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# Reliability of the Welfare Quality®- Animal Welfare Assessment Protocol for Growing Pigs

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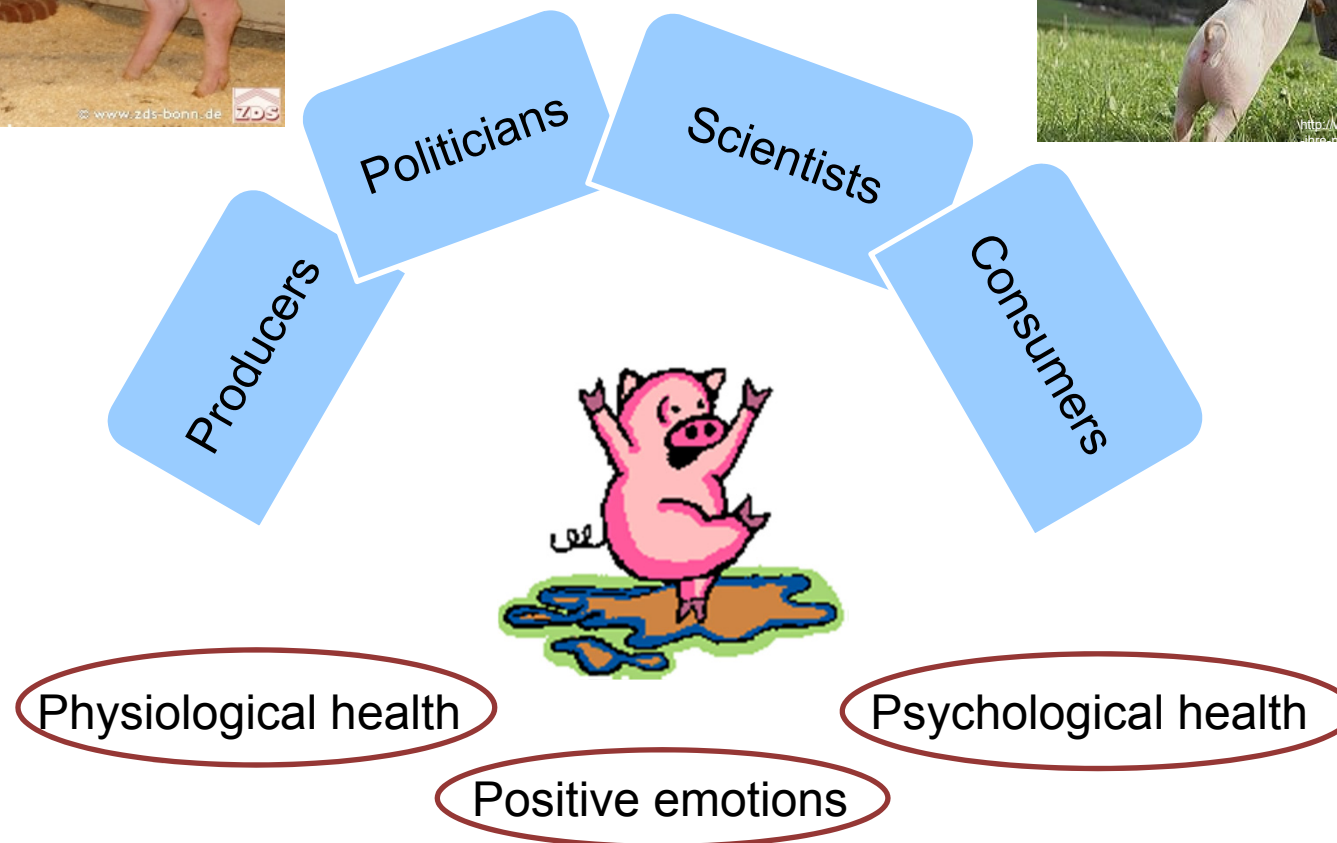
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Session 54, abstract number 18597, [iczycholl@tierzucht.uni-kiel.de](mailto:iczycholl@tierzucht.uni-kiel.de)





