An animal welfare assessment framework for virtual fencing

Caroline Lee, AWNA 2025

Virtual fencing

Back in 2004….

Learning principles

Approaches boundary

Audio warning signal

(Conditioning stimulus)

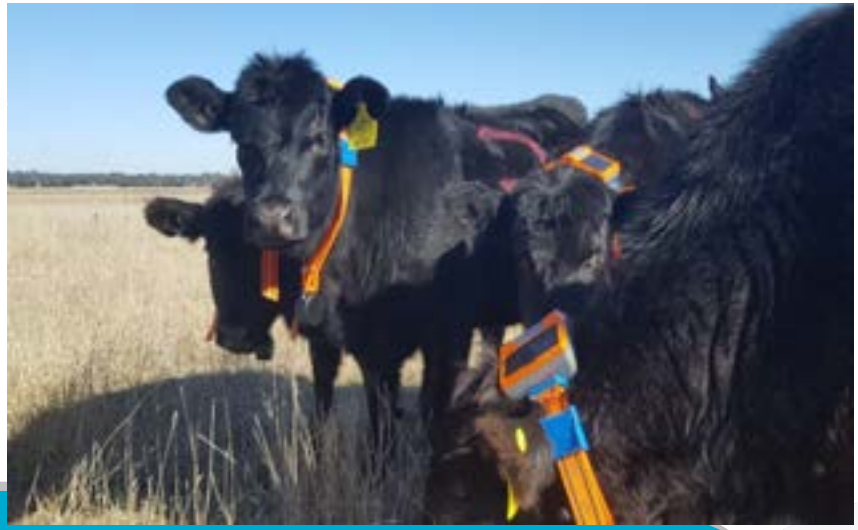
Associative learning

No response → Electric shock

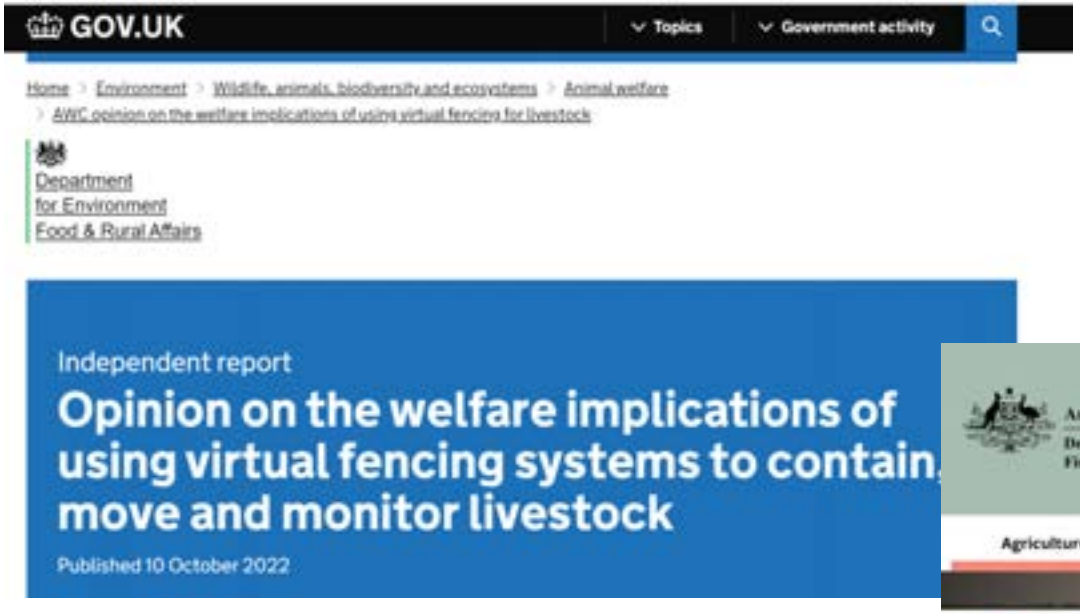
(Unconditioned stimulus) → Response

(avoidance)

Electric shock use



Regulation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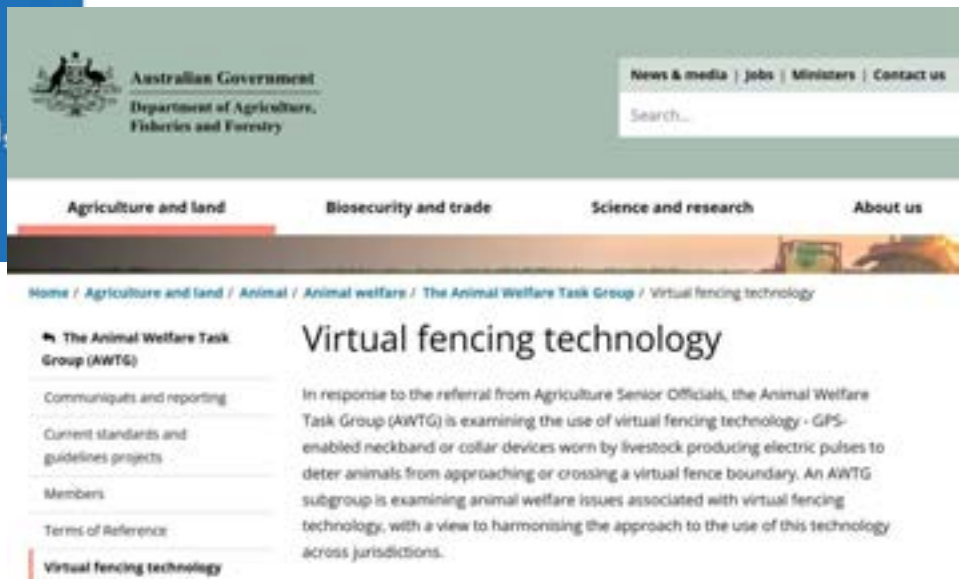
Topics
Government activity
Home > Environment > Wildlife, animals, biodiversity and ecosystems > Animal welfare
> AWC opinion on the welfare implications of using virtual fencing for livestock
Department for Environment Food & Rural Affairs
Independent report
Opinion on the welfare implications of using virtual fencing systems to contain, move and monitor livestock
Published 10 October 2022


RSPCA
knowledgebase
Home > Farm Animals > General Farming Practices > Management >
What is virtual fencing (or virtual herding) and does it impact animal welfare?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Virtual fencing technology
Virtual fencing technology
In response to the referral from Agriculture Senior Officials, the Animal Welfare Task Group (AWTG) is examining the use of virtual fencing technology - GPS-enabled neckband or collar devices worn by livestock producing electric pulses to deter animals from approaching or crossing a virtual fence boundary. An AWTG subgroup is examining animal welfare issues associated with virtual fencing technology, with a view to harmonising the approach to the use of this technology across jurisdictions.

PERSPECTIVE ARTICLE

Front. Vet. Sci., 21 August 2018 | https://doi.org/10.3389/fvets.2018.00187

A Framework to Assess the Impact of New Animal Management Technologies on Welfare: A Case Study of Virtual Fencing

