Lambs show changes in ear posture when experiencing pain

MJ Guesgen¹, NJ Beausoleil²*, EO Minot³, M Stewart¹, KJ Stafford¹ and PCH Morel³

¹ Institute of Veterinary, Animal and Biomedical Sciences, Massey University, Private Bag 11-222, Palmerston North 4442, New Zealand
² Institute of Agriculture and Environment, Massey University, Palmerston North, New Zealand
³ InterAg, Waikato Innovation Park, Hamilton 3240, New Zealand
* Contact for correspondence and requests for reprints: N.J.Beausoleil@massey.ac.nz

Abstract

Ear posture, or the frequency of postural changes, may reflect various emotional states of animals. In adult sheep (Ovis aries), the ‘forward’ ear posture has been associated with negative experiences whereas the ‘plane’ posture has been associated with positive ones. This study aimed to see whether ear postures related to the experience of pain in lambs. The ear behaviour of four to eight week-old lambs (n = 44) was measured before and after tail-docking using a rubber ring. Each lamb was docked and its behaviour recorded while in the company of an observer lamb of similar age; each acted once as focal (dock’d) lamb and once as observer within the same pair. Lambs were docked in one of two rounds, so that half were docked in their first exposure to the test environment and half in their second exposure. Tail-docking was associated with an increase in the proportion of time spent with ears backward and decreases in the proportion of time spent with ears plane and forward (mean ± SEM): Backward: pre 0.12 ± 0.04, post 0.56 ± 0.04; Plane: pre 0.55 ± 0.05, post 0.19 ± 0.05; Forward: pre 0.27 ± 0.04, post 0.18 ± 0.04). There was also a significant increase in the number of changes between ear postures after docking (pre 5.63 ± 0.66, post 9.11 ± 0.66). Over both periods, female lambs held their ears asymmetrically for longer than males (mean of ranks ± SEM) [raw proportion of time]: Females 52.14 ± 3.44 [0.09 ± 0.01], males 37.54 ± 3.40 [0.05 ± 0.01]). This is the first study to demonstrate changes in the ear posture of lambs associated with the negative experience of pain. Ear posture is a non-invasive indicator of physical pain in lambs and may be useful for evaluating potential welfare compromise.

Keywords: animal welfare, ear posture, emotion, husbandry, lamb, pain

Introduction

Ears are essential for obtaining information from the environment (Manteuffel 2006) but ear posture, or the frequency of postural changes, may also reflect various emotional states of animals. Ear posture may also be purposefully manipulated by an animal to signal status or intent. Therefore, ear posture may be a useful mode of communication as ears are a clearly visible body part (Fox 1971; Williams 2002). There is evidence that sheep (Ovis aries) pay attention to (Kendrick et al 1995, 1996, 2001, 2007; Ferreira et al 2004), and display (Vögeli et al 2014), different ear postures according to their emotional experience. Veissier et al (2009) reported a relationship between ear postures and the responses of sheep to their environment according to the suddenness, familiarity, predictability and consistency of events or situations, factors which are thought to underlie a range of emotions. Sheep experiencing a negative emotion, elicited through separation from the flock, displayed a greater number of ear-posture changes and spent more time with ears in a forward or raised position (Reefmann et al 2009a,b; Stubsjoen et al 2009). Conversely, situations such as feeding, which were expected to elicit positive emotions, were associated with more ‘axial’ or ‘passive’ ear postures (Reefmann et al 2009a,b; Stubsjoen et al 2009).

Boissy et al (2011) went further, to suggest that negative situations can be characterised as either controllable or uncontrollable and that this ‘controllability’ affected ear posture. Uncontrollable situations (such as inability to control access to food) were associated with ears being backward, whereas controllable situations (ability to access food by passing through a photobeam) were associated with an ears-forward posture (Boissy et al 2011).

Pain is, by definition, a negative emotional experience (Molony & Kent 1997). Changes in ear posture in response to pain have been observed in mice (Mus musculus) (Matsumiya et al 2012), rats (Rattus norvegicus) (Sotocinal et al 2011), rabbits (Oryctolagus cuniculus) (Keating et al 2012), and horses (Equus caballus) (Dalla Costa et al 2014) as part of a general facial expression for pain in these species. All species evaluated held their ears backward when in pain. To date, no studies have evaluated ear behaviour in response to pain in sheep. Tail-docking has been shown to cause pain in lambs as indicated by various behavioural (Mellor & Stafford 2000; Thornton & Waterman-Pearson 2002; Grant 2004) and physiological