Test-retest reliability of the Welfare Quality® animal welfare assessment protocol for sows and piglets

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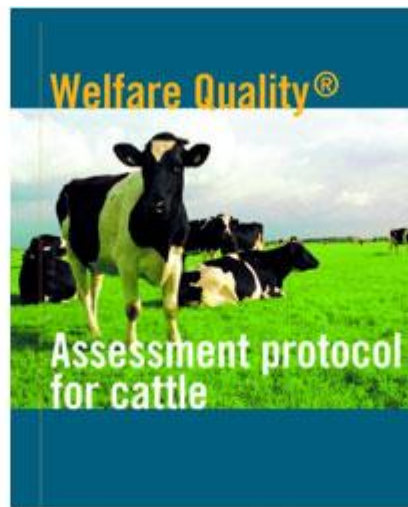**Session 8, Abstract number 28202, lfriedrich@tierzucht.uni-kiel.de**

Welfare Quality® (WQ)

WQ: Principles, criteria & indicators

WQ: Data collection

1. Qualitative Behaviour Assessment (QBA) (4-6 observation points, farm level)
   - Visual analogue scale, 20 terms, e.g. active, relaxed, fearful

absent   dominant

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0 mm   125 mm

2. Behavioural observations: Instantaneous scan sampling (1-4 pens)
   - Positive social behaviour
   - Use of enrichment material
   - Other
   - Negative social behaviour
   - Investigation of the pen
   - Resting

3. Behavioural observations: Stereotypies (40 sows)

4. Human-animal relationship (20 sows)

5. Individual indicators (90 sows, 10 litters)

Experimental setup

Test-retest reliability

- 13 farrowing farms
- Same observer
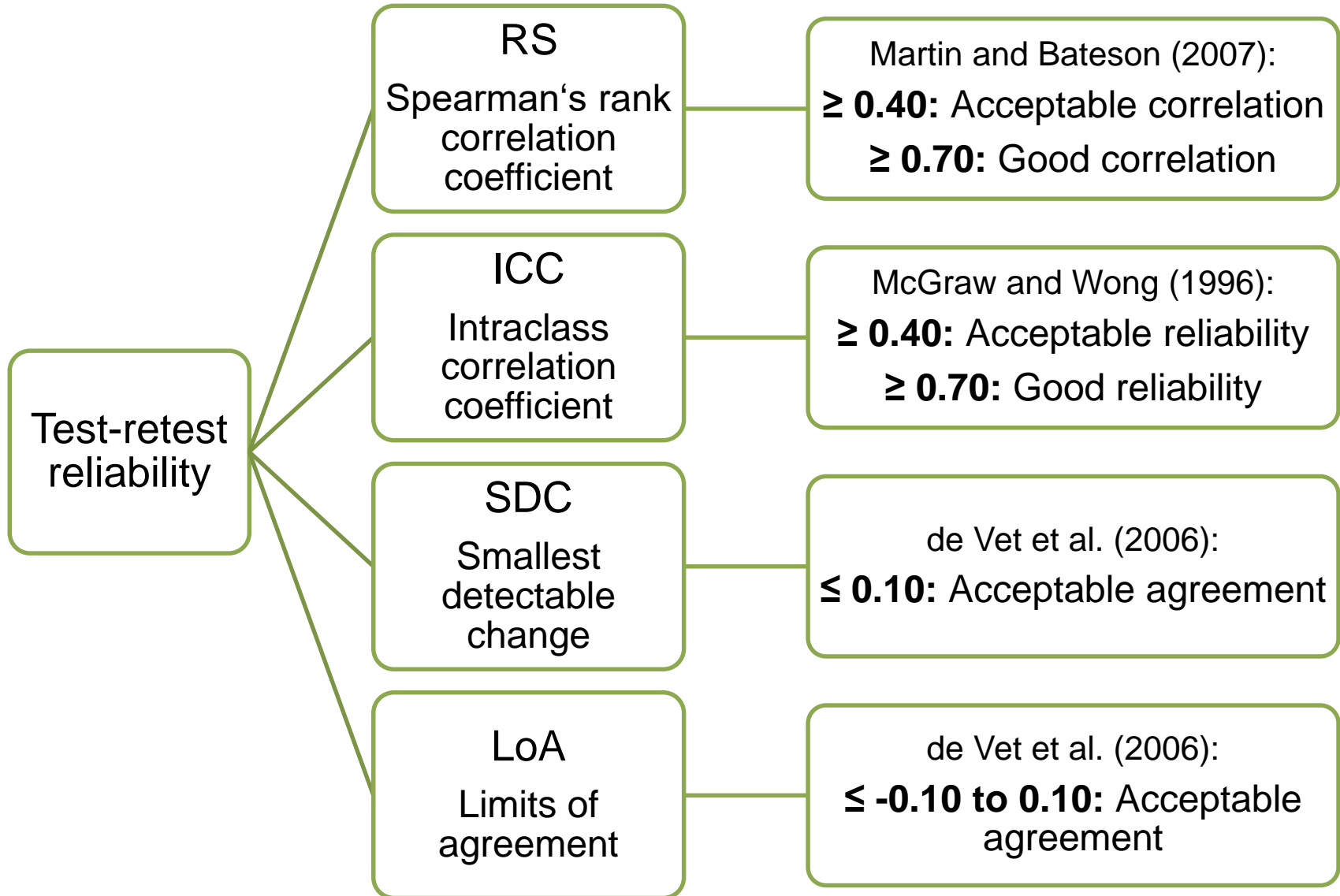- 5 farm visits (V1-5) per farm