# Animal Welfare





# Welfare Quality®



Welfare Quality

NEN



Welfare Quality

NEN



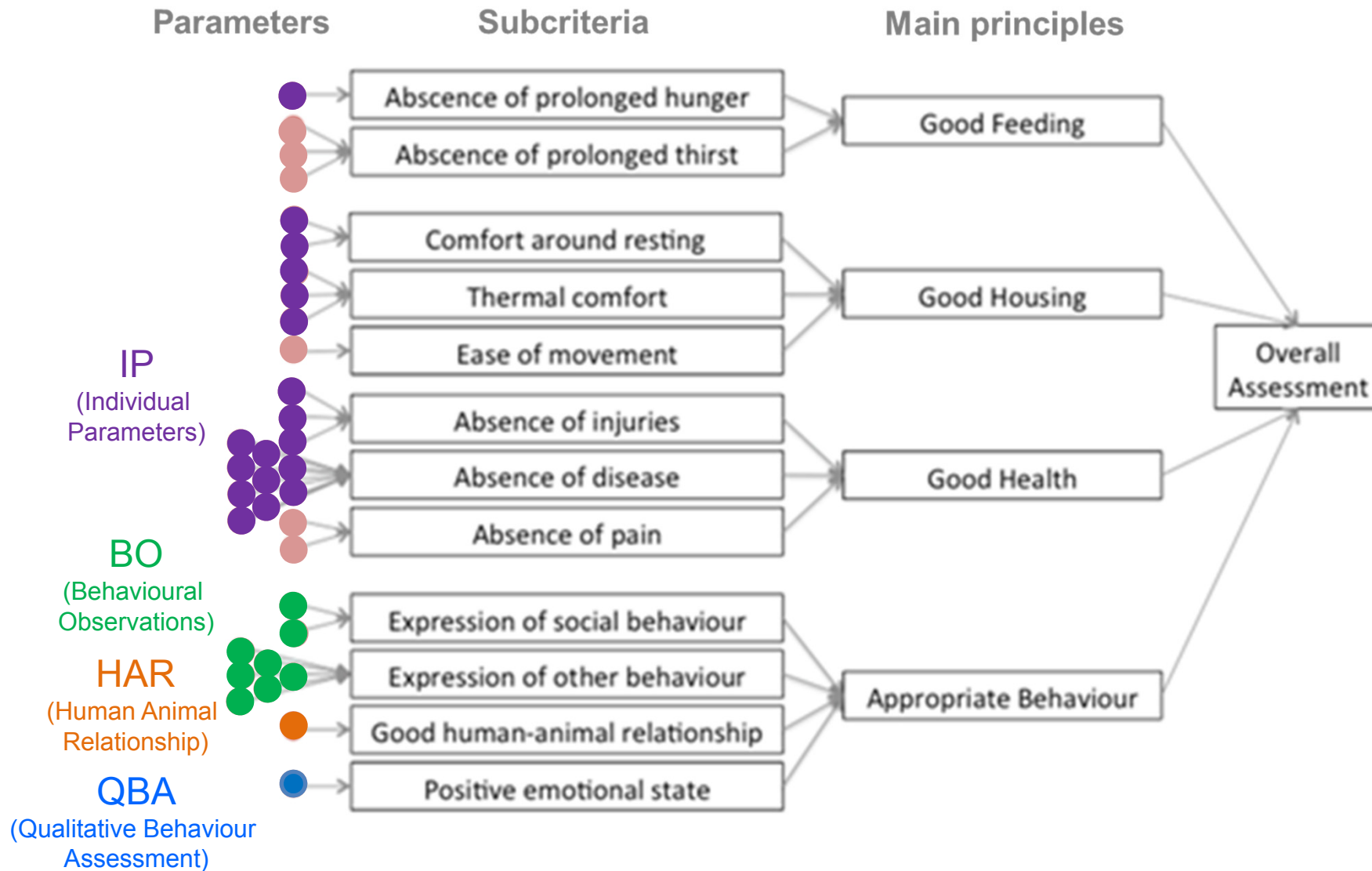
Welfare Quality

NEN

Is the Animal Welfare Assessment Protocol for Growing Pigs a reliable method for assessing Animal Welfare?



