

Take the lead



Exploring the Relevance of
Dog Emotional Health in Training

2019 Delta Institute
Dog Behaviour Conference

Keynote Speaker Sarah Heath

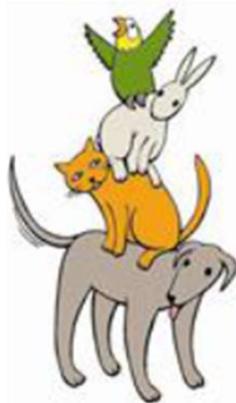


2019 Delta Institute Dog Behaviour Conference

Take the Lead:

Exploring the Relevance of Dog Emotional Health in Training
16th and 17th February 2019

Mercure Sydney International Airport



**Behavioural
Referrals
veterinary
practice**
a referral service in
behavioural medicine

Speakers

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Timetable

Day one

09:00-09:10	Welcome to the seminar
09:10-10:30	Emotional Motivational Systems in dogs and their relevance to behaviour
10:30-11:00	<i>Morning Tea</i>
11:00-12:15	Emotional arousal and motivation and the role of classical conditioning in altering behavioural responses
12:15-13:15	<i>Lunch</i>
13:15-14:00	The Role of the Trainer in Geriatric Care - How to Improve Quality of Life for the Geriatric Dog
14:00-14:30	<i>Afternoon Tea</i>
14:30-13:30	The Importance of Emotional Relaxation and How It Differs from Physical Stillness
13:00-16:30	Panel discussion with Dr Sarah Heath, Dr Gaille Perry and Natalie Watson – summary and wrap up of the day

Day two

09:00--10:30	Rehabilitation Training and Emotional and Physical Health in Animals
10:30-11:00	<i>Morning Tea</i>
11:00-12:15	The Effects of Emotional Illness on Behavioural Responses
12:15-13:15	<i>Lunch</i>
13:15-14:00	Dogs, Cats, and Kids - Positives and Potential Problems and Household Management

14:00-14:30	<i>Afternoon Tea</i>
14:30-13:30	The Benefit of Teamwork between Veterinary Behaviourists and Rehabilitation Trainers
13:00-16:30	Panel discussion with Dr Sarah Heath, Dr Gaille Perry and Natalie Watson – summary and wrap up of the day

Emotional motivational systems in dogs and their relevance to behaviour

In order to be able to understand behaviour it is important that we understand the emotional motivations that underpin behavioural responses. Panksepp describes seven different behavioural circuits in the brain and an understanding of these systems is crucial to understanding why dogs do what they do. All of the systems are normal and result in behaviours which enhance an individual's ability to survive. One of the factors which influences behavioural output is the emotional motivations that are being triggered within any given context and the balance between those emotions. Alterations in the relative intensity of motivation in relation to the different systems will lead to alterations in behavioural outcomes.

1. Seeking (Desire)

This is the system that is involved in the seeking out of resources that are necessary for survival e.g. food, right environmental temperature, shelter etc. and in general exploration and learning. In dogs there can be considerable variation in the triggers which activate the seeking system according to breed. Similarity in seeking motivation in relation a particular resource can lead to the potential for conflict between dogs and high levels of seeking motivation can also be involved in conflict between dogs and people. An understanding of seeking motivation is important in situations where attempts are being made to divert a dog into an alternative behavioural response. Predatory behaviour involves seeking motivation.

2. Frustration

This system is activated when an animal is thwarted in achieving an expected outcome. An animal can become frustrated when it is motivated by one of the other emotional systems but cannot fulfil its intended behaviour. For example, if a puppy is hungry but is made to wait for an excessive time before being told it can eat. Frustration is also seen if a dog is chasing a squirrel, driven by its seeking system, but the squirrel goes up the tree and out of reach. Some animals have more persistence than others and thus the frustration system is activated at different thresholds for different individuals. Breed variation is also seen in thresholds for triggering of the frustration system. In terms of potentially problematic behavioural outcomes frustration is a very significant emotional system. It is associated with an increase in the intensity and speed of behavioural responses and with an increase in the confrontational nature of those responses. For example, if a caregiver is playing ball with a terrier and delays in throwing the ball the dog may begin to bark intensely and rapidly and if the person does not respond by throwing the ball this behaviour may change to jumping up at the person and maybe grabbing at their sleeves or trouser legs.

3. Fear - Anxiety

This system protects animals from personal threat and from threat to resources. Fear is the form of this motivational system which is triggered by the presence of a real or perceived threat, while anxiety is triggered by the potential for such a threat. Provided the threat is real the

anticipatory nature of anxiety is protective, since it leads an animal to take action before a threat arrives and thereby increases the potential to avert the potential for danger. In situations where something or someone is perceived as a threat but has no real potential to cause harm anxiety can become debilitating. Such unjustified anxiety can be classed as an emotional disorder and warrants veterinary attention. Another situation in which anxiety can be debilitating is when a domestic animal finds itself in an environment, either physical or social, which poses a threat from their species-specific perspective but is not considered to be problematic from a human perspective. Miscommunication between the two species can result in chronic states of anxiety which can lead to problematic behavioural responses but can also compromise the dog in terms of its physical health. The negative emotional motivations of fear and anxiety are important for survival but when they are triggered unnecessarily or when they cannot be resolved they pose a problem in terms of animal welfare. They also influence the cognitive health of the animal as they reduce the potential for learning. Misinterpretation of the behavioural responses to the fear-anxiety system can lead to perceptions of dogs being stubborn or non-compliant and to inappropriate justification of forceful training methods. Some people consider pain as an eighth circuit, which is activated in the presence of actual or potential tissue damage, although it was not described as such by Panksepp and is considered by many to be part of the fear-anxiety system. Certainly, the emotional component of pain has a global effect on behaviour and should always be a consideration in any animal whose behavioural responses are causing concern. This is not only applicable to the context of dogs presenting with clinical behavioural concerns but also to those failing to meet human expectations in terms of obedience training, showing or competitive work such as agility, flyball or field trials.

4. Panic (Grief)

This system is activated in young animals to solicit attention from the primary caregiver in order for the animal to survive. Activation of the panic system often causes intense crying, which alerts the maternal figure or caretaker to the young offspring. The panic/grief system can also be activated in domestic animals when they are separated from their primary attachment figure, which can give rise to separation related behaviour issues in some animals. However, separation related behaviour can also be motivated by other emotional systems and it is important not to jump to conclusions. The fear/anxiety system can be involved in separation related behaviour when puppies have not been habituated to periods of being alone or when dogs experience a fear inducing situation when they are alone and come to associate their fear-anxiety with the context of separation. The frustration system can also be involved in these cases for example when dogs have a high seeking motivation for social interaction and develop a high expectation of availability of such interaction. In the context of separation this expectation cannot be met, and the frustration system will be triggered. If more than one dog is in the house when the humans are absent the motivation of social play may lead to boisterous interactions, which can cause unintentional damage in the home. The caregiver may return to find scenes of destruction, but the emotional state of the dogs may have been entirely positive. Similarly, the positive emotional motivation of seeking (desire) may be involved in cases where dogs raid the fridge or the bin when the people are not at home.

