

11 Undesired Behaviour in the Domestic Cat

Introduction

In this chapter we examine behaviour that cat owners may find problematic or undesirable. Such behaviour has an impact on the cat–owner bond, can result in relinquishment or even euthanasia of cats and can also indicate compromised welfare in the cats themselves. Despite this, relatively little research has focused on the epidemiology, aetiology, prevention or treatment of such behaviour in cats, and much of the published literature is anecdotal, based on individual case reports or derived from opinion-based sources.

Although terms such as ‘behaviour problem’ and ‘undesired behaviour’ are widely used in the literature, it is difficult to find a clear definition of what such terms mean, or a consistent idea of which types or presentations of behaviour are included. Since a ‘behaviour problem’ must be a behaviour that an owner finds ‘problematic’, this will clearly vary with each individual owner’s subjective interpretation of what is acceptable. For example, whereas one owner may find intermittent aggressive behaviour between cats in a household acceptable, another may interpret this behaviour as a problem. Indeed, further complications for such definitions occur where owners interpret common behavioural signs shown by their cats in different ways: for example the same behaviour may be perceived as ‘aggression’ by some but regarded as ‘play’ by others. Our first problem in understanding undesired behaviour, therefore, is to consider how such behaviour may be classified, and the extent to which owner perception of ‘undesirability’ is an important consideration in such definitions.

The other potentially perplexing aspect of defining undesired behaviour is the extent to which such behaviour is considered to lie within the normal repertoire of the cat. Indeed, behaviour problems are sometimes divided in the literature into those that arise from behaviour that is essentially ‘normal’ or ‘adaptive’ for the species, and those that appear to be ‘abnormal’ or ‘maladaptive’ (Borchelt and Voith, 1982). The former includes those instances where behaviour is likely to be shown by cats in a manner compatible with that seen in a ‘natural’ environment, or which may occur in other contexts consequent to modulation by

the processes of associative learning. For a domesticated species, such as the cat, it is perhaps difficult to define what a 'normal' environment may be, and in practice comparisons are generally made with cats in a free-ranging or feral environment. Abnormal behaviours are generally considered to include those with a clearly medical origin, or those where the behavioural signs displayed are not generally apparent in that species.

Differentiating 'normal' or 'abnormal' behaviour, however, is not as clear as might be expected. Some presentations do fall clearly within one or other of these categories: a cat that urine sprays in response to enforced close contact with another cat that is not part of its social group can be described as showing an adaptive response, even though this may be undesirable to an owner. Equally, an extreme behavioural response that occurs entirely independently of environmental stimuli, for example from a partial seizure focus within the limbic system, is clearly 'abnormal'. However, there are many cases that fall between these two extremes. Many animals show species-specific behaviour in response to an aversive event, but may either appear to react at an unexpectedly low threshold, show a higher degree of response than would normally be expected at first exposure or generalize a behaviour between contexts more rapidly than one might expect through learning. There may be many reasons for these apparently 'abnormal' characteristics of 'normal' behaviours, including: (i) medical conditions that influence the threshold of responses (see [Chapter 12](#), this volume); (ii) other environmental causes of arousal occurring concomitantly; (iii) genetic factors such as personality characteristics; (iv) developmental causes of increased reactivity; (v) epigenetic changes caused by chronic stress; or (vi) a whole host of other factors. Other cases might present with behaviour that appears on first examination to be completely abnormal, but for which a clear history emerges, revealing how the cat has learnt the behaviour through a series of unique experiences over time. It is the complex interweaving of genetic, developmental, environmental and internal factors that can make the interpretation of individual behaviour cases both fascinating and challenging. The involvement of multiple, interacting factors in each case also means that those who advise owners on the treatment and management for such cases should have both demonstrable knowledge and clinical skill in feline behaviour before attempting to treat cases. The overlapping roles of learning and medical disease also mean that non-veterinary clinicians should work closely with members of the veterinary profession.

Proportion of Cats Showing Undesired Behaviours

There is limited evidence as to the proportion of domestic cats showing undesired behaviour. However, the number of cats referred to specialist centres for behavioural advice is suggested to be increasing: whether this change is as a result of increased owner awareness that behaviour therapy is an option for cats, or due to changes in the actual number of behaviour problems that are developing, is unclear (Heath, 2005). The former is possible, since cats appear to be becoming increasingly popular pets, with a recent survey estimating over 10.5 million cats in the UK (Murray *et al.*, 2010). In addition, the role of the cat in households also appears to have altered over time, from one where the cat was rather more peripheral to the family, possibly kept for rodent control, to one where the cat plays an important social role within the family and can provide considerable emotional support for some owners (Bradshaw and Limond, 1997). This may result in owners investing more time and financial resource in addressing undesired behaviours.

These same factors, however, may also account for an increased proportion of cats developing undesired behaviour. The increasing number of cats inevitably leads to higher local population densities. The stress that many cats experience when living in close proximity with unfamiliar cats (see [Chapter 8](#), this volume), particularly where local populations are in flux, may account for increased numbers of undesired behaviours. More cats are also kept in multi-cat households, with Murray *et al.* (2010) reporting that 42% of cat owners had two or more cats, and 2% having between six and 12 cats; such numbers are likely to generate problems associated with social stress, as discussed further below. The changing role of cats within families may also be an important factor in increased behaviour problems: the inclination of owners to show intense and close bouts of interaction with cats can be at odds with the natural social behaviour of cats, and the resulting miscommunication may lead to the development of behaviours that owners find undesirable.