# Welfare Quality®





## 1. Qualitative Behaviour Assessment (QBA) (4-6 observation points, 80-240 animals)

active

relaxed absent \_\_\_\_\_ 125mm \_\_\_\_\_ dominant

fearful

## 2. Behavioural observations (BO) (3 observation points, 120-180 animals)

Positive social behaviour	Enrichment material	Other
Negative social behaviour	Exploration behaviour	Resting

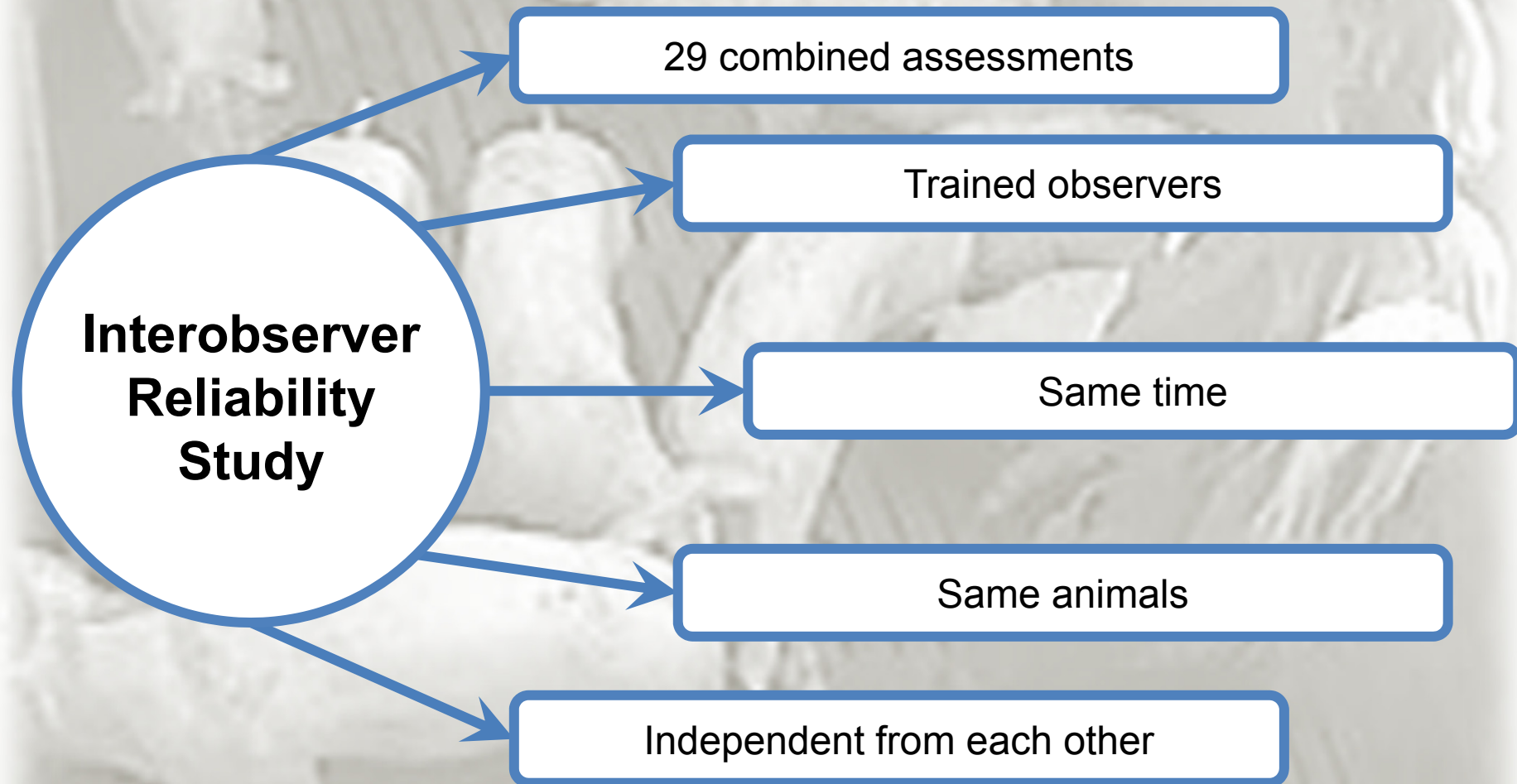
## 3. Human Animal Relationship Test (HAR) (10 pens, 100-400 animals)

