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## **BEHAVIOURAL TRAITS OF CATS (*Felis catus*) – IMPORTANCE FOR HUMANS**

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**Abstract.** Among companion animals, the behaviour of the cat is least known and understood. For years it has been a mystery to many people. It is difficult to correctly assess and read a cat's facial expressions, tail movements and perception of the world. Increasing attention is being paid to developing proper relationships with animals and improving our understanding of their language. This study describes the body language of cats, with particular focus on the expression of the emotional states of these popular pets.

**Key words:** cat, behaviourism, body language.

## **INTRODUCTION**

Cats have long evoked extreme emotions. They have been worshiped by some and aroused fear in others. In ancient Egypt, they were mummified and placed in graves together with the pharaohs. In the Middle Ages, they were associated with witches. Black cats aroused the greatest fear; they were identified with dark forces and were burnt at the stake together with women suspected of witchcraft. After the period of the greatest persecution, cats returned to favour and people began to believe in their extraordinary power to fight demons. Over the years, people's attitude towards these animals has changed. Today, they are friends and defend households against pests (Sztych 2011; Penar and Klocek 2017).

Cats are mysterious and independent, and their true nature is not fully understood. They are considered to be solitary animals because they do not form herds, hunting alone and usually moving about alone. However, they do not avoid the company of other animals and people, and if they become bored with someone's presence, they simply go elsewhere. They can indicate their opposition or dissatisfaction in a given matter very clearly. A good knowledge of the basic principles of communication between these animals and their environment makes it possible to develop a good relationship with the pet and to avoid many problems associated with behavioural disorders (Cichoń 2007a; Farnworth 2015; McGowan et al. 2017).

This paper presents the most important changes in posture, including the arrangement of whiskers and tail and ear movements, as well as the vocalizations that allow human beings to correctly assess the emotional states of the cat.

## BODY LANGUAGE

Cats can communicate in many ways. This is possible due to the diversity of the head muscles and individual parts of the body. They behave completely differently towards representatives of their own species and in relation to people, and their messages are usually short, simple and unambiguous. The inability to correctly recognize signals sent by the cat can lead to very unpleasant consequences (Neilson 2006; Cichoń 2007b).

Studies have shown that the cat employs 25 different body language signals, which can be used in 16 combinations (Fig. 1). Many of them can be observed during the play of kittens or even an adult cat. They are used in hunting, chasing, running away and fighting. The rivalry between animals before force comes into play is based primarily on body language that indicates the advantage of one of the individuals. Signs of this dominance include arching of the back, gazing hypnotically at the opponent, growling, and rhythmic tail movements. The weaker individual, wanting to avoid a situation in which the problem is solved by force, usually begins to clean its fur and thus breaks eye contact, thereby sending a clear signal that the encounter is over (Neilson 2002; Stella et al. 2014).



Fig. 1. Relaxed cat (photo Elżbieta Horoszewicz)

### Vibrissae

Vibrissae, commonly called whiskers, are located above the eyes, on the cheeks, above the upper lip, under the chin and over the wrist joint. They are tactile hairs which serve as touch receptors. They not only help the cat to sense obstacles and recognize them accurately, especially at night, but also enable precise reception of stimuli from its environment. When they protrude straight out to the sides, they signify calm and relaxation,

whereas whiskers lying flat and close to the head indicate anxiety. A cat sending warning signals often directs its tactile hairs forward, and when it is intrigued by a sudden situation, sound or object, it begins to move them rapidly (Neilson 2006; Cichoń 2007b) – Fig. 2.



Fig. 2. Warning signals; anxious cat (photo Elżbieta Horoszewicz)

### Ears

Cats have very well-developed and sensitive hearing. They are able to analyse sounds with high frequencies of around 60 kHz. These skills enable them to locate the ultrasonic vocalizations of rodents. In addition to their role as the hearing organ, ears also provide information about the cat's well-being. Ears directed upwards and slightly forward indicate contentment in the cat, while the ears of a frightened cat lie flat and sideways. Ears pointed straight back are a warning signal announcing an attack. When the animal is interested (Fig. 3) in some intriguing noise, it may move its ears rhythmically from side to side (Snowdon et al. 2015).



Fig. 3. Interested cat (photo Elżbieta Horoszewicz)

## Tail

From an anatomical point of view, the tail consists of 18 to 26 vertebrae, depending on the breed. This is another part of the cat's body that can inform us of its feelings at a given moment. Even a motionless tail can provide a great deal of information about the cat's mood. A tail that is raised up, lowered, straightened, curved or tucked is a reflection of diverse feelings. Cats that are content or interested in stimuli from the external environment usually keep their tails raised high, while a tail curved in an inverted U shape means that the cat wants to play with its owner or another pet. The tail of a cat that is agitated or frightened is usually puffed up, and the tip of the tail makes rhythmic sideways movements (Fig. 4). In extreme cases, it can be hidden under the belly (Cichoń 2007b; Feuerstein and Terkel 2008).



