



# What do maternal tests actually test?

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67<sup>th</sup> Annual EAAP Meeting Belfast, UK,  
August 29<sup>st</sup> to September 2<sup>th</sup>, 2016

Session 18, Abstract number 23025

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# Introduction

**Which maternal characteristics do maternal tests evaluate?**

- ❖ **What do maternal tests exactly test?**
- ❖ **Which combinations and types of maternal tests are advisable?**



# Material & Methods

## Experimental design

- 47 multiparous sows (4 batches); Mixed breeds (PIC / Porkuss)
- Behavioural testing in week 2 and 4 post partum (in total 94 observations)

### Reunion test HP



**TA = Test arena**

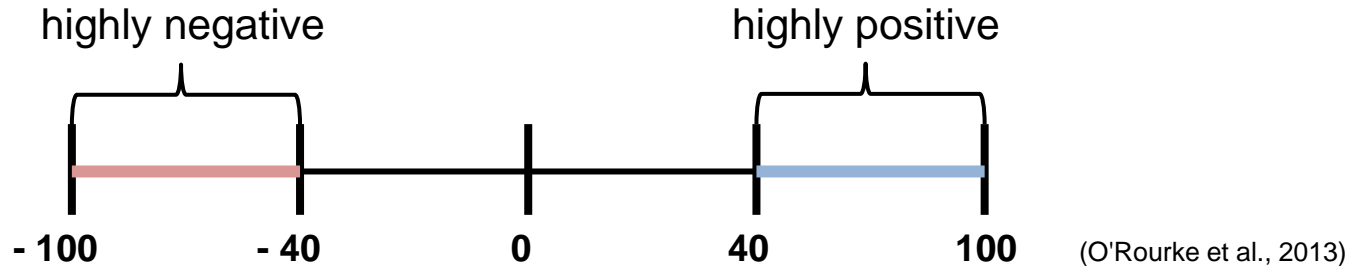
**HP = Home pen**



# Material & Methods

## Statistical analysis

- Behavioural parameters (count data)
- Factor Analysis with SAS ® → Redundancies in behavioural parameters



- Five factors are retained by the Kaiser-Guttman criterion (O'Rourke et al., 2013)
- Factors explain 89% of total variance



# Results & Discussion

## Factor 1

Separation test TA



Piglet scream test TA



Separation test HP



Test	Parameter	Factor 1
Separation test in test arena	Vocalisation	76
	Near piglet nest	74
	Exploring floor	-67
Piglet scream test in test arena	Vocalisation	60
	Exploring floor	-57
Separation test in home pen	Vocalisation	50

- Factor 1 explains 33% of total variance
- Reaction of sow when piglets in danger in home pen and test arena
- Vocalisation is an important maternal instrument (Weary et al., 1996; Hutson et al., 1991)
  - High response of sow increases piglet survival (Thodenberg et al., 2002, Weary et al., 1996)
- Local attachment with the piglets (Špinka et al., 2000)



# Results & Discussion

## Factor 2

Separation test HP



Reunion test HP



Test	Parameter	Factor 2
Separation test in home pen	Vocalisation	43
	Active	69
	Exploring floor	67
Reunion test in home pen	Vocalisation	72
	Contact with piglets	64

- Factor 2 explains 18% of total variance
- Reaction of sow while searching piglets and reunite with piglets in home pen
- Vocalisation is an important instrument but another type than on Factor 1

(Marchant et al., 2001)

- Tactile contact to get feedback about intactness of piglets
  - Sows with low piglet mortality showed more contact with piglets (Andersen et al., 2005)



# Results & Discussion

## Factor 3

Reunion test TA



Test	Parameter	Factor 3
Reunion test in test arena	Vocalisation	48
	Active	64
	Contact with piglets	77
	Exploring floor	-68

- Factor 3 explains 14% of total variance
- Reaction of sow when reunited with piglets in test arena
- Factor loadings similar with Factor 2 but load on another factor
  - Environment (test arena vs. home pen) has an influence



# Results & Discussion

## Factor 4



Test	Parameter	Factor 4
Reunion test in home pen	Vocalisation	87
	Suckling	82

- Factor 4 explains 12% of total variance
- Reaction of sow when reunited with piglets in home pen
- Vocalisation loads together with suckling
  - Vocalisation → Calling piglets and signal for suckling-synchronisation
  - In nature synchronisation to minimize cross-suckling (Wechsler and Brodmann, 1996)





# Results & Discussion

## Factor 5

Reunion test TA



Piglet scream test TA



Test	Parameter	Factor 5
Reunion test in test arena	Near piglet nest	-48
Piglet scream test in test arena	Near screaming piglet	-56
	Active	72
	Contact with piglets	65

- Factor 5 explains 10% of total variance
- Reaction of sow when reunited with piglets and when piglets in danger
- Two maternal characteristics found in one piglet scream test
  - Local attachment with piglets or screaming piglet
  - Contact with piglets to check their intactness



# Conclusion

## ❖ Four main maternal characteristics found

Test	Communication	Contact	Care	Local attachment
Separation test in test arena	F1			F1
Reunion test in test arena		F3		F5
Piglet scream test in test arena	F1	F5		F5
Separation test in home pen	F1	F2		
Reunion test in home pen		F2	F4	

## ❖ Test environment influences maternal behaviour

- ❖ Standardisation of test procedure



**Thank you for your  
attention!**

**This project is kindly financed by  
Rentenbank.**





# Factor loadings

Test	Parameter	F1	F2	F3	F4	F5
Separation test in test arena	Vocalisation	76				
	Near piglet nest	74				
	Exploring floor	-67				
Reunion test in test arena	Vocalisation			48		
	Near piglet nest					-48
	Active			64		
	Contact with piglets			77		
	Exploring floor			-68		
Piglet scream test in test arena	Vocalisation	60				
	Near screaming piglet					-56
	Active					72
	Contact with piglets					65
	Exploring floor	-57				
Separation test in home pen	Vocalisation	50	43			
	Active		69			
	Exploring floor		-67			
Reunion test in home pen	Vocalisation		72		87	
	Active					
	Contact with piglets		64			
	Suckling				82	



# Ethogram

Variable	Behaviour	Location	Description
Posture	Active	HP	Sow stands or kneels down.
	Inactive	HP	Sow sits or lies.
	Active	TA	Sow walks or kneels down.
	Inactive	TA	Sow stands, sits or lies.
Behaviour	Exploring floor	HP / TA	Sow sniffs or roots with the nose within 0.2 m of the floor.
	Exploring nest	TA	Sow explores with her nose or scratches with her front legs the front wall of the piglet nest in the TA.
	Exploring TA	TA	Sow sniffs or roots with the nose within 0.2 m of the floor and explores with her nose or scratches with her front legs the side walls of the TA.
	Contact	HP / TA	Sow has contact with her nose with a piglet or searches for contact by running after a piglet.



# Test arena