## 4. Individual parameters (IP) (10 pens, 100-150 animals)





# Experimental Setup





# Statistical Parameters

## Reliability and agreement parameters

**RS**  
Spearman  
Rankcorrelation

Nonparametric measure of correlation of the observers

**ICC**  
Intraclass  
Correlation

Proportion of variance of observers to residual variance

**SDC**  
Smallest  
Detectable Change

Expression of the measurement error (error that is not attributed to true changes)

**LoA**  
Limits of  
Agreement

Calculation of the difference between each pair of observers and reference interval



## Mean values [mm] and agreement parameters

	Observer1 [mm]	Observer2 [mm]	RS	ICC	SDC	LoA
<b>active</b>	68	92	0.33	0.17	0.30	-0.10 - 0.47
<b>relaxed</b>	46	55	0.70	0.56	0.27	-0.26 - 0.41
<b>fearful</b>	4	15	0.14	-0.01	0.25	-0.17 - 0.32
<b>agitated</b>	18	36	0.56	0.40	0.34	-0.23 - 0.55
<b>calm</b>	51	45	0.83	0.66	0.24	-0.38 - 0.27
<b>enjoying</b>	35	31	0.08	0.14	0.26	-0.30 - 0.23





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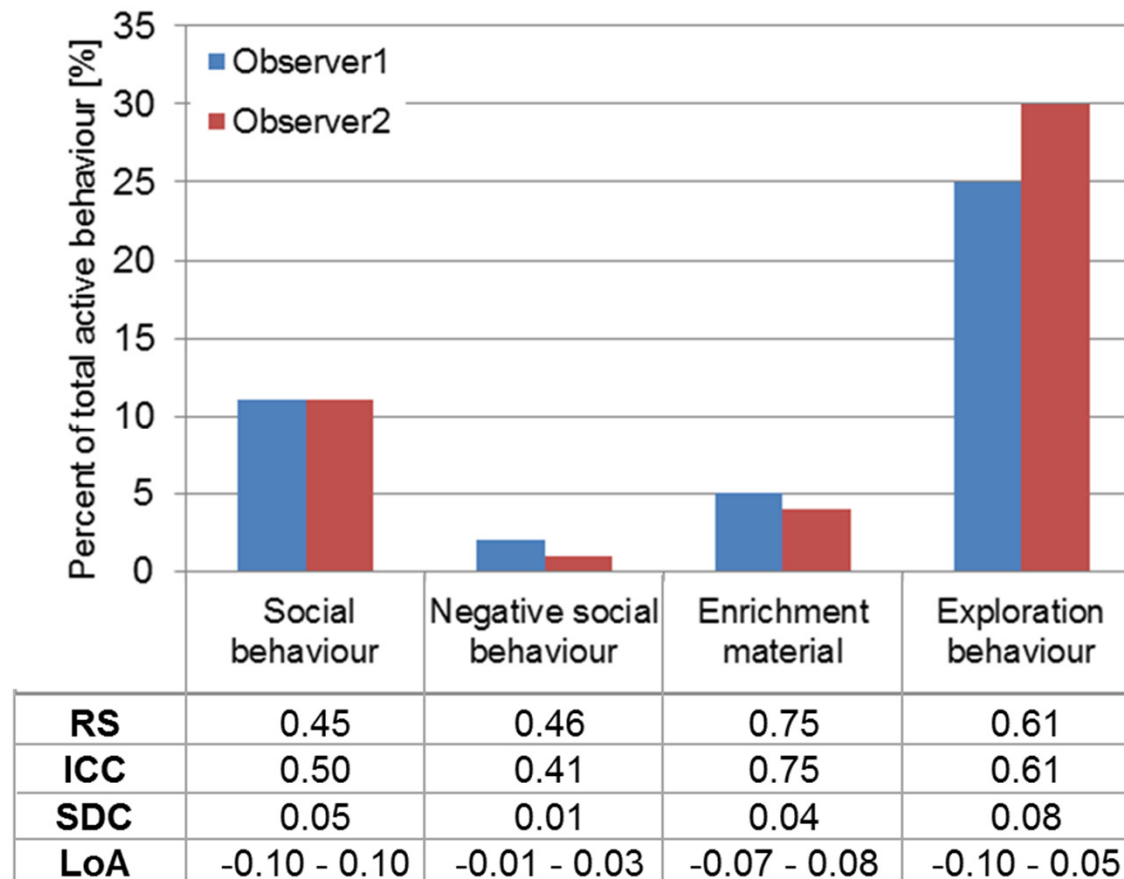
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# Behavioural Observations (BO)