Fig. 4. Agitated cat (photo Elżbieta Horoszewicz)

## Eyes

The cat is a typical hunter, as evidenced by the characteristic arrangement of the head and the frontal positioning of the eyes, which enables excellent binocular vision and accurate estimation of the distances of objects. The cat's vision is also very sensitive to movement and ideally adapted to seeing in dusk or darkness, but unfortunately lacks the ability to perceive details. Another feature that distinguishes this organ from that of other companion animals is that the pupils can widen or narrow depending to the amount of available light or according to the cat's mood. During the day when light is plentiful, the pupils have the shape of a vertical slit, but they can expand in response to fear or stress, or narrow before an attack. Because of these features, the signals sent by the animal are difficult to read correctly. Behaviour that people recognize as friendly, i.e. a smile and eyes opened wide (Fig. 5), will be perceived by the cat as hostile, because to the cat a show of teeth and wide-open eyes are a sign of aggression. A representative of this species that wants to announce its friendship will behave completely differently: its eyes will be half-closed and it will move freely. The pupils of a relaxed cat observing its surroundings dilate and contract depending on the intensity of light, but widened pupils are a sign of agitation. Research carried out by Bennett et al. (2017) found great variation in the emotions expressed by the facial expressions and especially the eyes of the domestic cat.

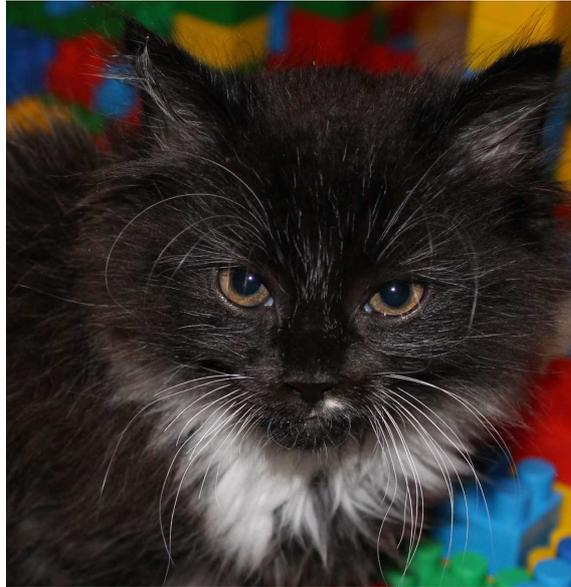


Fig. 5. Angry or frightened cat (photo Elżbieta Horoszewicz)

In addition to facial expressions and body language, the cat can communicate using sounds and smells. How often they emit sounds is a breed-specific trait, and some sounds are reserved for humans and are never used to communicate with other cats. Juveniles learn them over a period of about 12 weeks. Initially, these are sounds that express a greeting, a threat or anxiety. Research indicates that cats emit vocalizations with about sixteen different timbres and tones. These can be classified as meowing, purring, snarling, hissing and yowling (Yeager et al. 2003; Espin-Iturbe et al. 2017).

Meowing is a typical sound associated with cats, which appears most often during greeting. Cats can use different tones, halftones or voice vibrations to give new meaning to a single meow. Despite breed differences, there are some types that are common to the species. A short and quick 'meow' usually means a greeting or thank-you. On the other hand, when the cat does not get what it wants – whether it is asking to be fed or stroked or for someone to open the door – it produces a loud and drawn-out 'mrrooww'. In extreme cases of dissatisfaction, the cat owner may hear an increasingly intense urging in the form of 'mrrroowww'. Another type of sound is purring, which arises when air flows through the larynx with each inhalation and exhalation. The purr of the domestic cat consists of two phases, and is only possible when its mouth is closed or when the kitten is nursing from its mother. It can continue for hours, until the cause of the purring is interrupted. It occurs at a frequency of twenty-five cycles per second, irrespective of gender, age or breed, and plays the most important role in the mother's relationship with her offspring. Kittens begin to purr one week after birth, while nursing. Cat sounds also include warnings, which are issued by the cat when it is irritated or very angry. This is a trait inherited from the wild ancestors of the domestic cat. This group of vocalizations includes hissing, caused by the rapid exhalation of a large amount of air. It is accompanied by the characteristic opening of the mouth, which together with the raised upper lip and arched tongue is a clear warning to others. This group also includes growls or murmurs that indicate dissatisfaction and very often precede an outburst of aggression. Cats use them most often as a last resort when other signals do not achieve results (Bessant 2007).

