

Temperament traits in sows: Considerations for management and longevity



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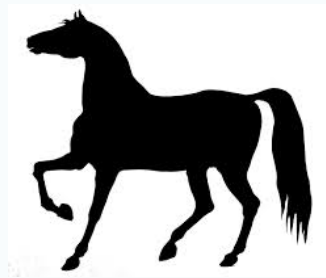
Sow lameness, longevity and temperament workshop, October 2013

Outline

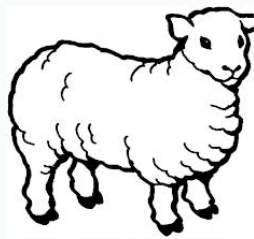
- Introduction to temperament research
- Why consider pig temperament?
 - Links to aggression, maternal traits, RFI, handling response, stress and meat quality
- Measuring temperament
- Interactions between temperament and housing
- Sow temperament & the relationship to health and production
- Conclusions: considering temperament in sow selection

Pigs with personality?

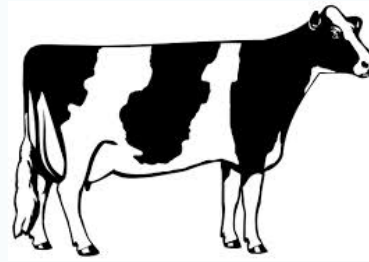
- **Temperament** refers to *behavioural traits that are consistent over time and across situations*
- Synonymous with personality; often regarded as *innate* but influenced by *experience/learning*
- **Temperament types** have been characterised in many species...



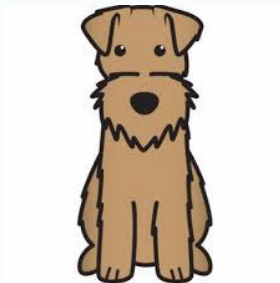
Lloyd et al 2008



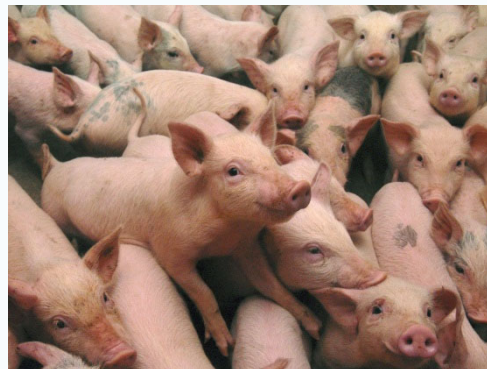
Murphy et al 1994



...Pigs are no exception!



Svartberg and Forkman, 2002



Why consider temperament?

Temperament is an important selection criterion in companion species:

- Horse temperament affects use and quality as a riding horse
(Graf et al. 2013)
- Dog temperament used in service dog selection (Svartberg, 2006)

In livestock:

- Focus on traits related to **production** and **management**
- Muir- Inadvertent selection for aggression in poultry, swine

Models of temperament

- Myers-Briggs Type Indicator
 - Common tool in HR/
 - Management training, self-awareness, leadership
- Five Factor Model- 'The Big Five'
 - 5 dimensions in human psychology: Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism
 - Similar traits found in animal research, esp. EAN
- Active/Passive traits
 - Studies linking behaviour & stress physiology
 - Focus on rodents, humans and pigs

Pig temperament types

- Two temperament traits widely studied in pigs
 - **Active/Passive**
 - Hessing, 1993- Studies using 'back test'
 - Coping styles
 - Links to aggression, stress physiology
 - **Confident/Fearful**
 - Hemsworth & Coleman
 - Links to productivity

**Assessment of 2 traits:
Four main types**

Active/Confident	Active/Fearful
Passive/Confident	Passive/Fearful

Important behaviour traits

- **Sow line-** Aggression, Maternal characteristics
- **Boar line-** Aggression, Handling, Stress and 'Coping style'



Aggression



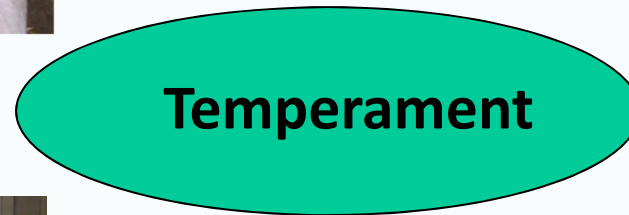
Maternal traits



Ease of handling



Coping style/Stress response



Genetic links

Before selecting sows for specific traits, need to know-

- Heritability of each trait
 - Can we expect genetic progress?
- Genetic variation
 - How different are individual sows?
- Association between traits
 - If we select against aggression, will we influence handling or maternal abilities?

