

Table of Contents

Preface	ix
Glossary	xi
1 The Qualities That Make Up Sentience	1
1.1 Why Are We Interested in Sentience?	1
1.2 How Do People View Species Perceived to be Like Us or Unlike Us?	4
1.3 The Concept of Sentience	5
1.4 Definitions and Descriptions of Components of Sentience	6
2 Ethics, Morality and Attitudes	8
2.1 Ethics	8
2.2 Morality, Selfishness and Altruism	9
2.3 Obligations	13
2.4 Rights	15
2.5 Freedom	16
2.6 Brief History of Attitudes to Animals	18
3 Animal Welfare Science: History and Concepts	22
3.1 The History of Animal Welfare Science	22
3.1.1 Before 1960	22
3.1.2 The 1960s and 1970s	24
3.1.3 Post-1980	25
3.2 The Origins of the Animal Welfare Concept	27
3.3 Welfare in Relation to Other Concepts	32
3.3.1 Adaptation and welfare	32
3.3.2 Stress in relation to welfare	32
3.3.3 Needs and welfare	33
3.3.4 Health in relation to welfare	33
3.3.5 Naturalness and welfare	34
3.3.6 Welfare and well-being	34

3.3.7	Quality of life in relation to welfare	34
3.3.8	Welfare and 'a life worth living'	35
3.4	Welfare in Relation to Sentience	35
4	Brain Complexity and Cognitive Ability	37
4.1	Brain Function and Brain Size	37
4.2	Biology, Brain Function, Brain Structure and Cognitive Ability	38
4.3	Learning	40
4.4	Discrimination and Recognition	41
4.5	Cognition	42
4.6	Range of Cognitive Abilities	43
4.7	Metacognition	50
4.8	Innovation	50
4.9	Cognitive Bias	52
4.10	Variability Among Individuals and Within Populations	54
4.11	Capabilities for Morality	55
4.12	The Dangers of Occam's Razor	56
5	Feelings and Emotions	57
5.1	Affect, Feelings and Emotions	57
5.2	Physiological Systems of Emotions and Feelings	60
5.3	Mood	61
5.4	Cognition in Relation to Emotion	62
5.5	Pain	64
5.6	Fear	68
5.7	Anxiety	68
5.8	Various Pleasures	68
5.9	Social Affection	69
5.10	Guilt, Anger and Rage	69
5.11	Welfare in Relation to Feelings	71
6	Awareness and Consciousness	72
6.1	The Meaning of Awareness	72
6.2	Reporting Perception and Blind-sight	74
6.3	Consciousness	75
6.4	Assessing Own Actions and the Actions of Others	77
6.5	Concepts of the Future	78
6.6	Concept of Self	80
6.7	Awareness of Others Having Concepts	82
6.8	Evolution of Awareness	83
7	Motivation and Needs	84
7.1	Motivation	84
7.2	Needs	85
7.3	Freedoms	86

7.4	Welfare in Relation to Needs	87
7.5	Assessing What is Important to Animals	87
8	Welfare Assessment	90
8.1	Positive and Negative Welfare, Short-term and Long-term Assessment	90
8.2	Behavioural, Physiological and Clinical Indicators of Poor Welfare	91
8.2.1	Physiological measures	91
8.2.2	Behavioural measures	95
8.2.3	Disease, injury, movement and growth measures	97
8.3	Pain Assessment	98
8.4	Indicators of Good Welfare Including Pleasure, Happiness, Good Health	101
8.4.1	Reporting on happiness, or direct measurement?	101
8.4.2	Using information about preferences	101
8.4.3	Play and normal behaviour	101
8.4.4	Direct measures of good welfare	103
8.5	Integration of Welfare Measures	104
8.6	Risk and Benefit Analysis in Animal Welfare	105
8.7	Welfare Reports and Welfare Outcome Indicators for Use in Inspection	106
9	Sentience During Development, Brain Damage and Old Age	108
9.1	Introduction: Pre- and Post-sentience	108
9.2	Sentience in Embryos and Fetuses	109
9.2.1	Some developmental differences	109
9.2.2	Neural and pain system development	110
9.2.3	Awareness in the fetus	111
9.3	Sentience in Young Individuals	113
9.4	Sentience in Brain-damaged and Old Individuals	113
9.5	Welfare During Development, After Brain Damage and During Old Age	114
10	Ethical Decisions About Humans and Non-humans	116
10.1	Ethical Decisions when Sentience has been Evaluated	116
10.2	Summary of Which Animals are Sentient and When	117
10.3	Animal Protection	119
10.4	Conclusions About Sentience Research and Which Animals to Protect	121
10.5	Protection of the Unborn Child and Other Young	122
10.6	Protection of Brain-damaged and Senile Persons and Other Animals	123

11	Sustainability, Welfare Attitudes and Education	125
11.1	Sustainability	125
11.2	Changing Ideas About Product Quality	126
11.3	Attitudes to Animal Welfare and Consumer Pressure	126
11.4	Welfare of Wild Animals, Including Pests	128
11.5	GM Animals: Welfare and Public Attitudes	131
11.6	Welfare Legislation	136
11.7	Welfare and Codes of Practice	139
11.8	Education: Animal Abilities and Welfare	140
11.8.1	Teaching animal welfare: non-university courses	140
11.8.2	Teaching animal welfare: university courses	140
	References	143
	Author Index	169
	Subject index	179