5. Social Play

The play system is activated as puppies develop physically. During the neonatal period they do not have sufficient physical development, or development of the senses, to be able to play, but this changes during the transitional period. Social play is a positive emotional motivation. It is triggered in young animals to facilitate learning about social interactions, including threat, in a safe context. For social play to be successful both individuals need to be aware of the context

and effective communication is essential. For this reason, social play is most effective within species and attempts to confirm these contexts between species can be problematic.

6. Lust

This system is activated in animals as they develop and seek out sexual partners. It is aroused by the male and female sex hormones. In female animals, oxytocin transmission is promoted by oestrogen and in male animals, vasopressin transmission is promoted by testosterone. Oxytocin promotes trust and confidence in females and promotes sexual readiness. Vasopressin promotes assertiveness. In a domestic environment the impact of the lust system on canine behaviour is often removed through elective neutering. When animals are entire lust can be involved in unwanted behaviours either directly or through the effects of frustration when they are denied the opportunity to act upon the motivation. Some behaviours which people interpret as problematic, such as mounting and failing to respond to a recall cue, are assumed to be associated with lust motivation. As a result, castration of male dogs is commonly suggested as a treatment approach for such behaviours, but it is very important to investigate carefully before irreversible surgery is performed. Other emotional motivations such as fear-anxiety and seeking can be responsible and when this is the case castration is inappropriate and can even be detrimental.

7. Care

The care system is associated with parental care of young and is activated in females during late pregnancy with the shift of hormones that occurs – declining progesterone and increasing oestrogen, prolactin and oxytocin. These changes enable the development of maternal care, which leads to maternal bonding with offspring and the nurturing of the young. In situations of false pregnancy, the care motivation can be triggered in the absence of offspring and bitches will select alternative items to care for such as toys. Paternal care is also present in many species, although social conditioning and lack of access to offspring can affect the demonstration of care motivated behaviours. In socially obligate species the care motivation is not limited to the parent-offspring relationship and dogs are motivated through care in their interactions with other dogs, other domesticated species and with humans throughout their lives.

Of the seven behavioural circuits the fear- anxiety (including pain), panic (grief) and frustration systems are involved in situations of negative emotional arousal whereas the seeking, social play, lust and care systems are associated with positive emotional arousal. In this context positive and negative are not synonymous with good and bad but rather describe whether the motivation leads to behaviours of engagement or disengagement. From a behavioural point of view, it is important for anyone interacting with dogs to be able to read the outward manifestations of emotional motivation through species-specific communication signs and through emotionally dependent behavioural responses. This will help people to identify whether dogs are positively or negatively aroused and to make appropriate decisions about how and when to interact with them.

Emotional arousal and the role of classical conditioning in modifying emotional motivations and altering behavioural responses

In addition to an understanding of the different emotional motivations it is also important to have an appreciation of emotional arousal and the relationship between arousal and capacity when optimising emotional health. In 2010 Dr Sarah Heath developed a model of the “emotional sink” in order to illustrate the concepts of emotional capacity, emotional arousal and emotional resilience. This model has been used to explain the complex concept of emotional health in relation to behavioural responses in companion animals within the context of veterinary behavioural medicine. It is also beneficial in explaining canine behaviour in the training context and in highlighting the important interplay between cognitive, emotional and physical health.

Emotional health concepts

- Emotional stability = an individual’s ability to remain emotionally stable and balanced. It is dependent on an appropriate balance between emotional input and emotional drainage
- Emotional capacity = the level of emotional arousal that an individual can tolerate without significant or long-lasting negative outcome
- Emotional resilience = the ability to adapt to stressful situations and cope with life’s ups and downs. The word ‘resilience’ comes from the Latin ‘resilio’ meaning to bounce back. Resilience does not eliminate stress or erase life’s difficulties, but allows the animal to tackle or accept problems, live through adversity and move on with life
- Emotional intelligence = the capacity to be aware of, control, and express one’s emotions, and to handle interpersonal relationships judiciously and empathetically
- Emotional valence = whether an emotional motivation is positive or negative
- Emotional arousal = the amount of emotional motivation regardless of its valence

The sink model (Heath 2010)

According to Dr Heath’s model emotional capacity can be thought of in terms of an emotional sink where the size of the sink is influenced by:

- Genetics
- Early rearing
- Life experiences

The input into the sink can come from the cold (positive emotion) tap or the hot (negative emotion) tap and both taps contribute to the level of water (emotional arousal) in the sink. Certain triggers turn on the cold tap while others turn on the hot tap, but it is also possible for some triggers to turn both taps on at the same time (emotional conflict). Once the water has entered the sink it is important for it to be dispensed with after it has served its purpose. Failure to drain the water away will result in residue in the sink, which will threaten the ability of the sink to cope with the next input from the taps and increase the risk of the water level rising to the point where it can no longer be contained within the sink. In the same way in emotional health stability (keeping the level of emotion within the sink) relies on the individual having good emotional resilience which results in optimal emotional drainage after a trigger has been encountered. This helps to maintain a low level of residual emotion and maximises the availability of emotional capacity.

The importance of drainage and displacement behaviours

Animals drain out emotion using drainage behaviours, which can be likened to the flow of water out through the plug hole and outflow pipe. Drainage behaviours are consciously controlled and can occur after any amount of emotional inflow. The sink does not have to be full for drainage behaviours to be seen and when these behaviours are used appropriately, they ensure that the residue in the sink is kept at manageable levels. In a canine context drainage behaviours include sleeping, chewing and sniffing.

The other way in which water can be lost from the sink in order to prevent the potential for flooding is through the overflow hole in the top of the sink. According to Dr Heath's model displacement behaviours can be likened to the passage of water through the overflow hole. They are normal behaviours, which are being displayed in an abnormal context, and are seen when the emotional arousal level is getting close to the individual's threshold of capacity. The movement of water through the over flow hole in a sink is automatically triggered by the level of water in the sink and can occur whether the water in the sink is hot or cold. Likewise, displacement behaviours occur in association with high levels of both negative and positive emotion and a combination of the two. They occur spontaneously when the level of emotional arousal is reaching the threshold of the individual's emotional capacity (getting close to the top of the emotional sink).

Emotional overflow is most likely if:

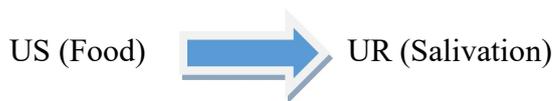
- The sink is small (low emotional capacity)
- The tap(s) is (are) turned on full (high intensity of emotional motivation)
- There was a high level of residual water in the sink at the time (poor emotional resilience - limited opportunities for emotional drainage or imbalance between emotional input and output)
- The people around do not recognise or act on species specific signs of impending overflow (displacement behaviours)

Application of learning theory

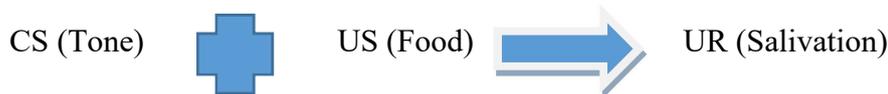
Within the context of training the main aim is to optimise the cognitive health of the individual but the interplay between cognitive, emotional and physical health necessitates an understanding of how emotional health can impact on the efficacy of learning. Training involves the application of operant conditioning as a means to establishing desired behaviours and changing behaviour in a given context when the current behaviour is considered to be inappropriate or unacceptable. In situations where behavioural responses are resulting from emotional motivations which compromise the animal's welfare it is important to work to alter the underlying emotion rather than simply change the behavioural output. Emotional responses to specific contexts and triggers are established through the learning process of classical conditioning and the changing of unwanted emotional associations through counter conditioning.

