



Massey University

Animal Welfare Science and Bioethics Centre

Professor Kevin J Stafford – Co-Director

Professor Craig B Johnson – Co-Director

Dr Ngaio J Beausoleil – Deputy Director

Professor David J Mellor – Foundation Director



Collaborating Centre for Animal Welfare Science
and Bioethical Analysis:
Founding Partner

<http://animalwelfare.massey.ac.nz>

Thriving – Not Merely Surviving: New Keys to Unlock Impediments to the Enhancement of Animal Welfare

Professor David J Mellor

BSc(Hons), PhD, HonAssocRCVS, ONZM

D.J.Mellor@massey.ac.nz



Massey University



Key Published Sources

- Fraser, D. and Duncan, I.J.H. (1998). 'Pleasures', 'pains' and animal welfare: Toward a natural history of affect. *Animal Welfare* 7, 383–396.
- Yeates, J.W. and Main, D.C.J. (2008). Assessment of positive welfare: A review. *The Veterinary Journal* 175, 293–300.
- Mellor, D.J. (2015a). Enhancing animal welfare by creating opportunities for 'positive affective engagement'. *NZ Veterinary Journal* 63, 3-8.
- Mellor, D.J. (2015b). Positive welfare states and promoting environment-focused and animal-to-animal interactive behaviours. *NZ Veterinary Journal* 63, 9-16.
- Mellor, D.J. (2015c). Positive animal welfare states and reference standards for welfare assessment. *NZ Veterinary Journal* 63, 17-23.
- Mellor, D.J. and Beausoleil, N.J. (2015). Extending the 'Five Domains' model for animal welfare assessment to incorporate positive welfare states. *Animal Welfare* 24, 241-253.
- Mellor, D.J. (2016). Updating animal welfare thinking: Moving beyond the 'Five Freedoms' towards 'A Life Worth Living'. *Animals* 6(3), 21; doi:10.3390/ani6030021
- Mellor, D.J. (2016). Moving beyond the 'Five Freedoms' by updating the 'Five Provisions' and introducing aligned 'Animal Welfare Aims'. *Animals* 6(10), 59; doi:10.3390/ani6100059
- Mellor, D.J. (2017). Operational details of the Five Domains Model and its key applications to the assessment and management of animal welfare. *Animals* 7(8), 60; doi:10.3390/ani7080060



OUR PURPOSE:

**FOR ANIMALS TO 'THRIVE'
NOT MERELY 'SURVIVE'**



Areas considered

- *The Freedoms, Provisions and Welfare Aims*
 - The Five Freedoms and importance of the Provisions
 - The Five Provisions / Welfare Aims Paradigm
- *The Five Domains Model*
 - Overview
 - Examples of its operation
- *Seven Key Applications of the Model*
 - Key general foci of AW management
 - Foundations of specific AW management objectives
 - Identifies previously unrecognised features of poor and good welfare
 - Monitoring changes in AW
 - Grading of AW compromise and/or enhancement
 - Prospective and retrospective AW assessments
 - Quality of Life assessments relevant to end-of-life decisions
- *Concluding comments*



Areas considered

- *The Freedoms, Provisions and Welfare Aims*
 - The Five Freedoms and importance of the Provisions
 - The Five Provisions / Welfare Aims Paradigm
- *The Five Domains Model*
 - Overview
 - Examples of its operation
- *Seven Key Applications of the Model*
 - Key general foci of AW management
 - Foundations of specific AW management objectives
 - Identifies previously unrecognised features of poor and good welfare
 - Monitoring changes in AW
 - Grading of AW compromise and/or enhancement
 - Prospective and retrospective AW assessments
 - Quality of Life assessments relevant to end-of-life decisions
- *Concluding comments*



The 'Five Freedoms' – overview

Freeloms	Provisions
1. Freedom <i>from</i> thirst, hunger and malnutrition	By providing ready access to fresh water and a diet to maintain full health and vigour
2. Freedom <i>from</i> discomfort and exposure	By providing an appropriate environment including shelter and a comfortable resting area
3. Freedom <i>from</i> pain, injury and disease	By prevention or rapid diagnosis and treatment
4. Freedom <i>from</i> fear and distress	By ensuring conditions and treatment which avoid mental suffering
5. Freedom <i>to</i> express normal behaviour	By providing sufficient space, proper facilities and the company of the animal's own kind

The 'Five Provisions'

- The Freedoms are *problematic*
- **BUT, the PROVISIONS are still *practically useful* in some ways**

Domain/category	Provisions
1. Nutrition	Provide ready access to fresh water and a diet to maintain full health and vigour
2. Environment	Provide an appropriate environment including shelter and a comfortable resting area
3. Health	Prevent or rapidly diagnose and treat injury and disease
4. Behaviour	Provide sufficient space, proper facilities and the company of the animal's own kind
5. Mental experiences	Ensure conditions and treatment which avoid mental suffering

The 'Five Provisions / Welfare Aims' paradigm

Three key issues regarding the 'Five Freedoms':

1. The Provisions more influential than the 'Freedoms' because they provide practical advice on animal welfare management
2. Most negative experiences listed in the 'Five Freedoms' can only be minimised, NOT eliminated
3. The 'Freedoms' mostly focussed on negative experiences, BUT now we must ALSO include positive experiences.



The 'Five Provisions / Welfare Aims' paradigm

Three key issues regarding the 'Five Freedoms':

1. The Provisions more influential than the 'Freedoms' because they provide practical advice on animal welfare management
2. Most negative experiences listed in the 'Five Freedoms' can only be minimised, NOT eliminated
3. The 'Freedoms' mostly focussed on negative experiences, BUT now we must ALSO include positive experiences.

Three steps are therefore recommended:

1. Avoid reference to the 'Five Freedoms' to reduce misconceptions and confusion
2. Emphasise the 'Provisions', BUT update them to give attention both to negative and positive experiences or states
3. Align each Provision with salient Animal Welfare Aims that emphasise animals' experiences that most affect their welfare.