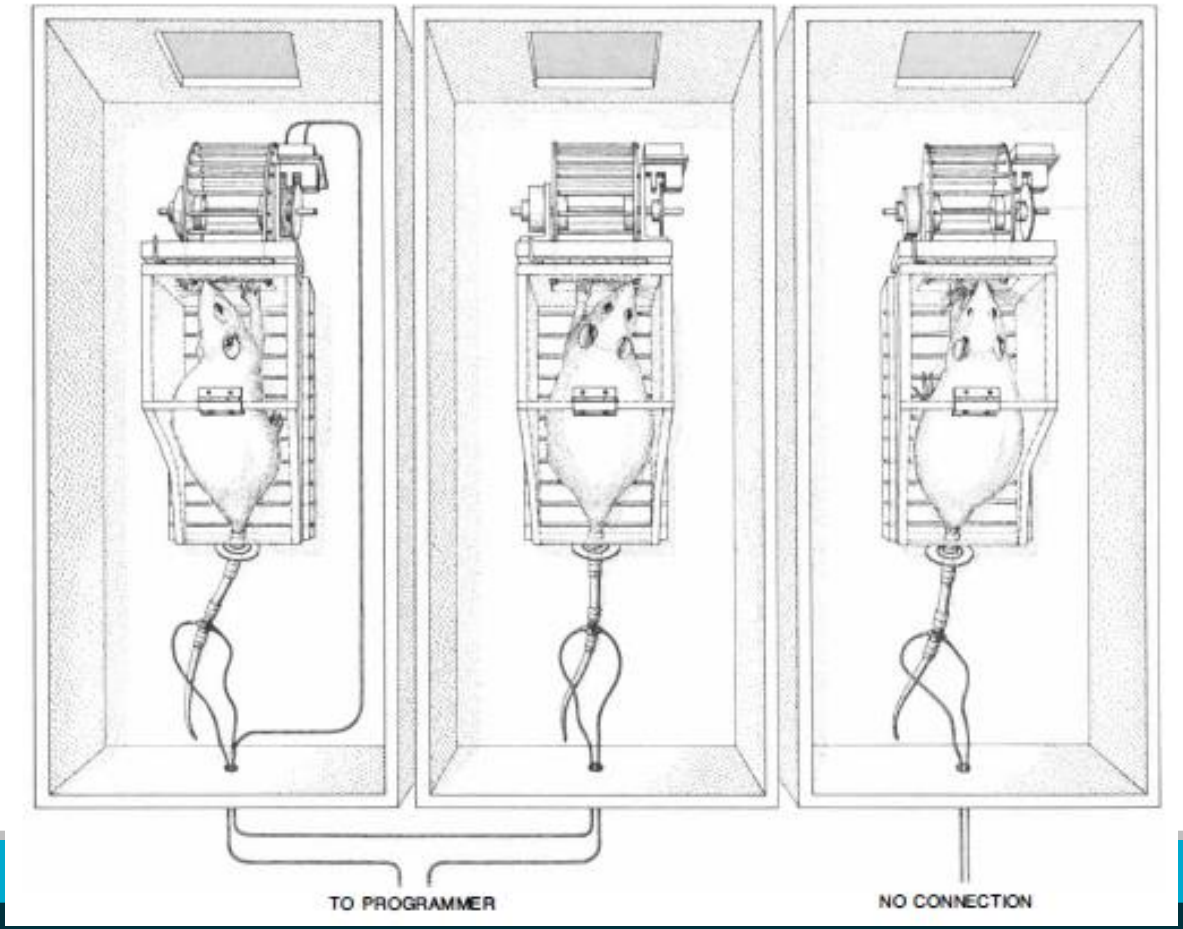
 Caroline Lee[1,2*], Ian G. Colditz[1] and  Dana L. M. Campbell[1,2]

Predictability and controllability

A: light signal + wheel (Predictable and Controllable)

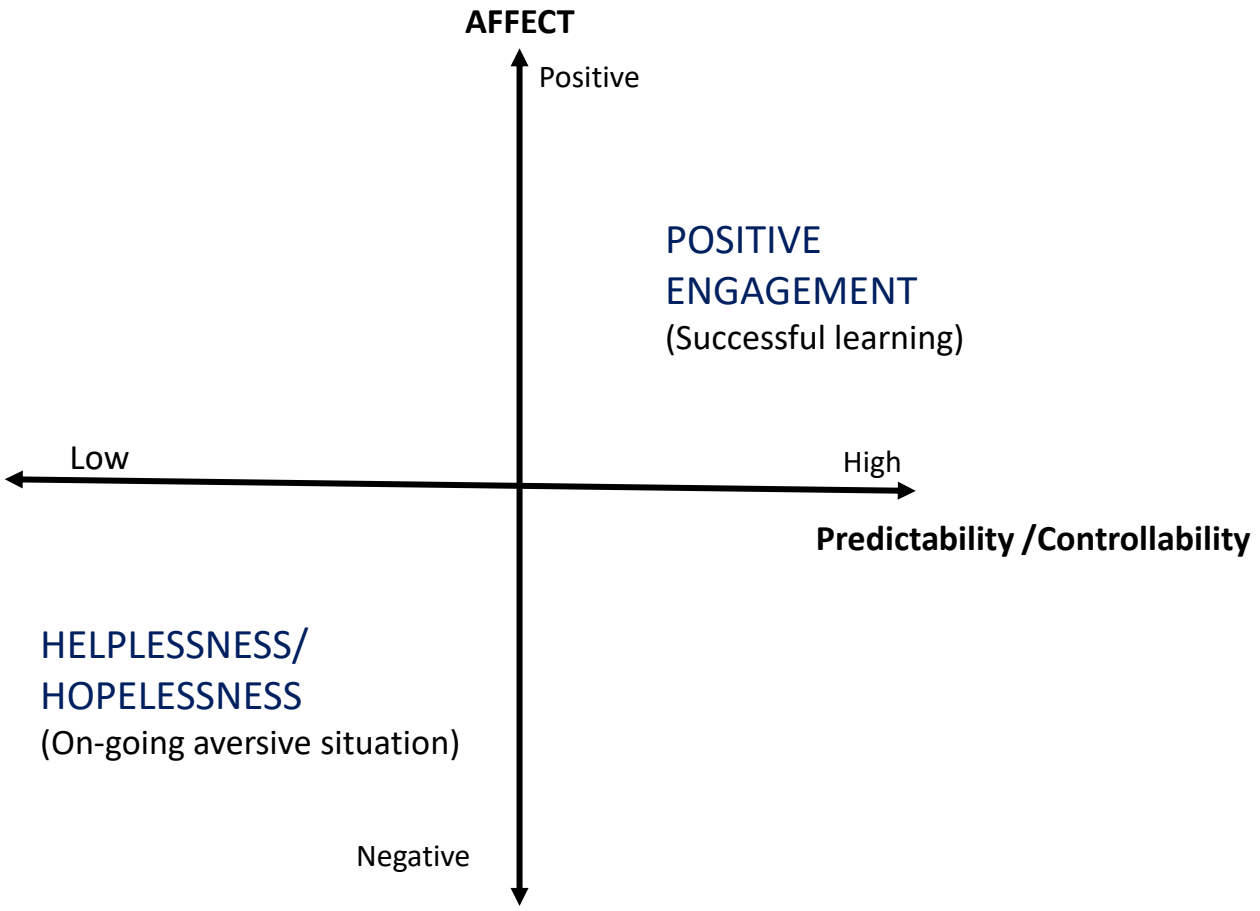
B: No signal + shock (not P or C)

C: No shock



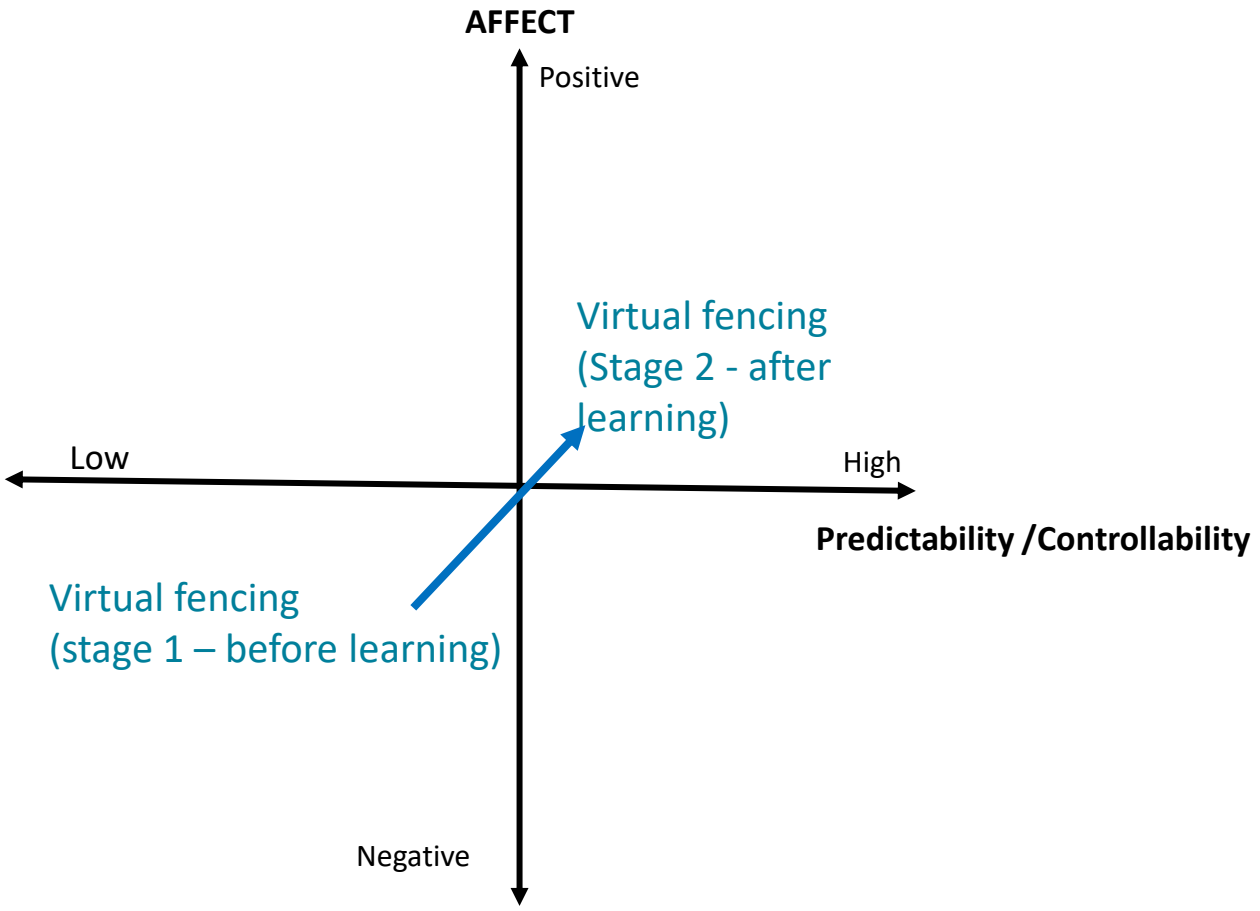
Weiss, 1972.

