CANINE & FELINE FEAR-BASED CONDITIONS

CANINE CONDITIONS

Fears/Phobias:

In people, fear is regarded as a normal response to a fear-inducing circumstance or event. Only abnormal or excessive fears, termed phobias, are regarded as dysfunctional. When animal behaviorists talk about fearful behaviors, they are actually referring to phobias as opposed to simple fears.

Anxiety:

Anxiety is an acute or chronic state of apprehension that either a) something terrible might happen or b) something desired or needed might not happen. A major component of anxiety is fear.

How Fears & Phobias Arise:

Genetics plays a role in the development of fear and anxiety. Certain breeds or breed lines of dogs are particularly prone to developing problems of this nature, and their genetic heritage provides the "fertile soil" upon which the seeds of fearfulness will grow. The fact that some dogs develop multiple fears without any obvious environmental priming is evidence in support of this.

One particularly striking example of genetically imbued fear is provided by a nervous strain of pointers formerly kept at the National Institute of Mental Health. These dogs display a genetic tendency for excessive fearfulness and will bark or collapse when confronted by strangers or open spaces. Further testimony to genetic influences on the development of anxiety and fear is provided by reference to the increased prevalence of certain anxiety-based or fearful disorders in certain breeds. German shepherds, as a breed, seem to be overly anxious and often display behaviors characteristic of such priming (e.g. mistrust of strangers, territorial/fear-based aggression, noise phobias, acral lick dermatitis).

Environmental influences play a major role in the development of fears and phobias. Positive exposure to a wide variety of stimuli during the sensitive period of development (3-14 weeks of age) is critical in this respect. A lot of good or harm can be done during this time period by not paying proper attention to young pups' welfare and not protecting them from adverse experiences. The classical sensitive period refers to a period of rapid socialization, but it could well be that there are other sensitive periods of learning that occur earlier or later in life. It has been suggested, for example, that acclimation to certain sounds may occur shortly after the transitional period at 2-3 weeks of age, whereas situational learning may "imprint" more readily

sometime after the 3-month socialization period.

The contribution of genetic and environmental influences in dogs is probably around 50/50 (as it is for most human behavioral characteristics). A genetically prone individual can be made 50% less fearful if properly raised. Conversely, a genetically stable individual might be rendered fearful by improper raising experiences. The worst possible scenario is having a genetically fear-prone individual who is exposed to unfortunate learning experiences during a sensitive period of development and beyond.

Assuming the best genetic influences and environmental experiences, a dog will become, as the old Army advertisement goes, "all that he can be". Could it be that such an individual might later become fearful for some cataclysmic reason? The answer is sometimes yes. Canine fearfulness acquired later in life appears analogous to post traumatic stress disorder (PTSD) in humans. If an otherwise stable individual is exposed to an extremely disturbing event, so that stress mediators like catecholamines flood the animal's body, an indelible imprint of the abhorrent learning may be formed. Catecholamines facilitate such permanent learning in adults, who then, for the rest of their lives, attempt to avoid getting in to the same circumstance again. They may even (apparently) have nightmares about the event, have difficulty sleeping, and may become chronically anxious. For a diagnosis of PTSD, the duration of symptoms must be at least 3 months.

Types of fears that may develop include:

1.) Animate fears (fear of the same or different species)
2.) Inanimate fears (often fear of sounds)
3.) Situational fears (e.g. separation anxiety)

Let's consider these fears independently, though the basic mechanism for each is essentially the same, and the various types of fears often occur together.

ANIMATE FEARS

Fear of People:

Although it is possible for a fearful dog to be frightened of its owners, this is rarely the case. Fearfulness is usually expressed toward strangers, toward unfamiliar people outside the family circle who are not frequent visitors to the household. Sometimes a dog that is frightened of people may have his "targets" fairly well defined. For example, his fear may be of men with white beards or men wearing boots. In other instances, dogs may respond to several different categories of fear-inducing people, including men with beards, men wearing hats, men of large stature, men with deep voices, men smoking cigarettes, etc. You'll notice that men are profiled in all these examples—that's because men are most frequently the subjects of dogs' fear.