The 'Five Provisions / Welfare Aims' paradigm

Provision	Animal Welfare Aims
1. Good nutrition: Provide ready access to fresh water and a diet to maintain full health and vigour	<u>Minimise</u> thirst and hunger and <u>enable</u> eating to be a pleasurable experience

The 'Five Provisions / Welfare Aims' paradigm

Provision	Animal Welfare Aims
1. Good nutrition: Provide ready access to fresh water and a diet to maintain full health and vigour	<u>Minimise</u> thirst and hunger and <u>enable</u> eating to be a pleasurable experience
2. Good environment: Provide shade/shelter or suitable housing, good air quality and comfortable resting areas	<u>Minimise</u> discomfort and exposure and <u>promote</u> thermal, physical and other comforts

The 'Five Provisions / Welfare Aims' paradigm

Provision	Animal Welfare Aims
1. Good nutrition: Provide ready access to fresh water and a diet to maintain full health and vigour	<u>Minimise</u> thirst and hunger and <u>enable</u> eating to be a pleasurable experience
2. Good environment: Provide shade/shelter or suitable housing, good air quality and comfortable resting areas	<u>Minimise</u> discomfort and exposure and <u>promote</u> thermal, physical and other comforts
3. Good health: Prevent or rapidly diagnose and treat disease and injury, and foster good muscle tone, posture and cardiorespiratory function	<u>Minimise</u> breathlessness, nausea, pain and other aversive experiences and <u>promote</u> the pleasures of robustness, vigour, strength and well coordinated physical activity

The 'Five Provisions / Welfare Aims' paradigm

Provision	Animal Welfare Aims
1. Good nutrition: Provide ready access to fresh water and a diet to maintain full health and vigour	<u>Minimise</u> thirst and hunger and <u>enable</u> eating to be a pleasurable experience
2. Good environment: Provide shade/shelter or suitable housing, good air quality and comfortable resting areas	<u>Minimise</u> discomfort and exposure and <u>promote</u> thermal, physical and other comforts
3. Good health: Prevent or rapidly diagnose and treat disease and injury, and foster good muscle tone, posture and cardiorespiratory function	<u>Minimise</u> breathlessness, nausea, pain and other aversive experiences and <u>promote</u> the pleasures of robustness, vigour, strength and well coordinated physical activity
4. Appropriate behaviour: Provide sufficient space, proper facilities, congenial company and appropriately varied conditions	<u>Minimise</u> threats and unpleasant restrictions on behaviour and <u>promote</u> engagement in rewarding activities

The 'Five Provisions / Welfare Aims' paradigm

Provision	Animal Welfare Aims
1. Good nutrition: Provide ready access to fresh water and a diet to maintain full health and vigour	<u>Minimise</u> thirst and hunger and <u>enable</u> eating to be a pleasurable experience
2. Good environment: Provide shade/shelter or suitable housing, good air quality and comfortable resting areas	<u>Minimise</u> discomfort and exposure and <u>promote</u> thermal, physical and other comforts
3. Good health: Prevent or rapidly diagnose and treat disease and injury, and foster good muscle tone, posture and cardiorespiratory function	<u>Minimise</u> breathlessness, nausea, pain and other aversive experiences and <u>promote</u> the pleasures of robustness, vigour, strength and well coordinated physical activity
4. Appropriate behaviour: Provide sufficient space, proper facilities, congenial company and appropriately varied conditions	<u>Minimise</u> threats and unpleasant restrictions on behaviour and <u>promote</u> engagement in rewarding activities
5. Positive mental experiences: Provide safe, congenial and species-appropriate opportunities to have pleasurable experiences	<u>Promote</u> various forms of comfort, pleasure, interest, confidence and a sense of control

Areas considered

- *The Freedoms, Provisions and Welfare Aims*
 - The Five Freedoms and importance of the Provisions
 - The Five Provisions / Welfare Aims Paradigm
- *The Five Domains Model*
 - Overview
 - Examples of its operation
- *Seven Key Applications of the Model*
 - Key general foci of AW management
 - Foundations of specific AW management objectives
 - Identifies previously unrecognised features of poor and good welfare
 - Monitoring changes in AW
 - Grading of AW compromise and/or enhancement
 - Prospective and retrospective AW assessments
 - Quality of Life assessments relevant to end-of-life decisions
- *Concluding comments*

The 2015 Five Domains Model – overview

- The Model:
 - Is NOT a *definition* of animal welfare
 - *Characterising welfare* is preferred to *defining* it
 - Characterisation is in terms of the *key attributes* of welfare
 - Is NOT an accurate representation of *body structure/function*
 - Each Domain *focuses attention* on areas *relevant to animal welfare assessment and management*



The 2015 Five Domains Model – overview

- The Model:
 - Is NOT a *definition* of animal welfare
 - *Characterising welfare* is preferred to *defining* it
 - Characterisation is in terms of the *key attributes* of welfare
 - Is NOT an accurate representation of *body structure/function*
 - Each Domain *focuses attention* on areas *relevant to animal welfare assessment and management*
 - **Thus, it IS a *focusing device***
 - **It is designed to *facilitate systematic, structured, coherent and comprehensive* animal welfare assessments**



The 2015 Five Domains Model – overview

- **The Model:**

- Is NOT a *definition* of animal welfare
 - *Characterising welfare* is preferred to *defining* it
 - Characterisation is in terms of the *key attributes* of welfare
- Is NOT an accurate representation of *body structure/function*
 - Each Domain *focuses attention* on areas *relevant to animal welfare assessment and management*
- Thus, it IS a *focusing device*
- It is designed to *facilitate systematic, structured, coherent and comprehensive* animal welfare assessments

The following POSTER gives more explicit guidance on, and numerous examples of, how to use the model to identify negative experiences and promote positive welfare states



The Five Domains Model

Physical/Functional Domains

Survival-Related Factors				Situation-Related Factors			
1: Nutrition		2: Environment		3: Health		4: Behaviour	
Restrictions on: Water intake Food intake Food quality Food variety Voluntary overeating Force-feeding	Opportunities to: Drink enough water Eat enough food Eat a balanced diet Eat a variety of foods Eating correct quantities	Unavoidable/imposed conditions: Thermal extremes Unsuitable substrate Close confinement Atmospheric pollutants: CO ₂ , ammonia, dust, smoke Unpleasant/strong odours Light: inappropriate intensity Loud/otherwise unpleasant noise Environmental monotony: ambient, physical, lighting Unpredictable events	Available conditions: Thermally tolerable Suitable substrate Space for freer movement Fresh air Pleasant/tolerable odours Light intensity tolerable Noise exposure acceptable Normal environmental variability Predictability	Presence of: Disease: acute, chronic Injury: acute, chronic; husbandry mutilations Functional impairment: due to limb amputation; or lung, heart, vascular, kidney, neural or other problems Poisons Obesity/leanness Poor physical fitness: muscle de-conditioning	Little or no: Disease Injury Functional impairment Poisoning Body condition appropriate Good fitness level	Exercise of 'agency' impeded by: Invariant, barren environment (ambient, physical, biotic) Inescapable sensory impositions Choices markedly restricted Constraints on environment-focused activity Constraints on animal-to-animal interactive activity Limits on threat avoidance, escape or defensive activity Limitations on sleep/rest	'Agency' exercised via: Varied, novel, engaging environmental challenges Congenial sensory inputs Available engaging choices Free movement Exploration Foraging/hunting Bonding/greasing bonds Rearing young Playing Sexual activity Using refuges, retreat, or defensive attack Sleep/rest sufficient