Classical Conditioning (Pavlovian/Respondent Conditioning)

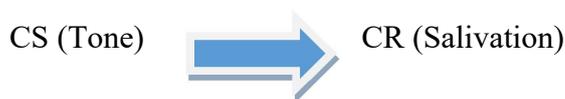
This involves an unconditional stimulus (US) which produces an unconditional response (UR). The response is an involuntary or reflex response and there is no need for external reward for learning to take place. If the unconditional stimulus occurs at the same time as a conditional stimulus (CS) this previously insignificant stimulus becomes the stimulus for the response. The response is then referred to as a conditional response (CR). The classically quoted example of this is the Pavlov's dogs' experiment in which the unconditional stimulus (food) was paired with a conditional stimulus (a tone) to produce an involuntary conditional response (salivation).



The unconditional and conditional stimuli are repeatedly presented together:



After multiple repetitions the conditional stimulus will invoke the response (now termed conditional response) even in the absence of the unconditional stimulus:



There are variables that can affect the efficacy of classical conditioning and in practice two of the most important ones are:

- **Contingency** - this refers to the relationship between the two events. The unconditional and conditional stimuli need to be linked consistently. Lack of contingency is a very common reason for owners to struggle with the process of house-training and for dogs to become sensitised through conditioning an association with negative emotion.
- **Contiguity** - this refers to the time between presentation of the conditional stimulus and the unconditional stimulus. The closer together these are presented the more rapid the learning. The practical application of this is that the cue for positive emotion should be present at the same time as the cue for a neutral emotional response or a low intensity negative emotional response in order for contiguity to be optimal.

Role of classical conditioning in optimising emotional stability

The associative learning processes of socialisation and habituation are forms of classical conditioning in which positive emotional associations are established with people, other animals and physical situations such that they will be regarded as being non-threatening. This form of learning is also involved in priming the individual's stress response mechanism so that they can adequately, and appropriately, control their response to stressful situations in adulthood. In order to maximise the benefits of exposure to novelty and challenge in the environment it is essential that the puppy is in a positive emotional state during that exposure. New people, animals and situations must be introduced in a controlled way in order to ensure that the risks of inadvertent sensitisation (creation of negative emotional associations) are minimised.

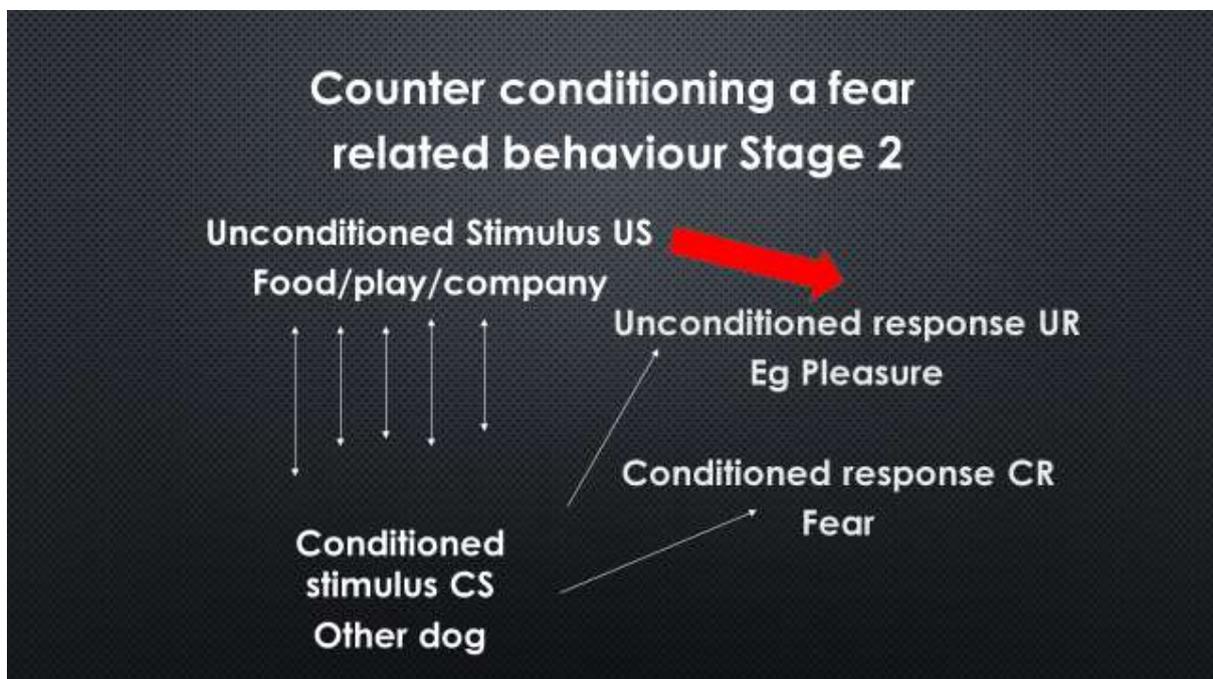
Classical conditioning of emotional responses

John B. Watson studied fear in humans and discovered that many emotional reactions were learned. He studied fear responses in babies. Sudden loud noises were found to be an unconditional stimulus for fearful reactions in young humans and by exposing a baby to loud

noises in the presence of a white rat it was possible to induce a fearful reaction to the white rat (baby crying).

A similar conditioning of fear responses occurs in dogs and it is important to be aware of how inadvertent learning can influence canine emotions. Creation of conditioned negative emotional associations with the veterinary practice or with the training environment would be examples of this form of learning. Ensuring that a dog is in a positive emotional state while it is being exposed to any form of novelty, be that people, other dogs or novel environments, is essential and is the basis of successful socialisation and habituation. If this does not occur puppies will become sensitised to these things and be at considerable risk of developing unwanted behavioural responses which threaten the relationship with their owner.

