Fear, Aggression, Communication, Body Language and Social Relationships in Cats

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SUMMARY
As knowledge about the normal behaviour of cats and their social behaviour has increased over the past decades, many beliefs about aggressive behaviours, its causes and management, have changed. Failure to understand what will promote friendly, amicable behaviour and what will promote aggressive behaviour can lead to various behaviour problems, including aggression and conflict over resources, such as food, resting sites and litter boxes. Thus, understanding the natural social organisation, relationships and communication of the cat and how this impacts on cats is essential if we are to better manage cats, especially those that live in multi-cat households.

Introduction
Fear is a feeling of apprehension associated with the presence or proximity of an object, individual, or social situation. Fear is part of normal behaviour and can be adaptive. The determination of whether the fear or the fearful response is abnormal or inappropriate must be determined by context. If a cat is fearful of stimuli that are innocuous such as walking on carpet or going outdoors, such fear would be considered irrational and, if it were constant or recurrent, probably maladaptive. Normal and abnormal fears usually occur as graded responses, with the intensity of the response proportional to the proximity of the fear-provoking stimulus. Aggression is a complex and often emotional issue. Aggression is one of the most common behavioural complaints reported by owners with respect to their cats. Many studies have shown it is the most frequent reason owners seek help from a veterinary behaviourist. The variety of targets, intensities and manner of presentation means that there is no “one size fits all” approach that can be applied to every case. Additionally, aggression can be a normal part of a cat’s behavioural repertoire, something that many clients have not considered when assessing their cat’s problems. This makes dealing with cases of aggression not only challenging but also rewarding.

Treatment of fearful or aggressive cats usually involves the 3 M’s: behaviour Modification, environmental Management and in some cases the use of psychotropic Medications. This paper will not discuss any treatment protocols.

Fear
Fear is a physiological, behavioural and emotional reaction to a potentially injurious stimulus. Experiencing fear is a survival mechanism, it is an adaptive response, and usually occurs in response to a specific stimulus. Fear is often connected to pain or a traumatic event. For example, if a cat falls down a set of stairs he or she may develop a fear of stairs.

There are four emotional stages of fear (the 4 F’s), which correspond with the physiological effects of the sympathetic nervous system:
the flight, fight or freeze responses. The muscles used for physical movement are tightened and primed with oxygen in preparation for a physical fight or flight response. For example, a cat may try to run away from a fear-evoking stimulus such as a veterinarian. However, if cornered it may freeze or become defensively aggressive.

The fourth emotional response is the fiddle response, when the cat may exhibit displacement behaviours. Displacement behaviours are normal behaviours but not in the context in which they occur. For instance the cat, when faced with the fear-evoking stimulus, such as the veterinarian, may yawn or lick its lips. In another context yawning, for instance when tired or licking lips after a meal would be considered normal behaviours. Many owners have seen this response but have never realised that it means that the cat is fearful or anxious.

The physiological reaction results in an increase in heart rate, increased respiratory rate (panting), sweating, trembling, pacing and possibly urination and defecation. Cats will exhibit changes in body posture and activity when afraid, and may engage in an avoidance response such as fleeing or hiding (Fig 1).

The neurotransmitter serotonin has been identified as a mediator of fear and anxiety. Normal fear is adaptive and transient in nature. However, abnormal or irrational fears must be treated for the welfare of the cat.

Aggression

The word aggression has different meanings depending on the context. Aggression can be described as a wide variety of overlapping behaviours that are directed to and often originate from outside stimuli such as sights, sounds and smells. However, internal stimuli, such as cold, hunger and fear, may also play an important role. Several factors influence an individual cat's propensity to aggress. The genetic make-up, past experiences and learning and the current environment all play a role in determining the cat's behaviour.

