Play behaviour and the welfare of calves

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Play = good welfare

Play behaviour widespread in mammals

Locomotor play

Social play

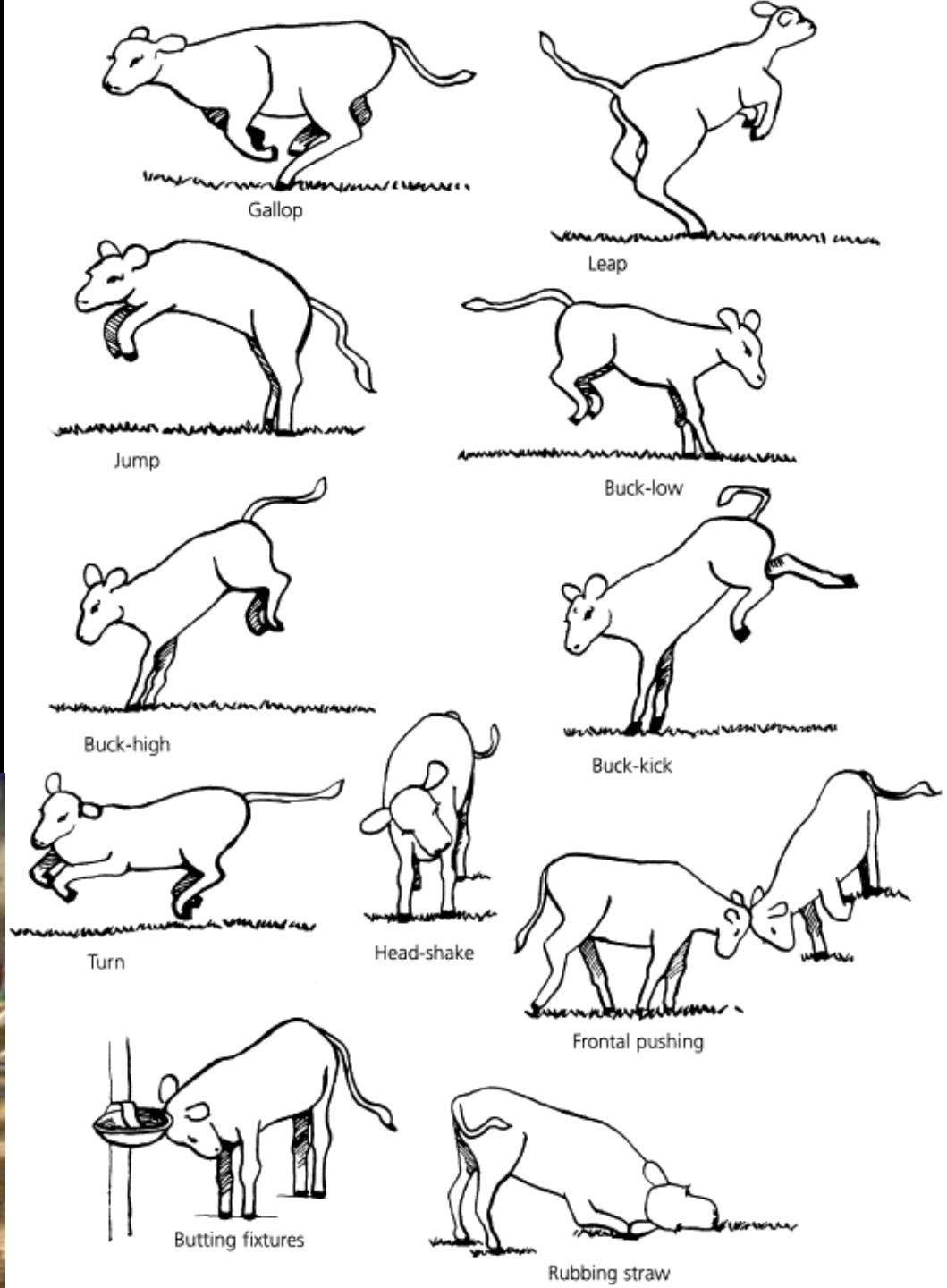
Object play

A single behavioural category of play?

Locomotor play common in ungulates

Practicing anti-predator responses?
Learning motor skills?

Bak Jensen et al.1998. Play behaviour in dairy calves kept in pens: the effect of social contact and space allowance. AABS. 56:97-108



Play behaviour in cattle

Locomotor play in calves

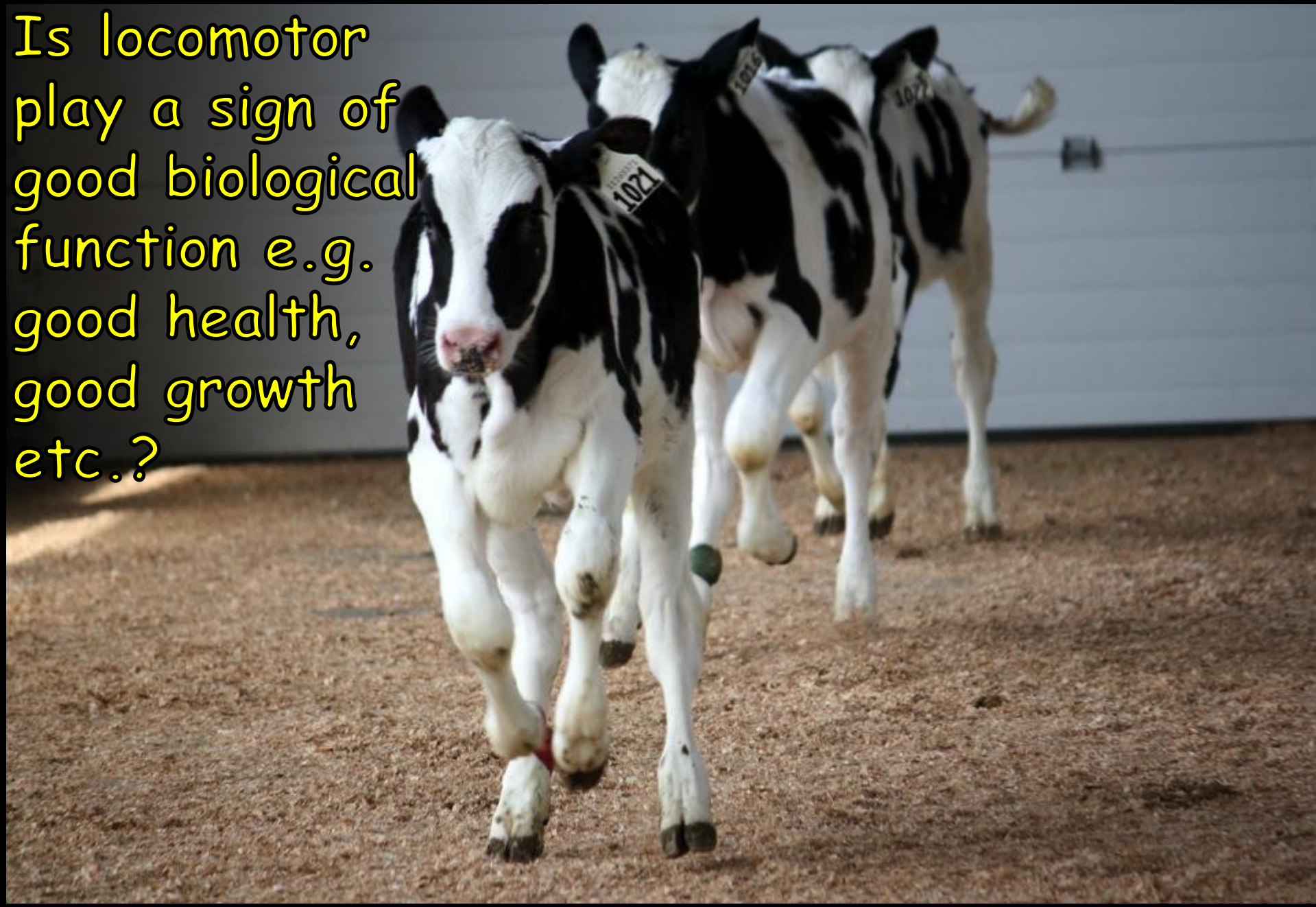
What is animal welfare?