Affective Experience Domain

5: Mental State							
Negative Thirst Hunger (general) Hunger (salt) Malnutrition malaise Rioted, over full Gastrointestinal pain	Positive Wetting/quenching Pleasures of drinking Pleasures of different tastes/smells Pleasure of salt taste Masticatory pleasures Postprandial satiety Gastrointestinal comfort	Negative Forms of discomfort: Thermal: chilling, overheating Physical: joint pain, skin irritation Physical: stiffness, muscle tension Respiratory: e.g. breathlessness Olfactory Auditory: impairment, pain Visual: glare/darkness eye strain Malaise from unnatural constancy	Positive Forms of comfort: Thermal Physical Respiratory Olfactory Auditory Visual Variety-related comfort	Negative Breathlessness Pain: many types Debility, weakness Sickness, malaise Nausea Dizziness Physical exhaustion	Positive Comfort of good health and high functional capacity Vitality of fitness	Negative Anger, frustration Boredom, helplessness Loneliness, isolation Depression Sexual frustration Anxiety, fearfulness, panic, anger Neophobia Exhaustion	Positive Calmness Engaged, in control Affectionate sociability Maternally rewarded Excitation/playfulness Sexual gratification Secure/protected/confident Likes novelty Energised/refreshed

Welfare Status



The 2015 Five Domains Model – operation

- **Key features of the Model:**
 - **Distinguishes between:**
 - *Survival-related ‘biological functioning’ (domains 1-3):*
Related to sensory inputs from inside the body
 - *Situation-related ‘environmental enrichment’ (domain 4):*
Related to sensory inputs from outside the body
 - **Identifies both -ve and +ve elements in each domain:**
 - *Physical/functional states (1-3)*
 - *Perceived external circumstances (4)*
 - *AND the aligned -ve and +ve affective experiences (5)*



The 2015 Five Domains Model – operation

- **Key features of the Model:**
 - **Distinguishes between:**
 - *Survival-related ‘biological functioning’ (domains 1-3):*
Related to sensory inputs from inside the body
 - *Situation-related ‘environmental enrichment’ (domain 4):*
Related to sensory inputs from outside the body
 - **Identifies both -ve and +ve elements in each domain:**
 - *Physical/functional states (1-3)*
 - *Perceived external circumstances (4)*
 - *AND the aligned -ve and +ve affective experiences (5)*
 - **The foregoing details explain the biological/affective background to the model**

Let us now look at a few examples



The Five Domains Model

Physical/Functional Domains

Survival-Related Factors				Situation-Related Factors	
1: Nutrition		2: Environment		3: Health	
Restrictions on:	Opportunities to:	Unavoidable/imposed conditions	Available conditions:	Presence of:	Little or no:
Water intake Food intake Food quality Food variety Voluntary overeating Force-feeding	Drink enough water Eat enough food Eat a balanced diet Eat a variety of foods Eating correct quantities	Thermal extremes Unsuitable substrate Close confinement Atmospheric pollutants: CO ₂ , ammonia, dust, smoke Unpleasant/strong odours Light: inappropriate intensity Loud/otherwise unpleasant noise Environmental monotony: ambient, physical, lighting Unpredictable events	Thermally tolerable Suitable substrate Space for free movement Fresh air Pleasant/tolerable odours Light intensity tolerable Noise exposure acceptable Normal environmental variability Predictability	Disease: acute, chronic Injury: acute, chronic; husbandry mutilations Functional impairment: due to limb amputation; or lung, heart, vascular, kidney, neural or other problems Poisons Obesity/leanness Poor physical fitness: muscle de-conditioning	Disease injury Functional impairment Poisoning Body condition appropriate Good fitness level
				Exercise of 'agency' impeded by:	'Agency' exercised via:
				Invariant, barren environment (ambient, physical, biotic) Inescapable sensory impositions Choices markedly restricted Constraints on environment-focused activity Constraints on animal-to-animal interactive activity Limits on threat avoidance, escape or defensive activity Limitations on sleep/rest	Varied, novel, engaging environmental challenges Congenial sensory inputs Available engaging choices Free movement Exploration Foraging/hunting Bonding/reaffirming bonds Raising young Playing Sexual activity Using refuges, retreat, or defensive attack Sleep/rest sufficient

Affective Experience Domain

5: Mental State							
Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive
Thirst	Wetted/quenching	Forms of discomfort: Thermal: chilling, overheating	Forms of comfort: Thermal	Breathlessness	Comfort of good health and high functional capacity	Anger, frustration	Calmness
Hunger (general)	Pleasures of drinking	Physical: joint pain, skin irritation	Physical	Pain: many types		Boredom, helplessness	Engaged, in control
Hunger (salt)	Pleasures of different tastes/smells	Physical: stiffness, muscle tension		Debility, weakness		Loneliness, isolation	Affectionate sociability
Malnutrition malaise	Pleasure of salt taste	Respiratory: e.g. breathlessness	Respiratory	Sickness, malaise		Depression	Maternally rewarded
Bloated, over full	Postprandial satiety	Masticatory pleasures	Olfactory	Nausea		Sexual frustration	Excitation/playfulness
Gastrointestinal pain		Auditory: impairment, pain	Auditory	Dizziness			Sexual gratification
		Visual: glare/darkness eye strain	Visual	Physical exhaustion	Vitality of fitness	Anxiety, fearfulness, panic, anger	Secure/protected/confident
		Malaise from unnatural constancy	Variety-related comfort			Neophobia	Likes novelty
						Exhaustion	Energised/refreshed

Welfare Status



The 2015 Five Domains Model – *affective states*

Domain 1: Nutrition

Restrictions on:

Water intake
Food intake
Food quality
Food variety

Voluntary overeating

Domain 5: Mental State

Negative

Thirst

Hunger (general)
Hunger (salt)

Malnutrition malaise
Bloated, over full



The 2015 Five Domains Model – *affective states*

Domain 1: Nutrition

Restrictions on:

Water intake
Food intake
Food quality
Food variety

Voluntary overeating

Opportunities to:

Drink enough water
Eat enough food
Eat a balanced diet
Eat a variety of foods

Eating correct quantities

Domain 5: Mental State

Negative

Thirst

Hunger (general)
Hunger (salt)

Malnutrition malaise
Bleated, over full

Positive

Wetting/quenching pleasures of drinking
Pleasures of different tastes/smells
Pleasure of salt taste
Masticatory pleasures
Postprandial satiety
Gastrointestinal comfort