Framework



Lee et al., Frontiers Vet. Sci. 2018

Framework



Lee et al., Frontiers Vet. Sci. 2018

frontiers in Veterinary Science

PERSPECTIVE
published: 23 February 2021
doi: 10.3389/fvets.2021.637709

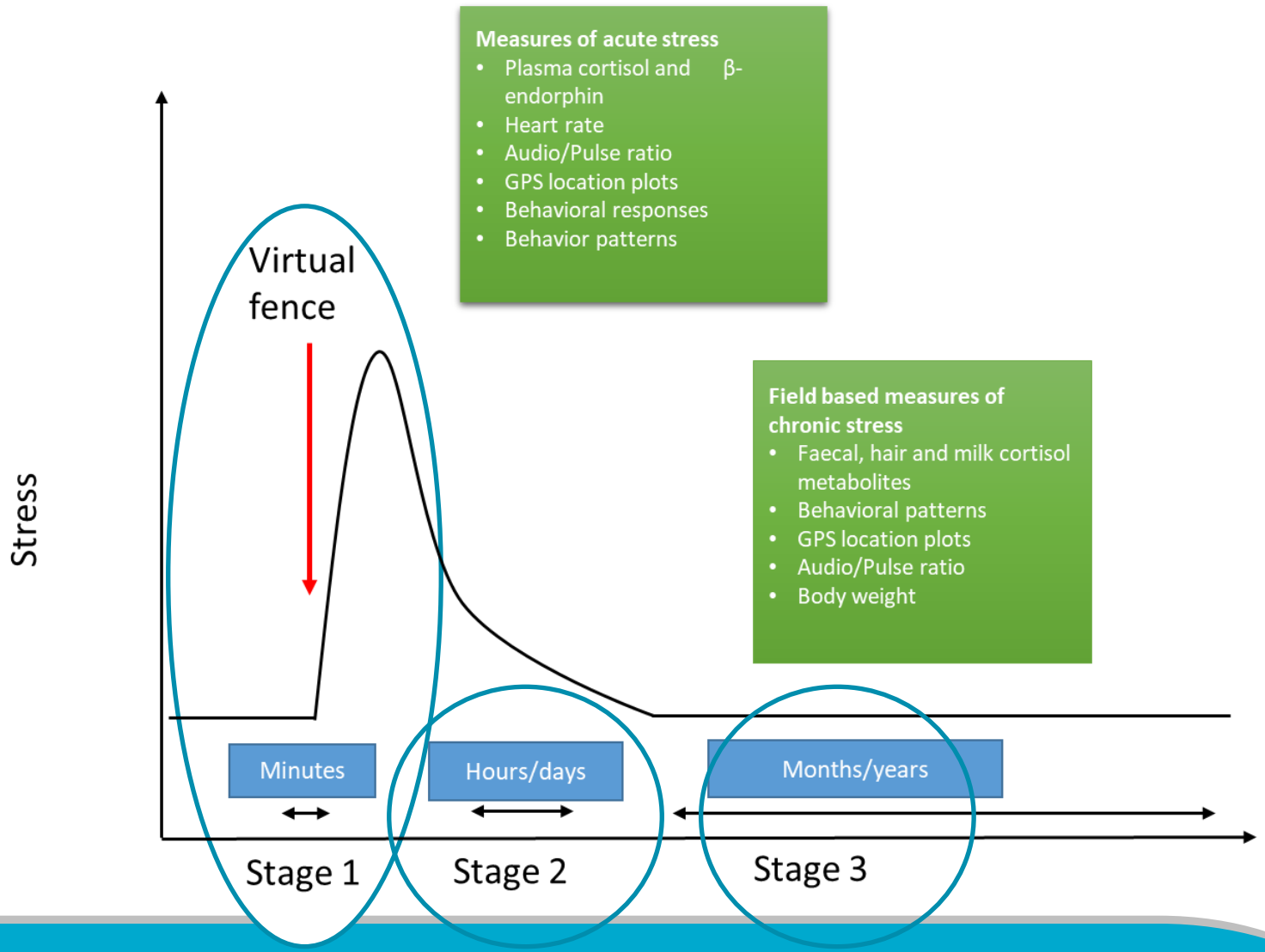
A Multi-Disciplinary Approach to Assess the Welfare Impacts of a New Virtual Fencing Technology

Caroline Lee and Dana L. M. Campbell*

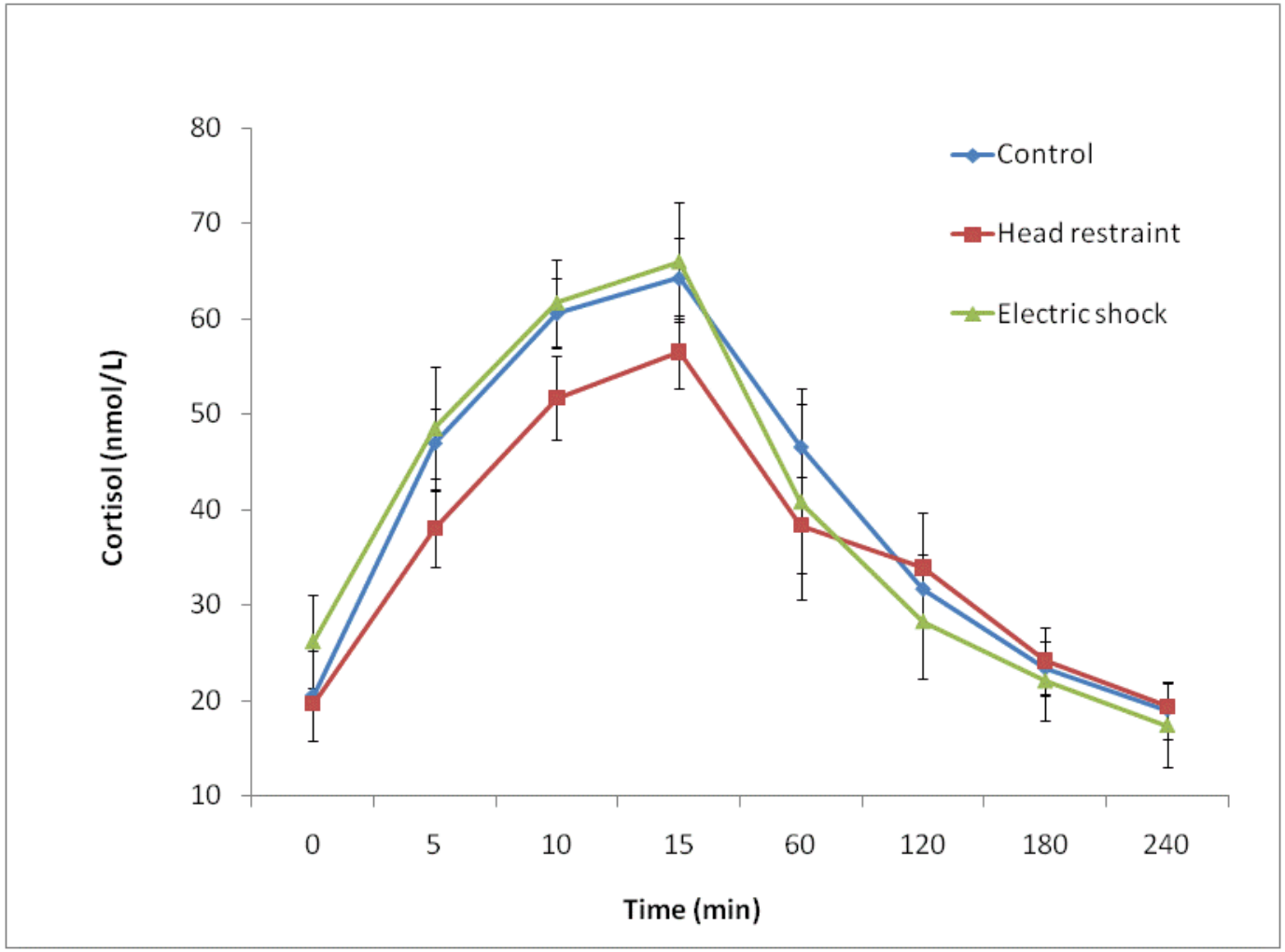
CSIRO, Agriculture and Food, FD McMaster Laboratory, Armidale, NSW, Australia