Poor biological function e.g. illness, poor growth, stress

Inability to perform natural behaviour

Poor animal welfare

Aversive affective states e.g. pain, fear, "boredom"


Is locomotor play a sign of good biological function e.g. good health, good growth etc.?
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Cows and calves separated at birth.

Calves housed in group pens and fed milk, grain and hay from automated feeders.

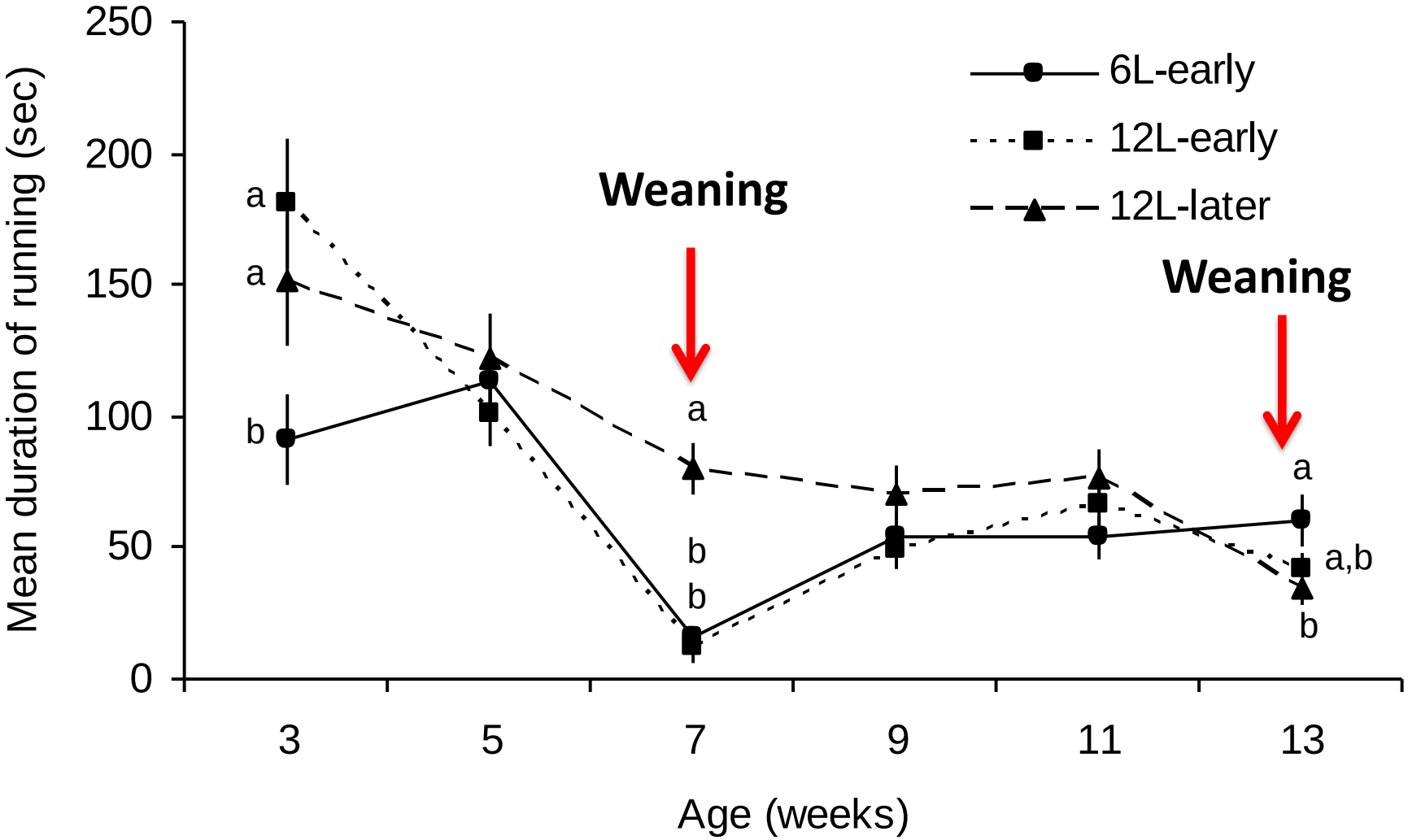
Weaned off milk and onto grain.

Calves that run for longest have better energy intake and weight gains before and after weaning off milk

(Miguel-Pacheco et al. 2015 Animal.)

	Energy intake	Daily weight gain
Before weaning	r = 0.40*	r = 0.47*
During weaning	r = -0.05	r = 0.04
After weaning	r = 0.25+	r = 0.34*

Play running was increased by a higher milk allowance and by a later weaning age Krachun et al., 2010 AABS 122:71-76



