The why and how of assessing pain and suffering in animals

Dan Weary

Part 1: Methods used to draw inferences regarding felt emotions?

- Acute response to noxious stimuli
- Responses with and without targeted drugs
- Motivation and conditioning tests
- Drug discrimination and generalization

Part 2: How do such feelings contribute to the experience of suffering?

Acute response to noxious stimuli: e.g. heel prick in infants

Anand & Craig, 1996

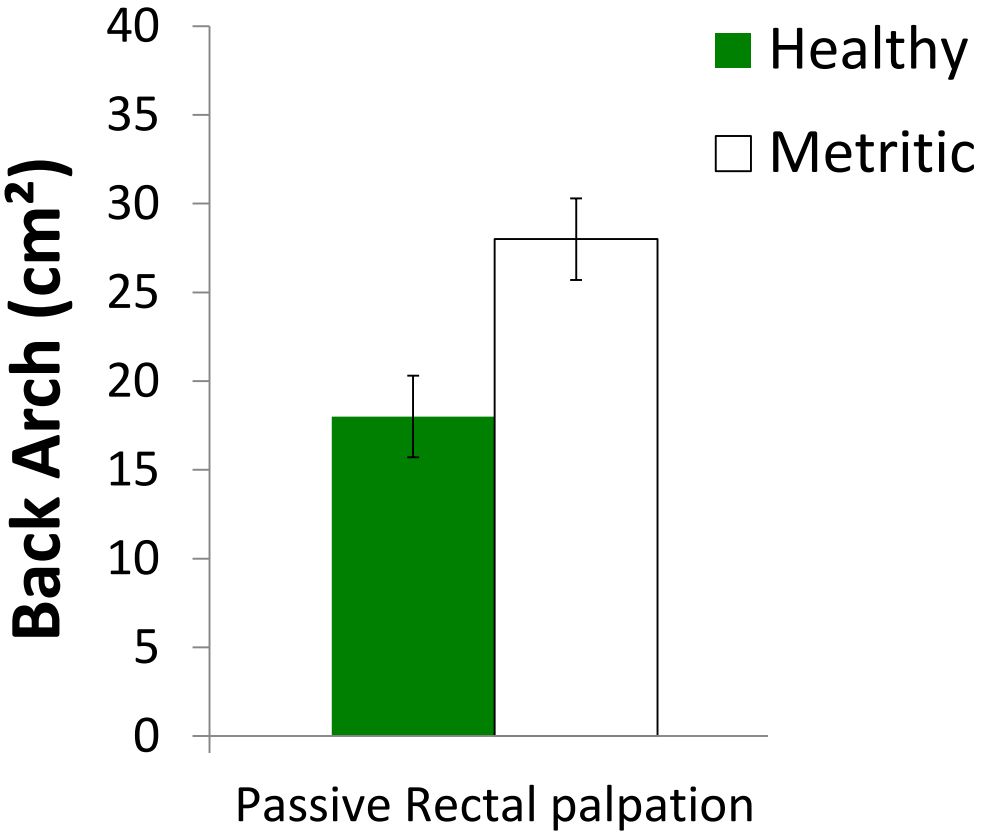
Acute response to noxious stimuli: e.g. uterine palpation in metritic cows

Before palpation

During palpation

Stojkov et al. 2015. J. Dairy Sci. 98:5352-5361

Acute response to noxious stimuli: e.g. uterine palpation in metritic cows



Stojkov et al. 2015. J. Dairy Sci. 98:5352-5361

Acute responses to noxious stimuli are intuitively compelling, but:

- Responses may not be pain specific
- Both response and lack of response can be difficult to interpret

