

Agonistic interactions at straw racks in group-housed horses

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Group housing in horses



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Often:

- large dynamic groups
- injury risk?

Group housing in horses

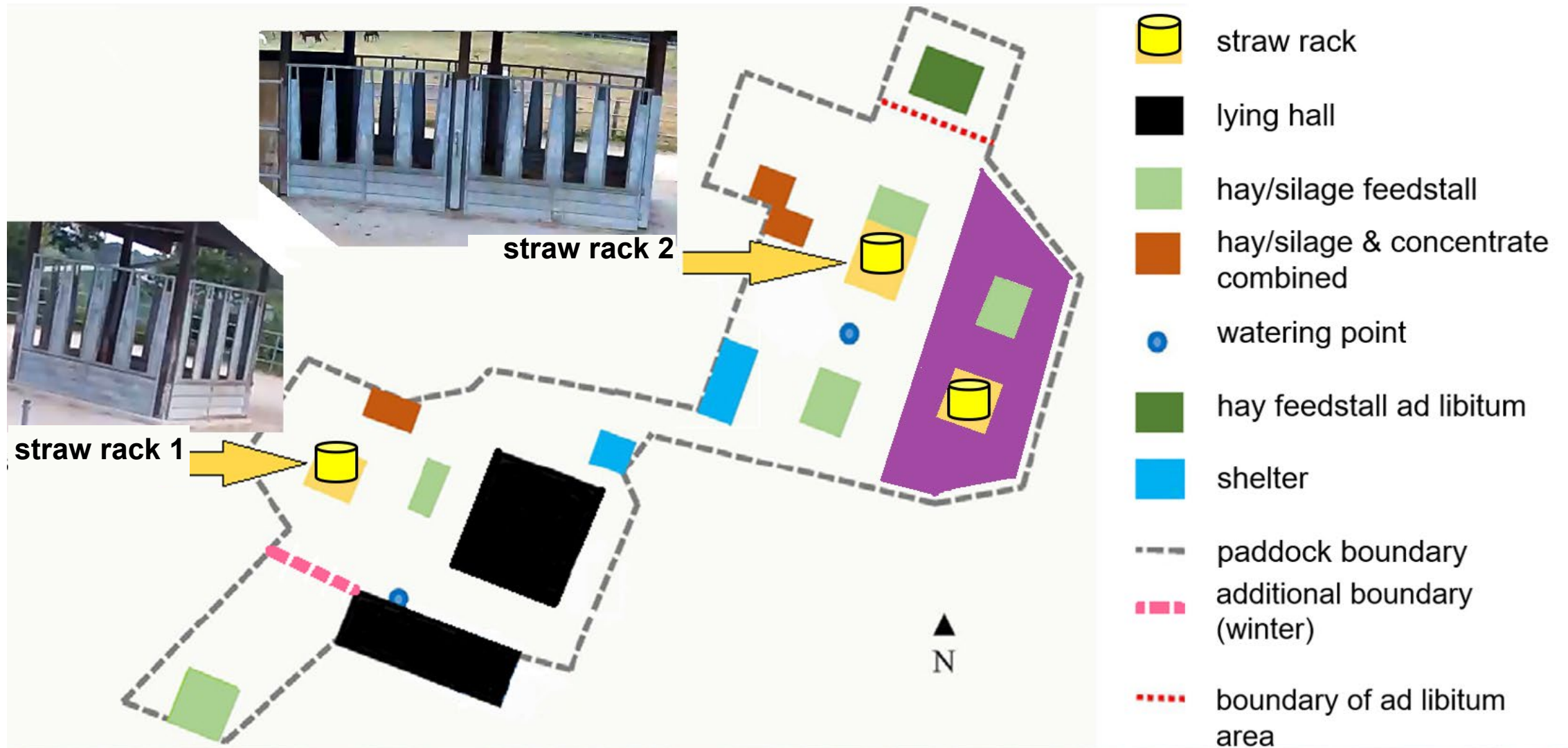
- agonistic interactions at limited resources
- no science-based recommendations concerning **positioning & design of straw racks**



Study farm

- 1 private HIT **active stable**, northern Germany
- 1 herd, **50 – 62 animals** (farm extension during observation period), various breeds, mares & geldings, aged 2 – 29 years
- **pasture access** during summer (9:00-10:30am, 4:30-6:00pm)
- transponder controlled concentrate & hay feeding, **straw ad libitum**
- **video observation** of 2 straw racks, differing in design and positioning
- evaluation of 15 days in June („**summer**“) & 15 days in December („**winter**“)