The Association of Pet Behaviour Counsellors (APBC) in the UK produces an annual review of data about the cases that have been referred to members from veterinary surgeons. Since rather few members of this organization specialize in feline behaviour, the data are limited in their application, but they do provide some insight into the types of behaviours for which cat owners seek expert help. In the 2005 review of cases, information was collated on 65 feline cases, of which 30 were male and 35 female. The presenting problem for 28% of the cats was indoor marking (including urine spraying, squat marking, middening and scratching) and 11% presented with inappropriate toileting

problems; 22% displayed aggression to other cats, of which 86% was directed towards other cats within the household; 11% showed some kind of fearful or ‘phobic’ response; 10% of cases presented with aggression towards people, 7% with behaviours caused by medical disorders and 5% with ‘bonding problems’ (presumably meaning cats showing a limited tolerance of interaction with people) (APBC, 2005). Data collected over a 6-month period in a referral clinic (Fig. 11.1) similarly showed that urine spraying, inappropriate elimination, aggression between household cats and aggression directed towards owners were the most common reasons for which owners sought help.

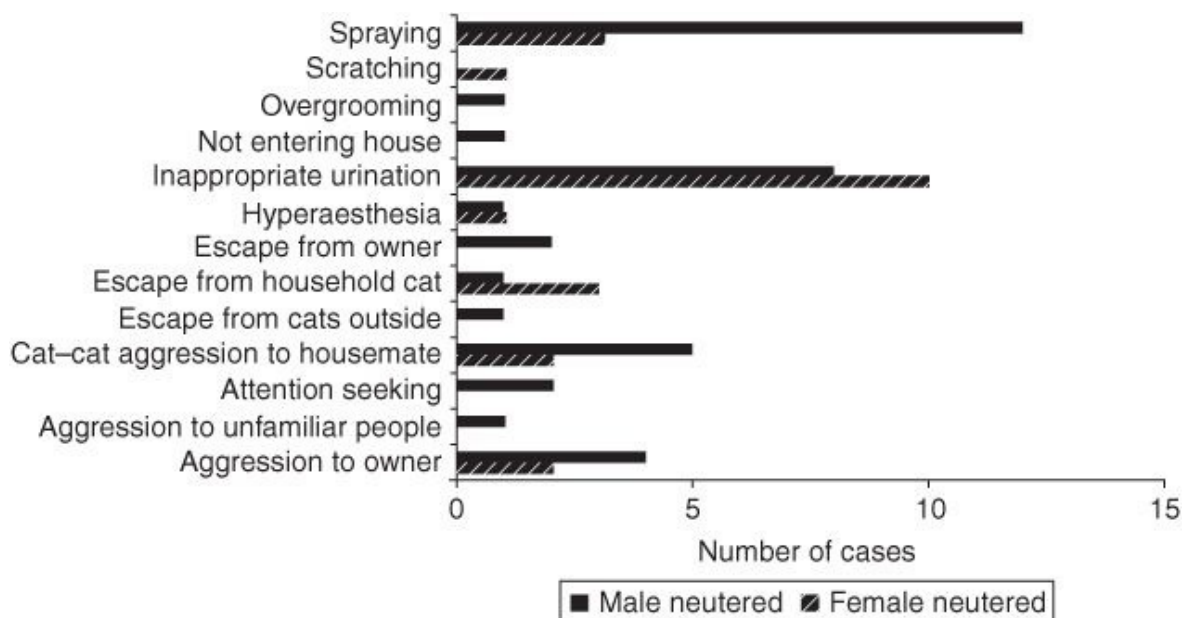


Fig. 11.1. Numbers of cats, by gender, referred to a specialist centre over a 6-month period in 2000 ($N = 61$).

Surprisingly little research has been done to investigate the prevalence of behaviour problems in the general cat population. Bradshaw *et al.* (2000a) conducted a door-to-door survey of 90 households in two areas of the UK, one rural and the other suburban. Answers from 15 male and 75 female respondents were acquired regarding all cats present in the households, a total of 161 cats. As shown in Fig. 11.2, not only was there a surprisingly high number of undesired behaviours displayed by cats in this study, but the frequency of the various types of problem was very different from that described above in a referred population. A survey of 109 owners visiting a first-opinion veterinary practice similarly showed a higher proportion of behaviour such as avoidance of other

cats, scratching and avoidance of visitors, compared with the common problems seen on referral (Fig. 11.3).

The difference between numbers and types of behaviour problems in the referral population and in the general population surveys suggest that the cats seen by referral practitioners are not only the 'tip of the iceberg' in terms of numbers of cats with behaviour problems, but also that owners tend to seek help for particular types of behaviour. These appear to be those behaviours that are more likely to impinge on the lifestyle or environment of owners, such as urine spraying, inappropriate urination and aggression towards people or other cats in the household. Confirming this, a general prevalence survey found a high proportion of problems that had less impact on owners, such as avoidance of unfamiliar people or other cats (Casey and Bradshaw, 2001).