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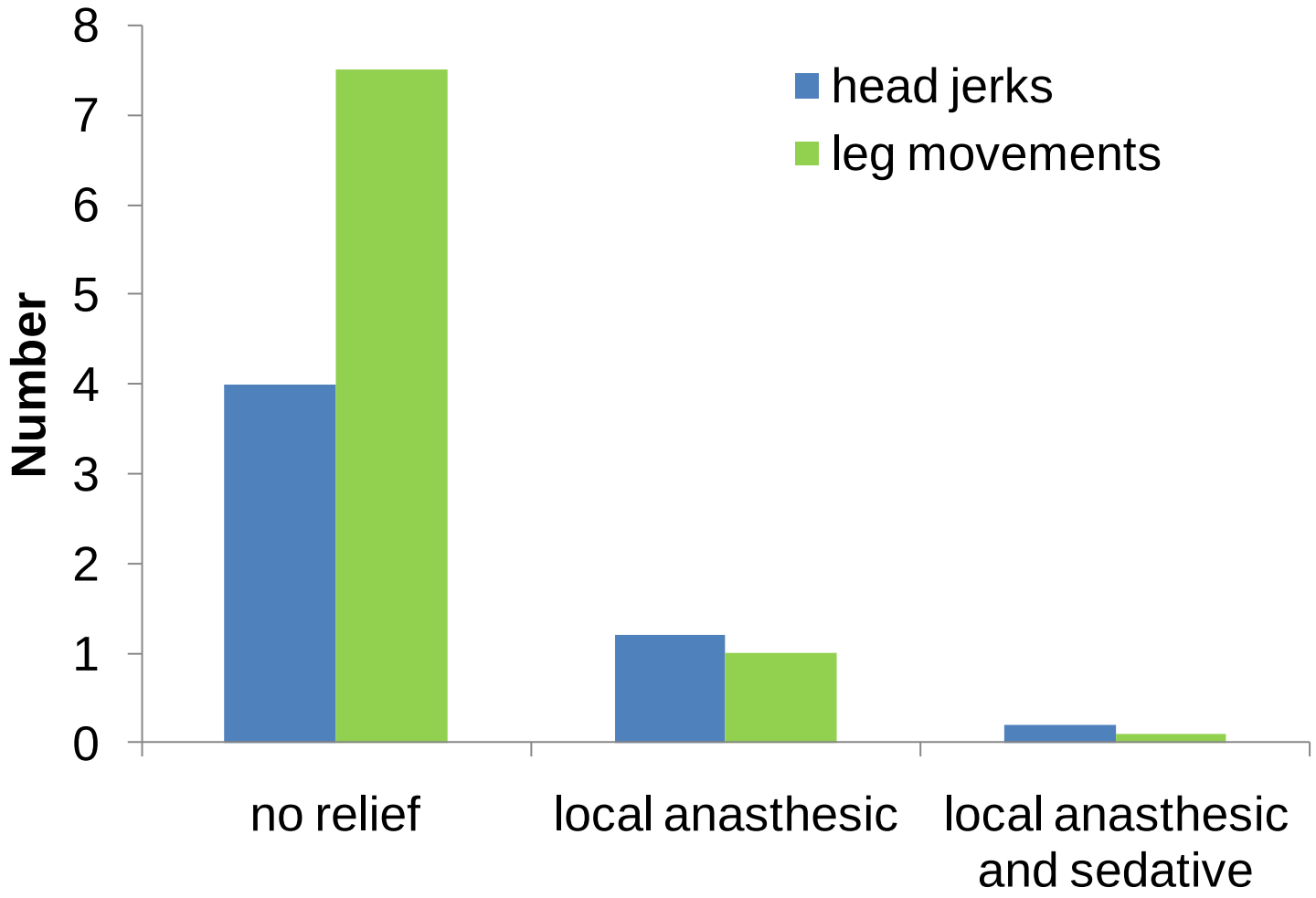
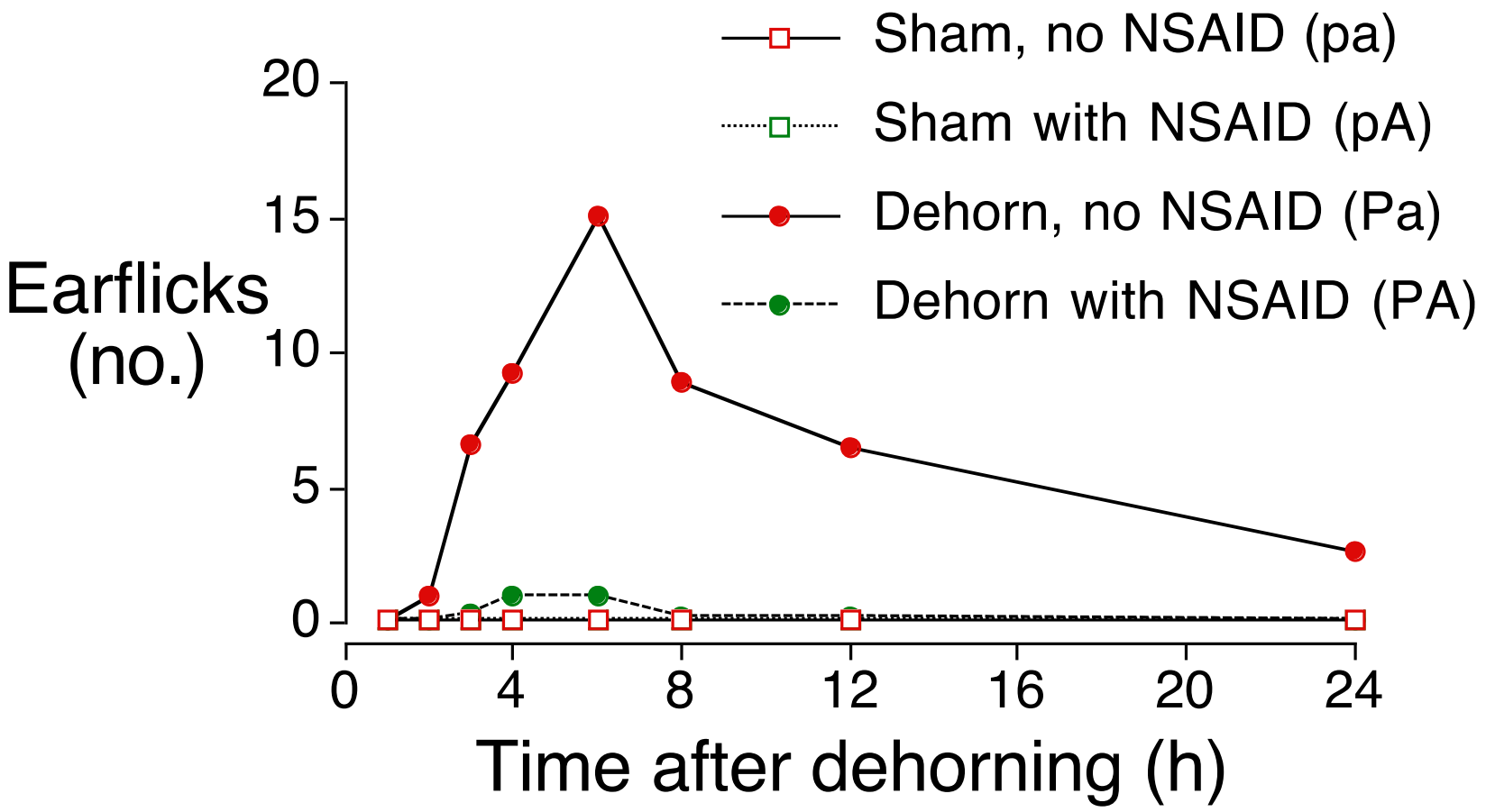
Pain control: e.g. Intra-operative pain