Learning stages and animal welfare

Lee & Campbell. Frontiers Vet. Sci. 2021

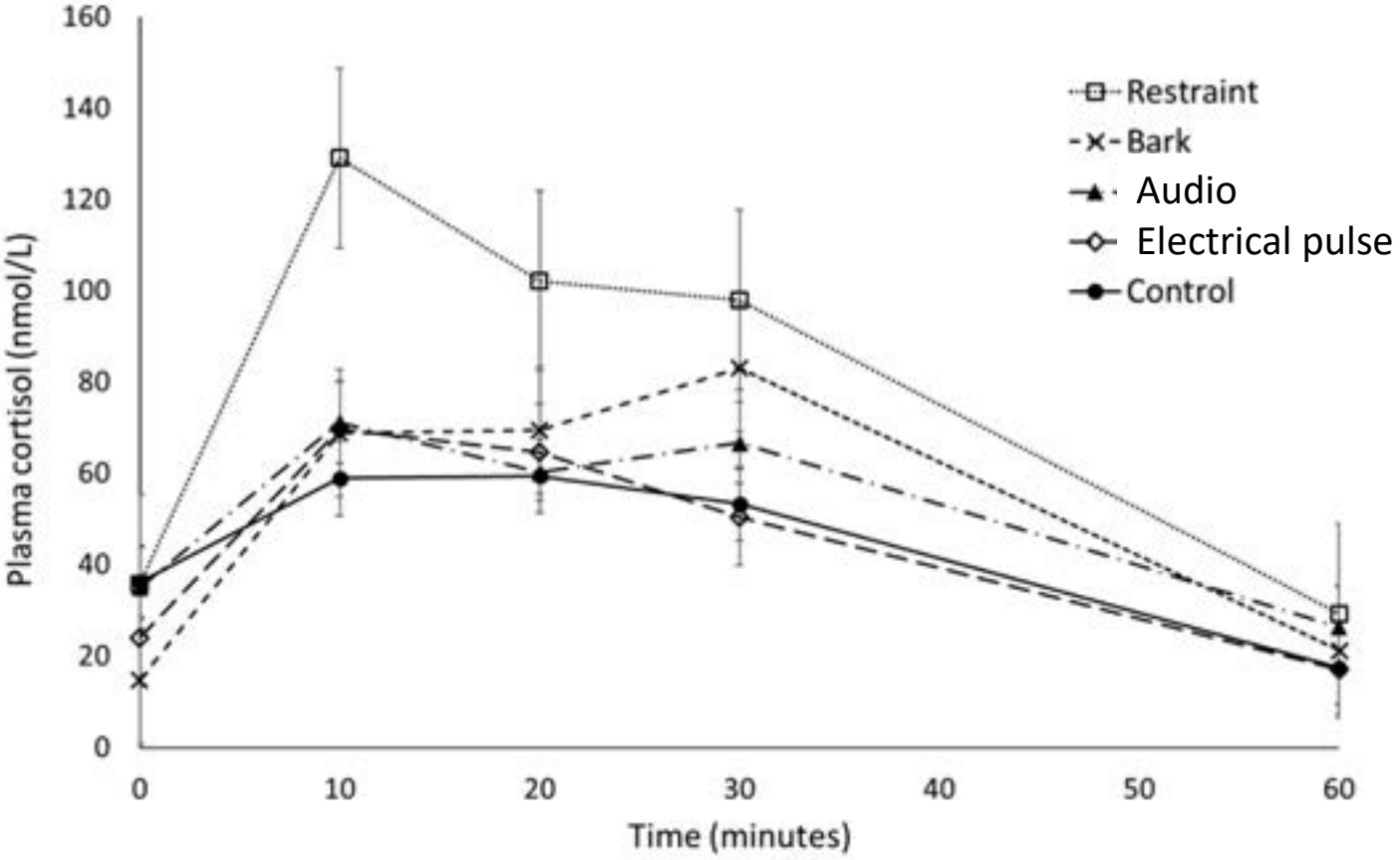


Stage 1 – stress response in cattle



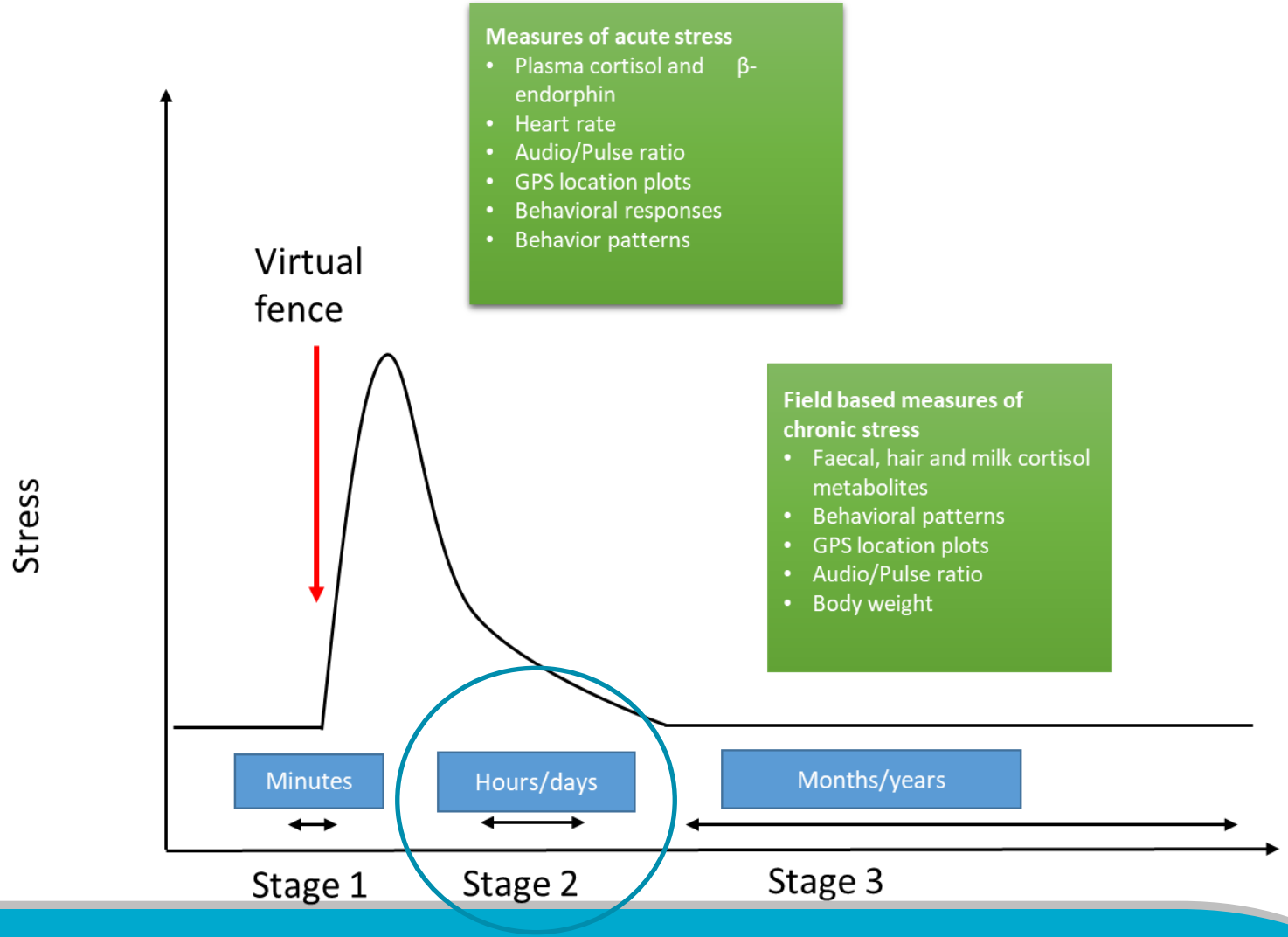
Lee et al., AABS, 2008

Stage 1 – stress response in sheep

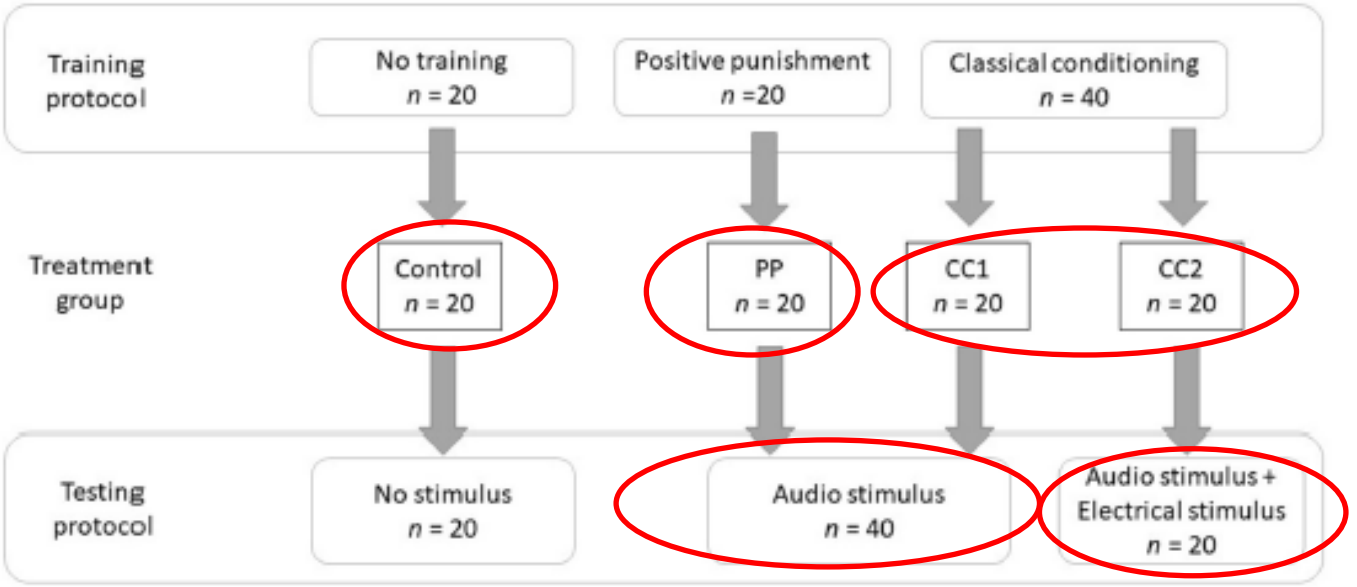


Kearton, T. et al. 2019.