Other evidence for the extent to which undesired behaviours in cats influence the cat-owner bond comes from reasons for relinquishment of cats to rescue organizations. There is considerable inconsistency in the proportion of cats reported to be relinquished for apparent behaviour problems in these studies, ranging from about 8% to over 33%, probably influenced not only by methodological differences in data collection but also by owner perception of what may be an 'acceptable' reason to abandon a cat. In the UK, over a 12-month period, only 7% of cats were relinquished to Cats Protection primarily due to undesired behaviours (according to owner reports), although a much higher proportion (38%) were returned to centres after homing because of undesired behaviour (Casey *et al.*, 2009).

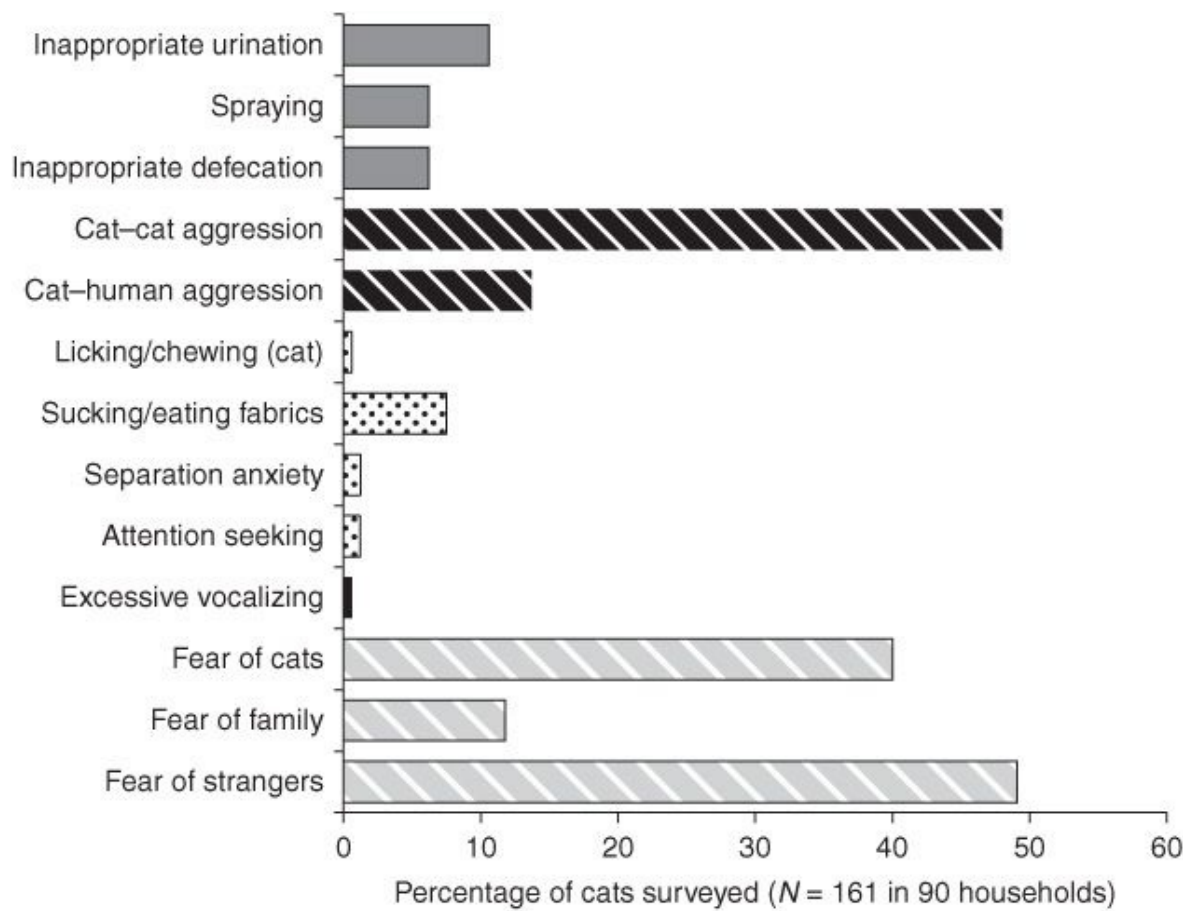


Fig. 11.2. Prevalence of ‘behaviour problems’ in the general cat population (from Bradshaw *et al.*, 2000a).