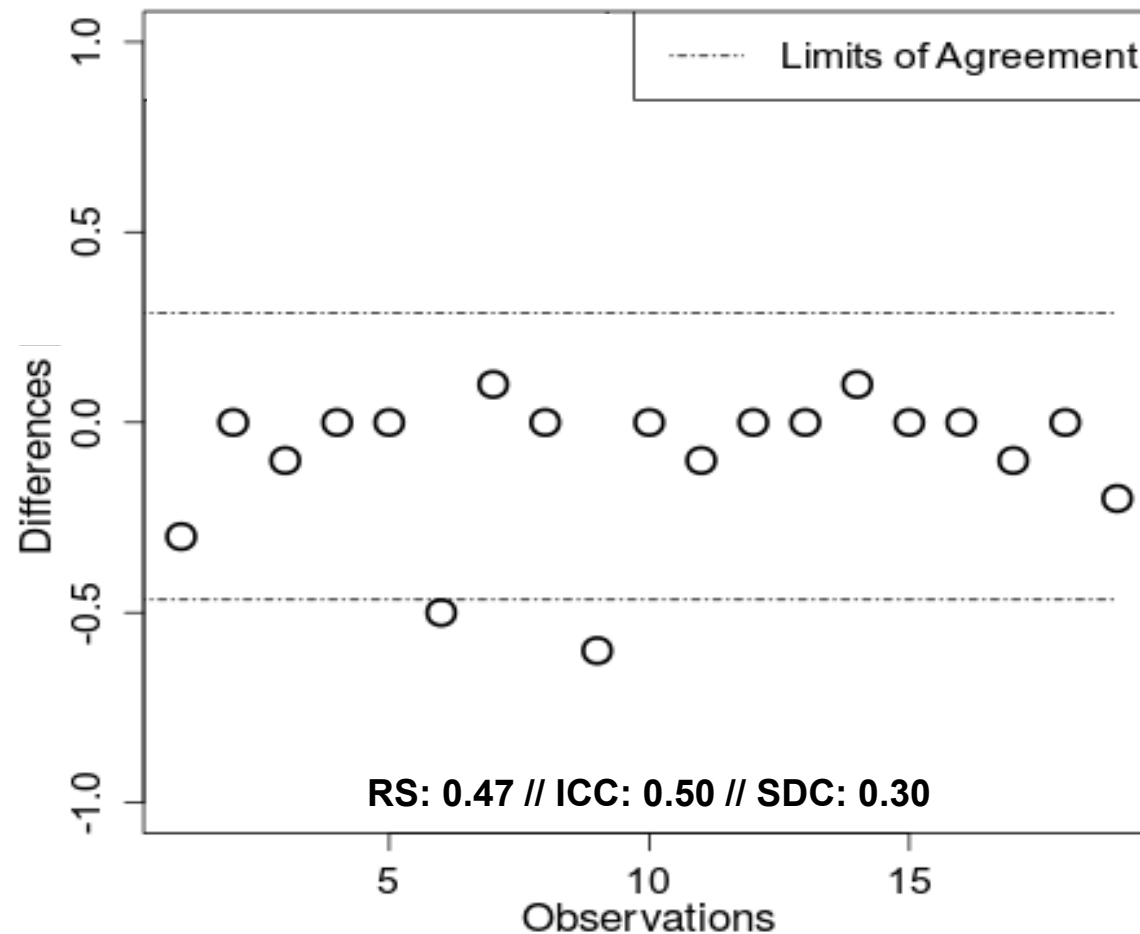
## Mean values of behavioural categories [%] and agreement parameters