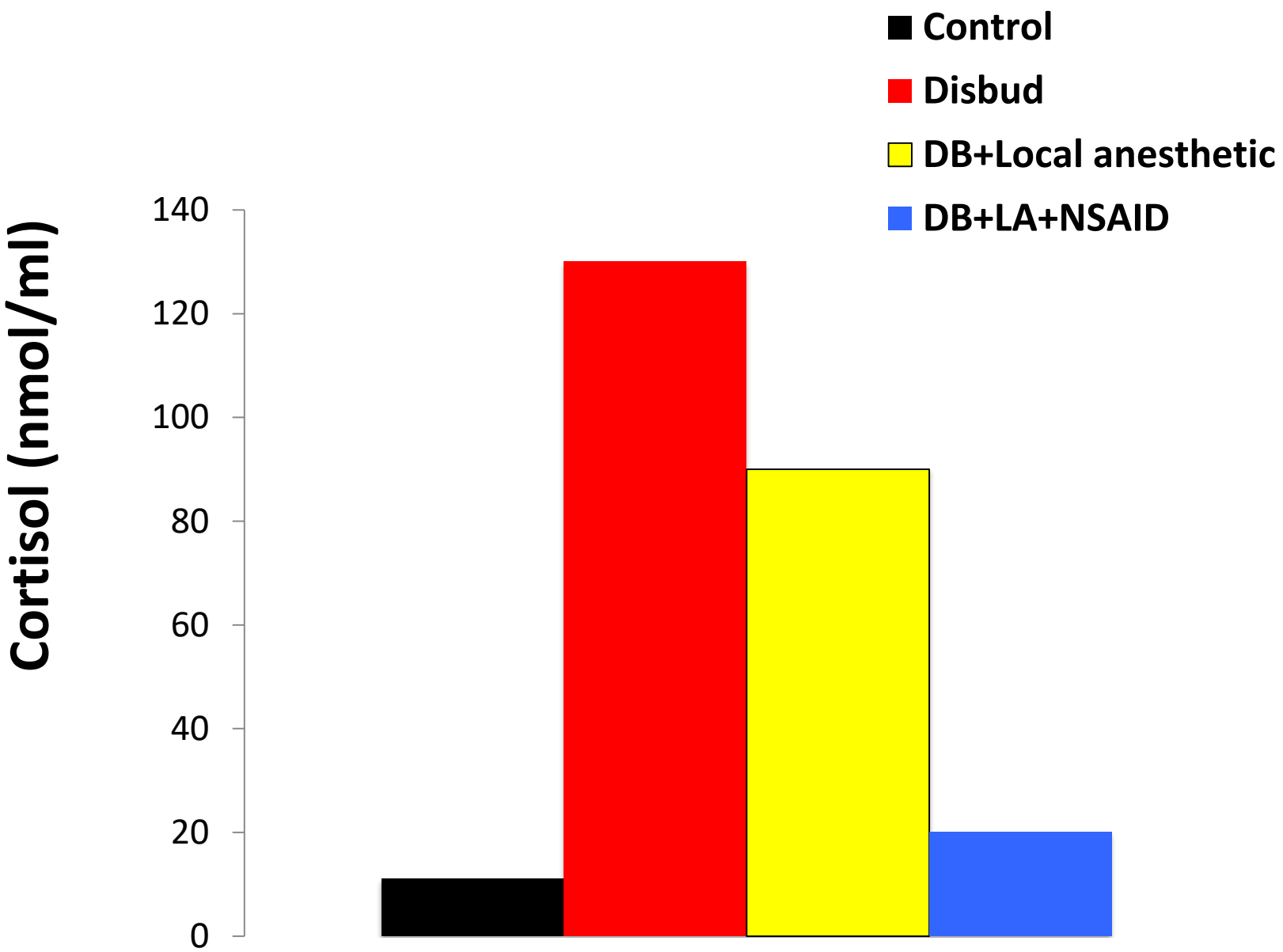
Locomotor play (running) is higher in calves with higher energy intakes and better growth

Affective states (emotions) and locomotor play?

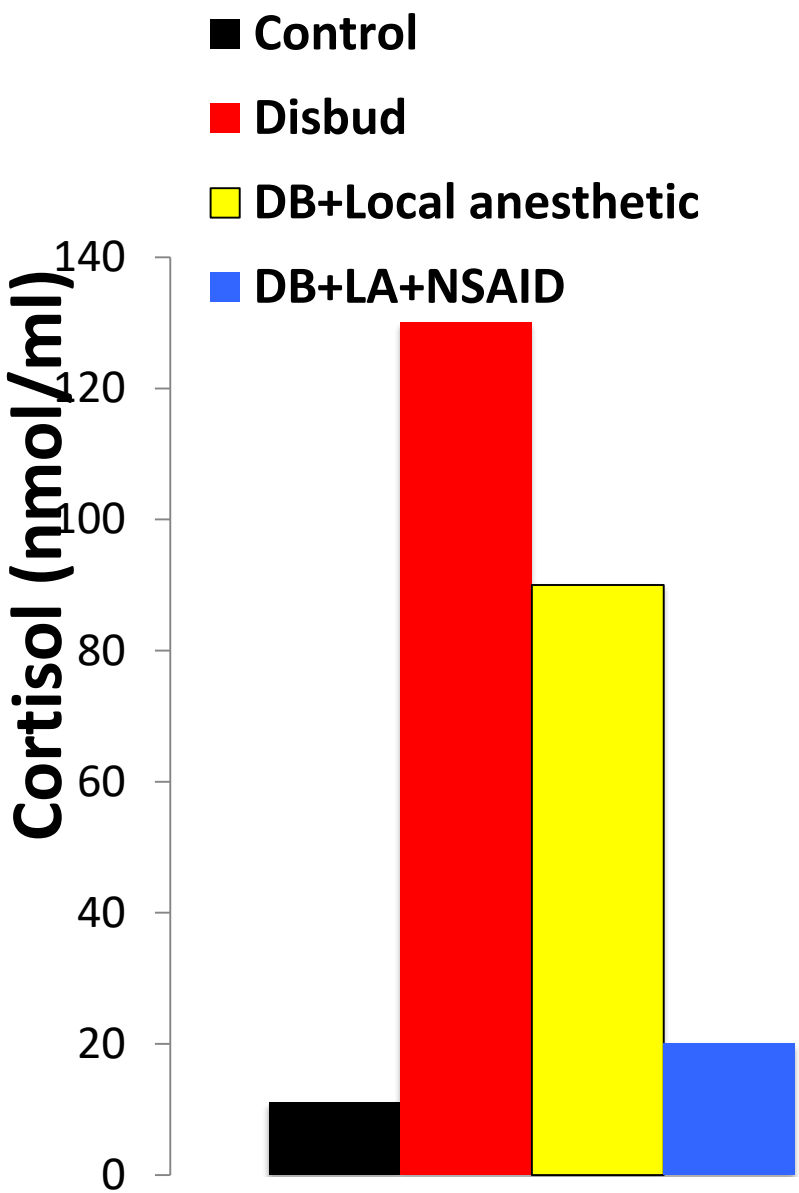
Reduced pain during dehorning with use of anesthetics and analgesics increases play behaviour.

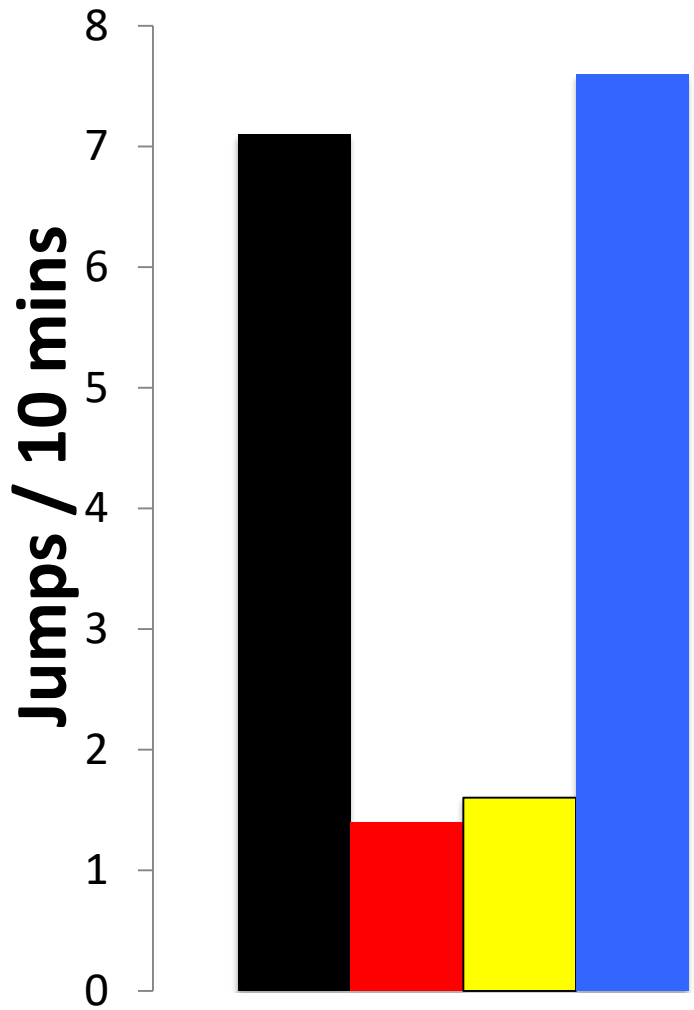
Mintline et al. 2013 AABS 144:22-30

Pain control reduces effects of disbudding on cortisol (Stafford et al., 2002 Res Vet Sci 73:115-123)