V1: Day 0

V2: Day 3

V3: Week 7

V4: Month 5

V5: Month 10

Statistical parameters

Test-retest reliability

RS
Spearman's rank correlation coefficient

Martin and Bateson (2007):
≥ 0.40: Acceptable correlation
≥ 0.70: Good correlation

ICC
Intraclass correlation coefficient

McGraw and Wong (1996):
≥ 0.40: Acceptable reliability
≥ 0.70: Good reliability

SDC
Smallest detectable change

de Vet et al. (2006):
≤ 0.10: Acceptable agreement

LoA
Limits of agreement

de Vet et al. (2006):
≤ -0.10 to 0.10: Acceptable agreement

Statistical parameters: QBA

- Further evaluation: Principal component analysis (PCA)
  - Used to emphasise variation
  - Reduction of number of original variables (descriptive terms) into fewer dimensionality (principal components)

- Comparison of principal components 1 und 2 (PC; PC1 and PC2) between farm visits
  - Two-dimensional interpretative word chart
  - Spearman's rank correlation coefficient (RS)

Qualitative Behaviour Assessment

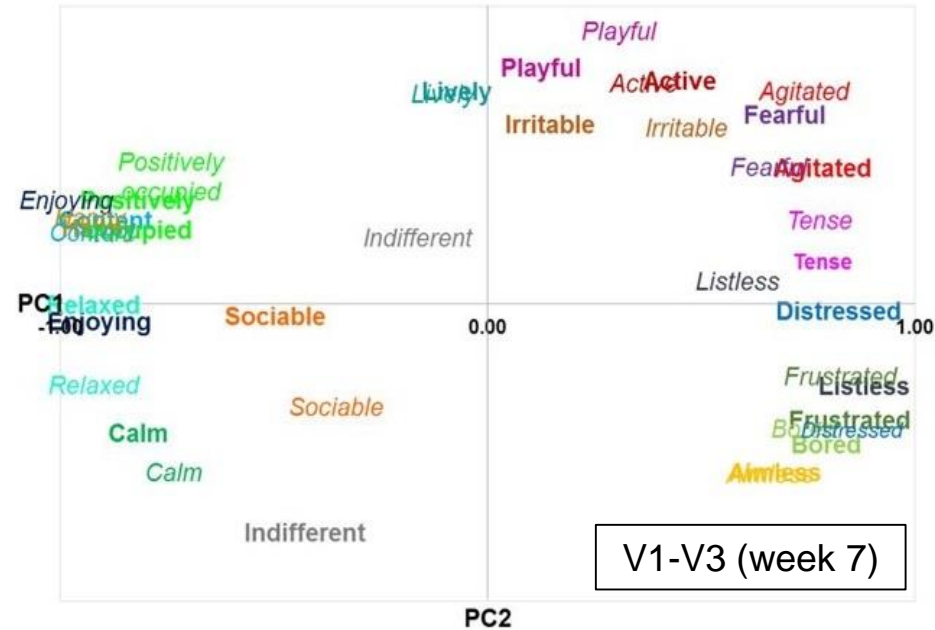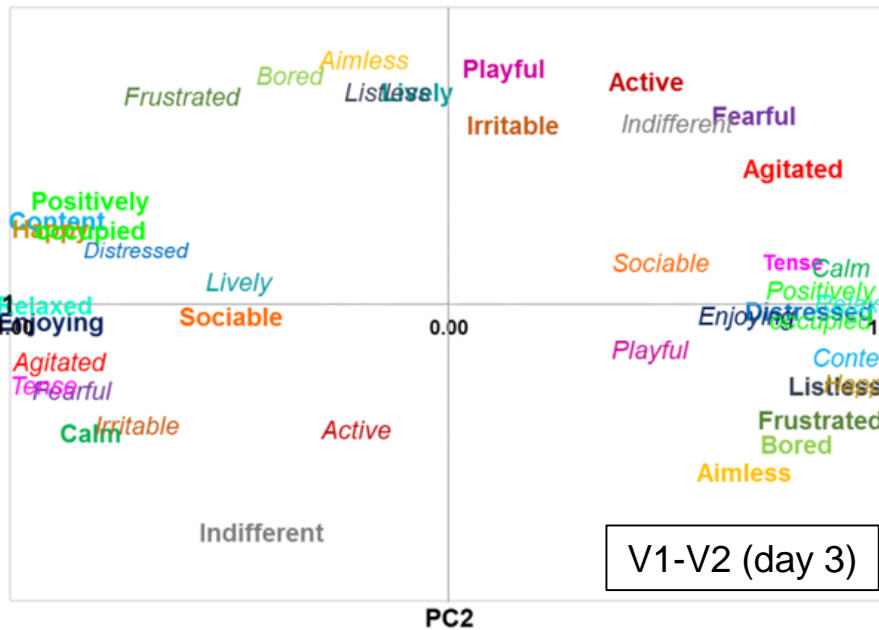Mean values [%] of the farm visits (V1-5), corresponding statistical parameters
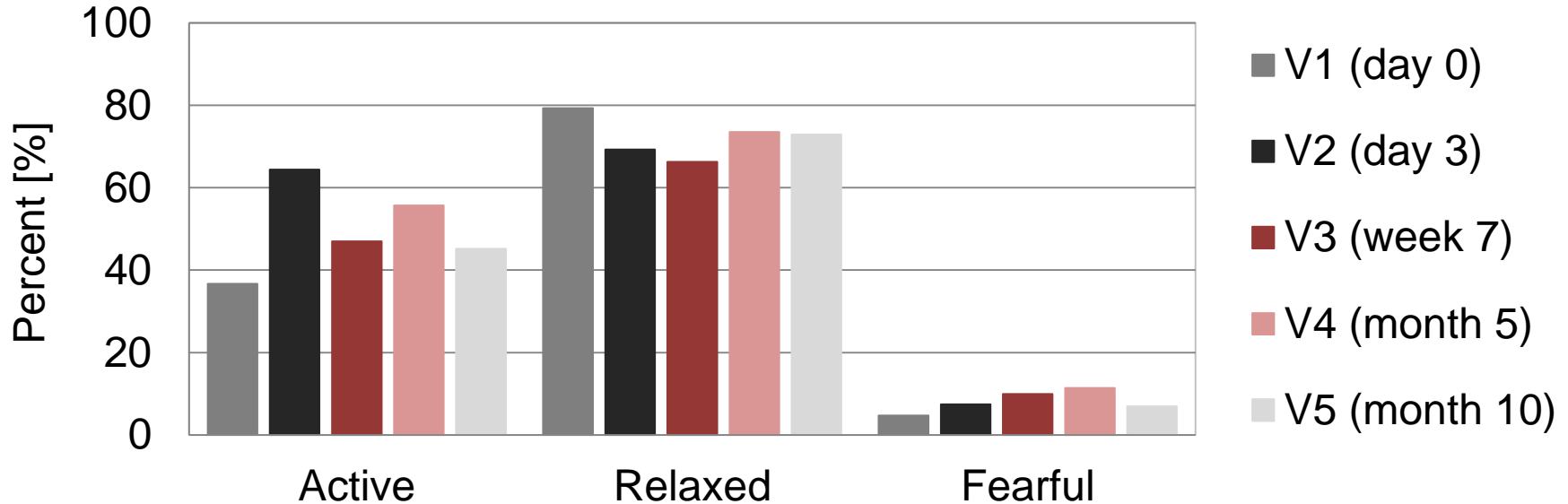
Adjectives	RS [median]	ICC [median]	SDC [median]	LoA [range]
Active	0.18	0.36	0.58	∈(-0.48;0.27)-(-0.91;0.53)
Relaxed	0.35	0.32	0.53	∈(-0.22;0.48)-(-0.50;0.61)
Fearful	0.20	0.15	0.19	∈(-0.22;0.16)-(-0.45;0.31)
…				