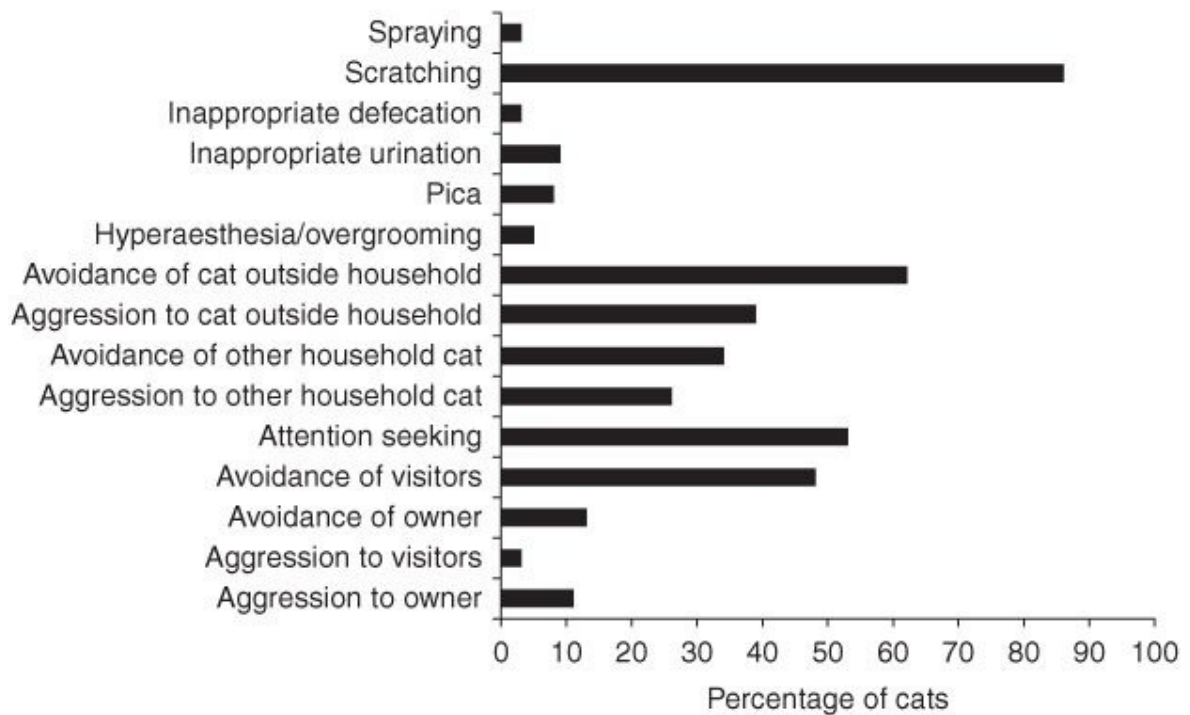


Fig. 11.3. Percentage of cats showing a range of undesired behaviours in a survey of cat owners visiting a first-opinion veterinary practice ($N = 109$) (from R. Casey, unpublished data).

Classification of Undesired Behaviour

Consistent descriptions and classifications of undesired behaviours are essential for those working in cat behaviour research or clinical practice. However, classification of undesired behaviours has taken a number of different approaches in the literature. For example, behaviour problems in cats have been defined according to: (i) what form the behaviour takes (e.g. ‘excessive vocalization’); (ii) the context in which the behaviour occurs (e.g. ‘territorial aggression’); (iii) the target for the behaviour (e.g. ‘intraspecific aggression’); or (iv) the likely motivation of the behaviour (e.g. ‘redirected aggression’). All of these approaches have potential drawbacks. For example, describing an observed behaviour, context or target gives no indication as to potential motivation. This can be misleading, since a behavioural presentation can arise via a number of different routes. For example, an excessively vocalizing cat could be showing this behaviour for one or more of several reasons, including gaining owner attention, in response to anxiety, or as a consequence of hyperthyroidism or age-related changes. A diagnostic category combining these together could lead to

related changes. A diagnostic category combining these together could lead to prescriptive approaches to treatment that are unlikely to be appropriate for all cases.

The main drawback of defining behaviour according to motivation is that this approach requires a degree of subjective interpretation, gleaned from historical, observational and contextual information. Because of the interpretational nature of this type of classification, variation may occur between authors, for example relating to differences in preferred theories of aetiology within different cultures. With the current limited knowledge of the aetiology of behavioural conditions, these diagnoses must be regarded as hypothetical constructs that should be subject to modification and development as science progresses and knowledge increases (Sheppard and Mills, 2003). One salient example of difficulties arising from this type of classification system is the differences of opinion in the use of a hierarchical framework when interpreting interactions between groups of cats (see [Chapter 8](#), this volume). Motivational categories of behaviour are, however, likely to be more closely related to treatment protocols.

Factors Influencing Development of Undesired Behaviours

Although undesired behaviours are often considered separately, the principles underlying the development of such behaviours are no different from those influencing behaviours that are acceptable for owners. In interpreting undesired behaviour it is therefore important to consider the normal behaviour or ethology of cats, together with the individual learning opportunities that have influenced the development of specific responses in particular circumstances. Most of the undesired behaviours that we discuss in this section are essentially ‘normal’ responses of members of this species to the environment in which they find themselves. However, owners often seek help because behaviours are incompatible with their lifestyles, are elicited by inappropriate stimuli, occur in an inappropriate context or are shown at such intensity that they become a nuisance. In many cases, such behaviour has started as a normal response and becomes inadvertently reinforced to the point that it becomes unacceptable. Many behaviour problems also arise as a result of an owner’s lack of understanding of the natural behaviour of their pet. For example, many owners do not appreciate the amount of mental and physical stimulation that cats require, particularly when housed in an indoor environment, and the occurrence

of many behaviour problems is at least partly influenced by their pet's lack of opportunity to show normal species-specific behaviour. Apart from physiological and pathological factors, which are addressed separately in [Chapter 12](#), this volume, the main factors influencing the development of undesired behaviours in cats are: (i) the limitations of intraspecific social behaviour in the species; (ii) relative differences in socialization experience; (iii) breed and individual differences; (iv) ability to show natural behavioural responses; and (v) individual learnt experiences. These are separately addressed in the sections below.