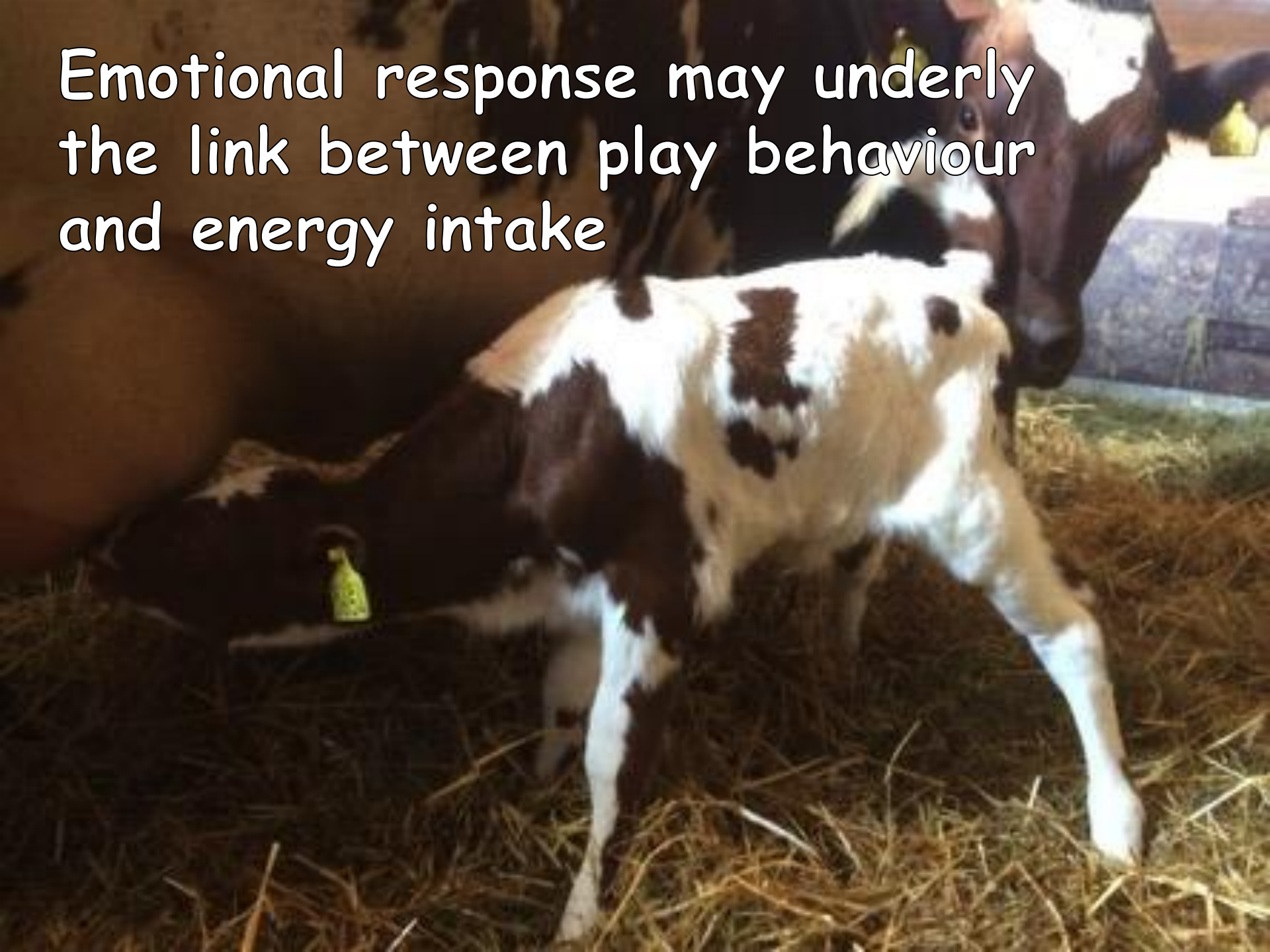


Pain control reduces effects of disbudding on cortisol (Stafford et al., 2002 Res Vet Sci 73:115-123) and locomotor play (Mintline et al. 2013 AABS 144:22-30)





