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The social function of pain-related behaviour and novel techniques for the assessment of pain in lambs

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Abstract

Pain is a phenomenon that is physical and emotional. There is growing evidence to support the idea that emotional neural systems in the brain drive future behaviour. The behavioural reactions accompanying the pain experience are highly varied, which suggests multiple functions. Pain-related behaviour often doesn't occur in isolation. Instead, it is observable by other animals, thus providing access to information about the emotional state of the animal.

The purpose of this thesis was to investigate pain-related behaviour within a social context. In the simplest terms, animal interactions occur in a dyad, where the animal displaying a particular repertoire of behaviours is the actor and another viewing and potentially responding to the actor's behaviour is the observer. Each individual can be an actor and observer simultaneously.

Domestic sheep are a good model species for studying pain from a social perspective. They are a social species with a strong tendency to form groups. Sheep provide us with an opportunity to evaluate the social influences on pain within the context of painful husbandry procedures normally undertaken in New Zealand such as tail docking, ear tagging and castration. There is also some evidence that the social context affects the behaviour and emotional state of sheep.

The social influences on pain perception and expression have only just begun to be investigated and the studies contained in this thesis add a great deal to this research area. Therefore, the literature review was presented at the end of the thesis and made reference to the findings of the previous experimental chapters of this thesis and introduced a social/communicative function for pain related behaviour.

This other chapters then provided evidence for the social function of pain behaviour, by investigating both sides of the actor-observer dyad. Two chapters focussed on the actor lamb. One, which is presented as two papers, investigated novel ways pain may be expressed by lambs. These are the first studies to demonstrate changes in the ear posture and facial expression of lambs associated with the negative experience of pain. The other chapter, presented as another two papers, investigated what factors affect pain expression by lambs. One study of this chapter demonstrates that the ontogeny of pain processing appears to differ between male and female lambs, and the other demonstrates that expression of pain behaviour depends on the relationship between the actor and observer lamb and previous experience of the test environment.

There is also one chapter, comprised of one paper, which focussed on the observer lamb. This paper investigated how pain expression by the actor lamb affected the behavioural expression of the observer. This study demonstrated socially facilitated behaviour of lambs, possibly indicative of empathy, in response to conspecific pain using quantitative behavioural methods, and a novel qualitative assessment technique.

This thesis culminates in a general discussion chapter which assesses the methodologies used and their limitations, as well as drawing together the research presented in this thesis and analyzing it in the context of the social communicative function of pain.

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Table of contents

Abstract	ii
Acknowledgements	iv
Table of contents	v
List of figures	vi
List of tables	vii
1 General Introduction	1
2 Novel techniques for assessing pain in lambs	9
2.1 Lambs show ear posture changes when experiencing pain	10
2.2 Scoring and quantification of a facial expression for pain in lambs	22
3 Factors affecting pain expression by actor lambs	47
3.1 The effects of age and sex on pain sensitivity in young lambs	48
3.2 Social context and other factors influence the behavioural expression of pain by lambs	58
4 How pain expression affects conspecific observer lambs	75
4 Behavioural and emotional effects of viewing a conspecific in pain	76
5 Literature Review	99
Evidence for a social function of pain-related behaviour	100
Introduction	101
Characterizing pain-related behaviour	103
Avoidance function of pain	104
Healing function of pain	104
Social function of pain	105
Mechanisms underlying socially facilitated behaviour and social buffering	115
Other factors influencing the social function of pain behaviour	119
6 General discussion	124
Discussion of methodologies and their limitations	124
Interpreting the results of experimental studies	128
Final thoughts and future directions	130
7 References	134
8 Appendix	149