Grondahl-Nielsen et al. 1999

Pain control: e.g. post-operative pain



Faulkner and Weary 2000. J. Dairy Sci. 83:2037-2041

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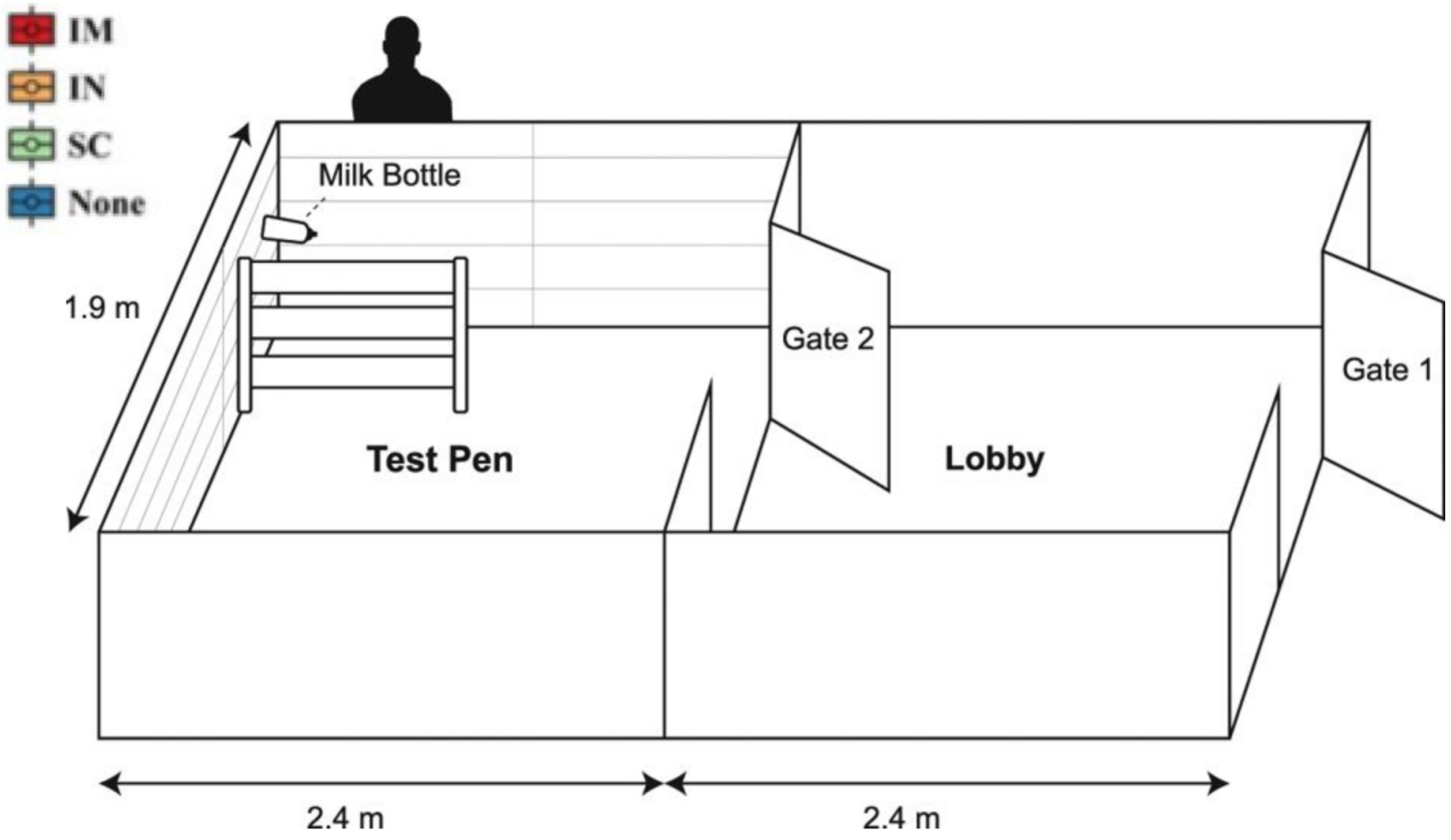
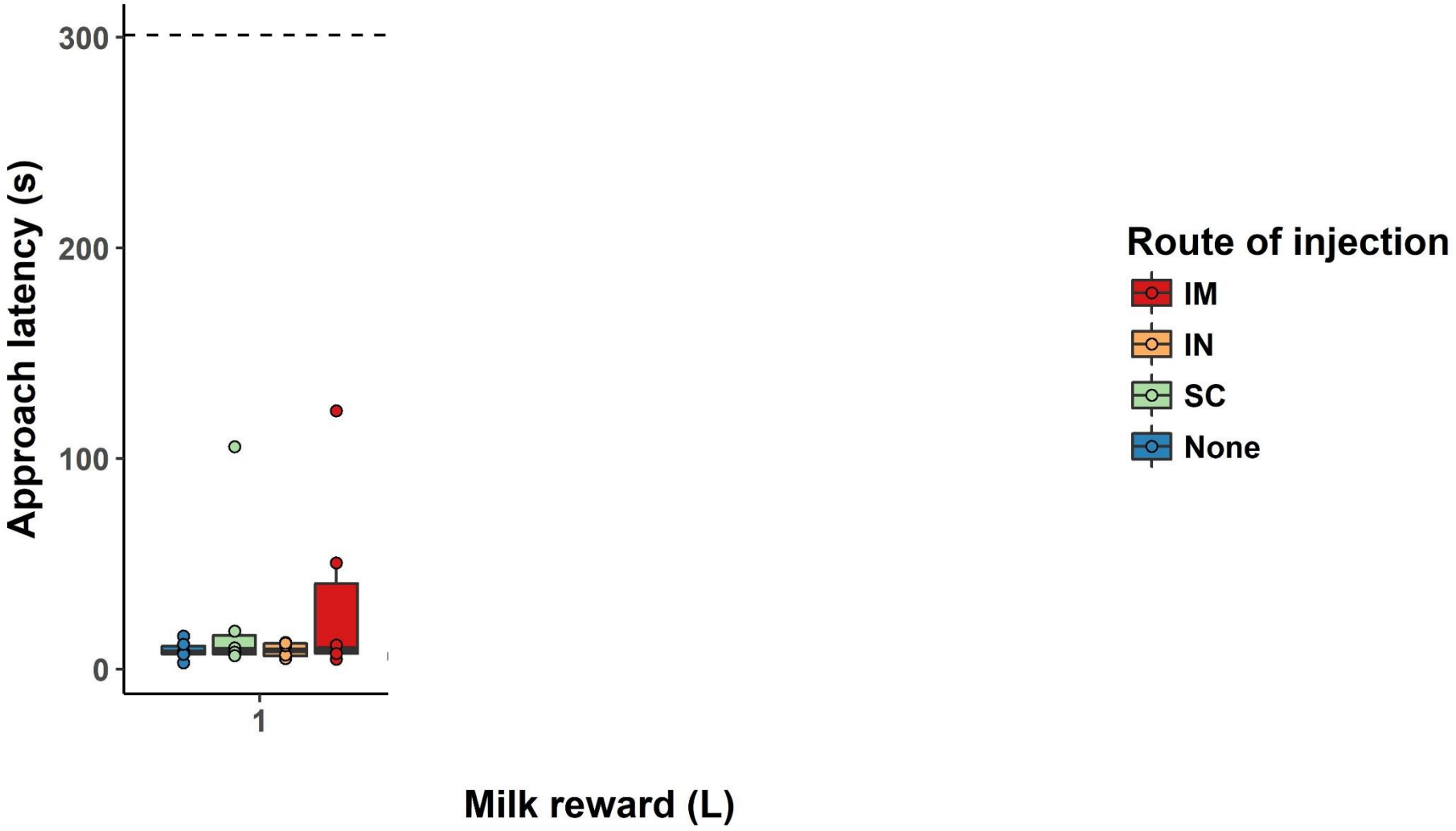
Approach-avoidance testing