Emotional response may underly the link between play behaviour and energy intake



Calves raised with the mother for 6 weeks

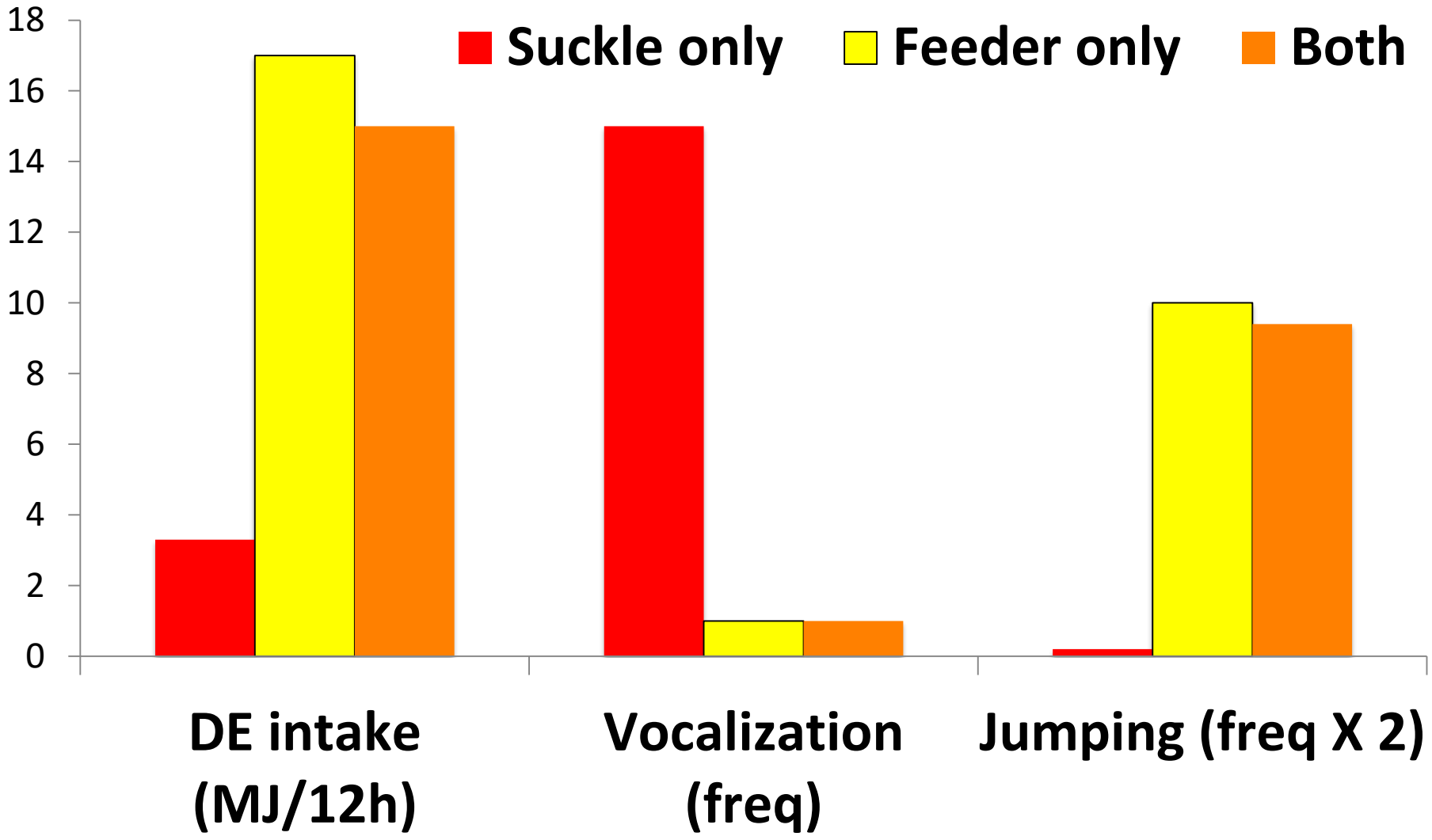
Calves could either

a) nurse the cow
b) nurse the cow and drink milk from an automated feeder
c) only drink from an automated milk feeder.

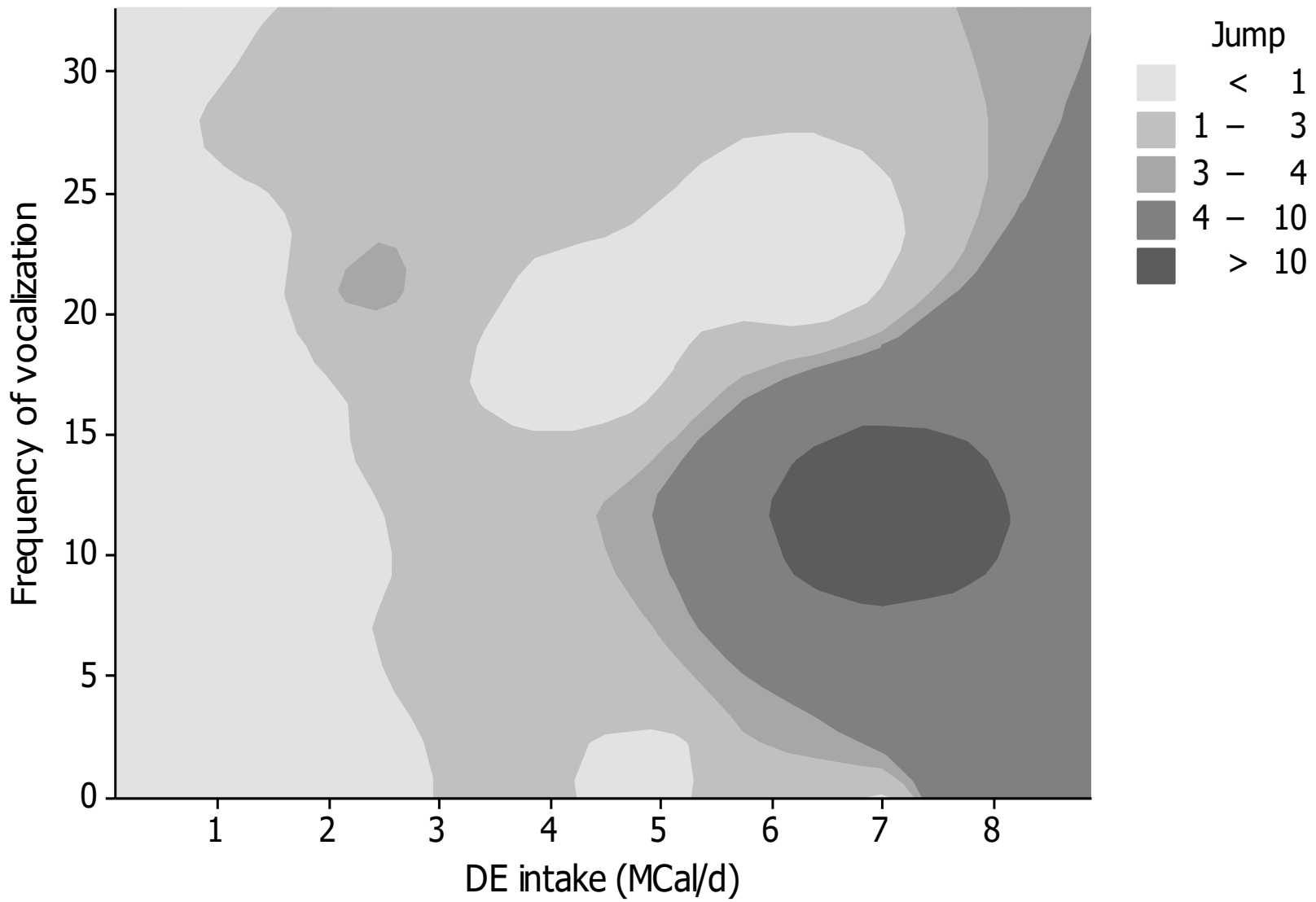
After 6 weeks, the calves and the cows were separated.

Johnsen et al. 2015. The effect of nursing on the cow-calf bond. AABS. 163:50-57

At separation, calves not dependent on their mothers for milk had lower energy intake, vocalized less and showed more play. No differences in walking duration.



The amount of jumping shown reflected both the energy intake after separation and the frequency of vocalization



The reduced locomotor play after separation from the mother reflects the emotional response to reduced energy intake

Validating indicators of good animal welfare ("Happy and Healthy")