Qualitative Behaviour Assessment

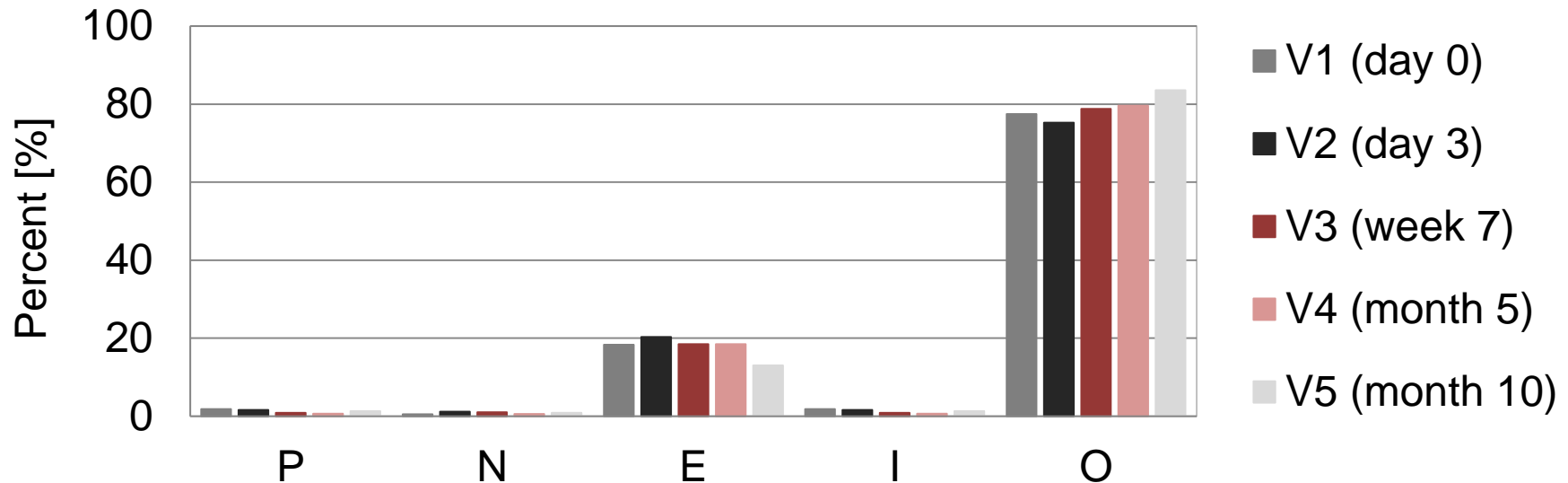Word charts of the factor loadings concerning the Qualitative Behaviour Assessment

V1-V2 (day 3)

V1-V3 (week 7)

RS	V1-V2 (day 3)	V1-V3 (week 7)	V1-V4 (month 5)	V1-V5 (month 10)
PC1	-0.83	0.93	0.93	-0.90
PC2	-0.80	0.87	-0.12	0.83

Instantaneous scan sampling

Mean values [%] of the farm visits (V1-5), corresponding statistical parameters

Category	RS [median]	ICC [median]	SDC [median]	LoA [range]
Positive social behaviour (P)	0.37	0.28	0.05	∈(-0.03;0.06)-(-0.08;0.08)
Negative social behaviour (N)	0.34	0.15	0.03	∈(-0.03;0.02)-(-0.04;0.03)
Use of enrichment material (E)	0.78	0.63	0.38	∈(-0.26;0.25)-(-0.41;0.52)
Investigation of the pen (I)	0.37	0.28	0.05	∈(-0.03;0.06)-(-0.08;0.08)
Other (O)	0.64	0.59	0.38	∈(-0.28;0.25)-(-0.53;0.40)

