

Factors influencing the motivation of sheep for food

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Abstract

The measurement of strength of motivation is a tool used to assess the resources that an animal values and, subsequently, may aid in determining its welfare. However, the relationship between animal motivation and welfare is not well defined, with conclusions based on the assumption that welfare is reduced if a 'valued' resource is not provided. One possible way to better understand the relationship between changes in motivation and welfare is by investigating the factors that influence motivation in a demand test. This may provide a better understanding of motivation and may assist in elucidating the implications of changes in motivation on welfare and welfare assessment. Therefore, this thesis aimed to investigate factors that may alter the motivation of sheep for food in a behavioural demand test. Mature Merino wethers were trained in a 50m U-shaped lane to access a double-sided feeder and earned a food reward with each access event. Three different experiments were undertaken examining the effects of: 1) energy balance (comparing a 0h and 14h food deprivation); 2) energy density (comparing motivation for a high energy and low energy food) and; 3) the opioid reward system (comparing motivation for a high energy and low energy food with and without the administration of an opioid antagonist) on a ruminant's motivation for food. In each experiment either 8 or 10 sheep were tested to see how many times in a 20h period they would walk various distances (costs) for a 4g food reward after exposure to differing treatments. The main results indicated that energy balance (the difference between energy expended and energy consumed) may aid in determining feeding motivation at costs of 25m and less. However, no sheep stopped working for food at or near the point of zero energy balance (where energy consumed equals energy expended) and all sheep consistently worked for food at longer costs while in an energy deficit. The P_{max} (cost at which maximum responding occurred) and the estimated cost at zero energy balance were between 29 and 41m across all treatments and experiments. This may suggest that feeding motivation begins to decline near the point of zero energy balance. However, it is difficult to identify which metabolic feedback system or nutritional parameters might be influencing this result. Sheep also exhibited higher levels of motivation toward a low energy compared to a high energy food at costs of less than 25m, and a μ -opioid receptor antagonist, naltrexone hydrochloride, was effective at reducing food rewards earned. This indicates that sheep work harder to access food with a lower energy density, possibly, to attain sufficient energy levels, and suggests that both energy balance and the opioid reward system may be influencing feeding motivation. The experiments undertaken for this thesis were not able to provide conclusive

evidence as to how these factors might influence welfare and welfare assessment. However, various hypotheses have been proposed, as have possible directions for further research.

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Table of Contents

Abstract	ii
Declaration.....	iv
Acknowledgements.....	v
Table of Contents.....	vii
List of Tables	x
List of Figures.....	xi
Chapter 1.....	1
General Introduction	1
1.1 Introduction.....	2
Chapter 2.....	4
2.1 Animal welfare.....	5
2.2 Current measures used to assess welfare.....	6
2.2.1 Behavioural measures	7
Normal behaviour.....	7
Abnormal behaviour	8
Using motivation behaviour to assess welfare	10
2.2.2 Physiological measures.....	10
2.2.3 Biological function and production measures	12
2.2.4 Measures of disease and injury	13
2.2.5 Affective state measures	13
2.3 Motivation and preference	15
2.3.1 Preference testing	16
2.3.2 Motivation testing.....	17
Defining motivation.....	17
The development of motivation testing	17
2.3.3 Limitations of motivation testing	18
2.3.4 Motivation and adaption.....	19
2.3.5 Understanding motivational mechanisms for different resources.....	20
Motivation for social contact.....	21
Motivation for drinking.....	23

2.4	Main factors influencing feeding motivation.....	25
2.4.1	Energy balance	25
2.4.2	Nutrient and mineral balance	28
2.4.3	Influence of hedonic reward system	30
2.5	Conclusion	31
2.6	Scope of thesis.....	32
Chapter 3.....	33
3.1	Abstract.....	34
3.2	Introduction.....	36
3.3	Materials and methods	40
3.3.1	Animals and housing	41
3.3.2	Facility and equipment.....	41
3.3.3	Habituation and behavioural demand training.....	44
3.3.4	Experimental design.....	44
3.3.5	Behavioural demand testing.....	47
3.3.6	Statistical analysis.....	47
3.4	Results.....	50
Part 1	Comparing behavioural demand analysis methods.....	51
Part 2	Assessing the impact of energy balance on motivation for food.....	53
3.5	Discussion.....	58
Part 1	Comparing behavioural demand analysis methods.....	58
Part 2	Assessing the impact of energy balance on motivation for food.....	59
Chapter 4.....	66
4.1	Abstract.....	67
4.2	Introduction.....	68
4.3	Materials and methods	70
4.3.1	Animals and housing	70
4.3.2	Facility and equipment.....	72
4.3.3	Habituation and behavioural demand training.....	72
4.3.4	Experimental design.....	72
4.3.5	Behavioural demand testing.....	73
4.3.6	Preference testing	73
4.3.7	Statistical analysis.....	74