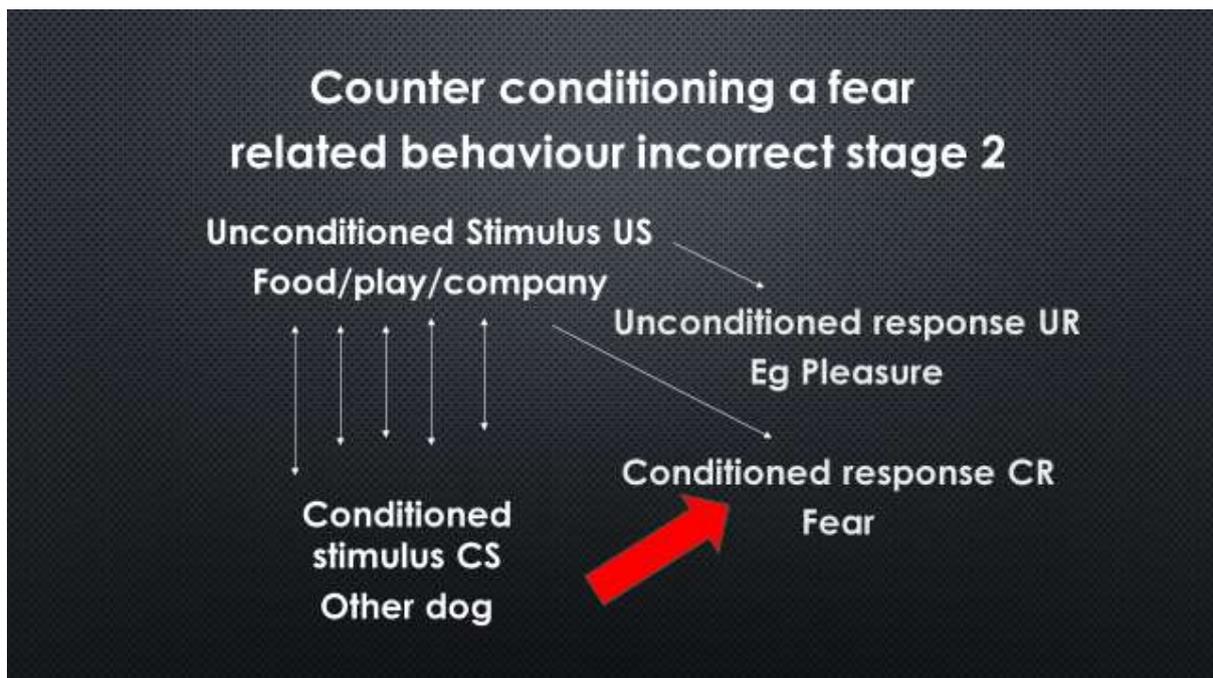
Classical conditioning is used in behavioural modification to alter the emotional response that an animal shows to a certain trigger. The process of counter conditioning involves pairing something that is currently inducing a negative emotional motivation with another stimulus, that invokes a positive emotional state. This can be an unconditional stimulus, which leads to an involuntary positive emotional state, but it can also be a learned stimulus which has been previously associated with a positive emotional reaction. The key to success is ensuring that the positive influence of the new stimulus is stronger than the negative influence of the fear inducing one. This can be achieved by increasing its positive properties but also by reducing the negative properties of the problematic stimulus. For example, if the fear inducing stimulus is at a sufficient distance from the puppy, such that it has no or very minimal negative emotional effect, it is then possible to introduce the positive stimulus at the same time and start to create positive emotional associations with the previously fear inducing stimulus. This process is called counterconditioning.



In an ideal world all classical conditioning will lead to positive emotions being conditioned but this is obviously not the case. When negative emotional associations have started to form it is important to carry out appropriate counter conditioning early in order to alter this and create positive associations instead. For example, if a dog is showing fear- anxiety motivated reactions

to other dogs it is possible to present a very calm dog at sufficient distance that it will not induce a negative emotional reaction and then introduce an inherently positive stimulus, such as high value treats, at the same time.

The risk with this form of learning is that the link between the fear inducing stimulus and the negative emotional state is sometimes stronger than the positive link with the new stimulus. When this happens a form of classical conditioning still occurs, but the previously positive stimulus takes on the negative properties of the fear inducing stimulus. This results in previously positive cues such as food and company inducing negative emotion and is a common reason for failure of attempts to counter condition.



Careful consideration of the relative levels of emotional arousal from the conditioned and the unconditioned stimuli is the key to successful application of classical conditioning in terms of modifying emotional motivations and altering behavioural responses

The importance of emotional relaxation and how it differs from physical stillness

Emotional relaxation

In order to maximise the benefits of behavioural modification and to optimise learning in a training environment it is important for dogs to have low levels of residual emotion and optimised emotional capacity. This is achieved by establishing a slow and steady input of appropriate emotional motivations, in relation to the context that the dogs are in. This needs to be coupled with an appropriate level of emotional drainage, using the sink model (Heath 2010), this can be explained in terms of reducing the residual amount of water in the sink, by ensuring that the plug is pulled out and by turning off any unnecessary taps. Where an emotional motivation is necessary, and it is not possible to switch off the tap the aim is to reduce the inflow to a minimal level. Once emotional relaxation has been achieved it is possible to begin to work on changing the emotional motivation that is associated with the problematic behavioural response. This is achieved by associating previously troublesome triggers, such as noises, traffic, separation or social interactions, with alternative emotional motivations and it can be likened to changing from a hot tap response to the trigger (negative emotion) to a cold tap response (positive emotion). It is important to work on the reduction in emotional residue and achievement of emotional relaxation before attempting to change the valence of the emotional response to the trigger since a full sink will flood when a tap is turned on irrespective of whether the tap is hot or cold.

Physical stillness

During training there are considerable advantages to dogs learning to lie down and be still. The aim is for the dog to rest in a certain location while activity happens around them and it is beneficial in terms of keeping the dog safe and minimising displays of unacceptable behaviour. Cueing a dog to sit on a dog bed while the front doors are opened is an example of physical stillness being used to manage a behavioural problem, such as rushing to the front door and being over enthusiastic in greetings. However, the stillness may not be associated with emotional relaxation. Physically lying down and being emotionally relaxed are not the same thing and it is important to be able to differentiate between the two.

Misperceptions

A significant number of patients with negative emotional bias related to perception of threat, or potential for threat respond with active behavioural responses but there are four potential behavioural responses to negative emotions, all of which are of equal importance. When dogs select one of the passive responses it is important to guard against mistaking this for relaxation.

Behavioural responses to negative emotion

Dr Sarah Heath has developed a form of terminology to describe the behavioural responses when an animal is experiencing a negative emotional response to a trigger in terms of the aims of those responses. This terminology has been developed over years of experience in clinical practice and is used to explain the importance of understanding the wide range of behaviours that can be displayed. It has also been developed with the aim of improving understanding of the equal importance of each of the possible separate categories of behavioural response and reduce the mistaken concept that it is only the intense forms of repulsion behaviours, which need to be a cause for concern. In terms of animal welfare recognition of all the possible behavioural responses to negative emotion is essential and by giving equal importance to all of

them we can improve prevention, management and treatment of clinical behavioural presentations.