Some cats that exhibit aggressive behaviours are actually abnormal or “ill”, that is they have a mental health disorder. This means that they are not able to respond appropriately in social situations as they are unable to learn what intra or interspecific signals mean. In many cases it is because they have an anxiety disorder. A thorough physical examination and appropriate pathology testing will assist in ruling out any physical problems that could be contributing to the behaviour. Any illness can lead to increased irritability and enhance the tendency to become aggressive. A good behavioural history will help to determine any external stressors, which can also play a critical part in determining when the threshold for aggression is reached.

Signs of Aggression

Signs of aggressions in cats vary between individual animals but in general may be:

- visual (changes in body posture, piloerection)
- auditory (growling, spitting, hissing)
- olfactory (spraying, scratching) as well as tactile (scratching, biting and may involve the use of teeth and claws).

Predisposing Factors for Aggression

Behaviour is influenced by three main factors. These are the influences of inheritance, learning and the environment. The genetic or inherited component predisposes a cat to behave in a certain way and will influence the behaviours expressed.
All previous experiences, (particularly those in the socialisation period which occurs between 3 and 7 weeks in cats), and what the cat has learnt from these experiences, also affect later behaviour, as does the current situation in which the cat finds itself. Environmental factors such as the presence or absence of others, fear-provoking stimuli such as odours, noises, loud voices, shouting, sudden movements, an assertive manner, and staring may increase the cat’s likelihood to respond with aggression. Fear or anxiety is now recognised as the underlying reason why a cat may respond aggressively in a given context.

These three factors also influence how a cat may respond when it is fearful or anxious. These responses generally fall into four categories: fight, flight, fear or fiddle. The fight and flight responses are probably the best known and certainly the responses that owners may be most familiar with, however the freeze and fiddle (displacement behaviours) responses, while also common, are less well recognised. All responses designed to increase the distance between it and the fear-provoking stimulus.

In any discussion of aggressive behaviour, the behaviour of victim(s) as well as the context in which the behaviour occurs needs to be considered, as aggression does not occur in isolation.

Most intraspecific aggression is highly ritualised, appears to serve some ethologically significant function and is commonly associated with competition between members of the same social group. Interspecific aggression, however, is most commonly associated with protection of self but may also involve some competition depending on the context.

To understand why some cats may act aggressively it helps to view the surroundings and the circumstances from the cat’s perspective. That is, “walk in their paws” and understand feline social behaviour.

Pathophysiology of Feline Aggression

In situations where the aggressive response is not considered normal contextually, there will be an underlying pathophysiological condition.

Currently, anxiety is thought to be the underlying factor in many categories of aggressive behaviour. Thus managing the underlying fear or anxiety will be an important part of dealing with cats exhibiting aggressive behaviours.

It is thought that the hypothalamus and amygdala are involved in aggression. Excitation of the ventromedial hypothalamus (VMH) and amygdala leads to a defensive response. The medial amygdaloid nucleus is involved with intra species aggression. Stimulation of the lateral amygdala facilitates predatory attack and defensiveness.

Monoamines and androgenic steroids act as modulators of established offensive and defensive aggressive behaviours. Medical conditions such as toxoplasmosis, ischaemic vascular problems, hepatic-encephalopathy, encephalitis, lead poisoning, arthritis, sensory (hearing and / or sight) deficits, hyperthyroidism, epilepsy and rabies have all been associated with aggression, as has the use of medications such as some anaesthetic agents and corticosteroids.

From several studies it appears that socially mature, intact males are most often implicated in exhibiting aggressive behaviour. However, aggression is not restricted to males and there is considerable variation in time of onset of aggression in animals capable of serious aggression.

Feline Communication

Cats can communicate complex signals in such a way that they are very clear not only to other cats but other animals such as dogs in the family as well as people. They do this by using sounds or auditory signals (meows, purrs, growls and hisses) in combination with visual signals changes in body language (expressive tails, ears, whiskers and bodies). They also use odours and tactile signals.

Communication requires a sender, a message, a medium and a recipient, although the receiver does not have to be present or aware of the sender’s intent to communicate at the time of communication; thus communication can occur across vast distances in time and space. The communication process is complete once the receiver understands the sender’s message – and this is where most problems between cats or between cats and people occur.