# Human Animal Relationship Test (HAR)

## Limits of Agreement of the differences of two observers

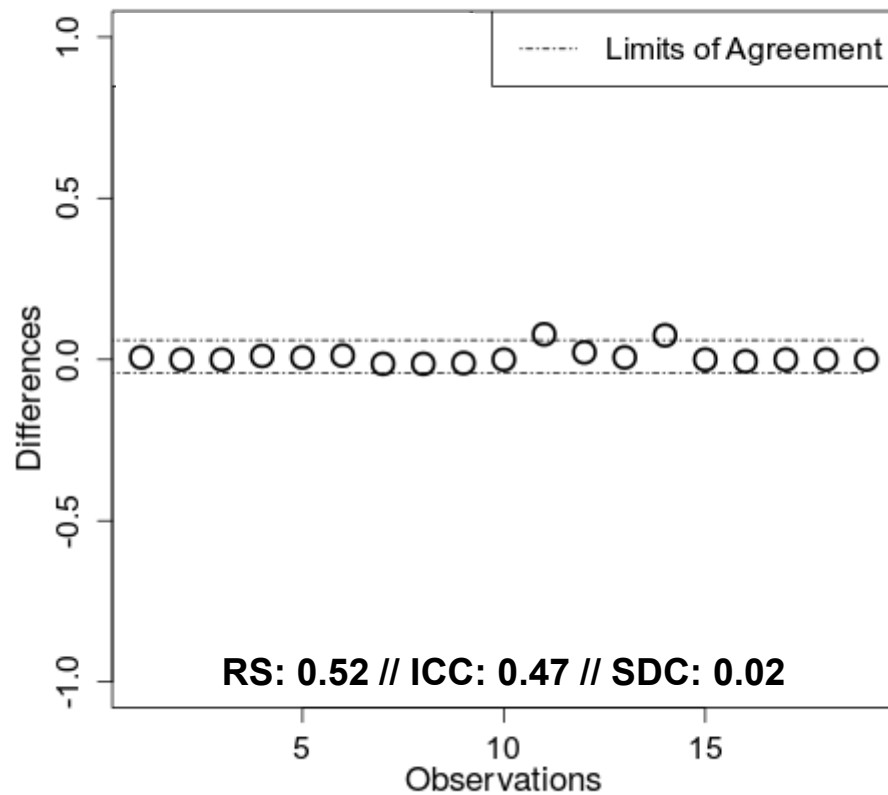




# Individual Parameters (IP)

## Limits of Agreement of the differences of two observers

Tail biting





# Discussion & Conclusion

## 1) Qualitative Behaviour Assessment

- Not reliable
  - Not a suitable method for the measurement of positive emotions

## 2) Behavioural Observations

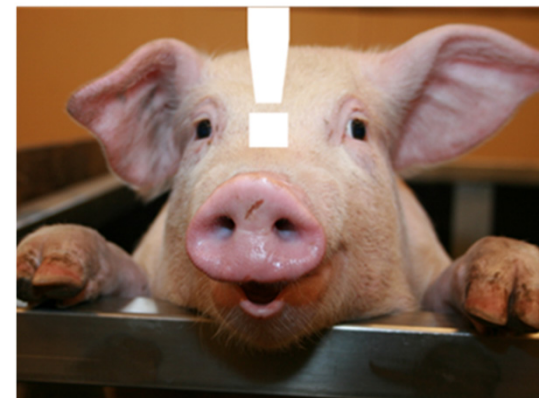
- Good reliability
- Validity?
  - Video observations

## 3) Human Animal Relationship Test

- No statement possible due to experimental design
  - Intraobserver Reliability Study

## 4) Individual Parameters

- Good reliability for most of the parameters
- Exception: Bursitis
- Some parameters occurred only rarely or not at all





Thank you  
for your  
attention!



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# Agreement vs. Reliability

- **Agreement vs. Reliability:**

- Agreement: how good is agreement between repeated measurements
- Reliability: how well can study objects be distinguished from each other despite measurement error
  - Related to variability between study objects



$$\text{reliability} = \frac{\text{variability between study objects}}{\text{variability between study objects} + \text{measurement error}}$$





# Formulas SEM/SDC/LoA

- **Standard Error of Measurement:**

$$\text{SEM} = \sqrt{\sigma_{\text{error}}^2}$$

- **Limits of Agreement:**

$$\text{LoA} \Rightarrow \text{SDdiff} = (\sqrt{2} * \text{SEM})$$

- **Smallest Detectable Change:**

$$\text{SEM} = 1.96 * \sqrt{2} * \text{SEM}$$



# Limits of agreement of the QBA term “calm”

## Qualitative Behaviour Assessment “calm”