One aim of a behavioural response to negative emotion can be to terminate interaction with the trigger completely and this can be achieved either by removing itself from the situation (*avoidance*) or by making the trigger go away from it (*repulsion*). Another aim when motivated by negative emotion may be to find out more about the trigger and the context in which it is being encountered. This approach is more likely to be selected if there is any perception of possible benefit from the situation or a perception that the use of repulsion or avoidance responses could increase the danger to themselves. There are two ways in which the animal can find out more about a potential threat. One is passive and involves the gathering of information from the context or the item or the individual (*inhibition*) and the other is active and involves exchanging information (*appeasement*). In dogs, inhibition is more likely to be selected in those contexts where there is a perception that avoidance or repulsion are unlikely to be successful, but may also be selected by less confident animals for whom exchanging information is more difficult. For non-obligate social species, the priority is to ensure the survival of the individual and inhibition is more likely to be selected since there is less potential benefit from exchanging information. In the case of socially obligate animals which have an inherent positive emotional response to the resource of social interaction (desire/seeking) there may be situations in which the other dog or person that they are encountering triggers a mixed emotional response due, for example, to a level of anxiety if they are unfamiliar. In these cases, the animal does not want to terminate interaction completely and wants to find out more about the person or dog in order to determine whether the positive potential of the interaction outweighs the negative potential. The presence of a positive emotional response of desire/seeking makes it more likely that this animal will attempt to exchange information (appease) thereby finding out more about the other individual and offering information about themselves which indicates a desire to avoid conflict. In socially obligate species the offering of information aims to reduce the negative emotional responses of the other individual. This is important in a situation of co-survival.

Method of offering and gathering information

Information is conveyed and received via the sensory systems. Scent is deposited in the environment via urine, faeces and anal sac secretions. In addition, dogs and cats have specialised glands in their skin which secrete scent signals which have an important role in social communication. Dogs will roll over on their backs or lift one of their hind legs to give other dogs access to this information and they may also sniff and lick at other dogs around the face and anogenital regions in order to collect scent related signals. Cats also use tactile interactions to share scent. They will rub on other cats in their social group as well as on humans and inanimate objects in their environment.

Auditory information exchange takes the form of species-specific vocalisations coupled with listening to the utterances of others. In an inhibited state it is the listening that is predominant while in appeasement the animal will be listening and vocalising as it seeks to exchange rather than simply gather information. Species-specific signals can be used to convey information about positive and negative emotions.

Visual senses are used in inhibition through watching and during appeasement interactions animals offer information via their body postures and facial expressions. These signals are species specific and a good understanding of communication systems in the domestic species is necessary in order to understand the information that they are seeking to convey.

Tactile interactions can also be used to convey information about the emotional states of an individual and dogs that are anxious will often lean against humans in order to communicate in this way. They can also gather information via the tactile sensory channel as they become aware of the level of muscular tension in the human.

Pitfalls of not recognising or misinterpreting behavioural responses

When dogs are in using an inhibition response they will often be physically still, and it is easy to misinterpret this as a state of emotional as well as physical relaxation. Passive gathering of information through visual, auditory and olfactory channels may go unnoticed. Depending on the answers that the dog is receiving via the information that it is gathering the dog may enter a state of lowered emotional arousal (due to an increased positive perception and reduced emotional inflow rate) or an elevated state of arousal (due to increased negative or positive perception and increased emotional inflow rate). In the example of a dog meeting unfamiliar people the practical consequences of this are as follows:

Unfamiliar person comes into the room and the dog responds to a cognitive cue to go and lie on its bed. Once on the bed the dog lies down and people in the room perceive that it is “relaxed”. The dog is physically still but is anxious due to the presence of an unfamiliar person in the room and uses an inhibition response to that negative emotion. Through listening, watching and sniffing it gathers information while remaining on the dog bed and the human animals in the room remain oblivious to the fact that the dog is physically still but emotionally aroused.

1. If the information gathering results in a lowering of emotional arousal coupled with increased low rate inflow of positive emotion the dog can transition from a state of inhibition to a state of both physical and emotional relaxation. Whether the dog remains on the dog bed and relaxes in the vicinity of the unfamiliar person at this stage is determined by the perceived benefits of staying put or moving to another resting place, such as another dog bed in another room or a sofa in another room which the dog is allowed to rest on, which may be considered more comfortable or more familiar by the dog. In this case the main emotional drive for the dog to go to another room is in order to move toward a positive emotional trigger as a result of increased positive emotion (desire-seeking).
2. If the information gathering results in increased emotional arousal as a result of increased rate of positive inflow, due to an increased positive perception of the unfamiliar person, together with some degree of negative emotional inflow because the person is still unfamiliar, the dog may alter its behavioural strategy to one of appeasement. This will involve the dog beginning to exchange information which may lead to increased proximity to the person and engagement with them through the sensory channels of vision, hearing and touch. In practical terms the dog may approach the unfamiliar person and sniff and/or lick at their hands or faces, lean into the person and seek visual and/or auditory interaction. In many cases these behaviours are misinterpreted as signs of “affection” and the unfamiliar person responds by engaging with the dog. If the engagement is appropriate and is gentle and calm, it can lead to an increased low rate inflow of positive emotion and a lowering of its emotional arousal. This leads to the consequences outlined in point 1 above. However, if the engagement from the person is inappropriate and/or intense this will lead to an increase in the negative emotional inflow rate and an increase in negative emotional arousal. The

behavioural aim of increasing distance and decreasing interaction will then result in a behavioural response of avoidance or repulsion (see point 3 below).

3. If the information gathering results in increased emotional inflow related to increased negative perception the aim of the dog's behavioural response can alter to a desire to decrease interaction with and increase distance from the unfamiliar person. In this situation a change to the behavioural strategy of avoidance may result in the dog leaving the room. In this case the main emotional drive for the dog to go to another room is in order to move away from a negative emotional trigger as a result of increased negative emotion (fear-anxiety). If avoidance is not possible, because the door is shut or because the dog has been given a verbal cue to stay on the bed in the room with the unfamiliar person, the state of inhibition will be maintained. If the human animals in the room have misinterpreted the state of inhibition for a state of calm and relaxation and approach the dog in order to stroke it and engage with it the dog will attempt to use avoidance. However, if avoidance is not available, for whatever reason, the only other available strategies are appeasement or repulsion. The use of appeasement may be misinterpreted since the dog is not moving away and is engaging with the person, but negative emotional inflow is still high. The response of the dog will depend on the form of interaction that the person engages in as outlined in point 2 above. When avoidance is not possible and appeasement is unsuccessful, the dog can either revert to a state of inhibition or to a strategy of repulsion.

The role of frustration

The emotional state of frustration is triggered by a failure to meet expectations. This includes a failure to be able to express emotional state and when behavioural strategies fail to achieve the aims of the emotional arousal frustration will be triggered. The features of frustration in terms of behavioural output is an increase in the intensity of speed of behavioural responses and an increase in selection of confrontational behaviours. Frustration can be associated with any other emotional motivation and there are countless clinical examples of unwanted behaviours resulting from frustration. For example, if a dog has a very strong desire-seeking drive to chase and it is held back from doing so, for example at the start of a fly ball competition or a greyhound race, the accompanying frustration will lead to an increase in intensity and speed which may be desirable in terms of the dog being faster in reaching the fly ball machine or completing the lap of the track. However, there can be pitfalls associated with deliberate increase in frustration as the tendency to promote confrontational behaviours can lead to the dogs becoming confrontational to other dogs, who get too close in the gate or in the line-up for the flyball machine, or to people who try to restrain the dog. It is important to realise the difference between frustration induced confrontation and fear-anxiety induced repulsion. Both are manifested in the same behaviours, growling, snarling, air snapping or biting, but the underlying emotion is different. The fact that frustration is characterised by increased speed and intensity can make the consequences of the associated confrontational behaviours much more severe, in terms of potential for injury.