Each cat has a unique smell. Certain areas of the cat's skin have sebaceous glands that produce an oily scented secretion. They are located on the temples, lips, chin and base of the tail. This secretion allows the cat to mark its territory and is another element of communication with its environment. Odour traces are usually left by scratching, rolling, rubbing against various objects and people, and marking with urine. The introduction of a new scent into the cat's world, such as the smell of another animal or a new piece of furniture, or a newborn baby appearing in the home, may cause a short-term disturbance of the cat's olfactory harmony. The discernment of pheromones is particularly important for the cat. The perception of certain phenomena by the senses of sight or hearing, which are adapted to the reception of sudden, short-term events, may be insufficient. In contrast, the sense of smell captures faint, long-lasting information from the environment. The cat is able to identify olfactory information that remains in the environment for several hours, days or even weeks (Łodzińska 2005; Kondrasiuk 2011).

## **SOCIAL COMMUNICATION**

Cats in the wild have their own diverse social system, which depends largely on environmental conditions. The main factor is the availability of food, which causes cats to form groups. Members of the group are usually related females and their offspring. Female cats living in such social groups share responsibilities; they look after not only their own offspring, but also the young of another female, or feed all the young with the prey they have captured, or sometimes even feed them with their milk. This all depends on the number of offspring.

Adult males do not belong to this group. They form only loose relationships with females during heat. Males do not take part in raising their offspring. In areas where food is highly dispersed, cats lead a solitary lifestyle. The cat fiercely defends the site where the den and the largest food source are located against intruders (Meadows and Flint 2005).

The cat communicates with its environment via its sense of smell. This communication takes place in two different ways: by smelling odours and by sensing chemical molecules called pheromones. Smell is a very important sense in the feline world and is necessary for survival. Together with chemical communication, it helps the cat to look for food (for example, cats are deaf and blind immediately after birth, but they have a well-developed sense of smell and easily find the mother's teat). The sense of smell helps the cat to assess the palatability of a given food (cats have about sixty million olfactory cells) and receive signals of sexual readiness. It is essential in choosing a partner for reproduction (individuals with a similar, perceptible composition of pheromones are repellent and unattractive because they are genetically too similar). Cats use their sense of smell to orient themselves in the territory. Many cat behaviours are associated with their well-developed sense of smell, which gathers all impressions from the outside world (Kondrasiuk 2011). One of these behaviours is scratching. The cat must scratch, and this is its natural behaviour. The cat needs to scratch not only to maintain good hygiene and body condition, but also to leave its scent. When the cat scratches various objects it leaves a scent trace as well as a visual trace. The scent is left owing to glands located between the front paw pads. This is a clear message indicating whom the area belongs to (Łodzińska 2005). Another behaviour associated with the well-

-developed sense of smell is excrement burial. Among wild cats, this is linked to the position the cat occupies in its community. It not only masks the scent, but also allows the cat to communicate its social status. Dominant males do not bury their droppings, but leave them in visible and frequently visited places, whereas cats with a lower status bury their excrement scrupulously and thoroughly. In contrast, domestic cats living in human homes simply bury their droppings, perhaps because they feel dominated by their owners (Morris 1996).

Cats can enter into social relationships not only with representatives of their own species, but also with a dog, guinea pig or canary. This is possible provided that the cat is accustomed to contact with other animals from a young age. Sensible behaviour in introducing a cat and a dog will allow the two species to live in harmony under one roof. Misunderstandings arise from the fact that cats and dogs behave very differently. For example, a dog may associate purring with growling, which it will interpret as a manifestation of hostility, while the cat may have no such intentions. People must teach these animals to live together in harmony, and under no circumstances should they exacerbate their hostile behaviour (Nalewaj 2005).

In the feline hierarchy, the human being occupies the highest position. Cats are viewed as independent animals that do not give in to humans as easily as dogs, but they can establish friendly relations with them. These animals feel very good in human homes, perhaps because they have constant access to food and shelter and do not have to worry about losing their territory. Another reason cats enjoy human companionship is that they are provided with caresses and play (Tymiński 2004).

The establishment of a good relationship with the cat begins when it is a kitten. The best time to build this relationship is the period of kitten socialization. Certain events taking place at this time will pay off in the cat's later individual development. Kittens are most easily accustomed to contact with humans at the age of two to seven weeks (Neilson 2002). Stroking the mother cat during pregnancy can be helpful in this process. Kittens born to a cat that has been subjected to very gentle pressure on the abdominal wall have been shown to be more tolerant of touch than those whose mothers were not stroked during pregnancy. This means that the cat's behaviour is already being formed during its foetal life. Other factors include the conditions in which the pregnant cat is kept and her predisposition to human contact, which is inherited by the offspring, as well as the environmental conditions in the first months of the kittens' life (Neilson 2002).