Injection method:



Ede et al., 2018. Sci. Reports 8:9443

Approach-avoidance testing

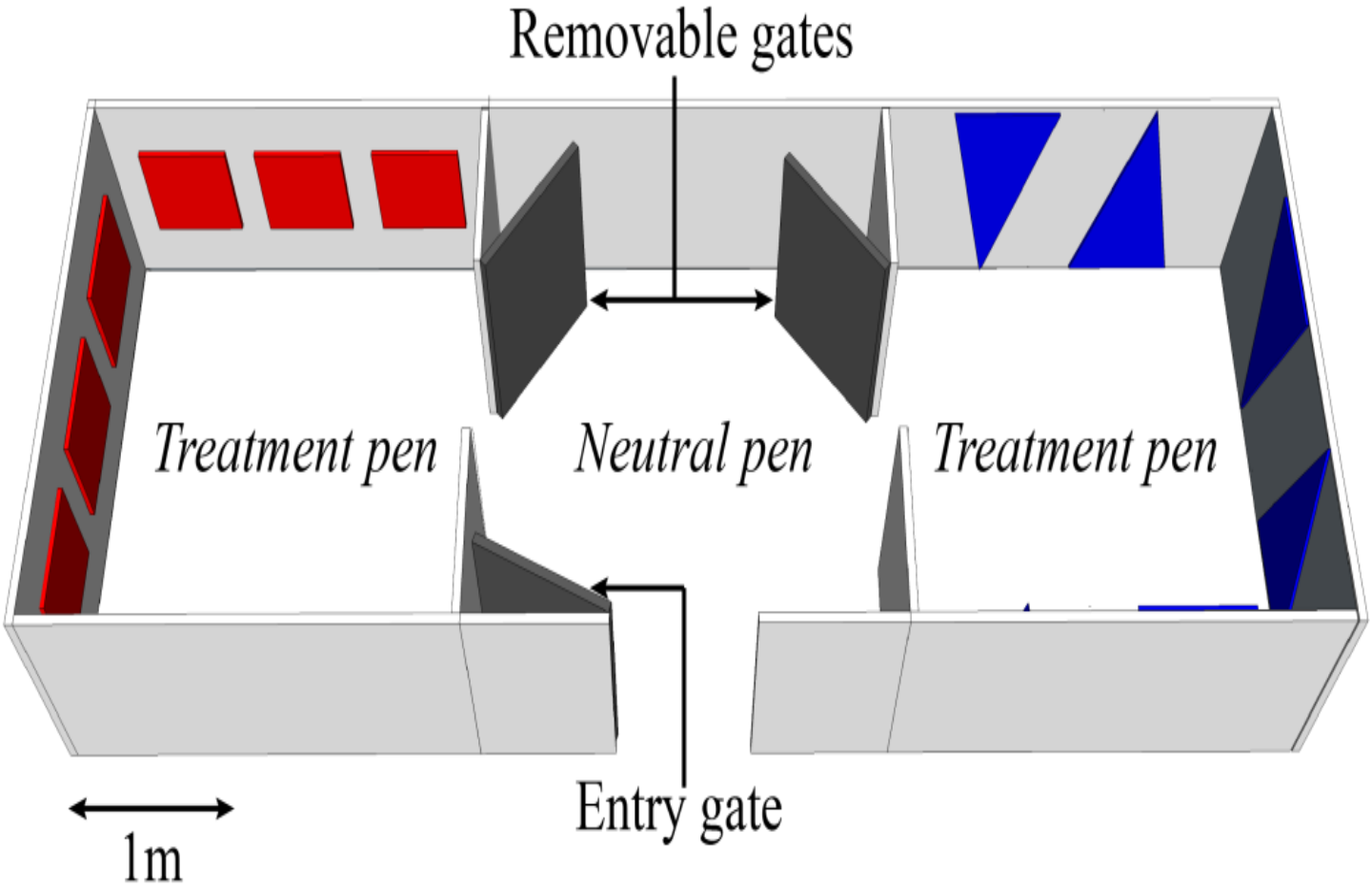


Ede et al., 2018. Sci. Reports 8:9443

Motivational tests provide pre-defined response measures with high consistency, but:

- Require inferences about motivation to access reward
- Motivation may vary with type of reward
- Some tests rely on an acute response (e.g. withdraw/escape)

Conditioned place aversion



Ede et al., in prep.

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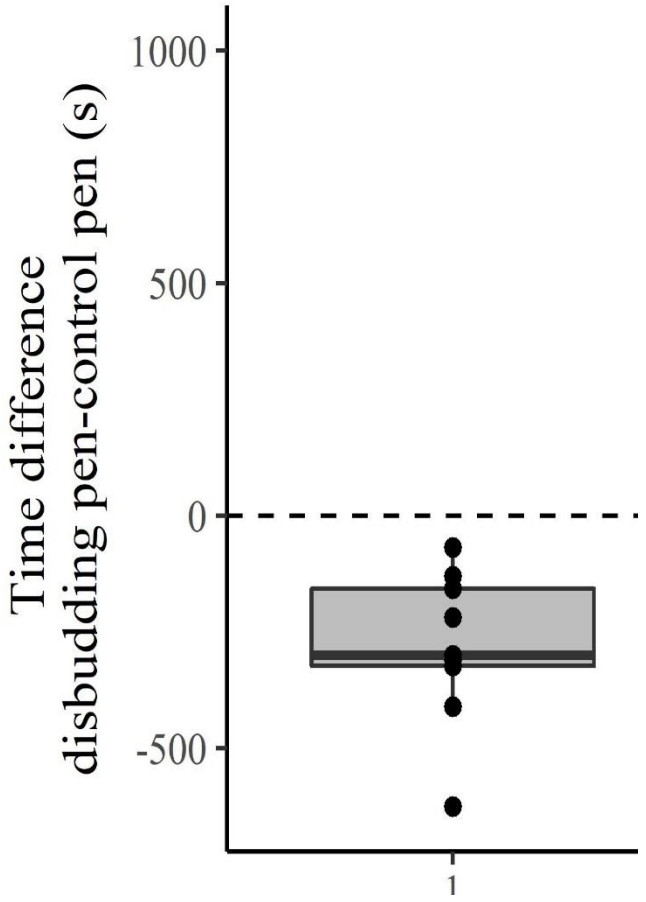

Ede et al., in prep.