Stereotypies

Example: Sham chewing, corresponding statistical parameters

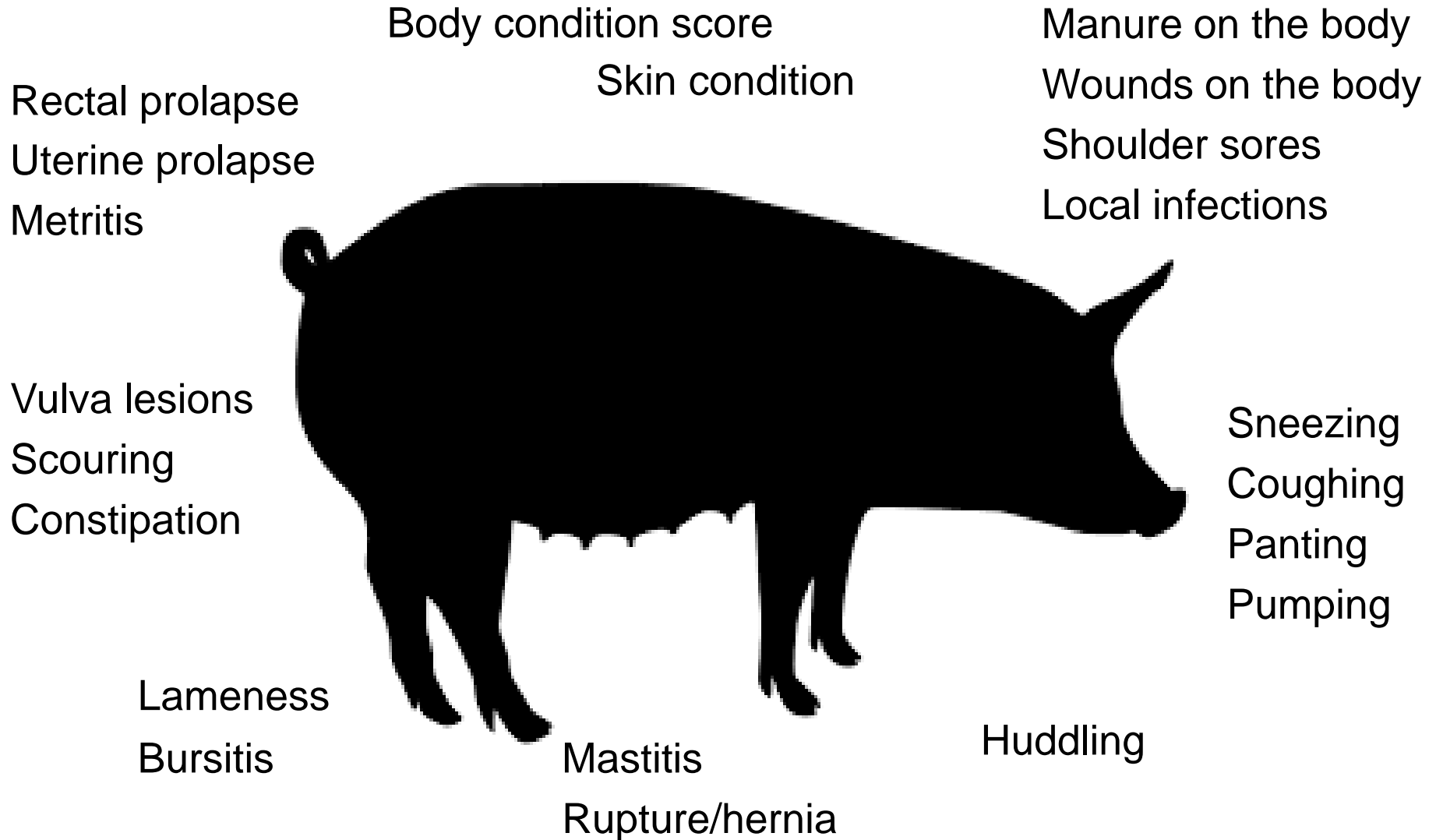|	
RS [median]:	0.84
ICC [median]:	0.88
SDC [median]:	0.17
LoA [range]:	∈(-0.17;0.13)-(-0.24;0.21)