Just as each human being has their own character and preferences, which constitute their personality, the same is true of cats. We cannot generalize that all cats love cleanliness or that they are all unsociable. There are several character types of cats that give them unique individual characteristics. The following types can be distinguished (Iracka 2000a):

- friendly and open cats that seek contact with people,
- shy and timid cats,
- nervous cats,
- cats that cannot be tamed even with many years of efforts,
- cats that love playing, caresses and long-lasting physical contact,
- cats that do not like playing with people.

It is possible to shape the character of a cat, but it must be done sensibly and skilfully.

Every mistake will have consequences in the future and may cause numerous problems for the owners. A person caring for a pregnant cat, and later her kittens, must put a great deal of effort into the character formation process and, above all, must be consistent. An owner wishing to raise the best possible companion cat must abide by several principles:

- ensure peace and quiet and stable environmental conditions during pregnancy,
- regularly stroke the belly of the pregnant cat,
- from the third week of life at the latest, regularly pick up the kittens, stroke them, and turn them over on their backs,
- involve everyone, including children, in the kittens' care,
- devote at least 40–60 minutes a day to physical contact,
- ensure that the kittens hear sounds that accompany daily life in the family, e.g. clanging pots and pans, music, or sounds of the city,
- supply the kittens with squeaky and noisy toys of various size, texture and hardness,
- ensure the young cats have contact with other animals, such as dogs, birds, or exotic animals,
- leave the kittens with their mother when they are introduced to new people, objects or phenomena (if the mother is timid, she is likely to pass on her fears and phobias to the kittens while they are becoming acquainted with their surroundings),
- do not separate the kittens from their mother and siblings before the age of eight weeks,
- teach the cat to use the litter box (bring the kitten to the litter box as soon as it attempts to relieve itself outside of it),
- teach the cat not to scratch and bite while playing with people. If the cat begins to scratch and bite while playing, stop playing immediately (Iracka 2000b).

Most people who have a pet believe that it understands what is being said to it. When owners communicate with their pets, they give them the feeling that they are part of the human world, thereby strengthening ties. Cats also love communicating with their owners. Although they cannot speak, they are capable of learning a dozen words or more. For this purpose, you should talk to the cat in the correct manner:

- use its name,
- speak to it often,
- use simple language, but with many words and sentences,
- consistently use the same words and phrases, so that the cat will learn them quickly,
- change the intonation and pitch of your voice (a high pitch evokes positive emotions and encourages contact with the human being; a low voice has a calming and warning effect).

In addition to verbal communication, a person can communicate with animals through body language. Cats closely observe their owners' behaviour, which is the source of much valuable information for them:

- lying on one's back signifies complete trust and the best possible intentions,
- narrowing one's eyes when greeting the cat is a sign of friendship,
- keeping close to the ground with outstretched arms, knees tucked under and a raised pelvis will be an invitation to play,
- raised eyebrows are a sign of interest.

When dealing with a cat, it is worth remembering the following:

- approach the animal a bit from the side, as this is how cats that wish to greet each other approach one another,

- at the first meeting, squat down and wait for the cat to approach you,
- kneel by the animal; do not bend over it,
- do not look a cat in the eyes for longer than two seconds,
- do not wave your arms excessively; cats do not like this,
- do not smile at a cat you do not know, as this will arouse fear and anxiety.

Owing to knowledge of the principles governing the feline world, conflicts, bites and scratches can be avoided, and life under one roof will become easier and much more pleasant for both the human being and the cat (Yeager et al. 2003).

## CONCLUSION

The cat was one of the first animals to be domesticated. People's attitude towards them has varied over the years, from the extreme emotions associated with the magical powers attributed to them, to the worshipping of cats as deities. However, their mysterious behaviour has always been a source of fascination. People have also discovered vast amounts of positive energy in the cat, contributing to their psychological well-being. An accurate understanding of the body language of these pets helps in establishing bonds and improving cooperation with them. This also allows the animal to be used not only as a companion to play with or a rodent exterminator, but also as an element of therapy for various diseases.

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## CECHY BEHAVIORALNE KOTÓW (*Felis catus*) I ICH ZNACZENIE DLA CZŁOWIEKA

**Streszczenie.** Kot jest zwierzęciem domowym o najmniej poznanym i zbadanym zachowaniu. Od lat stanowi zagadkę dla wielu ludzi. Prawidłowa ocena i odczytanie mimiki, ruchów ogona czy sposobu postrzegania świata są trudne. Coraz częściej zwracamy uwagę na tworzenie prawidłowych relacji ze zwierzętami, doskonalimy się w rozumieniu ich mowy. W pracy scharakteryzowano mowę ciała kotów, zwracając przede wszystkim uwagę na wyrażanie stanów emocjonalnych.

**Słowa kluczowe:** kot, behawioryzm, mowa ciała.