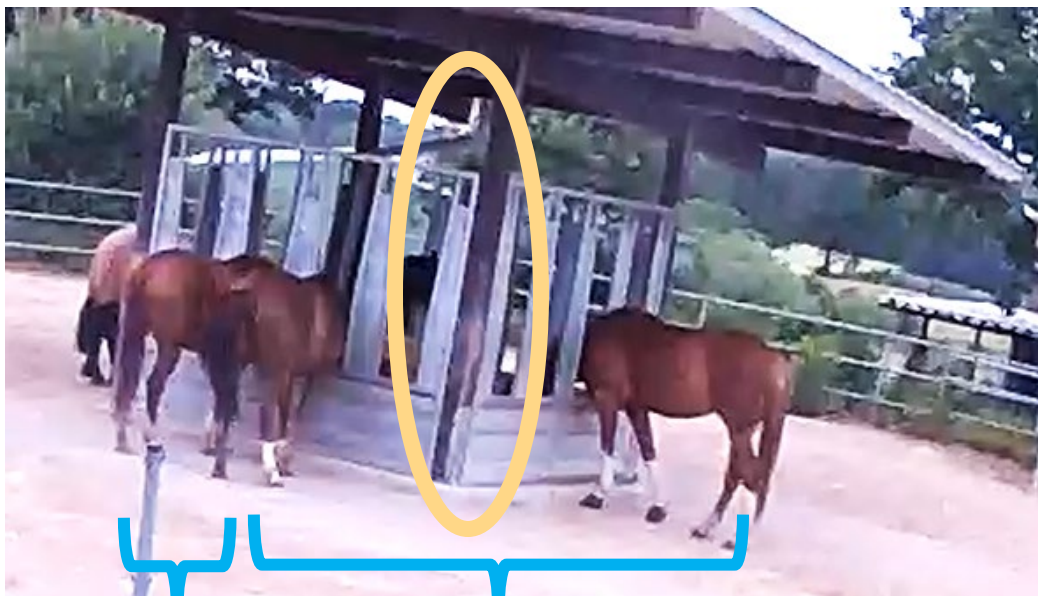
Study farm



Video observation

Part 1: rack occupancy & common feeding distances

instantaneous sampling (interval: 10 minutes)

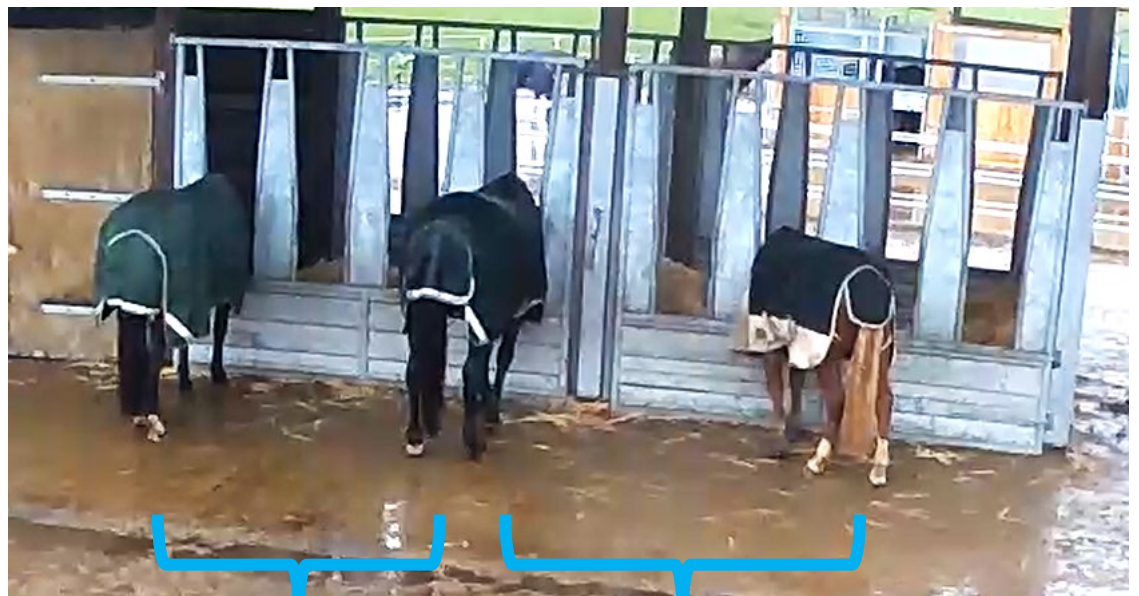


0 3

feeding distances

edge: 0

edge: 1



2

1

Video observation

Part 2: frequency & intensity of agonistic interactions & feeding interruptions

continuous sampling



facial threat
head swing
bite threat
kick threat
attacking
chasing
biting
kicking



Statistical analysis

Generalised linear mixed model

$$E[y_{ijkl}] = \phi (\mu + R_i + D_j^* T_k + St_l + e_{ijkl})$$

RACK

DAY

TIMESLOT

**STRAW
SUPPLY**

$E[y_{ijkl}]$: predicted number of feeding horses [h^{-1}] (part 1) resp.

predicted number of total ais [h^{-1}] (part 2)

ϕ : log link function (Poisson distributed data)