Good animal welfare

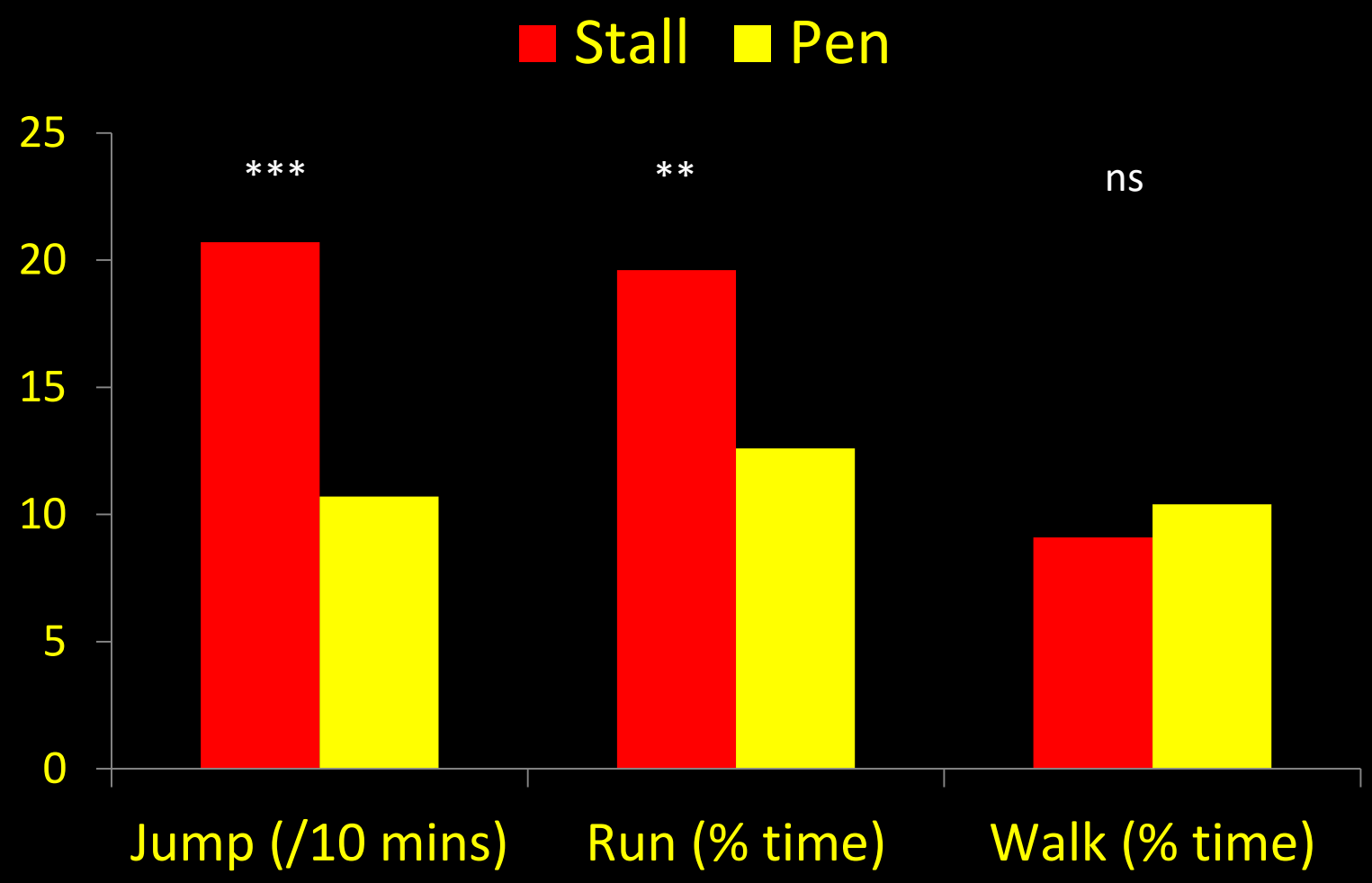
"Happy"
Affective states incl. positive emotions and lack of negative one

"Healthy"
Good biological function e.g. good growth, absence of illness

So far, so good

…but.....

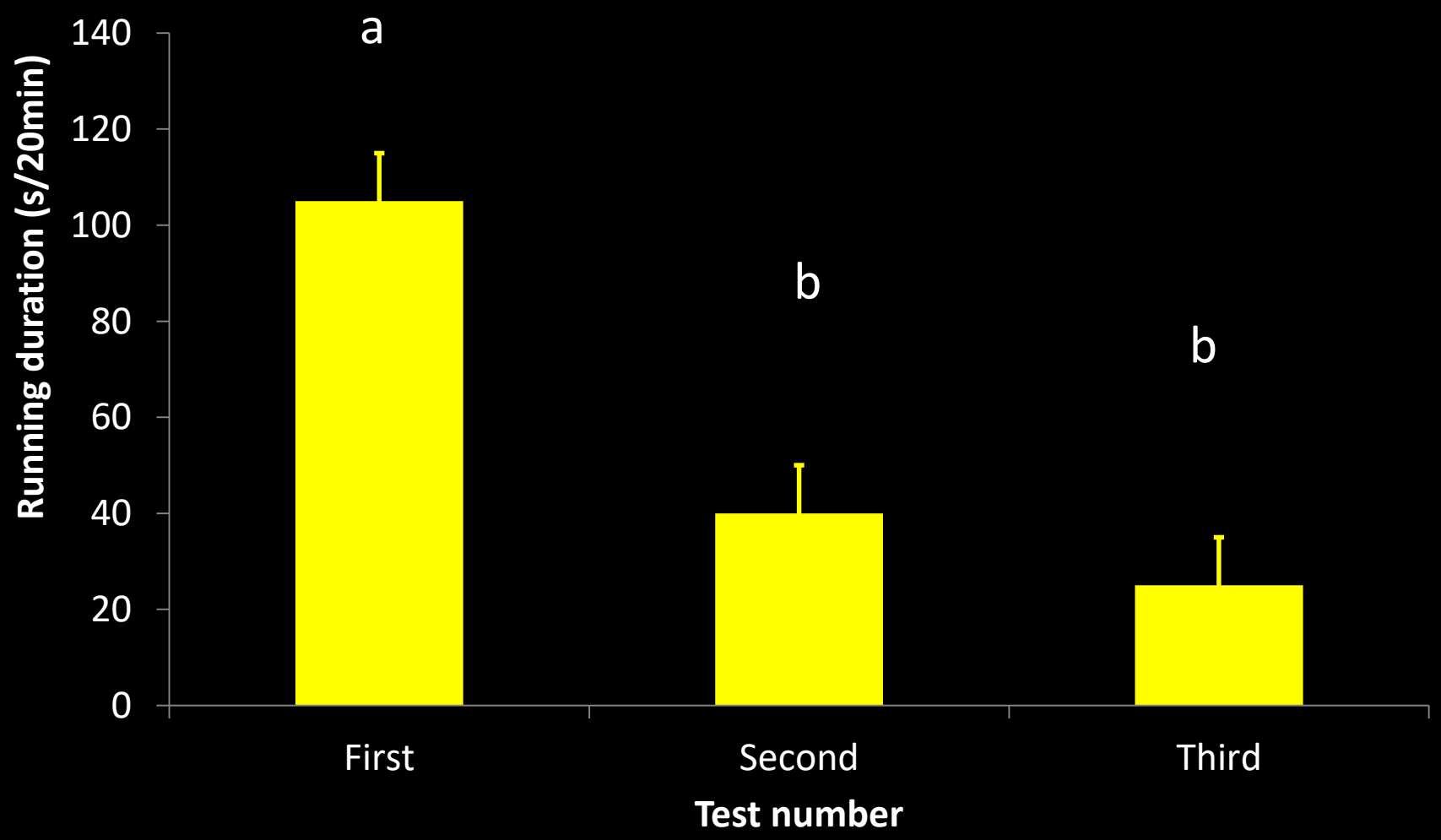
But: calves kept in small stalls show more play when released into an large enclosure than calves kept in large pens (Dellmeier et al 1985 JAS 60:1102; Jensen and Kyhn 2000 AABS 67:35)



(Rushen and de Passille 2014 Appl. Anim. Behav. Sci. 155:34-41)

Contradictory results: Locomotor play in the arena is highest when the arena is novel (Mintline et al 2012 AABS 141:101-107)