Stage 2 – after short term learning

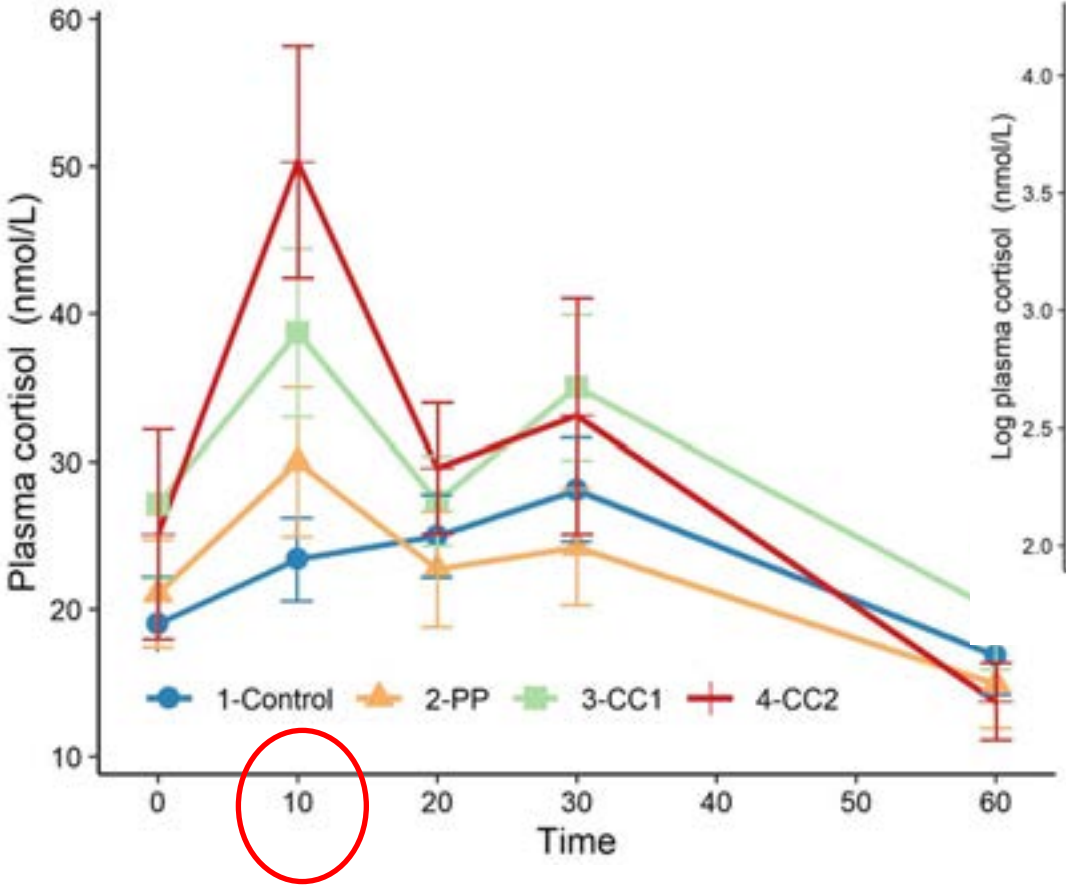


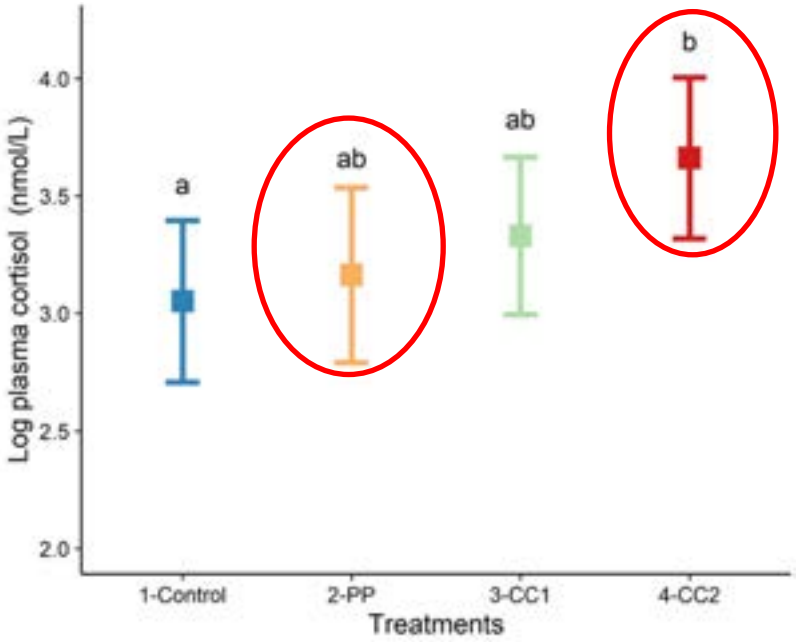
Stage 2 – after learning



Kearton et al., Frontiers Vet. Sci. 2020

Cortisol response

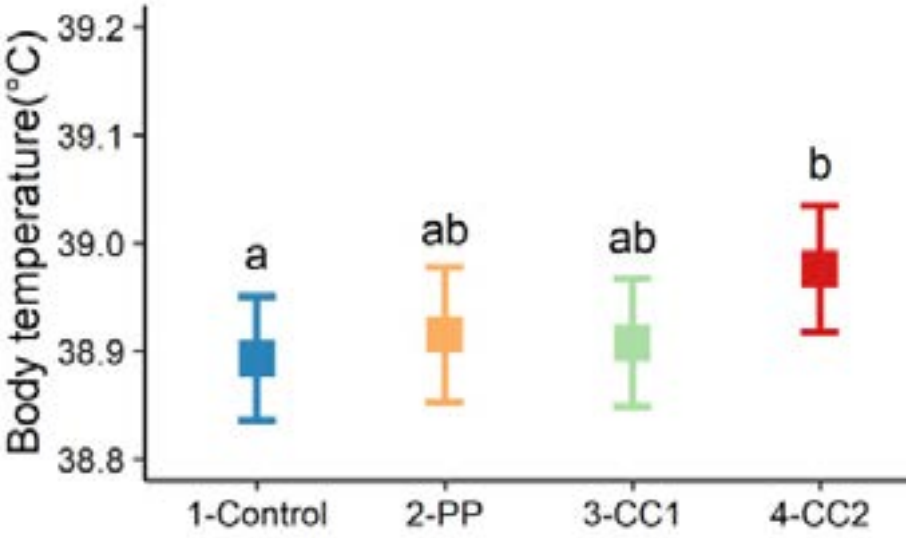


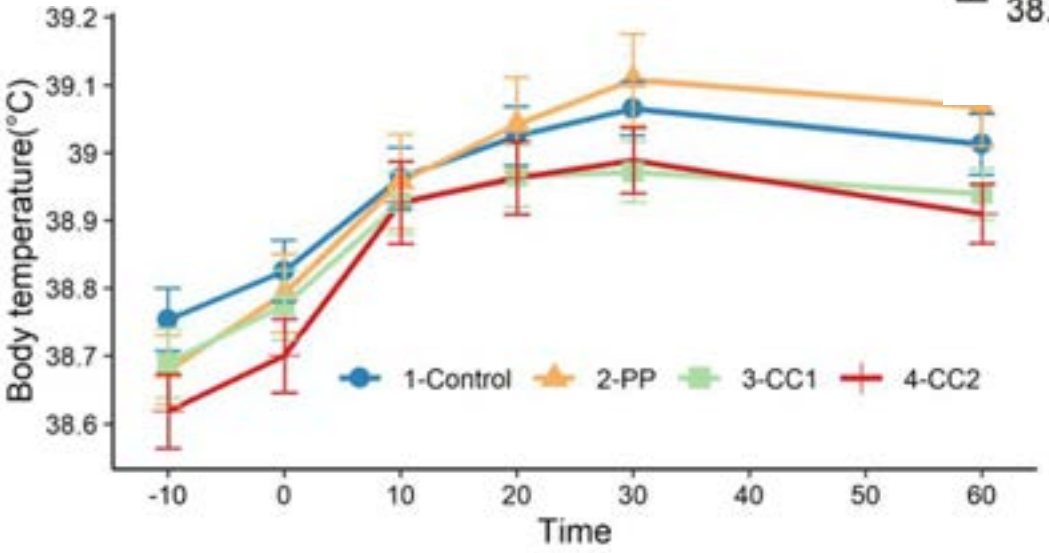


Kearton et al., Frontiers Vet. Sci. 2020