Part 1: Procedures used to draw inferences regarding felt emotions?

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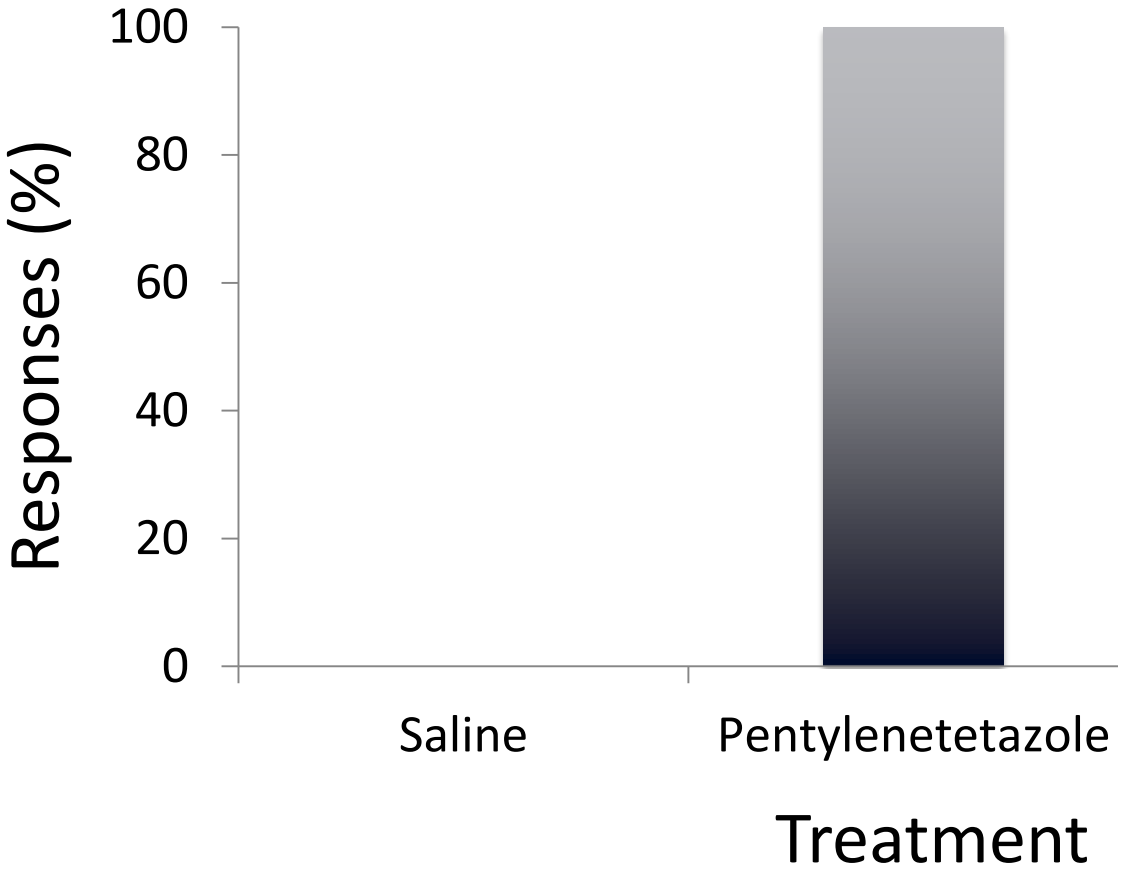
- **Drug discrimination and generalization**

Drug discrimination and generalization: e.g. rats on PTZ



Gauvin & Holloway, 1991. Pharmacol. Biochem. Behav. 39: 521-523.

Inferences regarding felt affect?

Response measures	Design features
Functional, specific, consistent	Drug discrimination and generalization
	Motivational testing
	Analgesics and controls
Function unclear, non-specific, variable	Response to noxious stimuli

Weary et al., 2017. Advances in the Study of Behavior 49:27-48

Part 1: Procedures used to draw inferences regarding felt emotions?

Part 2: How do such feelings contribute to the experience of suffering?

Usage in the medical literature

<u>concurrent negative affects:</u>

The patient required “small doses of codeine” for pain when she thought it was due to sciatica, but much higher doses were required when she was diagnosed with cancer.

Cassell, 1982

Usage in the medical literature

<u>concurrent negative affects:</u>

"In the month between an irregular chest X ray and results of the biopsy, I enjoyed very good health in the presence of serious illness… this turned that month into a controlled experiment in pure suffering."

Frank, 2001, p. 354

Usage in the medical literature

<u>concurrent negative affects:</u>

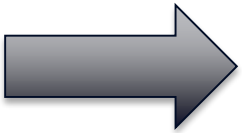
"The tendonitis caused extraordinary pain … but I knew what was happening and had reasonable assurance that the acute phase would not last long… So here is the reverse experiment: pain with more annoyance than suffering."

Frank, 2001, p. 354

Usage in the medical literature

Mood state:

Reduced ability to perform highly motivated tasks

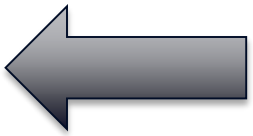


Low mood

Usage in the medical literature

Anhedonia:

Reduced motivation to perform previously rewarding tasks



Low mood

Usage in the medical literature

<u>Loss of control:</u>

"Suffering can start with anguish over the possibility that if the symptom continues, the patient will be overwhelmed or lose control"

Cassell, 1999, p. 531

Applying this understanding to animals?

<u>concurrent negative affects:</u>

e.g. pain + fear

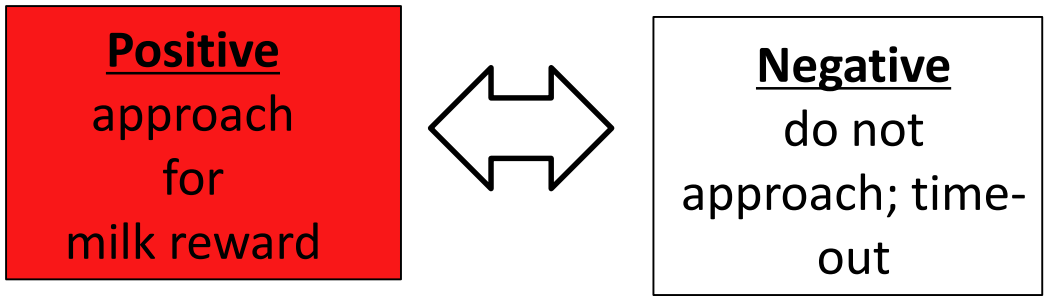
anhedonia:

Evidence of anhedonia:

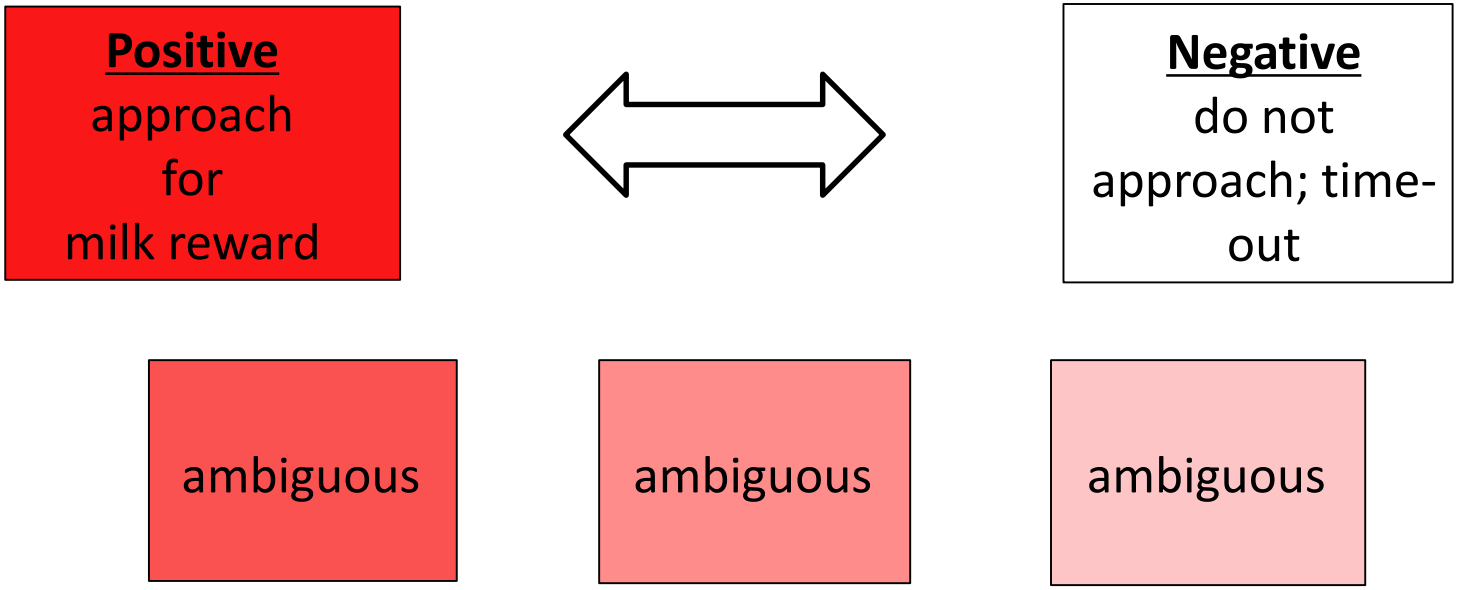
- reduced appetite
- reduced grooming
- reduced anticipatory behaviours

Assessing mood:

Training task

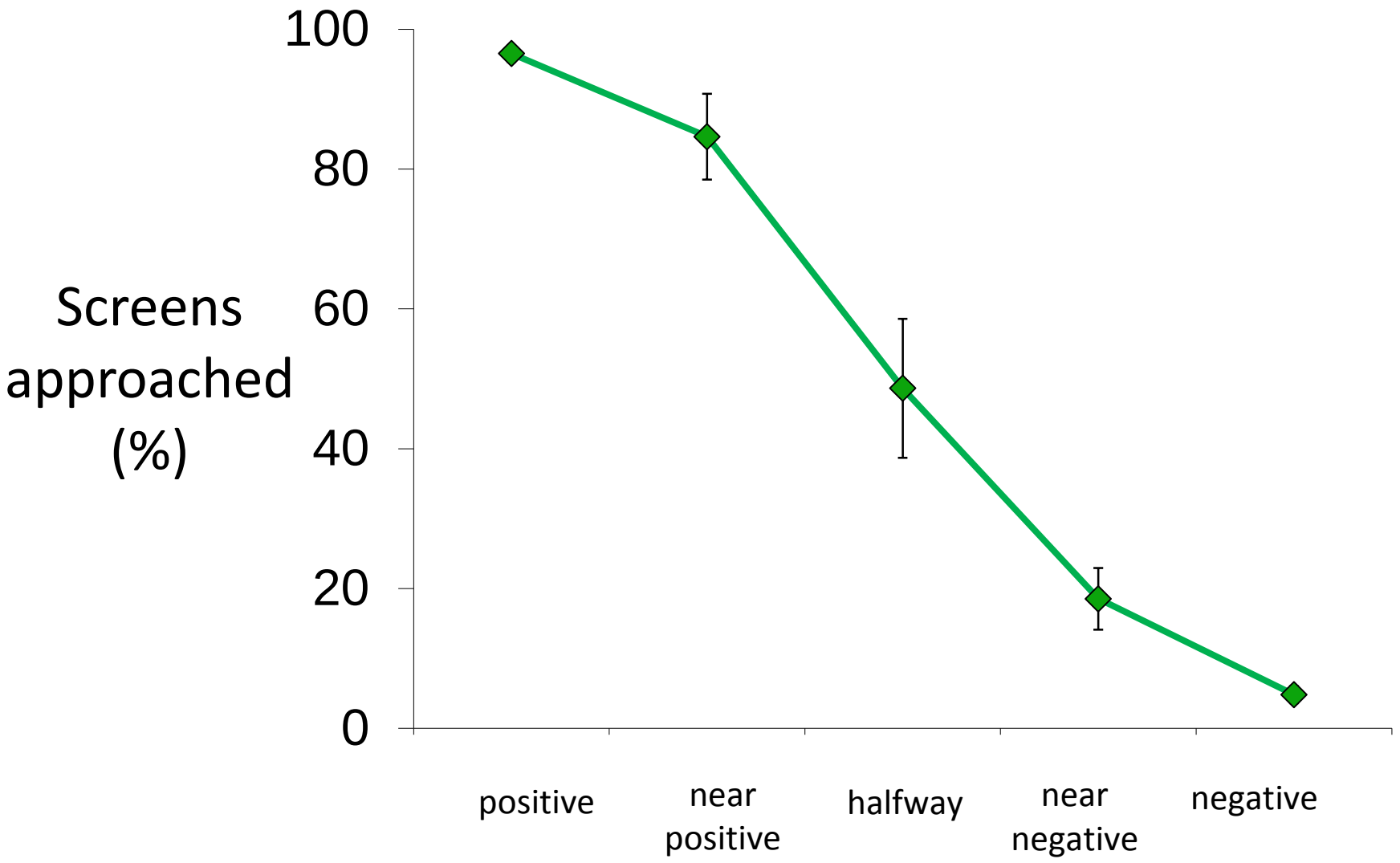


Cognitive Bias Task



Do calves approach these ambiguous screens?