μ : overall mean effect

R_i : fixed effect of the rack

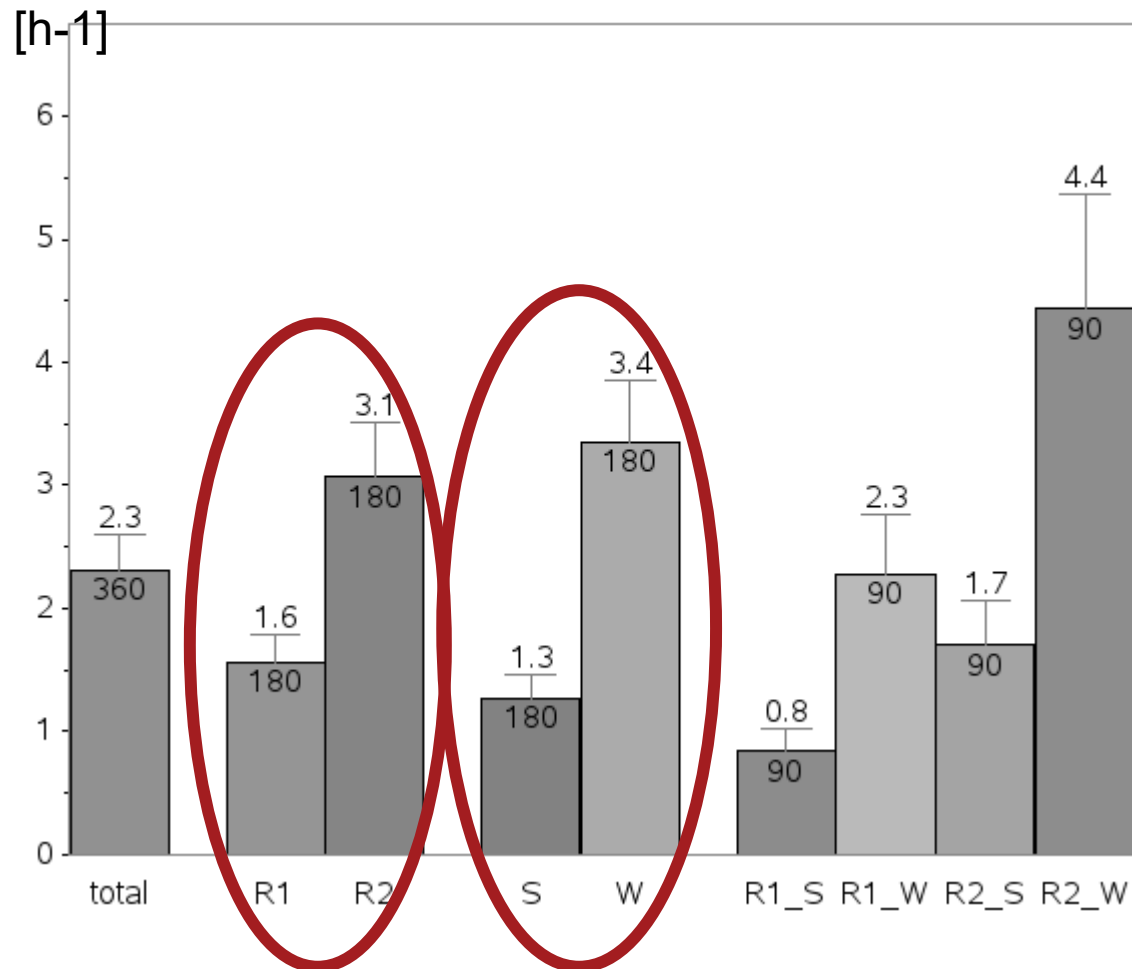
D_j^* : fixed effect of the respective observation day

T_k : fixed effect of the respective timeslot

St_l : fixed effect of fresh straw supply

e_{ijkl} : random residual term

Results (1): average number of feeding horses



1.6 (R1)
3.1 (R2)

1.3 (S)
3.4 (W)

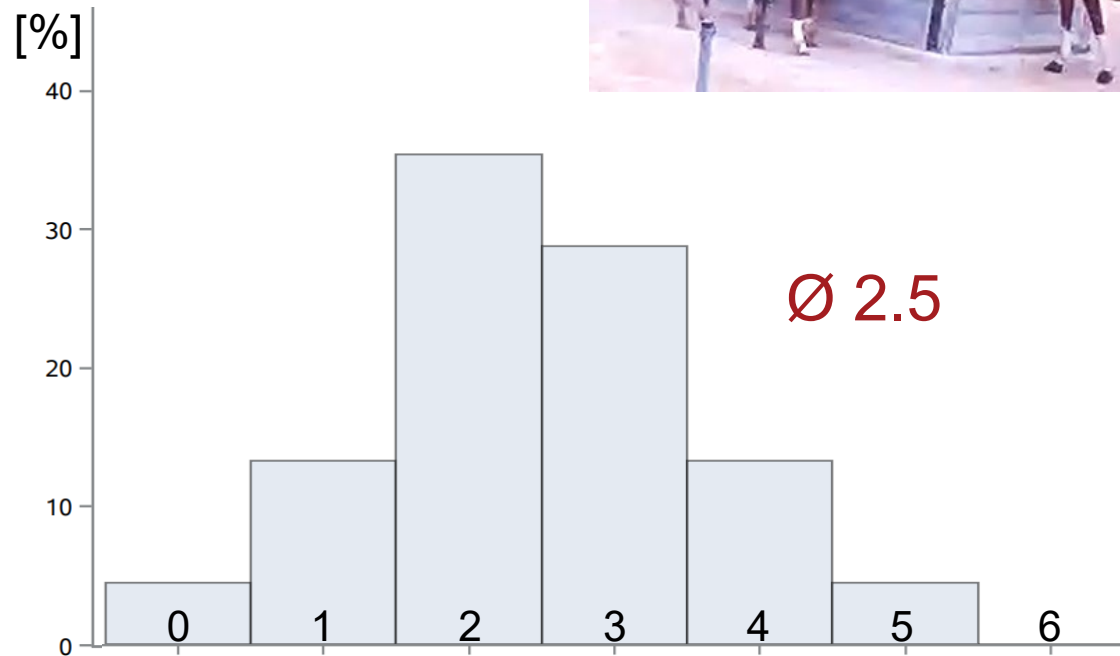
R1 = rack 1
R2 = rack 2
S = summer
W = winter