Can we use temperament to select for increased production and suitability for specific environment?

Study of sow temperament and housing environment

Objective: Understand the effects of group gestation housing on **sow temperament**, and interactions between **housing environment, temperament & factors influencing sow longevity**



Specific objectives were to determine:

- i) If temperament traits differ between sows housed in different systems
- i) Whether temperament traits are linked to factors influencing sow production or longevity

Sow temperament and housing methods

- 284 sows studied over two gestations
- Housed in two similar ESF housing systems
 - Part-slatted, unbedded system (CONV, n = 138 sows)
 - Deep-straw bedded system (ALT, n = 146 sows)
 - Group sizes: 21 - 30 sows
 - Sows mixed at five weeks gestation
- Temperament evaluation: four tests at eight weeks gestation
- Additional sow measures:
 - Body condition score & backfat
 - Injury & lameness
 - Sow productivity: piglets born, weaned, mortality

Temperament and housing system



- Conventional ESF** ~ partially slatted concrete floor
- Alternative ESF** ~ straw over concrete floor
- Free access stall**



Measuring temperament

Open door test (ODT)

Group test

Latency for a pig to exit a test pen



Novel object test (NOT)

Latency to contact objects, frequency of contacts



Pig approaching human (PAH)

Latency to contact a human, total number of contacts, time spent within 1m



Human Approach test (HAP)

Response score to an approaching human. Low score = fearful; High score = confident



ALT

Test	Active/passive (1)	Confident/fearful	Active/passive (2)
ODT latency (s)	0.082	-0.052	0.902
ODT rank	-0.056	0.047	0.917
PAH latency (s)	-0.129	-0.750	-0.034
PAH contacts (freq.)	0.068	0.846	-0.019
PAH time within 1m	-0.038	0.897	-0.048
HAP (score)	-0.027	0.672	0.045
NOT latency (s)	-0.608	-0.139	-0.126
NOT switches (freq.)	0.999	-0.079	-0.036
NOT total contacts (freq.)	1.000	-0.077	-0.033
NOT total duration of contacts (s)	0.720	0.263	-0.012

CONV

Test	Confident/fearful	Active/passive (1)	Active/Passive (2)
ODT latency (s)	0.072	-0.091	0.958
ODT rank	-0.005	0.071	0.942
PAH latency (s)	-0.883	0.045	0.073
PAH contacts (freq.)	0.926	0.003	0.025
PAH time within 1m	0.891	-0.025	-0.007
HAP (score)	0.684	0.119	0.168
NOT latency (s)	-0.278	-0.551	0.220
NOT switches (freq.)	-0.059	0.963	0.089
NOT total contacts (freq.)	-0.054	0.970	0.074
NOT total duration of contacts (s)	0.066	0.778	-0.100



Comparison of sows in bedded and concrete ESF systems

- Housing influenced sows' response to temperament tests

Behavioural test variables	System		<i>P</i>
	Straw	Part-slatted	
HAP Score	2.38	3.32	<0.005
PAH latency to exit (s)	111.11	99.24	NS
PAH time within 1 meter (s)	38.33	46.05	0.074
PAH number of contacts	3.15	3.69	NS
ODT latency to exit (s)	15.43	57.28	<0.001
NOT latency to contact (s)	44.67	59.36	<0.05
NOT total contacts	7.96	6.29	<0.001
NOT total duration of contacts (s)	25.95	39.35	<0.005
NOT frequency of switching between objects	6.98	5.36	0.001