Some dogs have a class action suit out against all men. Another common category of fear-inducing human is children, particularly boy children. Women are occasionally singled out, too. Finally, there are dogs that are frightened of **all** strangers, whatever their sex, height, weight, or other physical characteristics. These dogs are particularly pathetic creatures that have, no doubt, had a lifetime of mistreatment.

The Response to Fear:

One of the most common responses of fearful dogs is aggression, but let's first look at some of the more passive responses of fearful dogs to fear-inducing people, including avoidance, hiding, running away, and thigmotaxic behavior (hugging the wall). Fearful dogs also show their emotions via their facial expression and body posture, as well as exhibiting various involuntary responses such as trembling, salivating, pupillary dilatation, emptying of bowels or bladder, and discharge of anal glands.

Fearful Expressions & Postures:

Dogs that are frightened of people give away their innermost thoughts by their appearance, and it is no accident that they wear their hearts on their sleeves. They avert their eyes, lower their head, flatten their ears, tuck their body and tail (hunkering down to make themselves smaller), and may roll over to expose their belly and sometimes urinate. All this body language helps to defuse a would-be attacker of the same species by signaling their diminutive status and deference.

How to Avoid Animate Fears in Dogs:

If possible, the best strategy is prevention. Fear of people can be almost entirely circumvented if puppies are socialized from a very early age. Also, reversal of developing trends of fearfulness can be achieved if a dog's lack of experience with people or adverse experience with them is turned around soon enough. It has been said that socialization should begin when the pup is in the womb. While this is something of an exaggeration, it is nevertheless true that socialization should begin before the pup's eyes open at around seven to ten days of age. At this time, passing the puppy from one person to another, talking softly, stroking it, and allowing it to smell people's hands is starting it out on the right foot. Passing the puppy from person to person, including strangers, for as little as five minutes a day, ensuring that pleasant consequences are associated with the event, can be instrumental in warding off fear of people. It is the puppy owner's responsibility to ensure that this happens as early as possible in the pup's life, though they may not have an opportunity for such input from early on.

Most pups are adopted at six to eight weeks of age, and owners miss the prime socialization window opportunity. For potential adoptees, it is important to ensure that the breeder arranges the correct socialization experiences. In this way, the new owner can inherit a work in progress and progress from there. The worst situation for the pup is if it is raised in a dog-only environment in a kennel, garage, or back room and meets strangers only after adoption by its

new owners. While these dogs need a friend, too, and can sometimes have their fortunes reversed, it is far from an ideal starting point and requires understanding and patience on the part of the owner if the difficulties are to be circumvented.

Dealing With the Potentially Fearful or Already Fearful Dog:

Assume for a moment that your client has adopted a puppy from one of these less-than-optimal situations, from a pet store or puppy mill situation, or the like. How should you advise them to start? How should they continue? The first thing owners need to do is to make sure that the pup no longer experiences social isolation and is never exposed to adverse learning experiences in the presence of strangers. But here is the rub: Most people don't know how to do this. Failing to appreciate the critical nature of the problem and the impact of negative learning experiences, some trainers gaily recommend to new puppy owners that they take their new charge to the supermarket parking lot, shopping mall, or Little League game in order to expose it to as many people as possible. This they advise in the name of "desensitization", which it is not. If it is anything, it's flooding—that is, continuous exposure to something of which you are fearful in the hopes that you'll get over it. Flooding, while an effective remedy for some minor fears, either doesn't work or (often) backfires, compounding moderate or severe fears with each subsequent exposure. In other words, instead of the problem getting better, it gets worse.

True desensitization is a program involving baby steps, introducing the fearful pup to one person at a time at a distance that will not generate fear, and then, gradually, increasing the pup's exposure while ensuring no negative consequence or, indeed, a positive one. The latter technique of substituting a positive experience for a fearful one is called counter-conditioning (altering prior fearful conditioning to produce an opposite perception).