In situations where frustration is triggered by an inability to achieve the aims of the fear-anxiety motivational system (to protect the individual and/or its resources from threat or perceived threat) there can be an increase in the speed and intensity of any of the four possible behavioural strategies. If the chosen strategy is avoidance and the dog is temporarily denied the opportunity to move away, then when it is able to do so it will retreat at speed. If the chosen strategy is appeasement and the dog is denied the desired exchange of information then the appeasement,

in the form of leaning or jumping up to lick faces or barking or staring, will increase in intensity, and where appropriate speed. Likewise, inhibition which is unsuccessful will become more intense and the dog will try harder to gather visual, auditory or olfactory information. In any of these three situations the frustration may also increase the potential for confrontational behaviour to be displayed. If these strategies continue to be unsuccessful despite increased effort on the part of the dog a change of strategy to repulsion is likely and due to the presence of frustration the repulsion will be more intense and delivered with more speed. The added confrontational intention coupled with the intense and rapid repulsion can make this a very dangerous situation.

The importance of welfare

When engaging with dogs, be that in a domestic or a performance context, the aim is for dog-human interactions to be mutually beneficial. It is the height of human arrogance to think that the aims and expectations of human animals are more important than those of other species. Dogs and humans have lived together for thousands of years and both have benefited from the relationship. However, in modern society there has been an increase in the perception that dogs are products or commodities which are there for human animals to utilise for their own ends. This view is not compatible with the science of animal welfare or with the oath that veterinary surgeons make when entering the profession. Allowing non-human animals to live in a state of chronic negative emotional arousal and denying them the opportunity to respond appropriately to the full range of positive and negative emotional motivations is a welfare concern and one that needs to be addressed. In the context of emotional health, the words positive and negative do not equate with good and bad. Both negative and positive emotion is adaptive and beneficial when it is triggered appropriately, and survival depends on emotional stability and resilience. It is therefore not appropriate to seek a world that is fear free but rather to ensure that when fear-anxiety motivation is triggered appropriately the dog is able to respond using its natural behavioural responses. Emotional motivation also leads to a physiological response and if emotional health is not given due consideration physical health can be impaired as a result. In addition, emotional and physical health impact on cognitive health and this will be considered in the conference session on rehabilitation training and emotional and physical health.

Predicting behavioural outcome

It is generally accepted that prevention of unwanted behaviours by establishing appropriate ones is an aim of those working with dogs and their owners. An understanding of cognitive health and the role of appropriate application of learning theory is clearly important in order to establish appropriate behaviours in a range of different contexts. Another important factor in prevention is the ability to predict behavioural outcome and to identify contributing factors leading to those behaviours so that those that are undesirable can be minimised. This involves an understanding of natural ethology of the species and the breed combined with an appreciation of the interplay between the three elements of health, emotion, cognition and physical health. In terms of emotional health, prediction involves an understanding of emotional valence and flow rate, capacity, arousal, drainage and resilience. It is important to carry out an emotional assessment within the particular context and identify not only the emotional motivations which are present but also the relative flow rates from those motivations. Knowledge of the dog's history in terms of genetics, rearing and experiences is important in terms of understanding the individual's emotional capacity and resilience while in depth investigation of the present context, both social and physical, can increase understanding of the current level of emotional arousal and residue. An understanding of species specific displacement behaviours as an indicator of emotional arousal regardless of emotional valence will enable prediction of emotional overflow but it is an appreciation of the potential

behavioural responses to the emotional motivational systems and the role of visual (body language), auditory (vocalisation), olfactory and tactile communication in identifying emotional states which will increase the ability to predict behavioural outcome.

Conclusions

In the context of dog training the ability to use verbal cues to increase the delivery of certain behaviours is very important and efficient and effective operant (instrumental) conditioning is essential to achieve this aim. However, it is also important to consider the effect of emotional health on cognitive health and ensure that dogs are in the most appropriate emotional state and at the most appropriate level of emotional arousal for the task in hand. That task may be as broad as being a companion animal or as specific as being a competitive agility dog but the need for emotional awareness in training is just as relevant for all dogs. Facilitating emotional relaxation is key to improving learning and the ability to be able to distinguish between physical stillness and emotional relaxation is a requisite skill for those working in the fields of dog training or in veterinary behavioural medicine.

Rehabilitation Training and Emotional and Physical Health in Animals

Training is defined as “the action of teaching a person or animal a particular skill or type of behaviour” and the role of training in improving canine welfare is well documented. Preventative training of puppies is an important part of preparing them for life in a domestic environment. Whether they are destined to perform the job of being a companion for human-animals or selected for a more specific occupation such as being an assistance dog, a working dog or a performance animal the need to be trained for that job is just as important. Human animals do not enter the field of employment without some form of training, however basic or complex that may be, and it is not appropriate to expect non-human animals to fulfil the requirements of their human caregivers without appropriate training. Rehabilitation is defined as “the action of restoring something that has been damaged to its former condition” and in the canine context a rehabilitation trainer is an important member of the team when dealing with behaviours which are detrimental to dogs, their caregivers and the wider community. Their work involves a combination of skills and an understanding of the interplay between cognitive, emotional and physical health. They use cognitive processes to establish new behaviours and work with veterinary behaviourists to ensure that contributions from compromised physical and emotional health are also taken into consideration. In addition, rehabilitation trainers understand the influence of contextually appropriate emotions on cognition.

Emotional considerations

When engaging in the process of training it is important to be aware of the ways in which emotional state and arousal can influence learning. Ensuring a suitable learning environment is as important for dogs as it is for children. We would not consider it appropriate for a child to do their homework in a busy, noisy bowling alley and yet we frequently expect dogs to learn effectively in equally unsuitable environments. High levels of sensory input which increase emotional arousal can compromise the ability to learn and high levels of positive emotional input are just as relevant as negative ones. The child who is struggling to complete their homework may be positively motivated by the prospect of engaging with their friends in a game of bowling and find it difficult to concentrate. If the child is told that they cannot engage in bowling the fact that they are in the bowling environment but being denied the opportunity to bowl will lead to frustration of the desire seeking motivation and an increase in confrontational responses from the child would not be unexpected. In the same way a dog that is highly motivated by desire-seeking and/or social play to engage in social interaction with other dogs can find it frustrating to be in a context where their expectations of such interaction are thwarted. In these contexts, both the child and the dog will find it difficult to stay focused on the homework or training and if this is interpreted by the person who is instructing them as “lack of compliance” it may result in confrontational interactions. Being shouted out or forced to comply will increase frustration or induce a perception of threat and the triggering of fear-anxiety and neither of these emotions are conducive to learning.