Social interaction between cats

The unique origin of the domestic cat, derived from the essentially asocial *Felis s. lybica*, and subsequently adapted to live in social groups, has important impacts on the ability of *F. catus* to live successfully in the domestic environment. Their asocial ancestry has resulted in a much more limited visual signalling repertoire than that of species derived from cooperative hunters, such as the domestic dog (see [Chapter 5](#), this volume). Complex visual signalling evolved as an important element in enabling group cooperation in naturally social species, but was not a necessity for *F. s. lybica* where adult individuals maintained a distance that obviated the need for signals suitable for face-to-face encounters. Whereas for the ancestors of the domestic dog, social success depended on the ability of group members to display changes in emotional state such that other group members could adapt their behaviour accordingly, this ability was not important in the evolution of the cat.

The limitations of visual signalling in cats appear to have been a factor in restricting the types of social groupings to which the species can successfully adapt. Feral or farm colonies are made up of cooperative social groups of females, based on the concentration of food resources, and providing advantages of cooperative rearing of kittens (see [Chapter 8](#), this volume). These groups work well, despite the relatively poor ability of cats to display changes in emotional state using subtle visual signals, for two broad reasons. The first is that competition between individuals is minimized by the group size closely matching resource availability, and hunting behaviour remaining a solitary exercise. The second is that members of social groups are predominantly familial. Individuals are very familiar with each other, often developing together since birth. Furthermore, social bonds are repeatedly reinforced with affiliative tactile behaviours and the swapping of scent signals through rubbing and

grooming. This familiarity enables group members to 'know' each other well, in the sense that they can effectively predict how other group members are likely to respond in different circumstances, making the ability to judge responses through interpretation of visual signals less important. Encounters with cats from other colonies are unlikely to result in affiliative responses; rather, such interactions generally result in strategies that avoid any contact at all, or involve overt signs of aggression. Studies of these natural grouping of free-ranging cats therefore suggest that the response of cats to conspecifics is highly dependent on their relative perception of others as a 'group member' or 'non-group member'.

Given the limitations of social compatibility for cats, it is perhaps unsurprising that the diversity of social situations in which pet cats find themselves is the most common cause of undesired behaviours. In areas of high human population density, cats may live in close proximity with a number of cats which they do not perceive as part of the same social group. This can lead to high levels of vigilance and anxiety as cats attempt to occupy home ranges while at the same time avoiding contact with other cats. Predicting the temporal and spatial activity of other cats, for example through the monitoring of scent signals, can sometimes enable cats to occupy overlapping territories but not come into contact. However, where altered patterns of activity are caused by new cats arriving in an area, owner activities such as holidays or altering cats' access outside, this can have an impact on cats across a considerable area. The greatest impact is probably caused by cats that maintain a large territory size (e.g. unneutered or late-neutered toms), since they will come into contact with other cats over a wide area.

Behaviours arising from conflict between neighbourhood cats

Conflict between cats in a neighbourhood can have a number of consequences for the behaviour of individuals. Most obvious is the occurrence of aggression between cats: although owners may hear evidence of cats fighting, the first sign of a problem is often the abscesses occurring as a result of cat bites. The limited ability of cats to show appeasement behaviour means that encounters between cats often result in overt aggression, chasing and biting. However, other behavioural consequences are also common: cats that are anxious about contact with other cats cannot predict the activity of other cats; cats that have had previous negative encounters with other cats may alter their patterns of outdoor activity. This can consist of reducing time outside, the avoidance of particular areas or reduced overall area of range. The consequences of such alterations will

vary with other factors, but can include, for example, increased amounts of time seeking interaction with owners. Such cats may seek attention through excessive vocalization, or show abnormal play/predatory responses towards owners. Alternatively, avoidance of contact with neighbourhood cats may result in some cats no longer leaving the safety of the home, or only dashing out for short periods. Cats that are anxious about the activity of other cats in close proximity to the home may spend considerable amounts of time showing vigilant behaviour, such as ‘checking’ out of windows, or looking out through clear cat doors. They may only venture outside when owners go into the garden, or prefer to leave the house through an open door or window to avoid the uncertainty associated with going outside through a cat door with limited visual access to the outside area.

Reluctance to leave the safety of the house due to the presence of other cats can also lead to the development of inappropriate elimination. Where a cat’s normal toileting location is outside, reluctance to leave the house is a common reason for seeking an alternative toileting location inside. Cats are vulnerable when toileting, and insecurity about access to a usual toileting site is one reason for cats to alter their toileting location (Table 11.1). Hence, if a cat normally toilets outside, anxiety about neighbourhood cats will commonly lead to a shift to toileting inside; where a litter tray is not provided this will be on other surfaces, and perceived as undesirable by owners.

Table 11.1. Characteristics of suitable toileting sites for cats.

Features of a suitable toileting site for a cat
Suitable material for burying
Quiet location hidden away
Location away from the threat of other cats that are not perceived as part of the same social group Some cats prefer a separate location for defecation and urination
Litter matches the cat’s substrate preference Location away from feeding site, but not so far from the core area as to feel unsafe

Urine spraying is another consequence of social incompatibility between neighbourhood cats. As discussed in Chapter 5, urine spraying is an olfactory signal that is considered to serve a number of functions. In entire cats, these signals appear to have a sexual signalling function. However, urine spraying also

commonly occurs in neutered domestic cats. Although historically often described as a 'territorial' behaviour, urine spraying rarely occurs at the periphery of a cat's range. Rather, spray marks usually occur in locations that are 'socially significant' (Herron, 2010). For example, the most commonly sprayed items include furniture and walls or windows near to visual access outdoors (Pryor *et al.*, 2001), which are areas where conflict with other cats is likely to occur, or where the activity of other cats may be observed. Although cats 'check' both their own scent marks and those of others, they rarely 'over-mark' the scent of other cats with their own (Hart, 1974), also suggesting that this behaviour is not purely territorial. The rate of 'checking' tends to decline with the age of the scent mark, such that fresh urine is most interesting to cats, and interest decreases as the scent fades (De Boer, 1977b). As time since deposition appears to be important to cats, it seems likely that one important function of these marks is to enable cats to avoid each other when they co-occupy the same area (Cooper, 1997) in order to avoid overt aggression.

