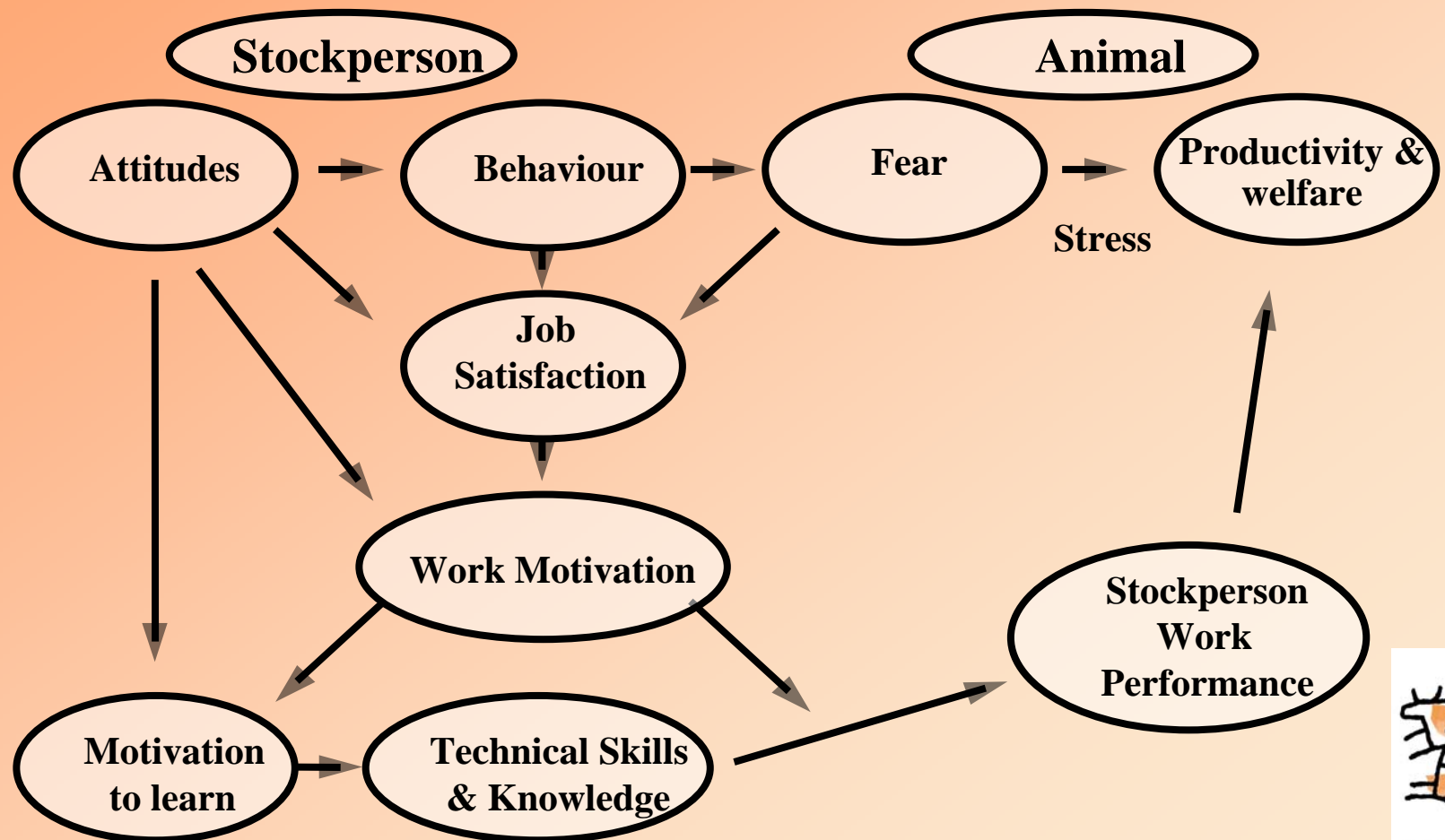
# Factors contributing to livestock productivity and welfare



# Stockperson selection?



# Factors contributing to livestock productivity and welfare



# Conclusion

- Understanding stockperson behaviour and the key attitudes underpinning these, appears to be the key to manipulating these human-animal interactions to improve animal welfare.
- Some of these attitudes and behaviours in commercial situations may not be intuitively obvious.

# Opportunities to improve human-animal interactions and thus improve animal welfare

The sequential relationships between stockperson attitude and behaviour and animal fear, welfare and productivity demonstrate the opportunities to improve animal welfare (and productivity) through appropriate:

- **training of stockpeople**
- **selection of stockpeople.**



Thank you!



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# Selection possibilities to improve human-animal interactions

## Variables predicting stockperson work performance

Performance	Attitude towards		Empathy
	Animals	Work	
Behaviour	✓	✓	✓
Technical skills	✓	✓	✓
Work ethic	x	✓	x
Intention to leave	✓	✓	✓

From Coleman (2001)



# Welfare QA and the stockperson

The **systematic and on-going selection and training** targeting the range of job-related characteristics that have been highlighted here, needs to be adopted as an essential element in any QA program that aims to improve animal welfare.



# Welfare QA and the stockperson

While records and inspections of critical welfare inputs and outputs may identify sub-optimal welfare standards, the underlying basis of the problem and the opportunity for correction may often rest with the stockperson.

Furthermore, conventional records and inspections may not identify the cause of the welfare problem if it is a consequence of limitations in the work-related characteristics of the stockperson.



# Welfare QA and the stockperson

Assessing the key job-related characteristics of stockpeople may provide industry with the potential to monitor the potential impact of individual stockpeople on animal welfare and **thus their training needs.**

Screening aids such as attitude and job motivation questionnaires may identify both weakness in individual stockperson and targeted training for these individuals.



# Welfare QA and the stockperson

Monitoring the behaviour of the animal in a standard manner to measure fear of humans may be useful in identifying deficiencies in the amount and nature of stockperson behaviour and thus complement the use of attitude questionnaires in predicting stockperson behaviour.