Put simply, communication is about sending and receiving messages between two or more parties. The messages may be sent instantaneously like a hiss or a stare, or can be ‘posted’ to be read by other cats as they encounter it, like scratch marks (Fig 2) on a tree trunk or urine sprayed in a prominent place.

Despite the differences in the way messages are presented, feline and human communication has much in common – this is probably one reason that cats and people are able to get along so well.

Both species rely on vocal messages and visual signals (commonly called body language) to add meaning and nuance to the messages sent. Humans also leave signs to be read at a later date in the form of signposts, books, blogs, graffiti and internet postings. While the technology is different, the intent is the same - to leave a message
Body language

Body

Cats send messages to other cats, animals and humans using their bodies. The size and shape of the body, the position of ears and tail and the visibility of potential weapons such as teeth and claws all convey important messages to others. In general terms, confident cats stand tall and evenly on all four feet, with their tail up or level with their back, and their ears forward. In general attacking cats try to make themselves appear larger to their opponent - they do this by raising their fur (also known as piloerection). The tail will be raised and the fur piloerect (Fig 3). When a cat really wants to convince another cat or person that it means business the cat will arch its back. The more fearful a cat is feeling the lower their body gets to the ground. Uncertain cats may take the middle road, often lowering their rumps while keeping their forelegs available for striking.

Adult cats will respond to a silhouette of their own species as they would to a real animal. Adults will show piloerection on the first presentation of a cat silhouette, This response should be fully developed in kittens by the age of 8 weeks identifying ourselves to others who come later. Problems arise between cats and people when we misinterpret the messages they are trying to send.

Before we can do something about these misunderstandings of communication between cats and people, it is important to understand where cats have come from and how they organize themselves socially. These are important factors that influence the way cats communicate.

Cats are territorial - they claim, mark and defend territories where they live and hunt. The size of a territory is determined, in part, by the amount of food it contains. In areas with abundant food, such as in a farm hayshed, a large number of cats may live closely together. While cats are solitary hunters, they do live in social groups - queens will often live in a loose group consisting of a queen and kittens from her last one or two litters. Female family members may even have adjacent territories.

Adult males usually have territories that overlap those of a group of queens. The importance of this for those of us who share our lives with cats in the cities and suburbs is that these territories may not align with house property lines. Therefore it is possible for a cat to claim the front yard of the house in which it lives as its territory but not the backyard.

Cats send signals using body language; that is by changing their posture, the position of their limbs and ears and with piloerection. Cats are very expressive and it helps when trying to understand cat communication signals to look at each area of the face and body separately.

Fig 2. Communication is about sending and receiving messages between two or more parties. The messages can be ‘posted’ to be read by other cats as they encounter it, like scratch marks.

Fig 3. In general, attacking cats try to make themselves appear larger to their opponent. (photo © Shutterstock)

Ears

A cat that is interested in what is going on around it will have its ears forward. A frightened cat will have its ears flat and backward facing. Often cats that are attempting to bluff another cat or who are not certain will hold their ears halfway between these positions, sideways.

Eyes

Interested cats tend to look at the person or object of their interest. Cats will stare at other cats or people as an aggressive signal (fig 4). This should not be confused with
making friendly eye contact. Aggressive stares are intense. Friendly eye contact can be soft and often the cat may blink in an exaggerated manner. This can also be seen when they are trying to decrease tension between two cats. Less confident cats and cats that wish to avoid a physical altercation will avoid looking at another cat or a person who is staring at them. By avoiding eye contact, the cat may simply look away or if it is feeling really uncomfortable, it may engage in some intensive grooming activity or displacement activity (which in feline terms means a common feline rule of thumb - “When in doubt groom”). Other cats often avoid looking at a cat that is engaged in a bout of composure grooming. The grooming behaviour is displacement behaviour motivated by feeling threatened but unsure if it is best to run away or stay put.