But novelty often induces fear in animals



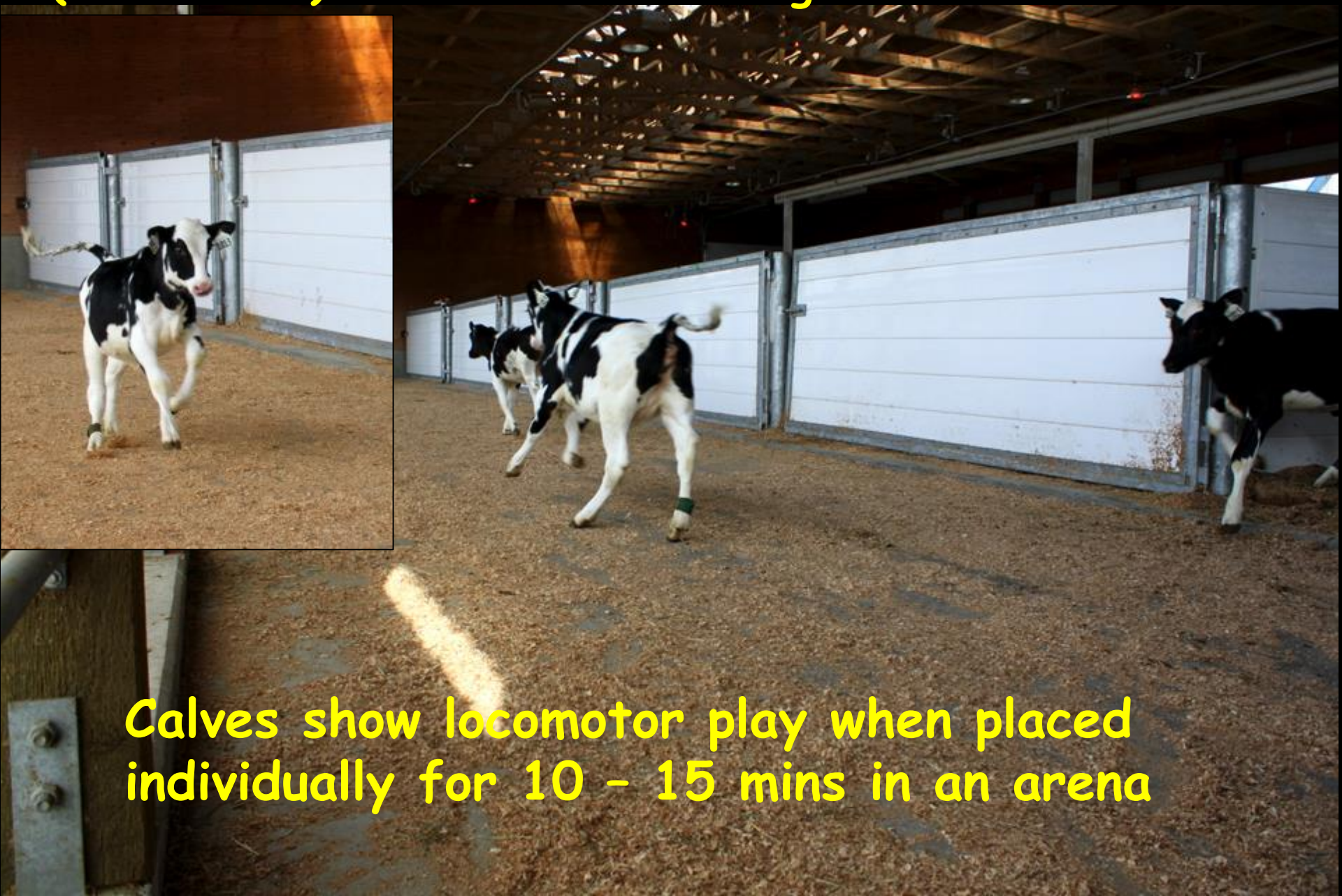
Effects of novelty on play reflect emotional response to novelty:
more curiosity = more play
more fear = less play

	Signs of fear		Curiosity
	Vocalization	Latency to enter	Sniff/lick
Running duration	r = -0.14	r = -0.58**	r=0.56**
Jumping frequency	r = -0.25+	r = -0.64**	r = 0.46*

+ P < 0.10

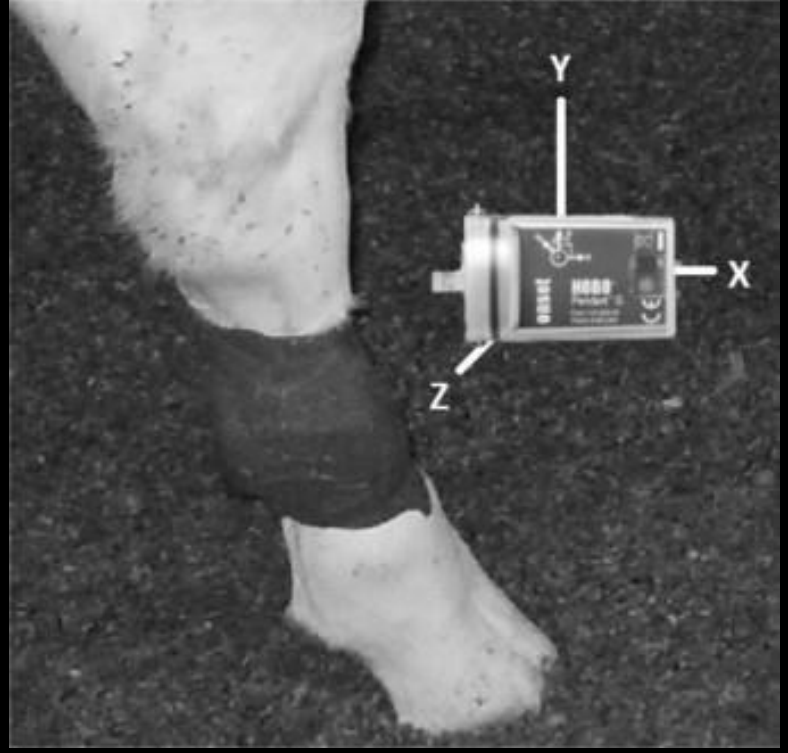
(Rushen and de Passille 2014 Appl. Anim. Behav. Sci. 155:34-41)

Spontaneous locomotor play in calves occurs only briefly (4-5 mins/d) and is time consuming to observe