The Five Domains Model

Physical/Functional Domains

Survival-Related Factors						Situation-Related Factors	
1: Nutrition		2: Environment		3: Health		4: Behaviour	
Restrictions on: Water intake Food intake Food quality Food variety Voluntary overeating Force-feeding	Opportunities to: Drink enough water Eat enough food Eat a balanced diet Eat a variety of foods Eating correct quantities	Unavoidable/imposed conditions: Thermal extremes Unsuitable substrate Close confinement Atmospheric pollutants: CO ₂ , ammonia, dust, smoke Unpleasant/strong odours Light: inappropriate intensity Loud/otherwise unpleasant noise Environmental monotony: ambient, physical, lighting Unpredictable events	Available conditions: Thermally tolerable Suitable substrate Space for freer movement Fresh air Pleasant/tolerable odours Light intensity tolerable Noise exposure acceptable Normal environmental variability Predictability	Presence of: Disease: acute, chronic Injury: acute, chronic; husbandry mutilations Functional impairment: due to limb amputation; or lung, heart, vascular, kidney, neural or other problems Poisons Obesity/leanness Poor physical fitness: muscle de-conditioning	Little or no: Disease Injury Functional impairment Poisoning Body condition appropriate Good fitness level	Exercise of 'agency' impeded by: Invariant, barren environment (ambient, physical, biotic) Inescapable sensory impositions Choices markedly restricted Constraints on environment-focused activity Constraints on animal-to-animal interactive activity Limits on threat avoidance, escape or defensive activity Limitations on sleep/rest	'Agency' exercised via: Varied, novel, engaging environmental challenges Congenial sensory inputs Available engaging choices Free movement Exploration Foraging/hunting Bonding/greasingfirm bonds Rearing young Playing Sexual activity Using refuges, retreat, or defensive attack Sleep/rest sufficient

Affective Experience Domain

5: Mental State							
Negative Thirst Hunger (general) Hunger (salt) Malnutrition malaise Bleated, over full Gastrointestinal pain	Positive Wetting/quenching pleasures of drinking Pleasures of different tastes/smells Pleasure of salt taste Masticatory pleasures Postprandial satiety Gastrointestinal comfort	Negative Forms of discomfort: Thermal: chilling, overheating Physical: joint pain, skin irritation Physical: stiffness, muscle tension Respiratory: e.g. breathlessness Olfactory Auditory: impairment, pain Visual: glare/darkness eye strain Malaise from unnatural constancy	Positive Forms of comfort: Thermal Physical Respiratory Olfactory Auditory Visual Variety-related comfort	Negative Sweatiness Pain: many types Debility, weakness Sickness, malaise Nausea Dizziness Physical exhaustion	Positive Comfort of good health and high functional capacity Vitality of fitness	Negative Anger, frustration Boredom, helplessness Loneliness, isolation Depression Sexual frustration Anxiety, fearfulness, panic, anger Neophobia Exhaustion	Positive Calmness Engaged, in control Affectionate sociability Maternally rewarded Excitation/playfulness Sexual gratification Secure/protected/confident Likes novelty Energised/refreshed

Welfare Status

The 2015 Five Domains Model – *affective states*

Domain 2: Environment

Unavoidable/imposed conditions:

Thermal extremes
 Injurious physical features
 Injuries from close confinement
 Atmospheric pollutants: e.g. CO₂,
 ammonia, dust
 Environmental monotony:
 ambient, physical

Domain 5: Mental State

Negative

Thermal discomfort: e.g. chilling or
 hyperthermic distress
 Physical discomfort/pain due to: e.g.
 - bruises, cuts, fractures
 - arthritis, skin rashes
 Respiratory discomfort: e.g. inflammation,
 breathlessness
 Malaise from unnatural constancy



The 2015 Five Domains Model – *affective states*

Domain 2: Environment

Unavoidable/imposed conditions:

Thermal extremes
 Injurious physical features
 Injuries from close confinement
 Atmospheric pollutants: e.g. CO₂,
 ammonia, dust
 Environmental monotony:
 ambient, physical

Available conditions:

Thermally tolerable
 Physical hazards minimal
 Space for freer movement
 Fresh air
 Normal environmental
 variability

Domain 5: Mental State

Negative

Thermal discomfort: e.g. chilling or
 hyperthermic distress
 Physical discomfort/pain due to: e.g.
 - bruises, cuts, fractures
 - arthritis, skin rashes
 Respiratory discomfort: e.g. inflammation,
 breathlessness
 Malaise from unnatural constancy

Positive

Thermal comfort
 Physical comfort
 Respiratory comfort
 Variety-related comfort



The Five Domains Model

Physical/Functional Domains

Survival-Related Factors				Situation-Related Factors			
1: Nutrition		2: Environment		3: Health		4: Behaviour	
Restrictions on: Water intake Food intake Food quality Food variety Voluntary overeating Force-feeding	Opportunities to: Drink enough water Eat enough food Eat a balanced diet Eat a variety of foods Eating correct quantities	Unavoidable/imposed conditions: Thermal extremes Unsuitable substrate Close confinement Atmospheric pollutants: CO ₂ , ammonia, dust, smoke Unpleasant/strong odours Light: inappropriate intensity Loud/otherwise unpleasant noise Environmental monotony: ambient, physical, lighting Unpredictable events	Available conditions: Thermally tolerable Suitable substrate Space for freer movement Fresh air Pleasant/tolerable odours Light intensity tolerable Noise exposure acceptable Normal environmental variability Predictability	Presence of: Disease: acute, chronic Injury: acute, chronic; husbandry mutilations Functional impairment: due to limb amputation, or lung, heart, vascular, kidney, neural or other problems Poisons Obesity/leanness Poor physical fitness: muscle de-conditioning	Little or no: Disease Injury Functional impairment Poisoning Body condition appropriate Good fitness level	Exercise of 'agency' impeded by: Invariant, barren environment (ambient, physical, biotic) Inescapable sensory impositions Choices markedly restricted Constraints on environment-focused activity Constraints on animal-to-animal interactive activity Limits on threat avoidance, escape or defensive activity Limitations on sleep/rest	'Agency' exercised via: Varied, novel, engaging environmental challenges Congenial sensory inputs Available engaging choices Free movement Exploration Foraging/hunting Bonding/reaffirming bonds Rearing young Playing Sexual activity Using refuges, retreat, or defensive attack Sleep/rest sufficient

Affective Experience Domain

5: Mental State							
Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive
Thirst Hunger (general) Hunger (salt) Malnutrition malaise Bleated, over full Gastrointestinal pain	Wetting/quenching Pleasures of drinking Pleasures of different tastes/smells Pleasure of salt taste Masticatory pleasures Postprandial satiety Gastrointestinal comfort	Forms of discomfort: Thermal: chilling, overheating Physical: joint pain, skin irritation Physical: stiffness, muscle tension Respiratory: e.g. breathlessness Olfactory Auditory: impairment, pain Visual: glare/darkness eye strain Malaise from unnatural constancy	Forms of comfort: Thermal Physical Respiratory Olfactory Auditory Visual Variety-related comfort	Breathlessness Pain: many types Debility, weakness Sickness, malaise Nausea Dizziness Physical exhaustion	Comfort of good health and high functional capacity Vitality of fitness	Anger, frustration Boredom, helplessness Loneliness, isolation Depression Sexual frustration Anxiety, fearfulness, panic, anger Neophobia Exhaustion	Calmness Engaged, in control Affectionate sociability Maternally rewarded Excitation/playfulness Sexual gratification Secure/protected/confident Likes novelty Energised/refreshed

Welfare Status



The 2015 Five Domains Model – *affective states*

Domain 3: Health

Presence of:

Disease: acute, chronic
Injury: acute, chronic
Functional impairment:
 acute or chronic limitation e.g. after
 limb amputation, partial lung
 resection or renal, cardiovascular,
 or other disease
 Poor physical fitness