Generalization curve



Neave et al., 2013. PLoS ONE 8(12): e80556

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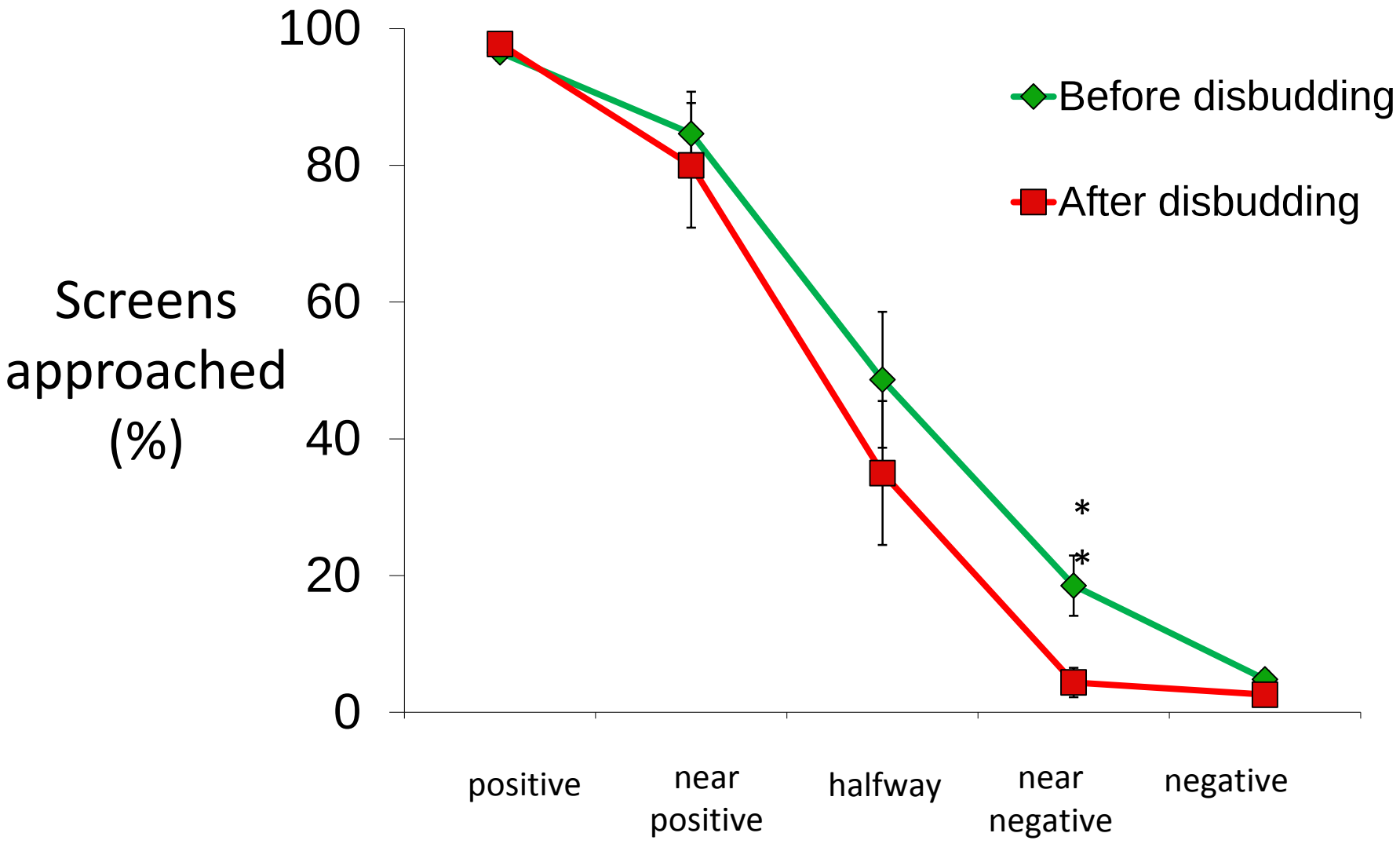
Cognitive bias after disbudding