Tail
Cat tails are extremely expressive and very rarely still - they swish when a cat is agitated or annoyed and sway gently when a cat is happy and relaxed. Vertical tails are seen at greetings, during play and in the female during sexual approaches. Horizontal tails are seen during amicable approaches. Lowered tails are seen in aggressive incidents and a tail held between the legs is seen when a cat really wants to avoid any altercation. The concave tail position where the tail is held vertically from the base and then curves over so the tip points at the ground is often used in aggressive incidences but may also be seen during play.

Vocalisation
The vocalisations cats make have been studied for many years, partly as their sense of hearing is so much greater than that of humans and also because they were used as a model for the development of the bionic ear. Vocalisations are a very important part of intra-species communication along with body language and visual and olfactory communication. Vocal communication is important for the spacing of individuals and can prevent direct confrontation.

The frequency limit and range tend to fall with age. It is interesting to note that deaf kittens tend to vocalise more loudly than their hearing counterparts — so feedback is important in that respect. However, it is not required to learn vocalisations. Kittens are also known to be able to recognise familiar “voices” by the time they are 4 weeks of age. They appear not to take note of one another’s communication patterns until they are about 9 weeks of age.

The sounds cats make can be divided into three main categories
- sounds made with the mouth shut
- sounds made with the mouth initially open but then closing
- sounds made with the mouth held open.

Some sounds are specific to particular circumstances such as the sounds a queen makes for her kittens.

Closed mouth
There are two sounds made included in this group. They are the purr and the Trill/Chirrup/Greeting meow. Purring has fascinated people for a long time. It is a monotone sound made by cats in a wide range of situations - the common feature of all the situations appears to be cat-cat or cat-human contact. Interestingly, cats also purr when in extreme pain. There is little information to explain why this occurs but some think this may be an attempt at self-calming by the cat.

The Trill/Chirrup or Greeting Meow is, as its name suggests uttered upon contact with a known, and liked, cat or person.

Open-closing mouth
There are four sounds included in this group, the Meow, the Long Meow, the female call and the Mowl (a male call). Only the Meow and Long Meow will are discussed here as they are social communications that are often directed at humans. The other sound that is common is used during the mating season (Spring).

The meow is a general communication sound for cats, with the long meow being a high intensity version of the ordinary meow. Many cats have expressive meows that can be identified as having different meanings by their human
families. Most cat owners learn what their cat’s meow means— for example when it wants to go out and when it wants some food. The variety in the meows of cats appears to be due to the individual differences between cats and, for meows directed at people the result of interactions with humans. The role of the long meow in cat-cat communication is unclear at present, but many cat owners know what their cat means when the direct a long meow at them, for example— “Open the door please! Hurry up with the food!”

**Open Mouth**
These sounds are the sounds of aggression; that is the growl, the yowl, the snarl, the hiss, and the spit. Growling, yowling and snarling are used when the cat signals it is threatening or actively attacking while hissing and spitting tend to be used in defensive aggression, when the cat feels threatened or is attacked (Fig 5).

![Fig 5. Hissing and spitting tend to be used in defensive aggression, when the cat feels threatened or is attacked (© Shutterstock)](image1)

**Odour Signals**

**Scent**
Cats recognize members of their social group or enemies by their appearance and by their smell. Each cat has its own particular smell, the result of secretions from glands in the skin of the corners of the mouth, sides of the forehead, and along the tail. Typical feline greeting behaviour involves sniffing these areas and around the anus. Cats will rub or bunt their faces against objects, people, familiar dogs and other cats to spread their scent around, not necessarily because they are friendly (Fig 6).

![Fig 6. Cats will rub or bunt their faces against objects, people, familiar dogs and other cats to spread their scent around, not necessarily because they are friendly.](image2)

It has been suggested that this behaviour forms a group scent that identifies members of their particular social group. Members who go missing from the group may initially be rejected until they smell “right” again. This is why it can be useful in multi cat households to rub a newcomer or a recently absent feline family member with a towel that has been rubbed over the other cat members of the family. The fact the cat smells ‘right’ can speed its acceptance into the group. The synthetic feline pheromone analogue Feliway® can also be used for this purpose.