Body temperature

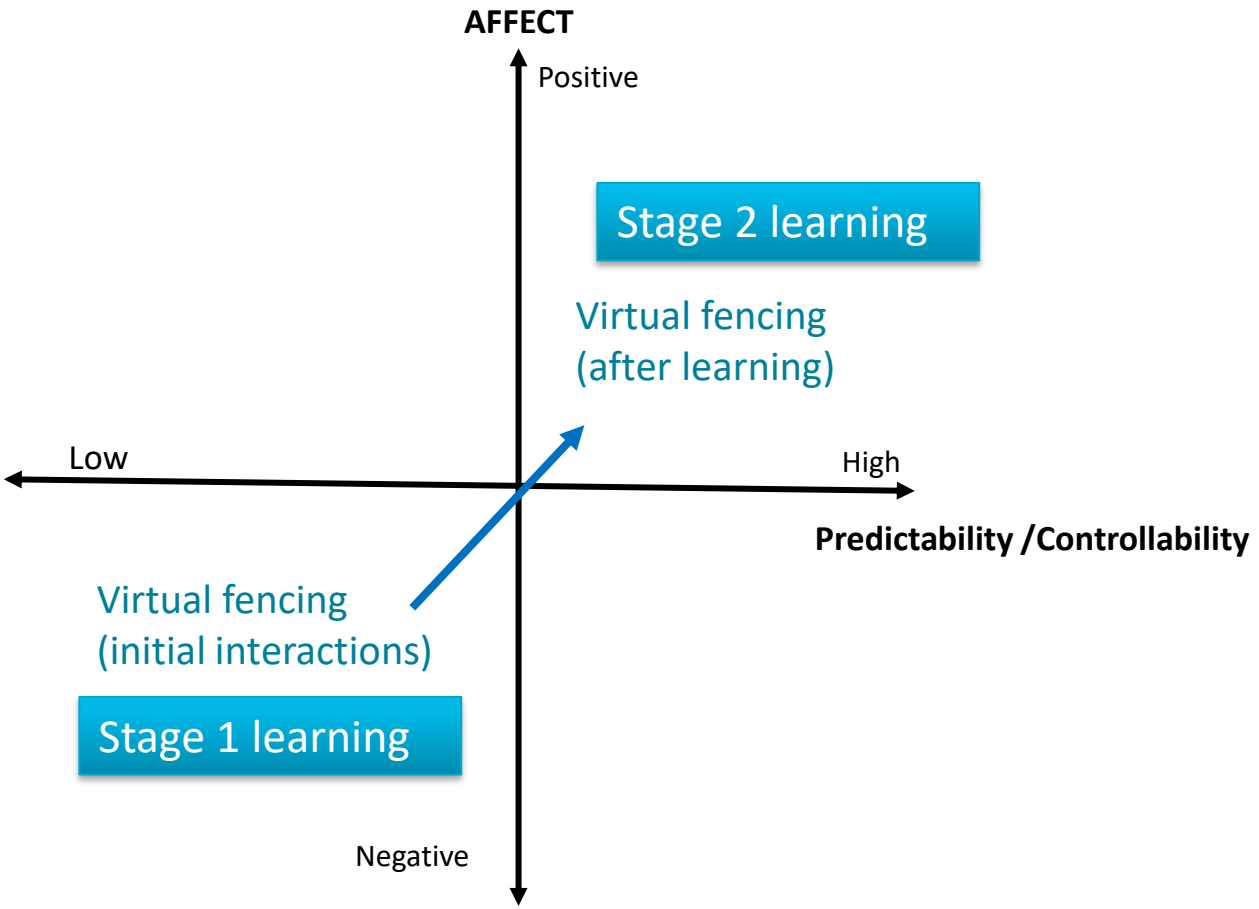
10 minutes





Kearton et al., Frontiers Vet. Sci. 2020

Framework



Lee et al., Frontiers Vet. Sci. 2018

frontiers in Veterinary Science

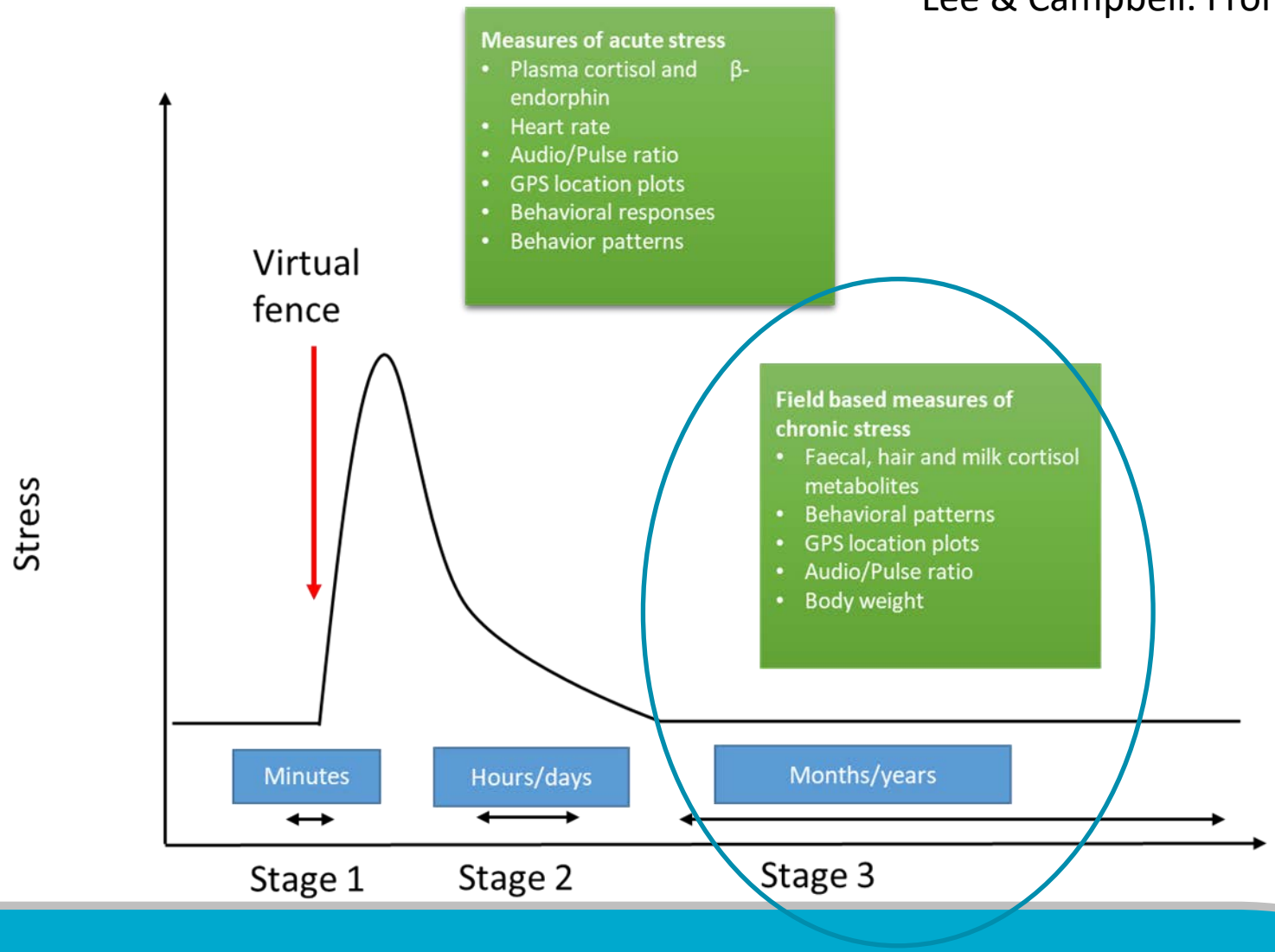
ORIGINAL RESEARCH
published: 30 November 2020
doi: 10.3389/fvets.2020.580523