- Sows in bedded system: more active, fearful

Breed effects on temperament

Free access stalls at PSC

- **Purebred line** showed more active/confident responses
 - **ODT**: shorter latency to exit pen
 - **PAH**: shorter latency to contact human
- **Crossbred line** showed more passive/fearful responses
 - **ODT**: Longer latency to exit pen
 - **PAH**: Longer latency to approach human



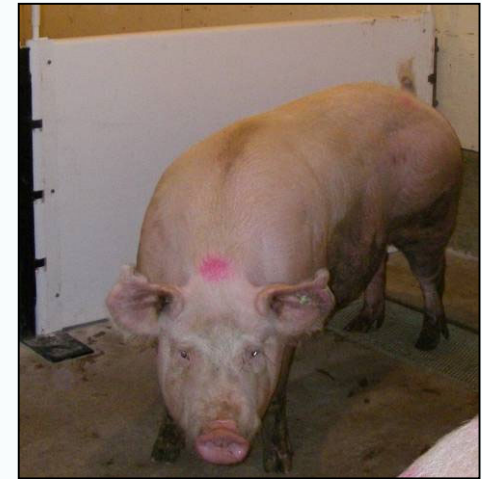
Age effects on temperament

HAP

- Middle parity sows (2nd - 3rd parity) had a higher HAP score than young or old sows ($P < 0.005$)

PAH

- Older sows (4th parity of greater) took:
 - Longer to approach a human ($P < 0.005$)
 - Spent less time within 1m of a human ($P < 0.005$)
 - Made fewer contacts with the human ($P < 0.05$)
- Fearful, or indifferent?
- Fear responses influenced by age/experience
- No influence of age on ODT and NOT measures



Relationships between temperament, body condition & injury score

Part-slatted ESF

- Active sows had a higher injury score
- Confident sows showed a greater improvement in BCS over gestation
 - Higher social status, lower stress, reduced RFI?

Straw-bedded ESF

- Active sows lost a more body condition during lactation
 - More stress in farrowing? Or better lactation ability?
- Confident sows had higher injury score



Relationships between temperament, body condition & injury score

Trait	Part-slatted ESF	Straw bedded ESF
Active/Passive	Active= higher injury score (- ve)	Active= greater BCS loss in lactation (- ve)
Confident/Fearful	Confident= greater increase in BCS in gestation (+ ve)	Confident= higher injury score (- ve)

- **Active traits:** linked to aggression, confirms previous studies
- **Passive traits:** reduced aggression, maintained BCS during lactation

Relationships between temperament & productivity

Free-access system:

- Sows with more passive traits produced:
 - greater number of piglets born & born alive
- Sows with more ‘fearful’ traits produced:
 - greater number of piglets born & born alive
- ‘Fearful’ sows unlikely to be truly fearful: sows have a lot of human contact
 - not avoiding human, more likely ‘**indifferent**’
- Previous studies: passive traits linked to reduced aggression and better mothering ability (Lovendahl et al, 2005, Andersen et al, 2005)

Summary



- **Active trait has negative attributes:**
 - greater injury scores, decreased BCS in farrowing
 - fewer pigs born alive
 - Previous studies: more aggressive, poor maternal traits
 - **Select for passive sows**
- **Confident trait has negative & positive attributes:**
 - Increased BCS in gestation, greater injury scores
 - fewer pigs born alive
 - Previous studies: greater productivity, reduced stress
 - **Confirm/validate using other measures , eg heart rate, cortisol, social status**

Conclusions & future research

- **Can we use temperament to select for increased production and suitability for specific environment?**
 - Temperament traits are heritable
 - There is significant genetic variation
 - Related to important production traits

Recommend two pronged approach-

- Selection: for 'sociable' temperament, reduced aggression
- Management: pen designs to reduce competition, mixing protocols

Conclusions & future research

Future work: *still a long way to go...*

- Distinguish between fear/indifference
- Gain better understanding of
 - effects of housing environment
 - influence of age and experience
- Determine heritability and phenotypic and genotypic variation
- Define associations among traits
 - Stress, handling, maternal, fear



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Thank You!