**Urine**

Long-term odour signals are posted prominently using urine sprayed on vertical surfaces. The urine can smell very pungent, and acts to inform other cats of the sex and sexual status of the cat claiming the territory. Spraying increases when queens are calling (in oestrus and looking for a mate). Some cats will also spray if they feel worried or anxious. However, cats do not spray because they are angry or spiteful or mean.

The flehmen or gape response to conspecific urine is not seen in kittens less than 5 weeks of age but is of a similar frequency and nature in 7-week-old kittens to that seen in adults.

**Feline Social Behaviour**
Cats should be thought of as a social species. Animals that are considered social live in companionship with others. They tend to have a higher tolerance to the presence of familiar as well as unfamiliar conspecifics. The
relationships between members of the group tend to be friendly rather than agonistic as cats recognize members of their own social group. Aggressive behaviour is exhibited by most cats toward unfamiliar cats that are not members of the group. Research has shown that when food resources are scarce feral and free-living domestic cats can survive in the solitary state. However, when food is plentiful they tend to live in a group or colony and these social groups that have an internal structure in which group members recognize each other and engage in a variety of social behaviours. But domestic cats are solitary hunters. This has sometimes led to the mistaken belief that they are asocial. As domestic cats have a small body size and relatively high metabolic rate, it is efficient for them to hunt small prey, such as rodents, alone.

However, social living can provide benefits such as allowing easy access to other cats for mating purposes, allowing the young to learn more about the environment and providing better options for protection against environmental stressors. Group living can also help in defence against predators.

Territory boundaries are maintained with visual and olfactory signals in the form of scratching on vertical surfaces and urine and/or faeces. Surrounding the territory is the home range, which may be shared in part with other cats. The size of the home range is directly related to the density of food sources. Where food is abundant, home ranges may be as small as 0.2 acre for females and 2.1 acres for males. In areas with less abundant food, ranges have been measured at 667 acres for females and 1038 acres for males.

A cat colony is matrilineal and the affiliate, co-operative relationships between females provide the social structure in the colony. There is co-operative care of the kittens by a queen and her female relatives, or other familiar queens. Within the group, a number of affiliate behaviours are exhibited, particularly between cats that are preferred associates. Preferred associates are cats that can be found close together more frequently than they are found with other members of the group. Preferred associates can be found together in a variety of contexts and locations and come together because of their social bond.

Nose-touch is a greeting behaviour that is exhibited most commonly between preferred associates, as is allogrooming, where one cat grooms another cat, usually on the head and neck. Members of the social group also allorub, where cats rub up and down each other’s sides. The head, sides and tail are all involved in this behaviour, which may go on for several minutes. This contact is thought to facilitate the exchange of scent to help cats recognise members of their own group.

In multi-cat households there is not necessarily one social group within the household. For example two cats that live together in one household may actually form one social group of two cats or two groups that contain one cat each (fig 7a and b). Likewise if there are three cats in one household they may form one social group of 3
cats, 2 social groups (i.e. two cats in one group and one cat in another) or three social groups each consisting of one cat. This is important for owners to understand, as the resources in the household need to be tailored to the number of social groups (or cat families) in the household. This means that the provision of adequate resources for resting, feeding, drinking and toileting is essential for group harmony.

**Conclusion**

The domestic cat is a social species with complex group dynamics. By understanding feline social systems we can maximise friendly interactions and minimise aggressive encounters within the household. When we recognise how cats communicate, whether by visual, auditory or olfactory signals we can recommend appropriate management of multi-cat households to prevent problems or after when disruption occurs. By recognising that fear and anxiety are the underlying reason for most aggressive behaviour we are better equipped to intervene appropriately and so increase the welfare of the cat and prevent disruption of the human animal bond.

**References and Further Reading:**