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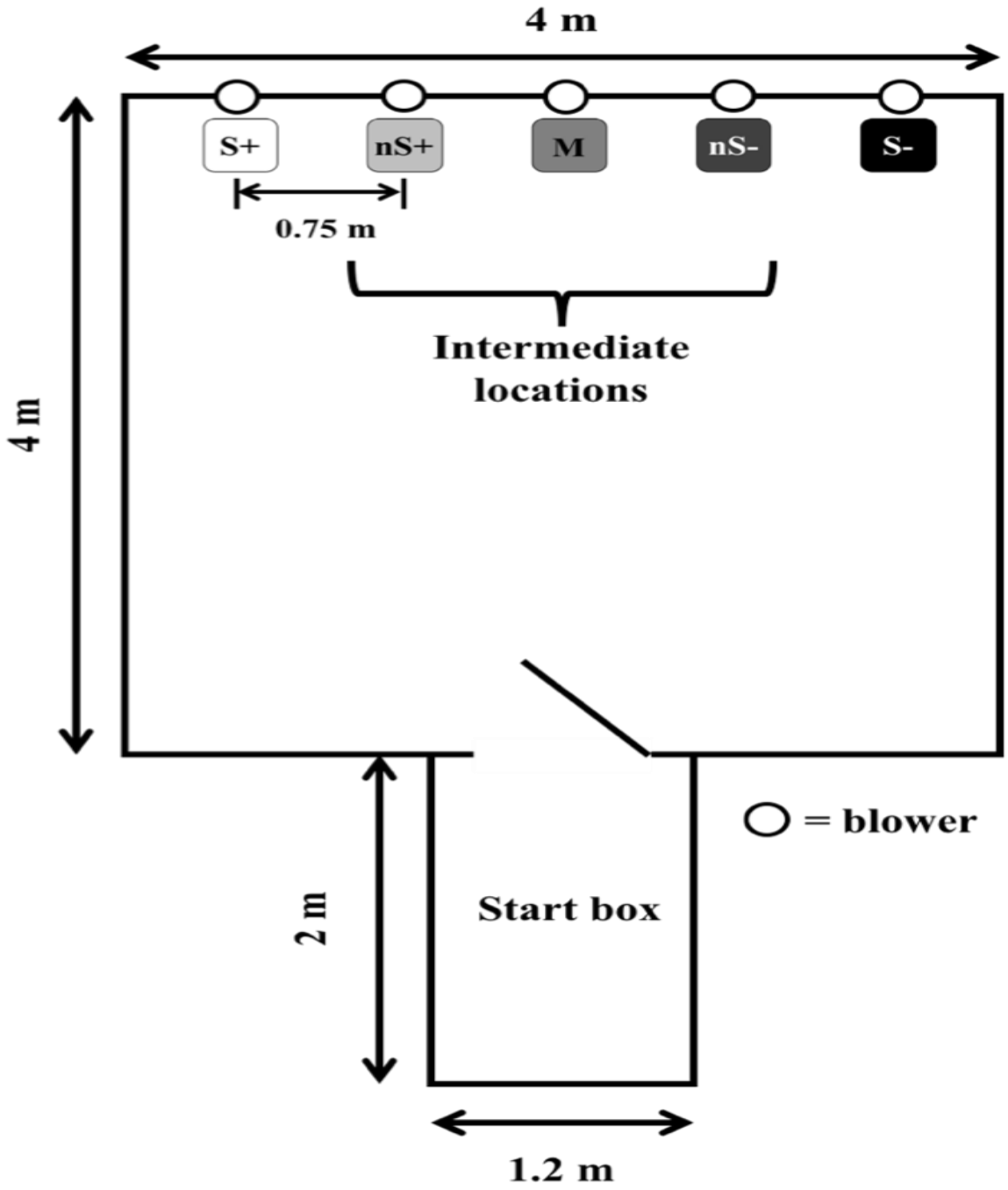
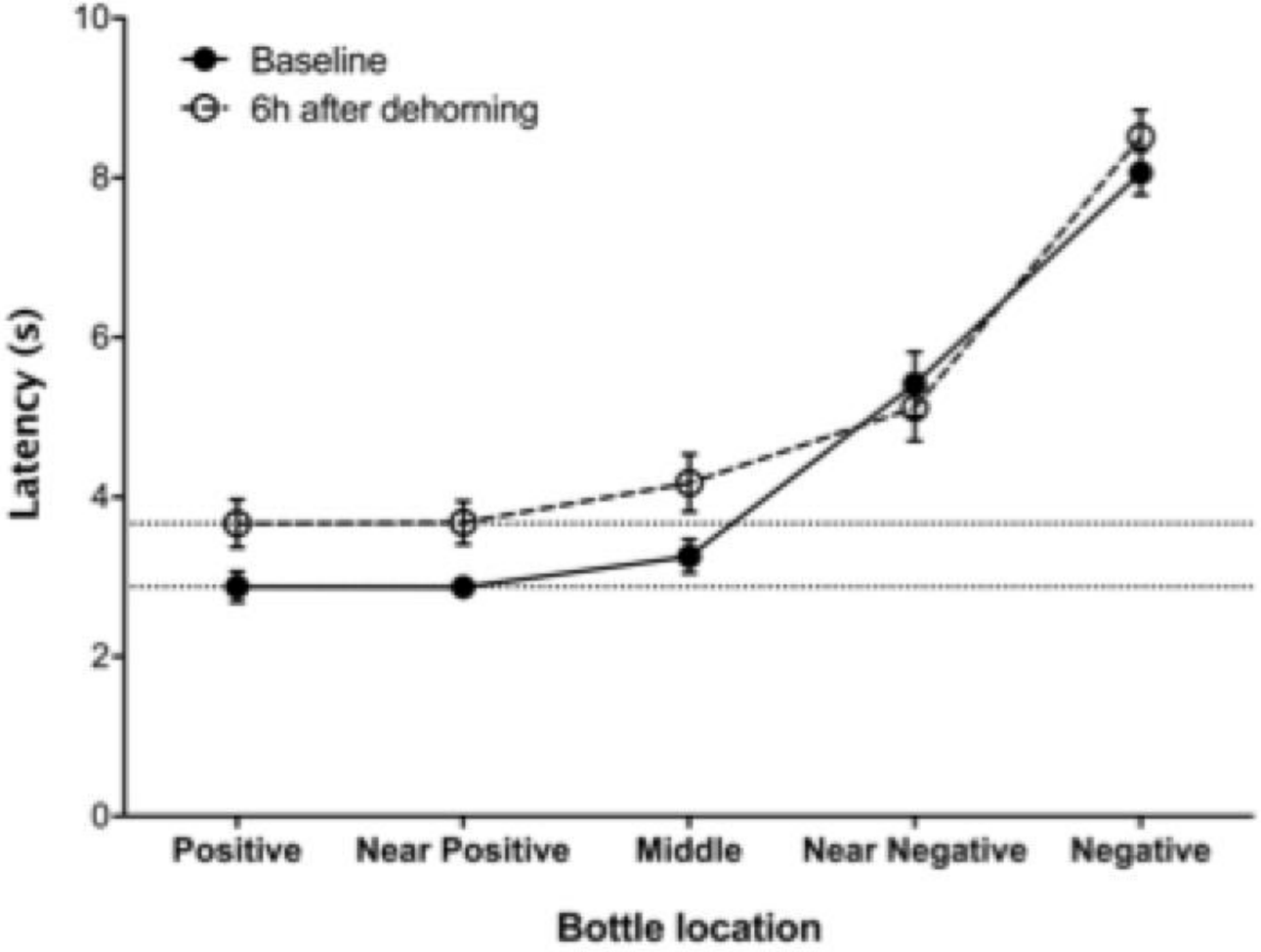


Lecorps et al., in prep.

and anhedonia

Cognitive bias during post-operative pain



Lecorps et al., in prep.

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Control:

Suffering summary

Pain is more likely to contribute to suffering when combined with:

- Fear
- Lack of control

Suffering might be identified by:

- Reduced performance of motivated behaviours
- Other indicators of low mood

Weary, 2014. Dilemmas in Animal Welfare, CABI, pp. 188-202.