The Influence of Predictability and Controllability on Stress Responses to the Aversive Component of a Virtual Fence

Tellisa Kearton[1,2], *Danila Marini*[1,2], *Frances Cowley*[1], *Sue Belson*[2], *Hamideh Keshavarzi*[2], *Bonnie Mayes*[1,2] *and Caroline Lee*[1,2*]

What are the longer term impacts?

Lee & Campbell. Frontiers Vet. Sci. 2021

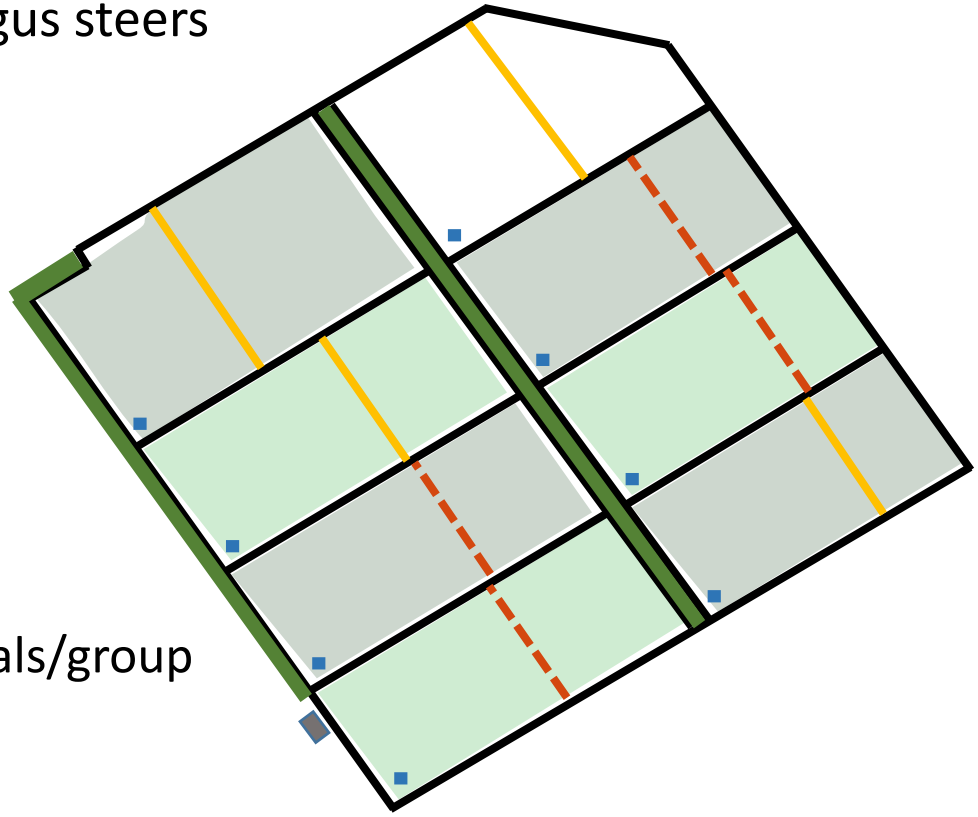


Virtual fence vs. electric tape

Campbell et al., 2019

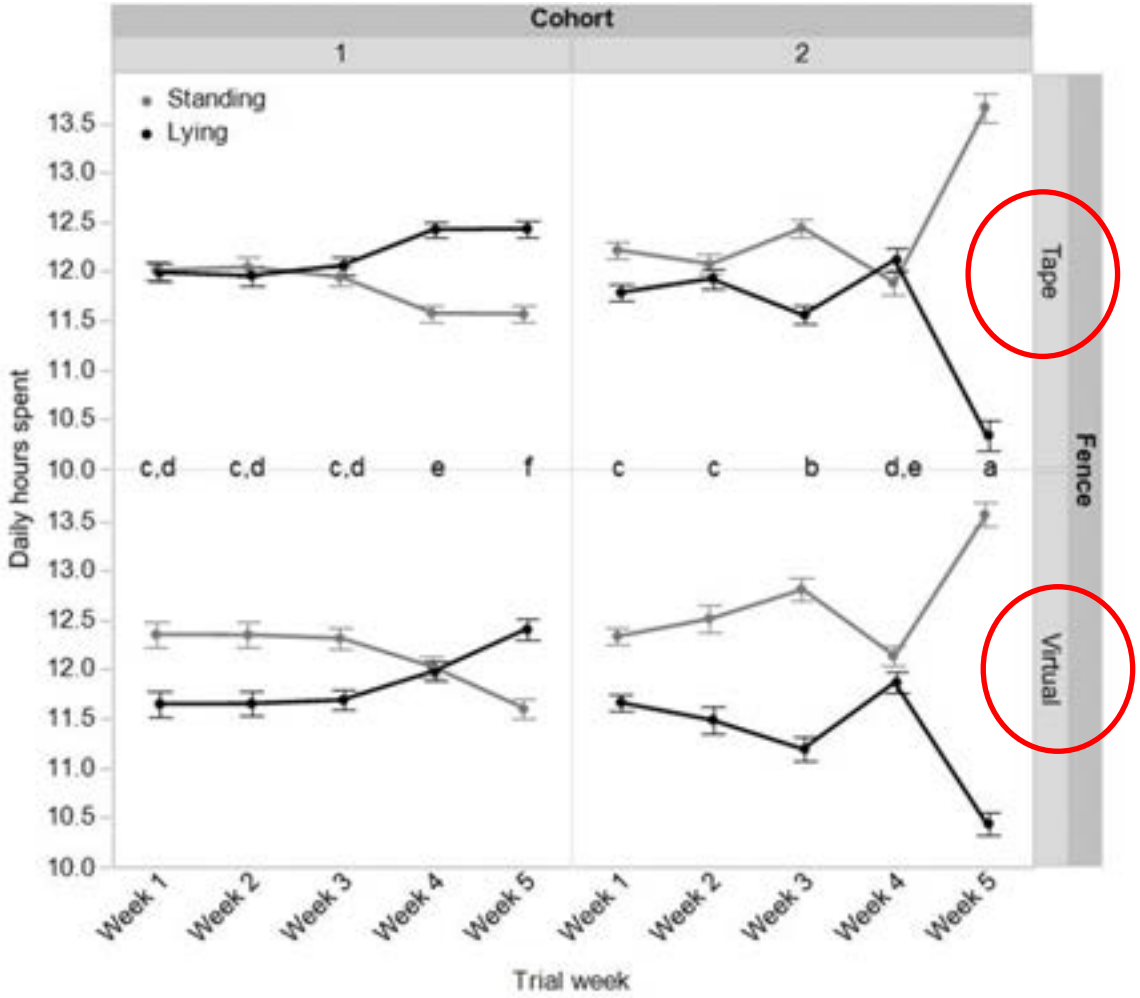
Virtual Fence vs. Electric Tape

64 Angus steers



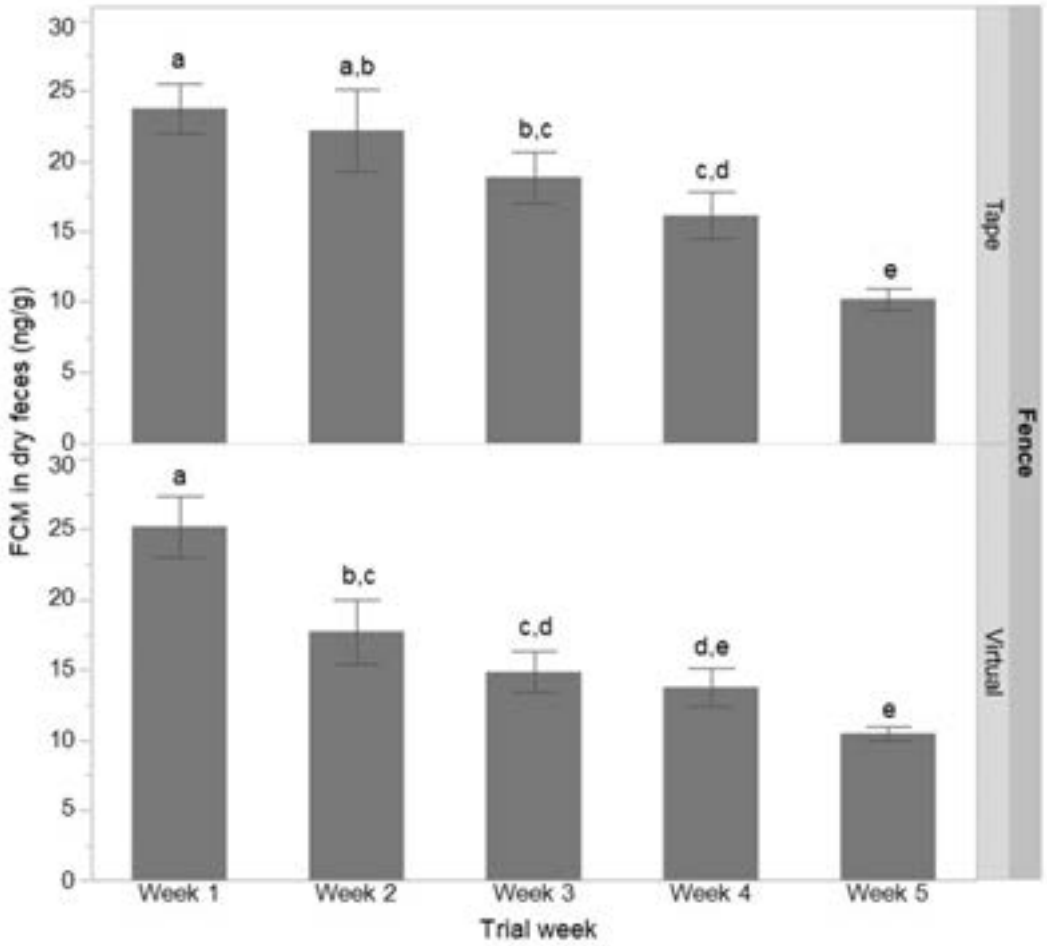
8 animals/group

Behavioural patterns



Fecal cortisol metabolites



***Conclusion**: Behavioural and physiological measures of welfare showed minimal differences between electric tape fencing and virtual fencing.*

ORIGINAL RESEARCH ARTICLE

Front. Vet. Sci., 11 December 2019 | https://doi.org/10.3389/fvets.2019.00445