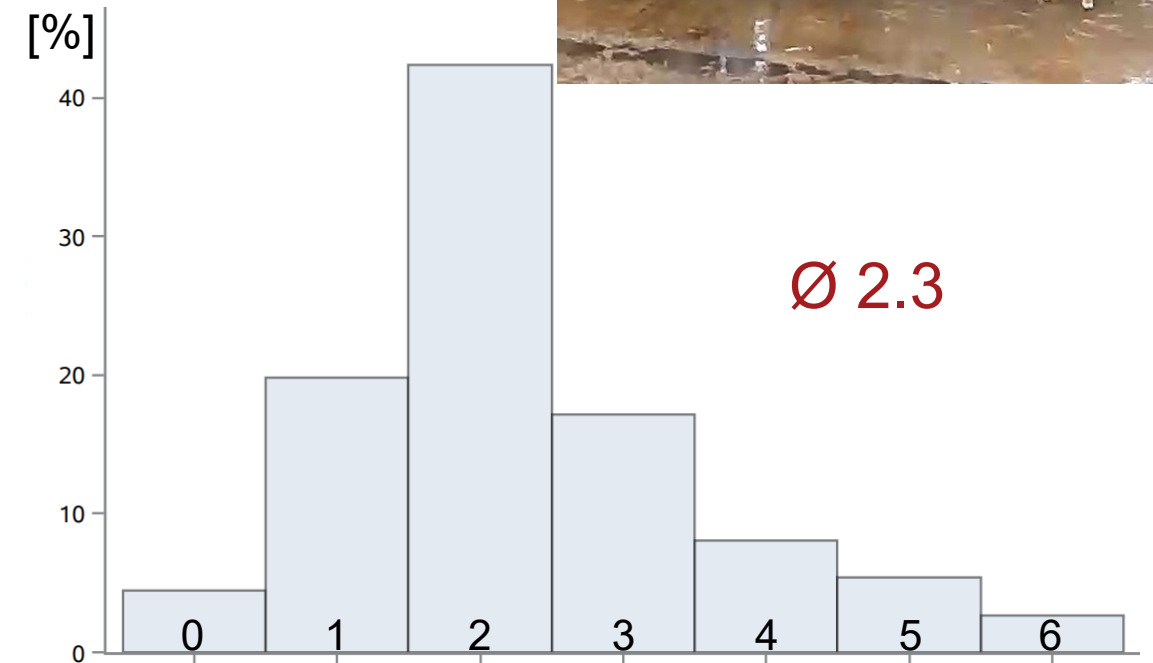
Results (1): distribution of feeding distances