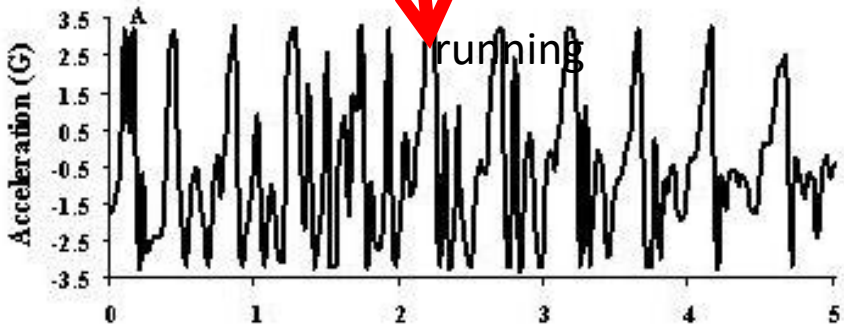


Calves show locomotor play when placed individually for 10 – 15 mins in an arena

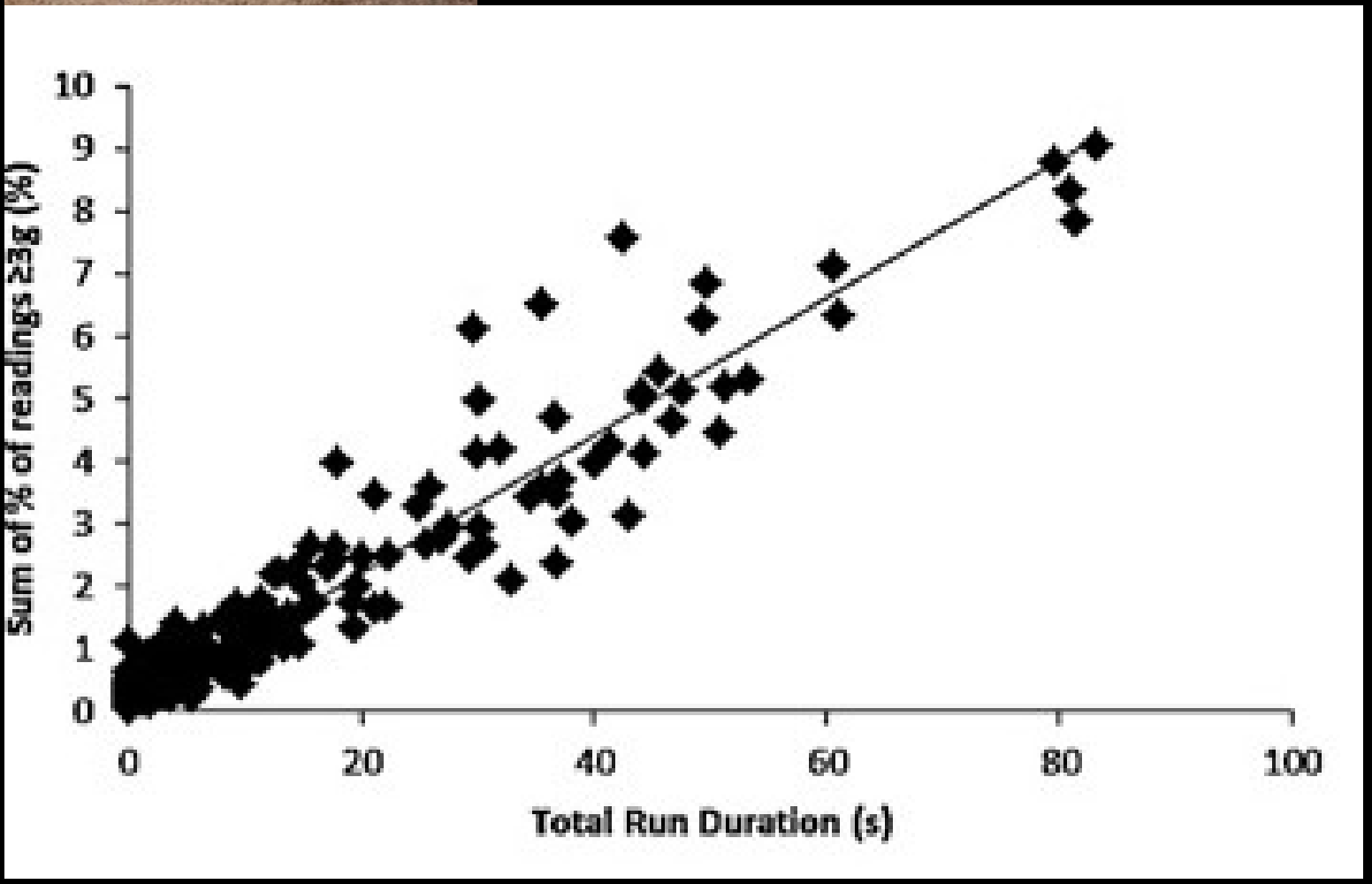
Can we automate the measurement of locomotor play?



Accelerometers attached to a calf's leg can show steps and can distinguish between walking and running



Measures of acceleration highly correlated with duration of running (Luu et al., 2013 148:21-27)



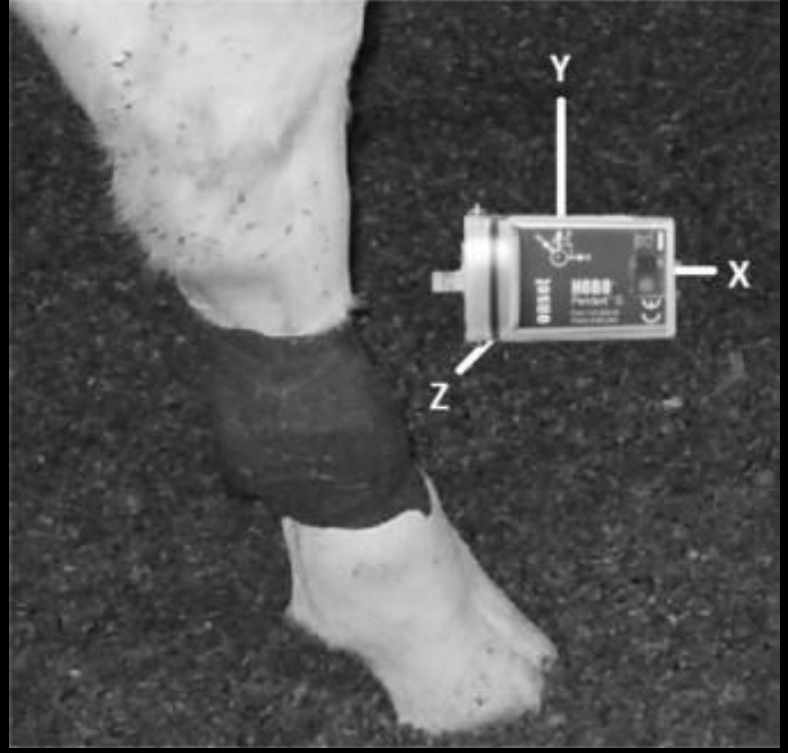
How generalizable are these results?

SOCIAL PLAY??

thank you

Measures of play in on-farm welfare assessment:

Can we automate the measurement of locomotor play?



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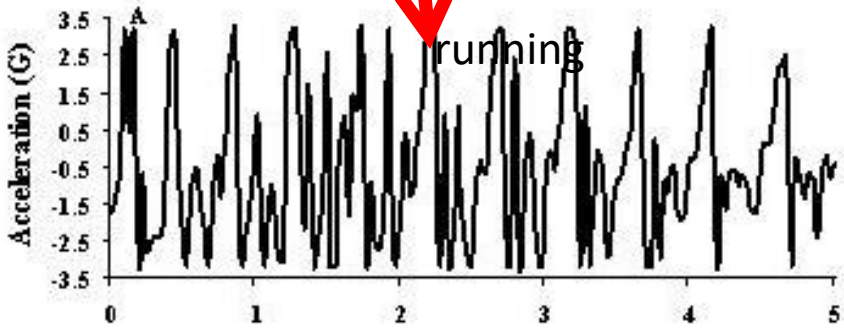

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