Since cats will urine spray in social isolation, it is also possible that these marks have a function in providing information to the marking cat itself. Leaving a mark in locations associated with perceived threat may provide the animal with a greater degree of predictability and control over its environment, as it enables it to 'know' areas where there is potential danger, and vigilance is needed. Hence, a spray mark on the cat flap would alert a cat to be cautious in that area if conflict with other cats had previously occurred at that location.

Cats that have their activity inhibited by other cats in the neighbourhood may also show other behavioural signs associated with stress, such as over-grooming. This is particularly likely to be the case where other cats actually enter the house, or the environment is such that the resident cat cannot predict or avoid encounters with other cats perceived as threatening.

Behaviours occurring in multi-cat households

Where multiple cats live in the same household, similar issues arise among them as those caused by social incompatibility between cats in a neighbourhood. Whether undesired behaviours arise in multi-cat households depends on the extent to which cats perceive each other to be members of the same social group, and also on the extent to which they can access resources independently. As with free-ranging cats, individuals in social groups generally show high levels of affiliative behaviours (such as allogrooming and allorubbing) and will choose to be in close proximity to each other, for example sleeping in contact with one

another (Table 11.2). Also consistent with free-ranging cats, individuals that are siblings or that have developed together as kittens are more likely to form social bonds than cats introduced as adults (see Chapter 8, this volume).

Where two or more cats within a household form separate social groups, they will generally establish different core areas in different parts of the house, and often essentially live separate lives. This may be achieved by active aggression or withdrawal on encountering the other cat, but more often occurs through establishing routines whereby actual encounters are minimized (Table 11.2). In such cases, even where there is no active aggression, the activity of each cat may be inhibited by the others. For example, one cat in the household may be unwilling to pass through a doorway when another cat is nearby, or it may not enter through a cat flap when the other cat is in the vicinity. Owners can often be oblivious to these patterns of avoidance. This is particularly the case where incompatible cats occupy the same space in order to access essential resources. For example, owners will often provide food for all cats in a household in the same room at the same time. In order to obtain sufficient nutrition, cats may have to eat close to other cats, although they would not choose to do so in other circumstances. Often, signs of anxiety shown by cats when forced to eat in close proximity are often not appreciated by owners. This may include individual cats bolting food very fast, or eating excessive amounts at a time to avoid the necessity of returning frequently to the feeding area, factors potentially important in the development of obesity. Other examples of unwilling proximity may occur where cats are attracted to limited sources of heat, or where multiple cats in a household value human contact and may sit either side of an owner in order to achieve attention, while also attempting to avoid direct contact with each other.

Table 11.2. Behavioural signs shown by cats in multi-cat households indicative of social groupings.

Indicators	Behavioural signs shown between dyads of cats within a household
Indicators that cats are likely to be in the same social group	<ul style="list-style-type: none"> Allogrooming Allorubbing Sleeping touching each other Interactive play behaviour initiated by either cat
Indicators that cats perceive each other as being in different social groups	<ul style="list-style-type: none"> Chasing/running away Hissing, spitting or batting at each other Avoiding contact or hiding Displacement of one cat by another Choosing to occupy different spaces (although may come together to access valued resources, such as at feeding time) Blocking movement (e.g. one cat sitting on stairs stops the other coming down) Inhibiting movement or activity (e.g. one cat remains immobile while the other present) Tense facial or body posture during contact Vigilance whilst other cat present (e.g. watching the other cat) Cats engage in play or interaction with owner separately

The problems for cats of living in a household with other cats not perceived to be in the same social group are often exacerbated by their owners' tendency to cluster other important resources together. In addition to feeding cats together, owners often provide litter trays, water bowls and entrance/exit points to the outside in single locations. The combination of limited resource access and avoiding other cats in the household commonly leads to a range of undesired behaviours. For example, a cat that has a core area upstairs in a household will have restricted access to important resources if these are all downstairs, in the core area of another cat. One common consequence might be the 'upstairs cat' starting to eliminate upstairs if access to a downstairs toileting location becomes limited. In some cases the toileting behaviour is precipitated by some other change, such as a change in the routine of the 'downstairs cat'. For example, the 'upstairs cat' may learn that it is safe to go downstairs to use the toilet first thing in the morning and last thing at night, because these are times when the

‘downstairs cat’ is out hunting. However, if another cat moves into the neighbourhood and inhibits the outside activities of the ‘downstairs cat’, this may induce inappropriate toileting in the cat living upstairs. Equally, if the cat living upstairs is in the early stages of hyperthyroidism, it will start to drink more, and hence need to urinate more than the previous twice daily, leading to the onset of inappropriate elimination upstairs.