a. rack 1



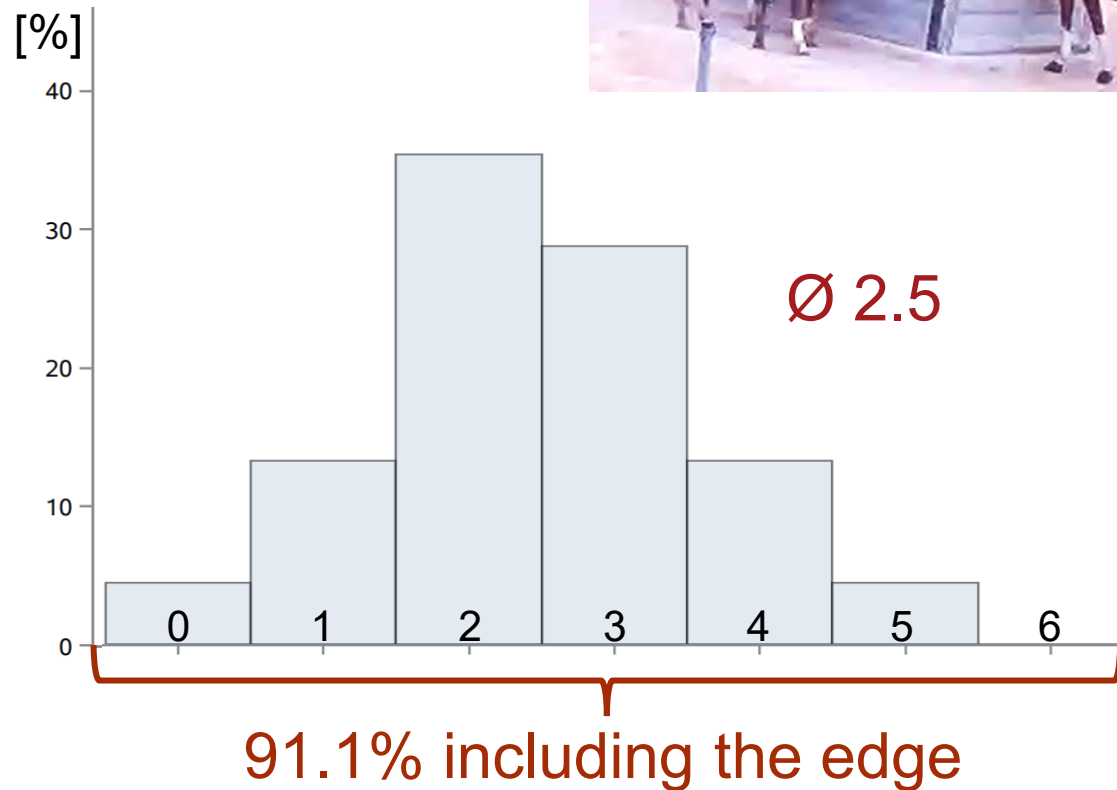
b. rack 2



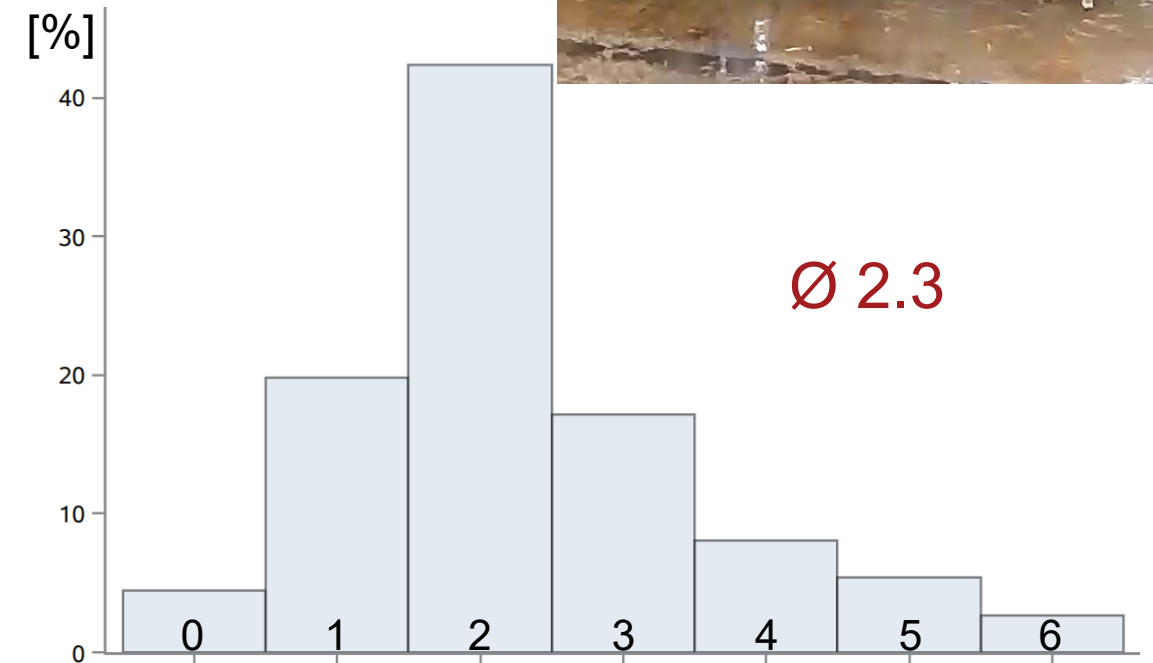
Results (1): distribution of feeding distances