4.4	Results	75
4.5	Discussion	83
Chapter 5	88
5.1	Abstract	89
5.2	Introduction	90
5.3	Materials and methods	92
5.3.1	Dose response study	92
	Behavioural demand study.....	93
5.3.2	Facility and equipment	94
5.3.3	Habituation and behavioural demand training	94
5.3.4	Experimental design	94
5.3.5	Behavioural demand testing	95
5.3.6	Preference testing	95
5.3.7	Statistical analysis	95
5.4	Results	97
5.5	Discussion	106
Chapter 6	110
6.1	Introduction	111
6.2	Comparisons of measures from different behavioural demand models	111
6.3	The impact of energy balance on feeding motivation	112
6.4	The opioid reward system and feeding motivation	114
6.5	Exploring possible links between feeding motivation, adaption, welfare and welfare assessment	115
	Reference list.....	120
	Appendix 1.....	146
	Appendix 2.....	157

List of Tables

Table 3.1 The first 8 days of each 36 day cycle (cycle 1 or C1 and cycle 2 or C2) shown for each pair of sheep. The grey blocks indicate the control treatment and the green blocks indicate the 14h food deprivation treatment.	45
Table 3.2 Summary data of the linear-elasticity and exponential demand models given as mean \pm SEM.	52
Table 3.3 Differences between the cost estimates at P_{\max} and at zero energy balance for control and 14h deprivation treatments ($P>0.05$ for all comparisons).	55
Table 4.1. Summary and analysis of the feed types used during the experiment.....	71
Table 4.2 Differences between costs at which P_{\max} and the estimated zero energy balance occurred ($P>0.1$ for all comparisons.....	79
Table 4.3 Individual food preferences of sheep in a free-choice test. Tests were conducted on days 4 and 5 (test 1) and days 62 and 63 (test 2) after completion of the behavioural demand testing. Intake is given as a percent of the total intake for the high energy (HE) and low energy (LE) food types.....	83
Table 5.1 Summary of the pellet type, ingredients and composition.....	94
Table 5.2 Differences between costs at which P_{\max} and the estimated zero energy balance occurred for high energy (HE), low energy (LE), high energy with naltrexone (HE+NTX) and low energy with naltrexone (LE+NTX) treatments ($P>0.1$ for all comparisons).	104
Table 5.3 Individual food preferences of sheep in a choice test. Tests were conducted prior to undergoing behavioural demand (BD) testing (test 1) and following the completion of BD testing (test 2). Intake is given as a percent of the total intake for the high energy (HE) and the low energy (LE) food types.	105