Human-animal relationship

Mean values [%] of the farm visits (V1-5), corresponding statistical parameters
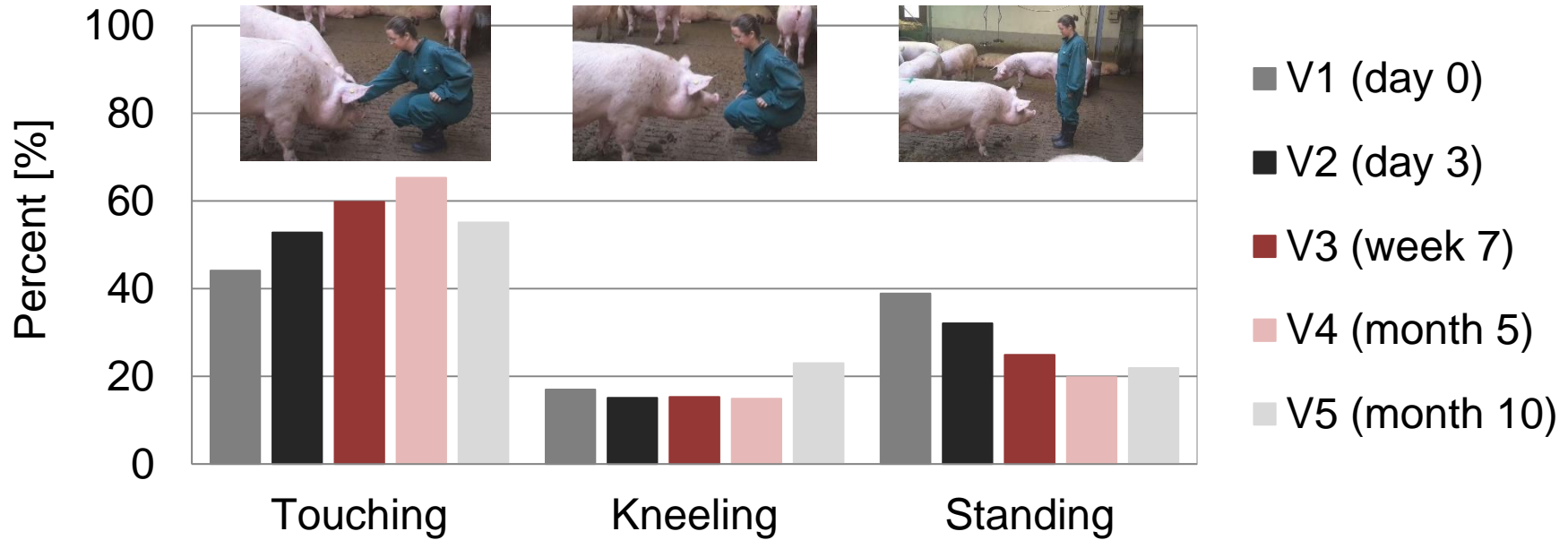
Category	RS [median]	ICC [median]	SDC [median]	LoA [range]
Touching	0.48	0.52	0.47	∈(-0.38;0.21)-(-0.67;0.25)
Kneeling	0.51	0.32	0.33	∈(-0.15;0.19)-(-0.39;0.44)
Standing	0.56	0.69	0.44	∈(-0.28;0.42)-(-0.39;0.73)

Individual indicators

Body condition score

Skin condition

Manure on the body

Wounds on the body

Shoulder sores

Local infections

Rectal prolapse

Uterine prolapse

Metritis

Vulva lesions

Scouring

Constipation

Sneezing

Coughing

Panting

Pumping

Lameness

Bursitis

Mastitis

Rupture/hernia

Huddling

Individual indicators

Manure on the body

Neurological disorder

Sneezing

Coughing

Rectal prolapse

Panting
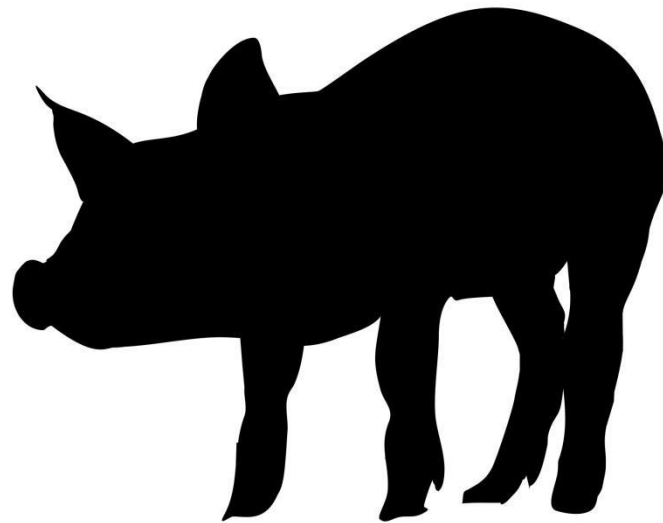
Scouring

Pumping

Splay legs

Lameness

Huddling

Conclusion

Indicator	Reliability		Agreement		Test-retest reliability
1. Qualitative Behaviour Assessment	Direct: ✗ PCA: ✓		Direct: ✗		In question
2. Behavioural observations: Instantaneous scan sampling	✓	✗	✗	✓	Accetable
3. Behavioural observations: Stereotypies	✓		✗		Accetable
4. Human-animal relationship	✓		✗		Accetable
5. Individual indicators	✓		✓		Accetable

Thank you for your attention!