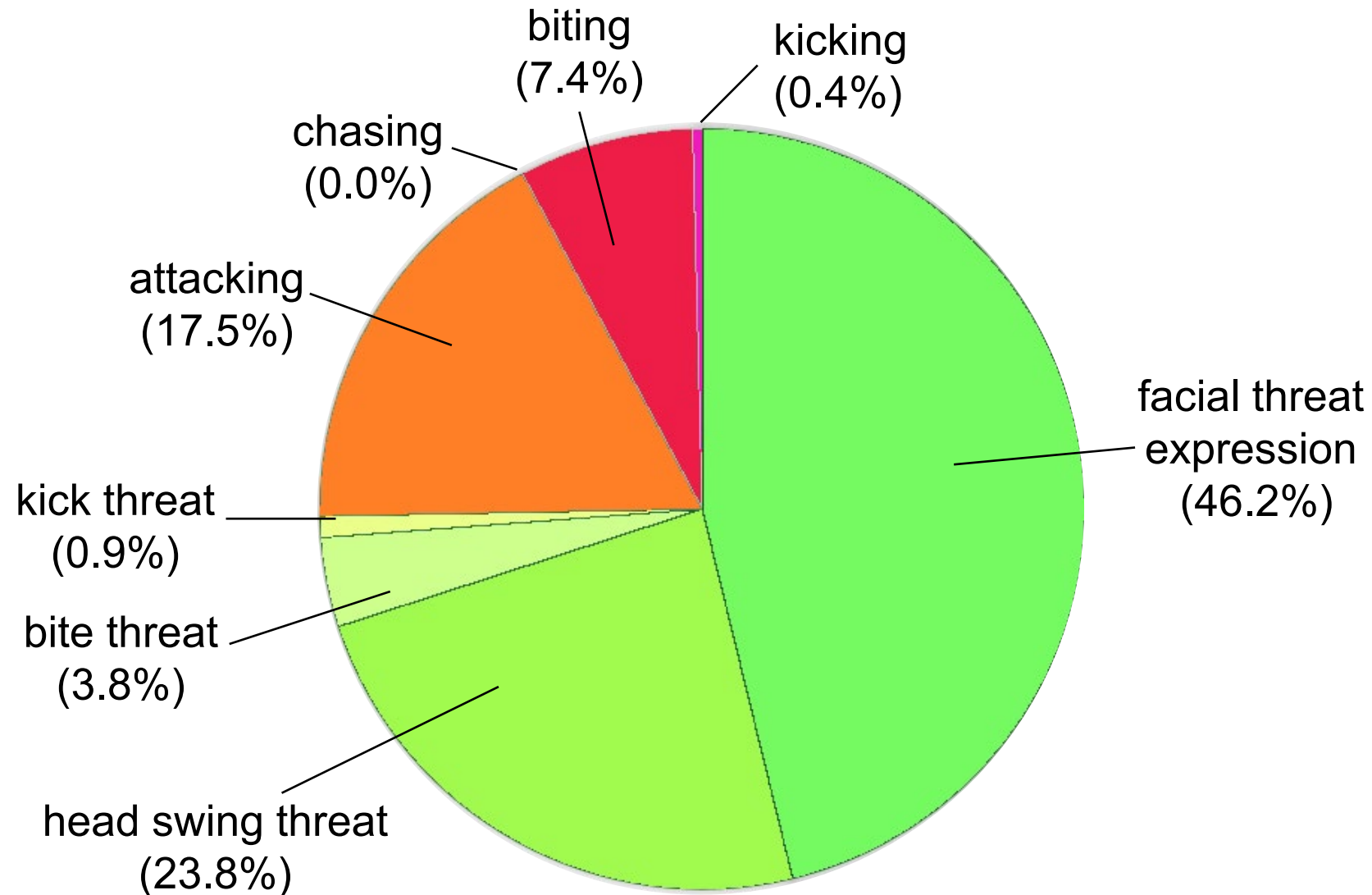
a. rack 1



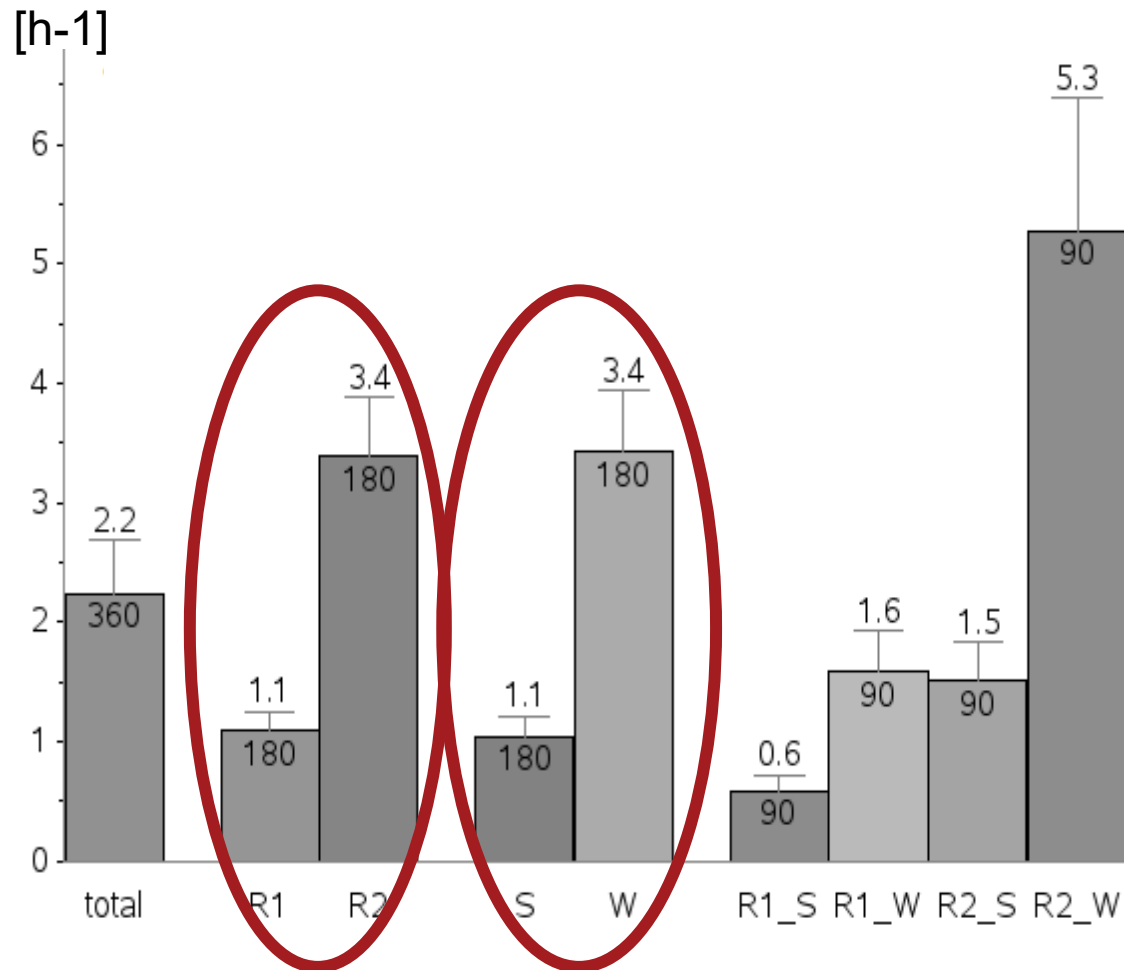
b. rack 2



Results (2): percentage of agonistic interaction intensities



Results (2): number of agonistic interactions (total)



1.1 (R1)
3.1 (R2)

1.1 (S)
3.4 (W)

R1 = rack 1
R2 = rack 2
S = summer
W = winter



71% disturbed feeding events (25% in total)

Possible explanation: positioning of straw feeders?