Domain 5: Mental State

Negative

Breathlessness
Pain: many types
Debility/weakness
Sickness, Nausea, Dizziness
Muscle weakness



The 2015 Five Domains Model – *affective states*

Domain 3: Health

Presence of:

Disease: acute, chronic
Injury: acute, chronic
Functional impairment:
acute or chronic limitation e.g. after
limb amputation, partial lung
resection or renal, cardiovascular,
or other disease
Poor physical fitness

Little or no:

Disease
Injury
Functional impairment
Good fitness level

Domain 5: Mental State

Negative

Breathlessness
Pain: many types
Debility/weakness
Sickness, Nausea, Dizziness
Muscle weakness

Positive

Comfort of high functional
capacity
Vitality of fitness

The Five Domains Model

Physical/Functional Domains

Survival-Related Factors				Situation-Related Factors			
1: Nutrition		2: Environment		3: Health		4: Behaviour	
Restrictions on:	Opportunities to:	Unavoidable/imposed conditions	Available conditions:	Presence of:	Little or no:	Exercise of 'agency' impeded by:	'Agency' exercised via:
Water intake Food intake Food quality Food variety	Drink enough water Eat enough food Eat a balanced diet Eat a variety of foods	Thermal extremes Unsuitable substrate Close confinement Atmospheric pollutants: CO ₂ , ammonia, dust, smoke Unpleasant/strong odours Light: inappropriate intensity Loud/otherwise unpleasant noise	Thermally tolerable Suitable substrate Space for freer movement Fresh air Pleasant/tolerable odours Light intensity tolerable Noise exposure acceptable	Disease: acute, chronic Injury: acute, chronic; husbandry mutilations Functional impairment: due to limb amputation; or lung, heart, vascular, kidney, neural or other problems Poisons	Disease Injury Functional impairment	Invariant, barren environment (ambient, physical, biotic) Inescapable sensory inputs Choices markedly restricted Constraints on environment- focused activity	Varied, novel, engaging environmental challenges Congenial sensory inputs Available engaging choices Free movement Exploration Foraging/hunting Bonding/greasing bonds
Voluntary overeating Force-feeding	Eating correct quantities	Environmental monotony: ambient, physical, lighting Unpredictable events	Normal environmental variability Predictability	Obesity/leanness Poor physical fitness: muscle de-conditioning	Poisoning Body condition appropriate Good fitness level	Constraints on animal-to- animal interactive activity Limits on threat avoidance, escape or defensive activity	Playing Sexual activity Using refuges, retreat, or defensive attack Sleep/rest sufficient

Affective Experience Domain

5: Mental State							
Negative Thirst Hunger (general) Hunger (salt) Malnutrition malaise Bloating, over full Gastrointestinal pain	Positive Wetting/quenching Pleasures of drinking Pleasures of different tastes/smells Pleasure of salt taste Masticatory pleasures Postprandial satiety Gastrointestinal comfort	Negative Forms of discomfort: Thermal: chilling, overheating Physical: joint pain, skin irritation Physical: stiffness, muscle tension Respiratory: e.g. breathlessness Olfactory Auditory: impairment, pain Visual: glare/darkness eye strain Malaise from unnatural constancy	Positive Forms of comfort: Thermal Physical Respiratory Olfactory Auditory Visual Variety-related comfort	Negative Breathlessness Pain: many types Debility, weakness Sickness, malaise Nausea Dizziness Physical exhaustion	Positive Comfort of good health and high functional capacity Vitality of fitness	Negative Anger, frustration Boredom, helplessness Loneliness, isolation Depression Sexual frustration Anxiety, fearfulness, panic, anger Neophobia Exhaustion	Positive Calmness Engaged, in control Affectionate sociability Maternally rewarded Excitation/playfulness Sexual gratification Secure/protected/confident Likes novelty Energised/refreshed

Welfare Status

The 2015 Five Domains Model – *affective states*

Domain 4: Behaviour

**An animal exercises ‘agency’ when it engages in
voluntary, self-generated and goal-directed
behaviours**

**Many such behaviours are rewarding and are
accompanied by +ve affects**



The 2015 Five Domains Model – *affective states*

Domain 4: Behaviour

Exercise of ‘agency’ impeded by:

Invariant, barren environment
(ambient, physical, biotic)
Constraints on environment-
focussed activity
Constraints on animal-to-
animal interactive activity
Limited sleep/rest
Limits on threat avoidance,
escape or defensive activity

Domain 5: Mental State

Negative

Anger, frustration
Boredom, helplessness
Loneliness, isolation
Depression, withdrawal

Unsatisfied sexually
Exhaustion
Anxiety, fearfulness, panic, neophobia



The 2015 Five Domains Model – *affective states*

Domain 4: Behaviour

Exercise of 'agency' impeded by:

Invariant, barren environment
(ambient, physical, biotic)
Constraints on environment-
focussed activity
Constraints on animal-to-
animal interactive activity
Limited sleep/rest
Limits on threat avoidance,
escape or defensive activity

Opportunities to exercise 'agency' via:

Varied, novel, engaging
environmental challenges
Free movement, Exploration
Foraging/hunting, Bonding/Reaffirming
bonds, Rearing young, Playing,
Sexual activity
Sleeping/resting
Using refuges, retreat, or
defensive attack

Domain 5: Mental State

Negative

Anger, frustration
Boredom, helplessness
Loneliness, isolation
Depression, withdrawal

Unsatisfied sexually
Exhaustion
Anxiety, fearfulness, panic, neophobia

Positive

Calmness
Vitality/reward
Affectionate sociability
Maternally/paternally/group rewarded
Excitation/playfulness
Sexually gratified
Energised/refreshed
Secure/protected/confident

The Five Domains Model

Physical/Functional Domains

Survival-Related Factors				Situation-Related Factors			
1: Nutrition		2: Environment		3: Health		4: Behaviour	
Restrictions on: Water intake Food intake Food quality Food variety Voluntary overeating Force-feeding	Opportunities to: Drink enough water Eat enough food Eat a balanced diet Eat a variety of foods Eating correct quantities	Unavoidable/imposed conditions: Thermal extremes Unsuitable substrate Close confinement Atmospheric pollutants: CO ₂ , ammonia, dust, smoke Unpleasant/strong odours Light: inappropriate intensity Loud/otherwise unpleasant noise Environmental monotony: ambient, physical, lighting Unpredictable events	Available conditions: Thermally tolerable Suitable substrate Space for freer movement Fresh air Pleasant/tolerable odours Light intensity tolerable Noise exposure acceptable Normal environmental variability Predictability	Presence of: Disease: acute, chronic Injury: acute, chronic; husbandry mutilations Functional impairment: due to limb amputation; or lung, heart, vascular, kidney, neural or other problems Poisons Obesity/leanness Poor physical fitness: muscle de-conditioning	Little or no: Disease Injury Functional impairment Poisoning Body condition appropriate Good fitness level	Exercise of 'agency' impeded by: Invariant, barren environment (ambient, physical, biotic) Inescapable sensory impositions Choices markedly restricted Constraints on environment-focussed activity Constraints on animal-to-animal interactive activity Limits on threat avoidance, escape or defensive activity Limitations on sleep/rest	'Agency' exercised via: Varied, novel, engaging environmental challenges Congenial sensory inputs Available engaging choices Free movement Exploration Foraging/hunting Bonding/reaffirming bonds Rearing young Playing Sexual activity Using refuges, retreat, or defensive attack Sleep/rest sufficient