Misinterpretation

One significant factor in limiting the benefit of training, be that preventative, competitive or rehabilitation training, is misunderstanding. Common scenarios in which training is not successful are those in which dogs are showing signs of hypervigilance and appeasement which are misinterpreted as excitement and pleasure. Hypervigilance is associated with an increased need to process sensory information and is a sign of anxiety, while appeasement is a desire to exchange information in order to make sense of an uncertain environment or increase the mutual benefit of a context for those involved in social interaction. When dogs are not responding to training as expected it is important to ask firstly about the quality of teaching

that the dog is receiving and secondly about the dog's ability to respond to that teaching. If the training is taking place in an inappropriate environment the dog's emotional health may be temporarily compromised and a change in venue and/or training technique may vastly improve the effectiveness of the training. When emotional health is compromised long term and emotional illness is involved it is important to address those issues through veterinary behavioural medicine before attempting to alter behavioural responses through the application of learning theory.

Physical health considerations

The interplay between physical health and cognition and emotion is more widely discussed in a human animal context but it is equally relevant to our canine companions. The relationship is complex and consideration of potential physical illness as a contributing factor for emotional and behavioural change is essential.

There are a range of medical conditions which can affect both emotional valence and arousal and working with a veterinary surgeon to rule out physical disease or institute appropriate treatment if it is present is essential (see notes on the benefit of teamwork between rehabilitation trainers and veterinary behaviourists).

Considering pain

When considering behavioural change in patients suffering from pain perhaps the most obvious manifestations are those which are directly associated with handling or interacting with the animal. Veterinary surgeons who are manipulating a fractured leg will not be surprised if their canine patient who is suffering from acute pain growls or even snaps at them. Cases of overt aggressive behaviour in such contexts might even be expected and the demonstration of aggressive behaviour may be a primary trigger for further investigation from a medical perspective. However, the role of associative learning should not be underestimated and the potential for delayed and more diverse behavioural changes, including avoidance, inhibition and appeasement, should also be considered. It needs to be remembered that in cases where individuals develop behavioural coping strategies, in order to deal with the pain, it is possible for these responses to become ritualised and even compulsive in nature resulting in an increased tendency for these dogs to be presented for behavioural concerns. Accurate history taking and good clinical examination is essential. A time line approach to history taking enables the practitioner to explore the development of the behavioural response and can be extremely helpful when investigating cases of a learned association between pain and behaviour.

When dealing with chronic pain there are a range of potential behavioural manifestations and the interplay between pain and behaviour is a crucial topic within behavioural medicine. The individual nature of the pain sensation in relation to the emotional and cognitive aspects must be considered and the premise that "pain is always what the patient says it is" is as relevant to veterinary patients as it is to their human animal counterparts. In order to accurately detect pain in behavioural cases it is essential that the information that companion animals give about their emotional state is recognised and understood. An ability to read body language signals and to notice the, often subtle, changes in gait, muscle mass and coat is necessary in order to investigate the complex bilateral relationship between pain and behavioural expression. Behavioural markers are crucial in the challenging context of diagnosing chronic pain and absence or apparent insignificance of traditional signs such as skeletal change on X-ray images cannot be taken as a reason to exclude the possibility of chronic pain. When practitioners are presented with patients whose behavioural signs indicate the presence of pain it is important to

investigate this further and the use of treatment trials using analgesic medications should be considered. Multimodal approaches to analgesia have been shown to give the best results and veterinary surgeons working in behavioural medicine, pain management and rehabilitation medicine, along with physiotherapists and hydrotherapists, have complementing skills which will significantly benefit the patient when managing these cases.

Conclusions

Rehabilitation trainers who are working to improve cognitive and emotional health also need to consider the potential for physical health to be playing a role in behavioural change. In addition, those working in preventative training and in training for competitive and working environments will benefit from an appreciation of the potential influence of emotional and physical health on response to training interventions. Lack of success or sub-optimal learning can be indicators of underlying issues and, rather than persevering with training, it is beneficial to step back and consider emotional and physical factors. If these can be managed or treated first then the training experience will be far more positive for the dog, their caregiver and the trainer.

The effects of emotional illness on behavioural responses

Assessing emotional health

All the emotional motivations described by Panksepp are normal and positive and negative states have an equal role to play in ensuring survival.

When dogs are showing any behavioural responses of interest, be that a reported behavioural problem or a behaviour which is incompatible with the aims of the training environment, it is important to determine whether

- The emotion is justified by the context
- The behavioural response is justified by the emotion
- The behavioural response is proportional in intensity and duration

When the answers to these questions are yes but the behaviour being expressed by the animal is detrimental to themselves or others or simply problematic for humans it is important to ask some further questions:

- i. is the environment (physical) meeting the environmental needs of the animal?
- ii. is the environment (social) meeting the species-specific needs of the animal?
- iii. is there evidence of frustration – are expectations realistic and able to be fulfilled?
- iv. is there evidence of emotional conflict?
- v. is there evidence of inappropriate learning?

Within the domestic environment and the training environment there are times when neither the physical nor the social environment will be fully meeting the needs of the animal. Minimising the negative impact of such environments is therefore essential in order to decrease unwanted behavioural responses, which are justified by negative emotion, which in turn is justified by the context the dog is in. Providing environments which meet the species-specific behavioural needs of the dog is a priority for care givers, trainers and veterinary practices. In many cases the intensity and duration of the behavioural response is not proportional, due to the involvement of frustration in addition to the underlying emotional motivation. It is therefore important to consider ways in which our dogs can be given a perception of some element of control within their domestic and training environments and some degree of success from their chosen behavioural response.

When the emotion and behavioural response are not justified by the context and the behavioural response is not justified or is out of proportion in intensity and duration to the challenge of the situation the possibility of an emotional disorder should be considered. Referral to a veterinary behavioural medicine specialist or a veterinary surgeon with a special interest in behavioural medicine will be necessary if the illness is long lasting or if medication is considered to be an appropriate part of the treatment protocol for the individual dog. Once emotional illness has been diagnosed and the emotional motivational system identified it is important to use a comprehensive behavioural history to identify the factors that are triggering that emotion. If those triggers do not justify the emotional response, then the process of counter conditioning can be used to change the emotional motivation. However, many dogs are not emotionally capable of learning through counter conditioning and ground work is needed to reduce emotional residue and increase emotional drainage before any beneficial learning can occur. While this ground work is being carried out it is essential that those caring for the dog work hard to prevent exposure to the trigger or, where that is not possible, ensure that the animal has appropriate and successful means of expressing and responding to the underlying emotion. The aim is for prevention of exposure and use of medication to be short-term strategies and for the

majority of dogs this enables behavioural modification techniques to be employed, which will alter the emotional response to previously problematic triggers.