Summary

- 3 openings = 1 feeding place
- feeding over edge is highly preferred
- agonistic interactions not rare at straw racks!
 - disturbed feeding, social stress, injury risk
- significant impacts of rack design and positioning



Summary

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 - disturbed feeding, social stress, injury risk
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Thank you! Questions?
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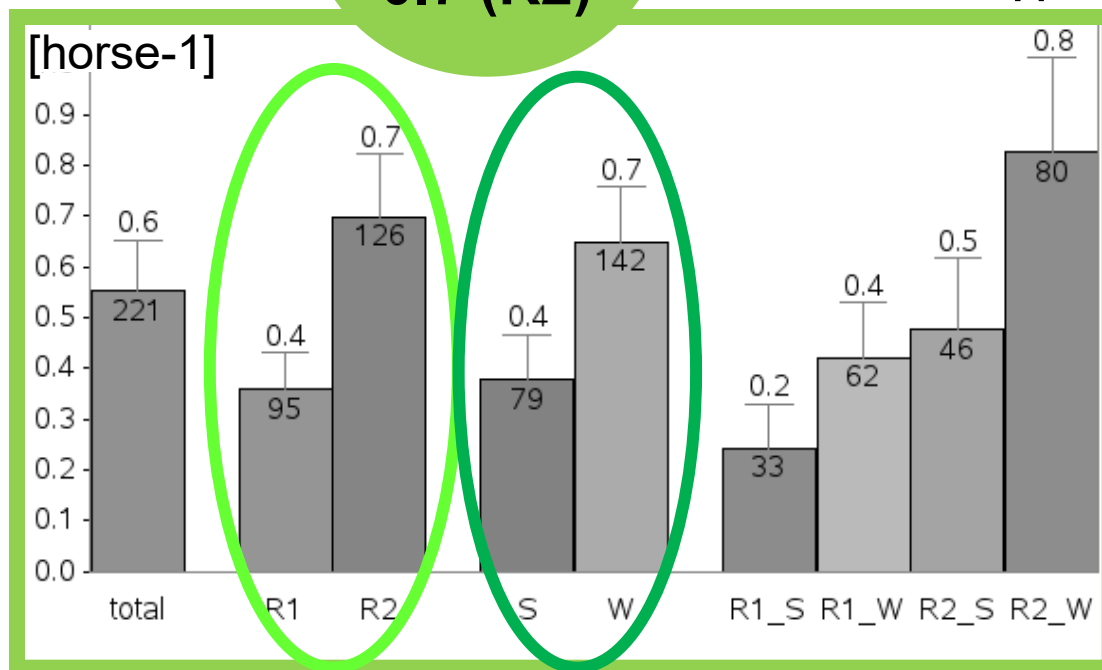
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2.c. i. Number of ais [horse-1]: ais with LOW risk of injury