Affective Experience Domain

5: Mental State							
Negative Thirst Hunger (general) Hunger (salt) Malnutrition malaise Bloat, over full Gastrointestinal pain	Positive Wetting/quenching Pleasures of drinking Pleasures of different tastes/smells Pleasure of salt taste Masticatory pleasures Postprandial satiety Gastrointestinal comfort	Negative Forms of discomfort: Thermal: chilling, overheating Physical: joint pain, skin irritation Physical: stiffness, muscle tension Respiratory: e.g. breathlessness Olfactory Auditory: impairment, pain Visual: glare/darkness eye strain Malaise from unnatural constancy	Positive Forms of comfort: Thermal Physical Respiratory Olfactory Auditory Visual Variety-related comfort	Negative Breathlessness Pain: many types Debility, weakness Sickness, malaise Nausea Dizziness Physical exhaustion	Positive Comfort of good health and high functional capacity Vitality of fitness	Negative Anger, frustration Boredom, helplessness Loneliness, isolation Depression Sexual frustration Anxiety, fearfulness, panic, anger Neophobia Exhaustion	Positive Calmness Engaged, in control Affectionate sociability Maternally rewarded Excitation/playfulness Sexual gratification Secure/protected/confident Likes novelty Energised/refreshed

Welfare Status

The 2015 Five Domains Model – *affective states*

Domain 5: Mental experiences

Negative

Thirst, Hunger (general/salt)
Malnutrition malaise
Bloated, over full

Positive

Pleasures of drinking, tastes/smells, chewing
Postprandial satiety
Gastrointestinal comfort

The 2015 Five Domains Model – *affective states*

Domain 5: Mental experiences

Negative

Thirst, Hunger (general/salt)
Malnutrition malaise
Bloated, over full

Thermal discomfort (cold/hot)
Physical discomfort (pain/stiffness)
Respiratory discomfort (inflammation,
breathlessness)
Malaise from unnatural constancy

Positive

Pleasures of drinking, tastes/smells, chewing
Postprandial satiety
Gastrointestinal comfort

Thermal comfort
Physical comfort
Respiratory comfort
Variety-related comfort

The 2015 Five Domains Model – *affective states*

Domain 5: Mental experiences

Negative

Thirst, Hunger (general/salt)
Malnutrition malaise
Bloated, over full

Thermal discomfort (cold/hot)
Physical discomfort (pain/stiffness)
Respiratory discomfort (inflammation, breathlessness)
Malaise from unnatural constancy

Breathlessness, Pain, Debility/weakness, Sickness, Nausea, Dizziness

Positive

Pleasures of drinking, tastes/smells, chewing
Postprandial satiety
Gastrointestinal comfort

Thermal comfort
Physical comfort
Respiratory comfort

Variety-related comfort

Comfort of high functional capacity and fitness

The 2015 Five Domains Model – *affective states*

Domain 5: Mental experiences

Negative

Thirst, Hunger (general/salt)
Malnutrition malaise
Bloated, over full

Thermal discomfort (cold/hot)
Physical discomfort (pain/stiffness)
Respiratory discomfort (inflammation, breathlessness)
Malaise from unnatural constancy

Breathlessness, Pain, Debility/weakness, Sickness, Nausea, Dizziness

Anger, frustration
Boredom, helplessness
Loneliness, isolation
Depression, withdrawal

Unsatisfied sexually
Exhaustion
Anxiety, fearfulness, panic, neophobia

Positive

Pleasures of drinking, tastes/smells, chewing
Postprandial satiety
Gastrointestinal comfort

Thermal comfort
Physical comfort
Respiratory comfort

Variety-related comfort

Comfort of high functional capacity and fitness

Calmness
Vitality/reward
Affectionate sociability
Maternal/paternal/group rearing rewards
Excitation/playfulness
Sexually gratified
Energised/refreshed
Secure/protected/confident

Areas considered

- *The Freedoms, Provisions and Welfare Aims*
 - The Five Freedoms and importance of the Provisions
 - The Five Provisions / Welfare Aims Paradigm
- *The Five Domains Model*
 - Overview
 - Examples of its operation
- *Seven Key Applications of the Model*
 - Key general foci of AW management
 - Foundations of specific AW management objectives
 - Identifies previously unrecognised features of poor and good welfare
 - Monitoring changes in AW
 - Grading of AW compromise and/or enhancement
 - Prospective and retrospective AW assessments
 - Quality of Life assessments relevant to end-of-life decisions
- *Concluding comments*



Seven Key Applications of the Model

The Model:

1. Specifies key *general foci* for animal welfare management
2. Highlights the *foundations* of specific welfare management objectives
3. Identifies previously *unrecognised features* of poor and good welfare
4. Enables *monitoring of responses* to specific welfare-focused remedial interventions and/or maintenance activities
5. Facilitates *qualitative grading* of particular features of welfare compromise and/or enhancement
6. Enables both *prospective* and *retrospective* welfare assessments to be conducted
7. Provides *adjunct information* to support *Quality of Life* evaluations in the context of *end-of-life decisions*.



Seven Key Applications of the Model

The Model:

1. Specifies key *general foci* for animal welfare *management*

- These *foci* relate to the *targets* of the Provisions:
 - Good nutrition
 - Good environment
 - Good health
 - Appropriate behaviour
- Good application of the Provisions achieves *welfare-relevant affective outcomes*
- We cannot *measure* affects directly, but we can *manage them practically* via the Provisions

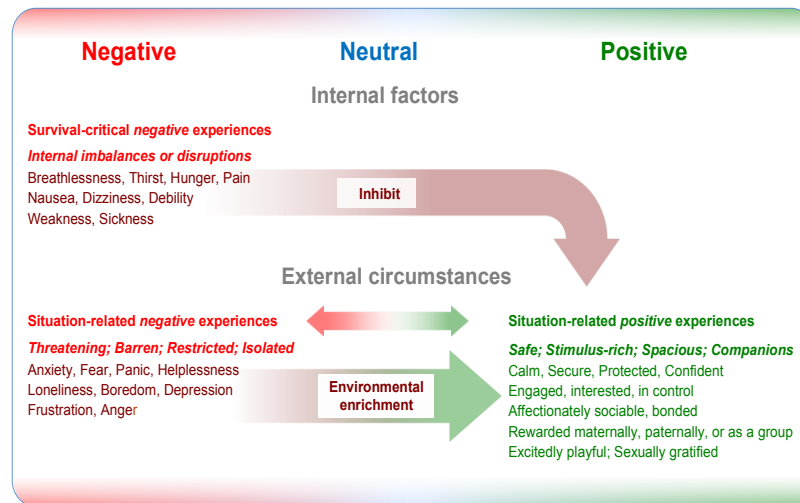
Seven Key Applications of the Model

The Model:

2. Highlights the *foundations* of *specific welfare management objectives*

- *Survival-critical negative affects:*
 - Minimise to low/tolerable levels that still motivate the required behaviours
 - Valence range is ‘*negative-to-neutral*’
- *Situation-related negative affects:*
 - Replace them with *situation-related positive affects* via *enrichments*
 - Valence range is ‘*negative-to-neutral*’
- *Situation-related positive affects:*
 - Provide opportunities to experience comfort, pleasure, interest, confidence and a sense of being in control
 - Valence range is ‘*neutral-to-positive*’

Seven Key Applications of the Model



Seven Key Applications of the Model

The Model:

3. Identifies previously *unrecognised features of poor and good welfare*

- Common misconception: “No pain, no welfare compromise”
- Related to laws that refer to “Pain and suffering”
- Suffering taken to include: *mental cruelty, discomfort or distress*
- All of these descriptors are *generic – non-specific*

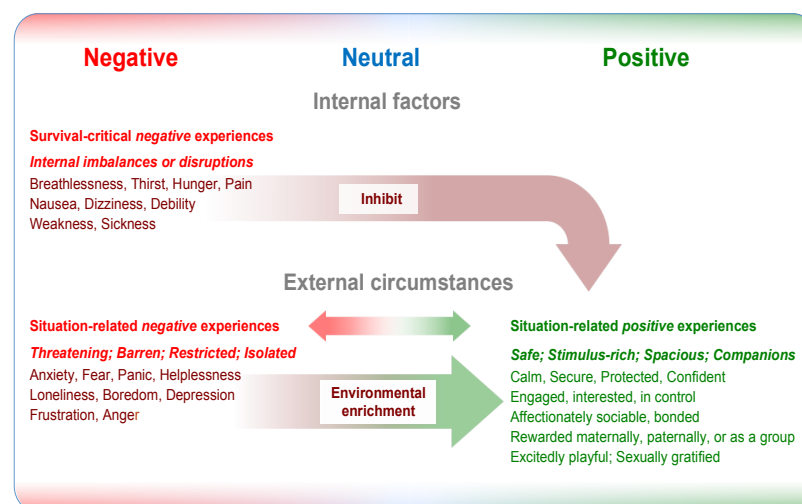
Seven Key Applications of the Model

The Model:

3. Identifies previously *unrecognised features of poor and good welfare*

- Common misconception: “*No pain, no welfare compromise*”
- Related to laws that refer to “*Pain and suffering*”
- Suffering taken to include: *mental cruelty, discomfort or distress*
- All of these descriptors are *generic – non-specific*
- The Model is much more specific with regard to negative affects

Seven Key Applications of the Model



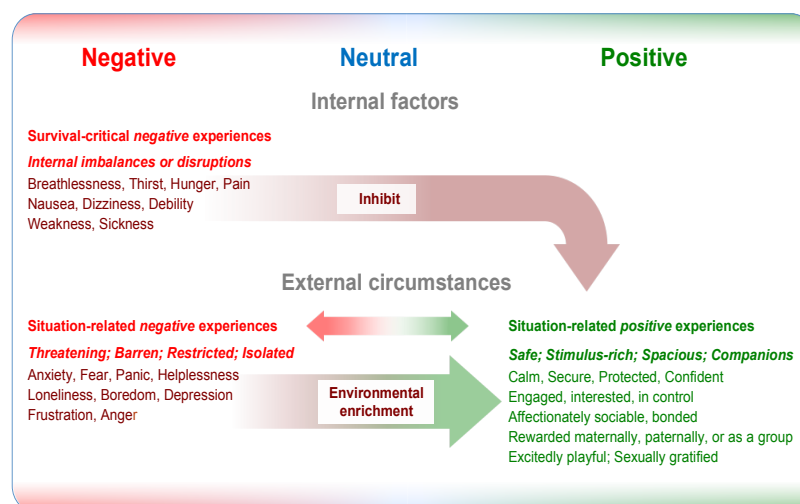
Seven Key Applications of the Model

The Model:

3. Identifies previously *unrecognised features of poor and good welfare*

- Common misconception: “*No pain, no welfare compromise*”
- Related to laws that refer to “*Pain and suffering*”
- Suffering taken to include: *mental cruelty, discomfort or distress*
- All of these descriptors are *generic – non-specific*
- The Model is much more specific with regard to negative affects
- The Model is ALSO very specific about possible *positive affects*

Seven Key Applications of the Model



Seven Key Applications of the Model

The Model:

3. Identifies previously *unrecognised features of poor and good welfare*

- Common misconception: “*No pain, no welfare compromise*”
- Related to laws that refer to “*Pain and suffering*”
- Suffering taken to include: *mental cruelty, discomfort or distress*
- All of these descriptors are *generic – non-specific*
- The Model is much more specific with regard to negative affects
- The Model is ALSO very specific about possible *positive affects*
- This specificity enables more precise targeting, via the Provisions, to correct particular welfare compromises and/or to promote particular welfare enhancements

Seven Key Applications of the Model

The Model:

4. Enables *monitoring of responses to specific welfare-focused remedial interventions and/or maintenance activities*

- Clearly, this is achieved by repeated Model-based welfare assessments
- Note: only welfare attributes for which particular indices are available and observable can be monitored

Seven Key Applications of the Model

The Model:

5. Facilitates *qualitative grading* of particular features of *welfare compromise and/or enhancement*

- **Five-tier compromise scale**
- **Relates to degrees/durations of physical/functional and situational impacts:**
 - A: None
 - B: Low
 - C: Mild-to-Moderate
 - D: Marked-to-Severe
 - E: Very Severe

Seven Key Applications of the Model

The Model:

5. Facilitates *qualitative grading* of particular features of *welfare compromise and/or enhancement*

- **Five-tier compromise scale**
- **Relates to degrees/durations of physical/functional and situational impacts:**
 - A: None
 - B: Low
 - C: Mild-to-Moderate
 - D: Marked-to-Severe
 - E: Very Severe
- **Four-tier enhancement scale**
- **Relates mainly to use of opportunities for rewarding behaviours:**
 - 0: None
 - +: Low-level enhancement
 - ++: Medium-level enhancement
 - +++: High-level enhancement

Seven Key Applications of the Model

The Model:

6. Enables both *prospective* and *retrospective* welfare assessments to be conducted
 - *Prospective applications to anticipated –ve and/or +ve impacts:*
 - During the devising of new zoo and aquarium enrichments
 - Changes in husbandry/housing of farm, working and sports animals
 - Evaluation of ‘pest’ control devices/tools and procedures
 - Evaluating RTT procedures – regulated in NZ since 1997