As with conflict between cats in the neighbourhood, anxiety arising due to incompatible cats living in the same house can lead to various other undesired behaviours. One common consequence is the occurrence of urine spraying, with urine marks located in significant areas such as where cats need to pass each other in narrow passageways in order to access important resources. As described for neighbouring cats, these signals may have both a communicative function to avoid direct confrontation and enable marking cats themselves to subsequently identify areas where potential conflict may occur.

Behavioural signs of chronic stress also occur. These may include cats spending prolonged periods of time hiding to avoid contact with other cats, or showing abnormal responses such as overgrooming. In addition, some cats move away from households where contact with other cats is stressful, for example predominantly living outside or moving to live in other households.

Because cats do not appear to be motivated to maintain social bonds in the same way as other species, the breakdown of established relationships often results in a permanent split of cats into separate social groups. Since the recognition of other individuals as group members is likely to be at least partially through their odour profiles, maintained by affiliative rubbing and grooming, situations that alter the scent of a group member can result in the breaking of social bonds. Should one cat from a social group leave a household for a period, for example if it is hospitalized, even siblings may fail to recognize that cat on its return. In extreme cases, this can lead to the complete breakdown of the relationship, because the initial aggressive response leads to a reciprocal response from the home-comer. It is therefore sensible for cat owners to rub cats returning from a trip to the vets with a towel or piece of bedding that is covered in the ‘group scent’, prior to reintroduction, or to actively ‘swap scent’ by stroking one cat and then the other (Crowell-Davis *et al.*, 1997).

Relative socialization experience

The importance of early sensitive periods for learning about both conspecifics and people has been discussed in [Chapters 4](#) and [9](#), respectively. Experiences

during the weeks immediately after a kitten is born appear to have a profound effect on the occurrence of fear-associated behaviours later in life (Casey and Bradshaw, 2008). Most of the evidence about socialization relates to the extent to which kittens need to experience people in order to accept contact with humans as adults. Where contact with people before 8 weeks of age has been limited or restricted to people of a particular gender or age category, anxiety about people is more likely to occur subsequently.

Probably one of the most common behavioural consequences of limited socialization experience is the avoidance of unfamiliar people. Although rarely seen in the referral behaviour clinic, for reasons discussed earlier, avoiding contact with visitors appears to be particularly prevalent in the cat population. Many cats are reported to 'disappear' when visitors come to the house, but very few owners perceive this to be a problem. Cats that are fearful of their owners are presented as clinical cases more frequently. These are often cats that have had little or no experience of humans in their early sensitive period for learning because, for example, they were feral or farm kittens.

Cats may also display aggressive behaviour towards people as a result of limited socialization. Aggression occurs as an alternative strategy to avoidance when the cat is attempting to prevent an anticipated negative outcome. In general terms, cats tend to avoid threatening stimuli by withdrawing, hiding or climbing. However, aggression is used as a defensive strategy when other behaviours are not successful. For example, this might happen where owners 'pursue' cats that are frightened, and try to interact with them. Once a cat has learned that aggression is an effective strategy to keep people away it will become more confident in the expression of this behaviour. Over repeated learning opportunities, therefore, cats may develop apparently 'offensive' aggression, even launching themselves at people, or showing the behaviour immediately on perceiving a particular person. It is particularly important, therefore, that opportunities for withdrawal are provided for cats housed in confined spaces, such as rescue centres (Kry and Casey, 2007), to prevent the development of aggression in this context.

Although there is much less evidence as to how social tolerance for other cats may be learned during the sensitive period, it is likely that learning about conspecifics occurs in parallel with learning about people. Differences in the relative tolerance of individual cats for other cats may therefore be modified by early experience: this is an area where further research is important, given the importance of social stress for both the occurrence of undesired behaviour and the welfare of domestic cats. As discussed with respect to interaction with people, ongoing social experience of other cats may modify perceptions formed

people, ongoing social experience of other cats may modify perceptions formed during the sensitive period. For example, a cat that is repeatedly attacked by another cat may subsequently feel even more threatened by the proximity of other cats.

A further important consequence of the early environment is the formation of the kitten's preferences for toileting location. A preference for substrates on which to toilet forms in the first weeks of life. This occurs as kittens form an association between the act of toileting and the material under their feet at the time. As with other associations made during this period of development, this will often influence toileting behaviour throughout life. For example, where breeders use a particular type of litter material, kittens may not recognize other substrates as 'toilets' after homing. It is probably also for this reason that hand-reared kittens sometimes have a propensity for eliminating on soft furnishings. Since their carers tend to hold them in a towel whilst stimulating the urogenital reflex (emulating the mother's usual behaviour), some appear to form an association between toileting and soft materials. Although substrate preferences formed during development can be strong, preferences can also change in the adult cat. Generally this is desirable, as it enables owners to gradually change from one litter material to another if they wish to. However, if a cat has persistently toileted in an inappropriate location, such as a carpet, over a prolonged period, it can form a preference for this surface, making resolution of the problem more difficult.

Ability to show a normal behavioural repertoire

Another important factor in the development of undesired behaviour is the extent to which cats are able to show a full normal behavioural repertoire. The normal ethology of the cat and its species-specific behaviours should therefore be considered as potentially relevant in individual cases where natural behavioural opportunities are restricted. The extent to which cats tolerate restrictions in activity, social interaction and predatory behaviour appears to vary considerably between individuals, and is likely to be influenced both by personality characteristics (see [Chapter 9](#), this volume) as well as 'expectations' derived from previous experiences (see [Chapter 3](#), this volume). For example, cats appear to vary considerably in the extent to which behaviour is altered by indoor-only housing, although anecdotal evidence suggests that cats that were previously active outside are more likely to show frustration-associated responses to spatial restriction. However, tolerance of spatial restriction will also vary with the extent to which owners are able to enrich the indoor environment –

for example, through the provision of play to simulate hunting activity, feeding enrichment and opportunities for climbing utilizing a three-dimensional space (Ellis, 2009).