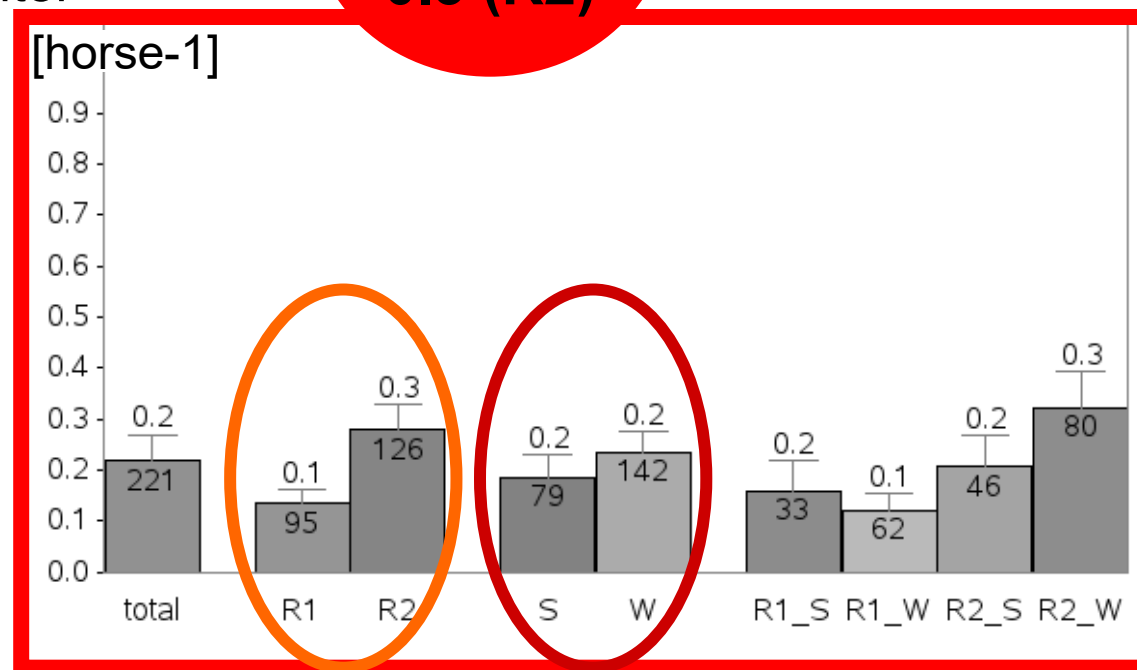
**0.4 (R1)
vs.
0.7 (R2)**

R1 = rack 1
R2 = rack 2
S = summer
W = winter

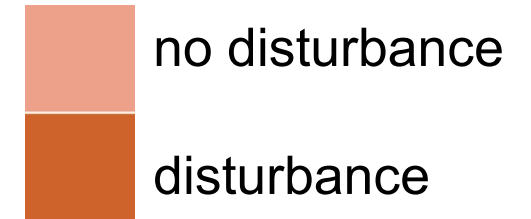


2.c. ii. Number of ais [horse-1]: ais with HIGH risk of injury

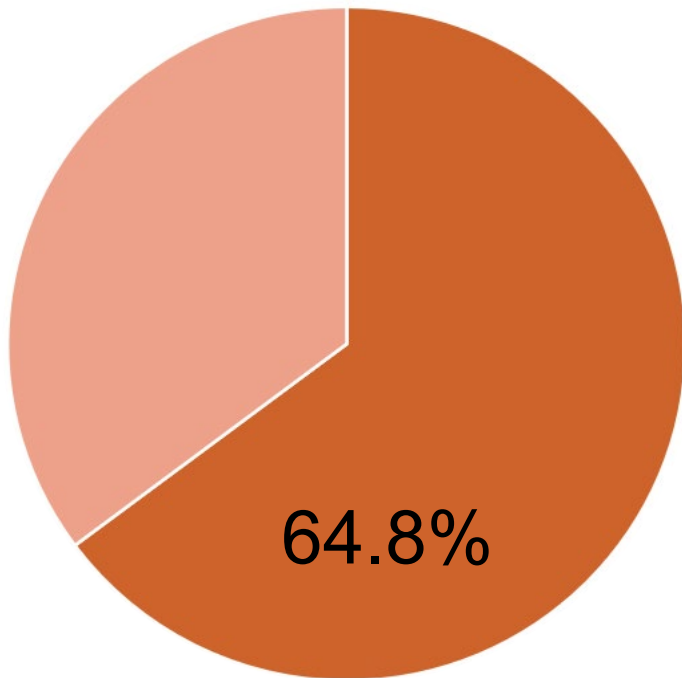
**0.1 (R1)
vs.
0.3 (R2)**



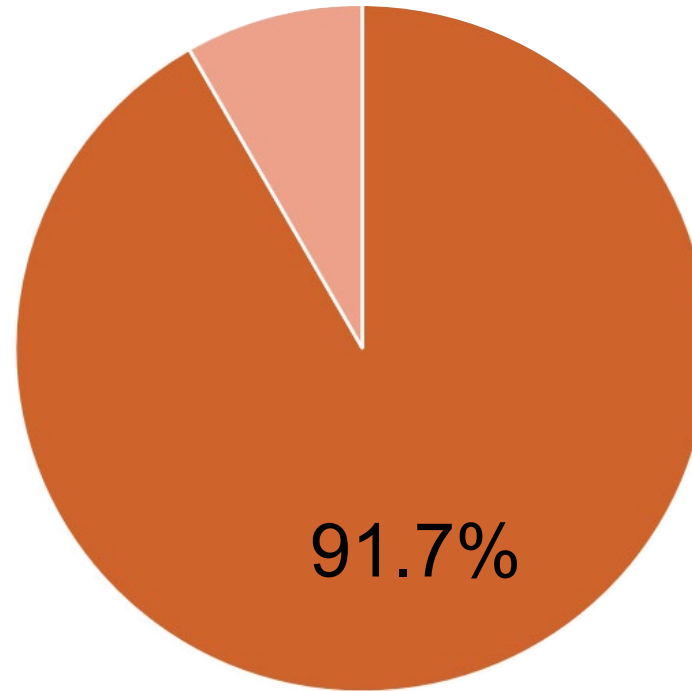
Results: Percentage of feeding disturbances



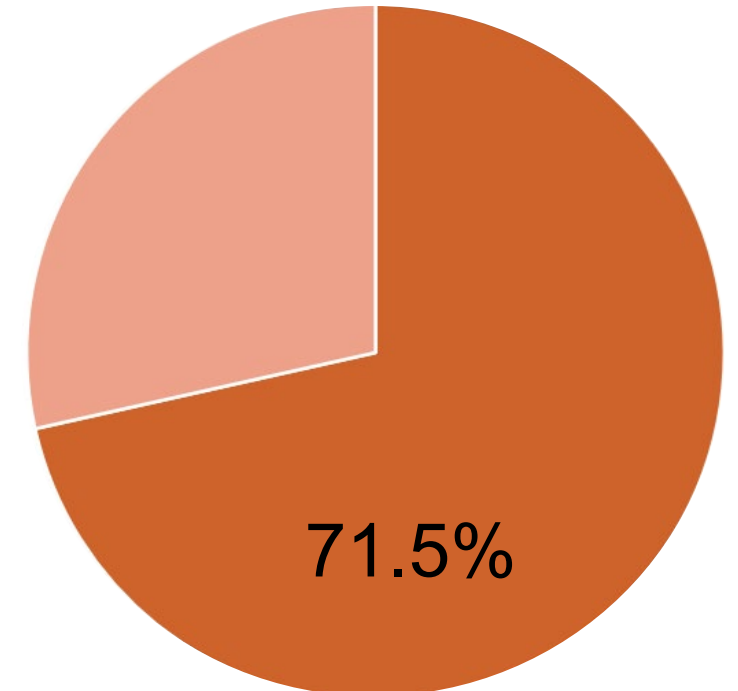
a. Agonistic interactions:
LOW risk of injury



b. Agonistic interactions:
HIGH risk of injury



c. agonistic interactions
TOTAL



Part 2: Agonistic interactions & feeding disturbances (5)

2.d. Ai-induced feeding disturbances

70% = high percentage! → stress → equine welfare issue

→ importance e.g. of **rack positioning**
(e.g. not too close to highly frequented pathes)