List of Figures

- Figure 2.1 Proposed model outlining the main factors underlying changes in the motivation for food in ruminant animals. Sections highlighted in orange are the focus of this thesis. 27
- Figure 3.1 A schematic representation of the behavioural demand facility. Two sheep were tested simultaneously on one day and two companion sheep were placed in each of the companion pens. 43
- Figure 3.2 Actual mean number of rewards consumed (\pm SEM) for both the control (blue circle) and 14h food deprivation (red diamond) treatments at all cost levels ($n=8$). 51
- Figure 3.3 Linear-elasticity demand curve with the back transformed mean number of rewards shown as a function of cost on a log-log scale for the control (blue circle, dotted line) and 14h food deprivation (red diamond, solid line) treatments. P_{\max} estimates are represented by open boxes ($n=8$). 52
- Figure 3.4 Exponential demand curve with the back transformed mean number of rewards shown as a function of cost on a log-log scale for the control (blue circle, dotted line) and 14h food deprivation (red diamond, solid line) treatments ($n=8$). 53
- Figure 3.5 Estimated mean energy balance (\pm SEM) at each cost level for control (blue, circle) and 14h food deprivation (red, diamond) treatments ($n=8$). 54
- Figure 3.6 Mean cumulative percentage reward (\pm SEM) relative to total reward for control (blue) and 14h deprivation (red) treatments ($n=8$). Significance levels are as indicated * $P<0.01$, ** $P<0.005$ 56
- Figure 3.7 Mean interval work rates (\pm SEM) given as a percent of the work completed over the total test period for the control (A) and 14h food deprivation (B) treatments ($n=8$). 57
- Figure 4.1 Mean number of rewards earned (\pm SEM) for each cost level at the low energy (LE, red diamond) and the high energy (HE, blue circle) treatments ($n=10$). 76
- Figure 4.2 Linear-elasticity demand curve showing the mean number of back transformed rewards as a function of cost on a log-log scale for the high energy (HE, blue circle, dotted line) and low energy (LE, red diamond, solid line) treatments ($n=10$). The differences in P_{\max} between the LE and HE treatments are represented by open boxes. 77
- Figure 4.3 Exponential demand curve showing the back transformed mean number of rewards as a function of cost on a log-log scale for the high energy (HE, blue circle, dotted line) and low energy (LE, red diamond, solid line) treatments ($n=10$). 78
- Figure 4.4 Estimated mean energy balance (\pm SEM) calculated for low energy (LE, red diamond) and high energy (HE, blue circle) treatments ($n=10$). 79
- Figure 4.5 Mean cumulative percentage reward number relative to total reward number after 20h for both the high energy (HE) and low energy (LE) feeds. Horizontal lines highlight intervals at which 50% and 80% of intake was achieved ($n=10$). 81

Figure 4.6 Mean interval work rates (+ SEM) given as a percent of the work completed over the 20h test period for the high energy (HE; A) and low energy (LE; B) treatments ($n=10$).	82
Figure 5.1 Least squares means number of rewards (\pm SEM) for the 0-6h test period for the high energy (HE, blue circle) and low energy (LE, red triangle) treatments ($n=10$).	98
Figure 5.2 Least squares means number of rewards (\pm SEM) for the 0-6h test period for treatments with naltrexone (NTX, yellow square) and without naltrexone administration (No NTX, green triangle) ($n=10$).	98
Figure 5.3 Least squares means number of rewards (\pm SEM) for the complete (20h) test period for the high energy (HE, blue circle) and low energy (LE, red triangle) treatments ($n=10$).	99
Figure 5.4 Mean numbers of rewards consumed (\pm SEM) between 6 and 12h of the 20h test period for the high energy feed (HE), low energy feed (LE), high energy feed with naltrexone (HE+NTX) and low energy feed with naltrexone (LE+NTX) treatments ($n=10$).	100
Figure 5.5 Mean numbers of rewards consumed between 12 and 20h of the 20h test period for the high energy feed (HE), low energy feed (LE), high energy feed with naltrexone (HE+NTX) and low energy feed with naltrexone (LE+NTX) treatments ($n=10$).	101
Figure 5.6 Estimated mean theoretical energy balance (\pm SEM) calculated for each cost level for the high energy (HE), low energy (LE), high energy with naltrexone (HE+NTX) and low energy with naltrexone (LE+NTX) treatments ($n=10$).	102
Figure 5.7 Linear elasticity demand curve showing the back transformed mean number of rewards as a function of cost on a log-log scale for the high energy (HE, blue diamond) and low energy (LE, green triangle) treatments and for the high energy food with naltrexone (HE+NTX, red square) and low energy food with naltrexone (LE+NTX, purple cross) treatments The differences between treatments at P_{max} are represented by open boxes ($n=10$).	103
Figure 5.8 Exponential demand curve showing the back transformed number of rewards as a function of cost on a log-log scale for the high energy (HE, blue diamond) and low energy (LE, green triangle) food types and for the high energy food with naltrexone (HE+NTX, red square) and low energy food with naltrexone (LE+NTX, purple cross) treatments ($n=10$).	104