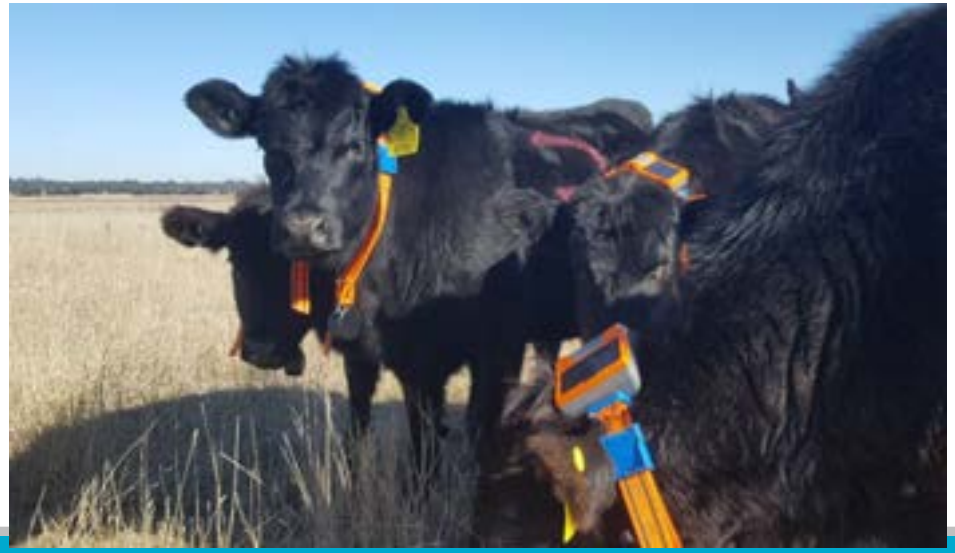
Virtual Fencing Is Comparable to Electric Tape Fencing for Cattle Behavior and Welfare

 Dana L. M. Campbell*, Jim M. Lea, Hamideh Keshavarzi and  Caroline Lee

Agriculture and Food, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Armidale, NSW, Australia

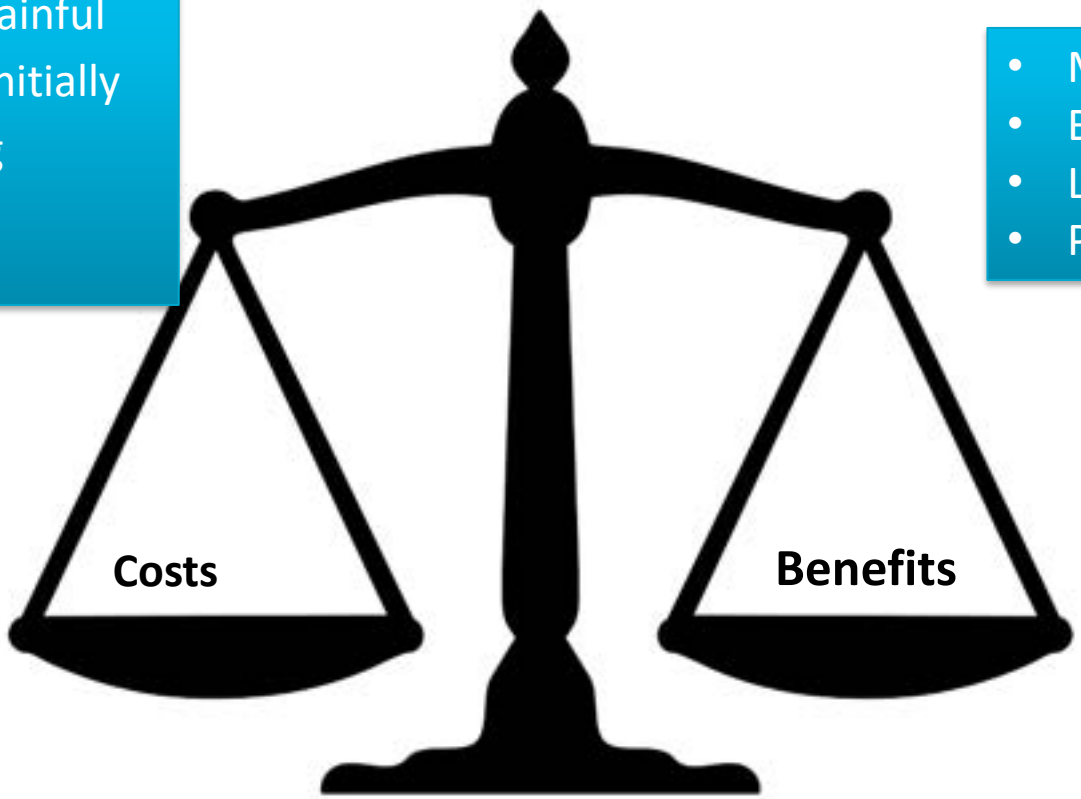
Potential risks to animal welfare

- Individual differences
- Social influences
- Increased complexity – ensuring P/C



Animal welfare balance

- Aversive and painful
- Cannot avoid initially
- Stress inducing



- Monitor health
- Better nutrition
- Less fence injuries
- Protect Wildlife

Conclusions

- Virtual fencing induces an acute stress response during learning.
- P/C important for reducing stress once learning has occurred.
- Animal training protocol must align with animal learning theory

Thank you

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