Seven Key Applications of the Model

The Model:

6. Enables both *prospective* and *retrospective* welfare assessments to be conducted
 - *Prospective applications to anticipated –ve and/or +ve impacts:*
 - During the devising of new zoo and aquarium enrichments
 - Changes in husbandry/housing of farm, working and sports animals
 - Evaluation of ‘pest’ control devices/tools and procedures
 - Evaluating RTT procedures – regulated in NZ since 1997
 - *Retrospective applications to situations that have occurred:*
 - Same as above
 - Forensic use in preparing Expert Witness Statements for cruelty court cases
 - Canadian experience
 - Recent visit to NZ and Melbourne by Dr. Rebecca Ledger

Seven Key Applications of the Model

The Model:

7. Provides *adjunct information* to support *Quality of Life evaluations* in the context of *end-of-life decisions*.

- QoL assessment is complex
- No 'all-inclusive' metric for QoL exists
- The welfare compromise and enhancement scales do not have a common base
- Only welfare attributes for which particular indices are available and observable can be monitored

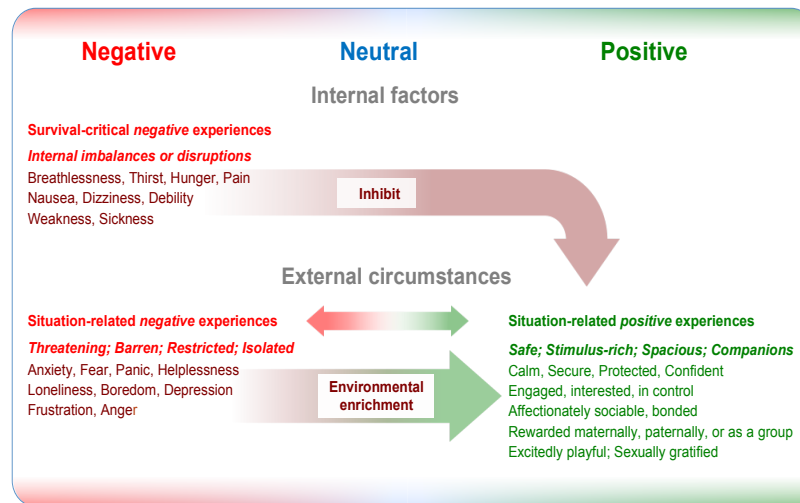
Seven Key Applications of the Model

The Model:

7. Provides *adjunct information* to support *Quality of Life evaluations* in the context of *end-of-life decisions*.

- QoL assessment is complex
- No 'all-inclusive' metric for QoL exists
- The welfare compromise and enhancement scales do not have a common base
- Only welfare attributes for which particular indices are available and observable can be monitored
- Nevertheless, the Model can provide helpful adjunct information when making end-of-life decisions
- This relates to *interactions* between *survival-critical negative affects* and the *motivation* to engage in behaviours that may give rise to *positive situation-related affects*

Seven Key Applications of the Model



Areas considered

- **The Freedoms, Provisions and Welfare Aims**
 - The Five Freedoms and importance of the Provisions
 - The Five Provisions / Welfare Aims Paradigm
- **The Five Domains Model**
 - Overview
 - Examples of its operation
- **Seven Key Applications of the Model**
 - Key general foci of AW management
 - Foundations of specific AW management objectives
 - Identifies previously unrecognised features of poor and good welfare
 - Monitoring changes in AW
 - Grading of AW compromise and/or enhancement
 - Prospective and retrospective AW assessments
 - Quality of Life assessments relevant to end-of-life decisions
- **Concluding comments**

Concluding comments

QUESTIONS

Q: Is the minimalist aim of mere survival sufficient?

A: The *biological functioning* approach, focused on survival-related factors, can achieve survival,

BUT this will usually only minimise or neutralise –ve affective states

NEVERTHELESS: it is important to do this!



Concluding comments

QUESTIONS

Q: Is the minimalist aim of mere survival sufficient?

A: The *biological functioning* approach, focused on survival-related factors, can achieve survival,

BUT this will usually only minimise or neutralise –ve affective states

NEVERTHELESS: it is important to do this!

Q: How can survival be accompanied by a good Quality of Life?

A: By identifying +ve affective experiences that animals may have

AND by providing them with opportunities to have those experiences



Concluding comments

QUESTIONS

Q: Is the minimalist conservation aim of mere survival sufficient?

A: The *biological functioning* approach, focused on survival-related factors, can achieve survival,

BUT this will usually only minimise or neutralise –ve affective states

NEVERTHELESS: it is important to do this!

Q: How can survival be accompanied by a good *Quality of Life*?

A: By identifying +ve affective experiences that animals may have

AND by providing them with opportunities to have those experiences

Q: How can such +ve experiences be identified?

A: *Via illustrations in the latest version of the Five Domains Model*



Concluding comments

QUESTIONS

Q: How can the 2015 model be used to improve Quality of Life?

A: First, consider the potential +ve affects that are known to be aligned with survival-related and situation-related factors

Second, for each domain, assess whether the circumstances would impede or allow animals to have +ve (i.e. rewarding) experiences

Third, seek to introduce and/or maintain beneficial circumstances, recognising that once in existence they are enrichments



Concluding comments

QUESTIONS THAT SUPPORT ENRICHMENT INITIATIVES

- What opportunities have been provided for the animals' comfort, pleasure, interest, confidence, choice and challenge?
- What provisions have been made to ensure that consuming the food provided will be an enjoyable experience?

Concluding comments

QUESTIONS THAT SUPPORT ENRICHMENT INITIATIVES

- What opportunities have been provided for the animals' comfort, pleasure, interest, confidence, choice and challenge?
- What provisions have been made to ensure that consuming the food provided will be an enjoyable experience?
- How will expressions of normal behaviour be encouraged and harmless wants met?
- What environmental choices will be available that will encourage exploratory and food acquisition activities which are rewarding?

Concluding comments

QUESTIONS THAT SUPPORT ENRICHMENT INITIATIVES

- What opportunities have been provided for the animals' comfort, pleasure, interest, confidence, choice and challenge?
- What provisions have been made to ensure that consuming the food provided will be an enjoyable experience?
- How will expressions of normal behaviour be encouraged and harmless wants met?
- What environmental choices will be available that will encourage exploratory and food acquisition activities which are rewarding?
- What provisions have been made to enable social species to engage in bonding and bond affirming activities and, as appropriate, other affiliative interactions such as maternal, paternal and group care of young, play behaviour and sexual activity?



Concluding comments

And finally, let us be clear:

It is **NOT** possible to completely eliminate all of the negative experiences that animals may have

BUT it **IS** possible to **MINIMISE** them

AND it **IS** also possible to **REPLACE** some situation-related negative affects by positive ones using **ENRICHMENTS**.



THANK YOU