Emotional groundwork

The aim of the emotional groundwork is to prepare the dog for optimal benefit from behavioural modification. It involves reducing emotional residue, through a combination of improving emotional drainage and reducing emotional input. Emotional drainage is achieved through activities such as chewing, sniffing and sleeping. Sleep deprivation is a factor in a number of cases with many domestic dogs not getting their full requirement of 16 to 18 hours of sleep per day. Improving this will involve a combination of approaches including providing or relocating the dog's own bed as well as altering the daily timetable to allow time for adequate sleep. Increasing appropriate chewing behaviour involves providing suitable targets for chewing and appropriate opportunities for this behaviour in calm surroundings. Sniffing on walks can be encouraged by altering the style of exercise and giving the dog the opportunity to explore its environment. Reducing emotional input can result from switching off emotional triggers completely or by minimising the salience of those triggers. The chosen approach will depend on many factors including the physical environment that the dog lives in and the social interactions with other pets and with people in the household. For example if a dog is aroused by the sounds of young children it may be possible to avoid walking at times when local schools are opening and closing each day, but if the dog lives in a house backing onto the playing fields of the local school it may be necessary to make further adjustments, such as not letting the dog into the garden at school break times as well as at opening and closing times. In situations where another dog in the household is negatively affecting the emotional health of the patient changes to daily schedules in order to reduce their interactions especially at times of emotionally arousing activities, such as greeting visitors, going for walks or feeding may be necessary. Another constraint will be the expectations and abilities of the human caregivers together with their commitment to the treatment programme.

Emotional disorders

When the emotional responses of the dog are not justified by the context or behavioural responses are not justified by the emotion or within normal boundaries of intensity and duration it is important to consider the possibility of an emotional disorder. Veterinary behavioural medicine is the veterinary discipline which deals with emotional health and its interface with physical health. The use of behavioural modification is still an important aspect of veterinary behavioural medicine and medication, pheromones and nutraceuticals may be used as adjuncts to that approach. When emotional responses are outside normal limits medication can be needed in order to restore neurochemical balance and while this is usually considered a short term (1-2 years) approach there are some individuals for whom life-long medication is necessary. In the author's experience the majority of dogs benefit from appropriate medication alongside behavioural modification, with the aim of altering the underlying emotional motivation and thereby altering the behavioural response, and many are able to be weaned off medication in time. Due to the lag time to effect of many medications in the behavioural field it is important to start work on behavioural modification to reduce emotional residue as soon as possible, as this will help to make the dog more receptive to specific behavioural modification when the medication has started to take effect. Less commonly medication is necessary to normalise emotional responses before behavioural modification can commence and in a small number of cases medication is needed long term.

Welfare considerations

In a small number of cases where the dog's emotional responses are "diseased" reducing emotional arousal may not be possible and emotional residue will continue to hamper learning. Long term prevention of exposure to problematic stimuli and use of appropriate minimal medication should then be considered in order to treat the emotional disorder. Rehoming is one possible course of action and if the new environment leads to a significant reduction in exposure to problematic stimuli the use of medication may be able to be reviewed and reduced. However, in dogs whose emotional health is severely compromised and where behavioural signs are severe or have been exhibited over a long period of time it may not be possible to achieve sufficient reduction in emotional residue for long term alterations in behaviour to be achieved. In such cases it is essential to assess the dog's welfare and make decisions which are driven by the best interests of the dog rather than the priorities of human beings. Not all dogs are suitable for rehoming or for long term medication and these approaches are not always in the best interest of the non-human animal. Quality of life must always be considered and there are cases where euthanasia is the most appropriate treatment.

The Benefit of Teamwork between Rehabilitation Trainers and Veterinary Behaviourists

Healthcare is a multidisciplinary subject and individuals who care for all aspects of the emotional, cognitive and physical health triad are of equal importance. This is well recognised within the human healthcare sector and over recent years an awareness of a team approach to non-human animal healthcare has increased. Provision of care in the three sectors of the triad is not mutually exclusive and some professions provide a service in more than one sector. Likewise, there is no exclusive profession for each sector. Traditionally veterinary surgeons have been tasked with looking after the physical health of the non-human species that people live and work with but the role of veterinary physiotherapists and hydrotherapists, along with other professions, has long been acknowledged in the sector of physical non-human animal health. Over recent years there has been improved understanding of the equal importance of emotional health and of the responsibility of the veterinary profession within this sector. Improved undergraduate veterinary teaching in behavioural medicine has led to increased awareness of the interplay between emotional and physical health and those who work in veterinary behavioural medicine care for both sectors of the healthcare triad. Trainers have traditionally been concerned with cognitive health, in a similar way to educators in the human field. More recently specialist sectors have developed within the training world and rehabilitation trainers care for the cognitive and emotional health of the animals in their care. This is similar to the development of specialist educators for humans and those working in the field of special needs where an understanding of emotional and cognitive health is essential in order to optimise the potential for learning. While the medical profession is the primary source of healthcare in a physical sense in humans these specialised educators also need to be aware of physical health concerns in their pupils and the ways in which those impact on their progress in the educational arena. Likewise, rehabilitation trainers for dogs need an awareness of physical health as it may impact on the behaviour of the animals they work with and through working with the veterinary profession the welfare of non-human patients can be protected.

The importance of non-veterinary professionals working in the field of animal healthcare to work on referral from a veterinary profession colleague relate to the non-speech nature of communication in the animals involved. In order to ensure that welfare is protected non-human animals should be examined by a veterinary professional prior to being seen by a rehabilitation trainer. This is necessary to rule out physical health factors which can contribute to emotional and behavioural change, such as chronic pain from osteoarthritis or endocrine disorders such as Cushing's or Addison's disease. General practitioner vets may also be able to detect an abnormality in the dog's emotional health but sometimes they do not have the necessary training or experience to do this. If doubt remains, then referral to a veterinary surgeon working in behavioural medicine will allow for assessment of emotional health and institution of treatment with medication where appropriate. If emotional responses are found to be justified by the context and behavioural responses justified by the emotion referral to a non-veterinary behaviourist may be indicated in order to deal with any unsuitable aspects of the physical or social environment and the influence of social interactions on the development of unwanted behavioural patterns. The rehabilitation trainer can work with both non-veterinary behaviourist and clinicians in veterinary behavioural medicine to implement the cognitive aspects of behavioural change through the appropriate application of learning theory. Interdisciplinary

referral and ongoing communication enable emotional, physical and cognitive health to be given equal consideration and for dogs with behavioural challenges to get the help they need.

Improved co-operation and communication between the different disciplines is necessary in order to improve early detection of problems and to offer appropriate help as soon as possible. Trainers may notice emotional challenges during routine preventative training, for example when dogs are hypervigilant in class or excess in appeasement interactions with other dogs and/or people in the training environment. If they can pick up on these signals and refer the dog to a veterinary surgeon at this stage, then more complex development of behavioural concerns and emotional compromise can be avoided. Likewise, veterinary surgeons can advise human caregivers of the importance of taking care of their pet's cognitive health and them to attend appropriate training classes from an early age. Rehabilitation trainers provide an important link between cognitive and emotional healthcare and are important team mates for veterinary surgeons working in behavioural medicine and non-veterinary behaviourists.

Provision of comprehensive healthcare necessitates a multidisciplinary approach and lack of co-operation and communication between professionals is detrimental to animal welfare. Mutual respect between the professions can only benefit the dogs, their caregivers, the professionals and the wider community.

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