Figures

Figure 1: Visual examples of the ear postures scored.	16
Figure 2: Median \pm interquartile range proportion of time with Ears Asymmetrical before and after tail docking.	17
Figure 3: Timeline of experimental procedure for Experiment II	29
Figure 4: Example image outlining how the facial features of each lamb were measured quantitatively including placement of sticker markers on the test lambs. The larger rectangle denotes a calibration sticker of a known size for later analysis.	32
Figure 5: Raw mean \pm SE Lamb Grimace Scale scores of Nose Features (a), Mouth Features (b) and Overall Pain Score (c) from the front angle in Experiment I: Tail docking versus sham tail docking.	35
Figure 6: Median latency of males and females to respond (s) to thermal stimulation depending on age of testing (days).	54
Figure 7: Mean ranks \pm SE frequency of kick (a), lip curl/neck arch (b), headshake (c) and the proportion of time in the abnormal upright (d) and normal lying (e) postures.	67
Figure 8: Mean ranks \pm SE (period*pair-sex interactive effect) frequency of rump wag.	68
Figure 9: Mean ranks \pm SE (period*treatment interactive effect) frequency of roll.	68
Figure 10: Word chart of observer 7 for dimensions one and two (a), two and three (b), and one and three (c); as well as word chart of observer 2 for dimensions one and two (d), two and three (e), and one and three (f).	88
Figure 11: Mean \pm SE (sex*period interactive effect) dimension one scores. F = female, M = male. Pre = before docking, post= after docking.	93
Figure 12: Mean \pm SE (treatment*period) dimension one scores.	93
Figure 13: Mean \pm SE (treatment*activity) dimension three scores.	93
Figure 14: The cycle of interaction between the observer lamb (dark grey circles) and actor lamb (light grey circles).	107
Figure 15: The nested mind-brain hierarchies of empathy. Boxes and ellipses (middle) represent the brain areas associated with the different levels of empathic processing (right). Figure based on Panksepp & Panksepp (2013).	117

List of Tables

Table 1: The number of male, female, singleton and twin lambs in each treatment group included in the analysis.	15
Table 2: Ear-related behaviours scored for actor lambs, based on Reefman et al. (2009a) and Veissier et al. (2009).	15
Table 3: Results of MIXED model analysis on frequency or duration of actors' behaviour before and after tail-docking (period).	18
Table 4: Description of the Lamb Grimace Scale action units.	27
Table 5: Descriptions of how measurements of the facial features were made in ImageJ for Experiment II.	31
Table 6: Results of linear MIXED model on Lamb Grimace Scale scores generated by five observers in Experiment I.	34
Table 7: Intra-class correlation coefficients for scores from five observers for stills of docked and control lambs taken from the front angle and side angle in Experiment I.	36
Table 8: Results of linear MIXED model on Lamb Grimace Scale scores generated by five observers in Experiment II.	38
Table 9: Intra-class correlation coefficients among five observers for stills taken in Experiment II before and after docking and with lambs restrained or in the pen.	39
Table 10: Results of linear MIXED model on quantitative measures of lamb facial expression in Experiment II.	40
Table 11: Number of male and female lambs tested on each day of age.	52
Table 12: The number of male, female, singleton and twin lambs in each treatment group included in the analysis.	63
Table 13: Behaviours scored for actor (tail-docked) lambs.	64
Table 14: Results of MIXED model on frequency or duration of actors' (tail-docked lambs) behaviour before and after tail docking (period).	66
Table 15: Behaviours scored for observer lambs.	82
Table 16: The final number of male, female, singleton and twin observer lambs in each treatment group included in the quantitative analysis of visual and pain-related behaviours (a), and ear behaviours (b).	83
Table 17: Human observers' terms showing the highest positive and negative correlation with the axes of dimensions one, two and three of the consensus profile.	87
Table 18: The final number of male and female observer lambs in each treatment group included in the qualitative analysis.	87
Table 19: Results of MIXED model analysis on quantitative data from observer lambs before and after actor tail docking (period).	90
Table 20: Results of MIXED model on qualitative data from observer lambs before and after actor tail docking (period).	91
Table 21: Summary of previous research into socially facilitate behaviour in observer animals.	108
Table 22: Summary of previous research into buffering in actor animals.	110