The ability to display predatory behaviour, or to direct predatory-type responses into play, appears to be particularly important for the cat. Restricted ability to show this type of behaviour can result in frustration, and thus to undesired behaviours including human-directed aggression. Inappropriate predatory/play aggression towards owners often first develops where these behaviour patterns are misdirected in the kitten. Play behaviour in kittens is important in the development of the motor responses needed for predatory behaviour (see [Chapter 7](#), this volume). In a feral situation, this ‘practising’ is initially directed at inanimate objects, but is later directed by the queen towards prey items that she brings back to the nest site (Kitchener, 1991). The kittens therefore learn the appropriate conditioned cues that stimulate these behaviours. In the domestic environment, owners are frequently tempted to play with their kittens by, for example, wiggling their fingers or moving their feet around under a duvet. While this is relatively harmless with a kitten, it can lead to inappropriate play/predatory aggression being directed towards hands or feet once the cat matures to an adult. In these cases, cats often ‘ambush’ their owners as they walk past by rushing out from behind furniture and grabbing their feet or legs, or swiping at them as they walk past. Once this type of behaviour starts it is often reinforced by the response of the owner – shrieking, pulling arms away or running away tend to reinforce the response, just as movement and squealing of a prey item would encourage further attack.

The other important aspect of the normal requirements of cats that may lead to undesired behaviour is patterns of toileting. Eliminating away from normal toileting sites commonly occurs where cats cannot easily access these sites, as discussed earlier. However, toileting behaviour can also change where toileting locations no longer fulfil the cat’s requirements of toileting locations, such as a suitable hidden location and litter substrate ([Table 11.1](#)). For example, since cats are generally fastidious in their eliminating habit, a litter tray that is cleaned infrequently is a possible reason for choosing an alternative location (Herron, 2010). However, since they are attracted to a toileting site partly by olfactory cues, over-zealous cleaning, particularly with a strong-smelling disinfectant, can also cause problems.

Learnt experience

Learnt experience plays an important role in the development of almost all undesired responses. For example, although relevant socialization experience may lead to a general acceptability of social contact with people, it is individual learning experience on first contact that determines how an individual cat responds to any perceived threat from a specific human contact. Furthermore, learning opportunities throughout life constantly modify how a cat responds to various aspects of its social and physical environment. Hence although first experiences strongly influence ongoing responses, behaviour can be subsequently modified. Indeed, the ability of cats to learn new associations forms the basis of behaviour modification programmes. In many cases, relative socialization experience is reinforced by subsequent experience – for example, a cat that is wary of people due to limited socialization is likely to avoid people who approach it. Where this strategy successfully avoids the perceived threat, the response will be reinforced, and hence more likely to be used on subsequent encounters (see [Chapter 3](#), this volume). In some cases, however, fear responses occur entirely as a result of specific aversive experiences. These behaviours in cats become reinforced as they are successful at avoiding the perceived aversive event. Through the normal processes of associative learning, cats will also become gradually more sensitized to aversive events, such that they respond at a lower threshold of stimulus, and will also generalize an avoidance response to similar stimuli.

In addition to the avoidance response, cats that value human attention will commonly learn behaviours that are successful at achieving this. For example, a cat that values human attention may learn that walking along a shelf and ‘wobbling’ valued ornaments is a very effective way to achieve interaction with owners who were otherwise watching the TV.

Learning is also important in understanding how the behaviour of individual cats may develop over time. Urine spraying in cats often first develops as a response to the proximity of socially incompatible cats, as discussed earlier. However, once established, the occurrence of the behaviour can be modified through learning. For example, the frequency and location of urine-spraying behaviour can alter depending on how owners respond to the behaviour, and how cats perceive this response. Because owners find the behaviour undesirable, many cats that urine spray are punished, for example by being shouted at or chased out of the room. Most cats find this response aversive, and will learn to leave scent marks only when owners are not present. However, other consequences are possible from this response by owners. Some cats may become very anxious about the change in the behaviour of their owner: since they do not understand the reason for the punishment, they perceive only that their owner is

behaving strangely towards them. Since spray marking is used to 'identify' contexts in which vigilance is required, cats will sometimes use the behaviour to identify owners as something of which to be wary, and urine spray directly on their owners, or on items that smell of their owners. Unfortunately many owners anthropomorphically assume that this behaviour is 'vindictive' or 'spiteful', thereby leading to an increase in punishment, and hence anxiety in the cat, and so the rate of spray marking spirals upwards. A further potential consequence of owners punishing their cat for urine spraying is where cats do not perceive the owner's response as punishing, but rather reinforcing. This occurs occasionally in cats that are highly motivated to achieve owner attention, and in such cases urine spraying may develop as a response that occurs in front of owners in order to achieve a response from them.

The manner in which cats perceive the consequences of their own actions, and behavioural strategies learnt to resolve situations of perceived threat or achieve desired goals, are therefore important factors in modulating how individual cats respond in different circumstances.