With this type of training, as Konrad Lorenz said, "Art and science aren't enough, patience is the basic stuff." Desensitization takes time and patience, but with persistence, it can pay off. Unfortunately, desensitization is never over, even when it's over. There's always another session necessary to keep a fearful dog well versed in its new acceptance. Fear, once acquired through adverse circumstances, will always be likely to rear its ugly head, though new learning that is constantly refreshed can be superimposed to minimize its impact. In other words, owners should always maintain some aspects of a desensitization program throughout a fearful dog's life for the new learning to remain in place. It's just that the intervals of controlled re-exposure can be longer for a dog that has been through the program.

The Really Difficult Case:

When a dog's fear of people is so extreme and so generalized that desensitization is virtually impossible, it may be necessary to consider fear- and anxiety-reducing medications to facilitate a desensitization program. Medications that may be beneficial include buspirone (BuSpar™), fluoxetine (Prozac™), clomipramine (Clomicalm™), amitriptyline (Elavil™), and beta blockers [e.g., propranolol (Inderal)]. While not a panacea, these various anti-anxiety, fear-reducing drugs can greatly facilitate retraining fearful dogs and the psychological help they provide the

dog is worthwhile for humanitarian reasons. In some cases, drug treatments may work so well that the dog is virtually fearless while on medication. This is the time to arrange many positive interactions with strangers so that the dog can learn they mean it no harm. When medication plays a role as substantial as this, it should be continued at an effective level until the dog is entirely comfortable with exposure to strangers. The dose of medication can then be incrementally reduced while, hopefully, the dog's newfound confidence remains in place. This latter technique is termed pharmacological desensitization.

INANIMATE FEARS

The archetypal inanimate fear is thunderstorm phobia. Affected dogs exhibit an excessive, apparently irrational phobic reaction to thunderstorms. Affected dogs show clinical signs such as panting, shaking, dilated pupils, salivation, sometimes even loss of control of bladder and bowels. They often compulsively seek their owner's attention during storms, and may pace or hide, often in bathrooms seeking solace in sinks or bathroom tubs, close to plumbing fixtures or metal radiators. If alone during a storm, they will usually bark frantically and may destroy property in attempts to escape. In some dogs, the full complement of thunderstorm stimuli is needed to trigger the phobic response, whereas others can have their phobia activated by the sound of rain, wind noise, or flashing lights.

Many dogs with thunderstorm phobia show fear of other sounds as well, so they may, for example, have a fear of sonic booms, quarry blasting, or cars backfiring. They also develop secondary fears of flashing lights, rain, and wind noise. Inquiring into their history, it is often found that they display other fears too, for example, fear of strangers or separation anxiety (some
40% of dogs with thunderstorm phobia also have separation anxiety and some 10% of dogs with separation anxiety also suffer from thunderstorm phobia).

Although sometimes regarded as a simple sound phobia, the exact causes of thunderstorm phobia are not crystal clear. Genetics seem to play some role in its development as it affects certain breeds primarily. Susceptible breeds include German Shepherds and other herding breeds, Labrador Retrievers, and northern breeds, and the fear can be appreciated when the dog is quite young. There is some evidence emerging that shelter/pound dogs may be at greater risk of developing thunderstorm phobia. Whether this is because they are generally less confident/more fearful or because of lack of social support during thunderstorms at a sensitive time during their development is unknown. Though controversial, some veterinarians hold that sub-clinical hypothyroidism may be a contributing factor in many anxiety-related behavior problems, including thunderstorm phobia.

Sometimes, in the early stages, the fear is rather mild and simply takes the form of the dog staying close to the owner during a storm. Thunderstorm phobia is usually first noticed when dogs are young (<1 years old) but may occur at any age, sometimes with acute onset. At some time after the onset of adulthood (2-3 years of age), there is often a sudden exacerbation of

thunderstorm phobia from mild fearfulness to extreme phobic proportions. The escalation often occurs during a particularly noisy storm.

Treatment of Thunderstorm Phobia:

Thunderstorm phobia is not an easy problem to resolve when it is severe. The achievable goals of therapy are to make the dog more comfortable during storms, to eliminate barrier frustration, and to prevent destructive behavior occurring in the owner's absence.

- Put dog in a relatively sound-proof and window-less area of the house (e.g., cellar)
- Try to drown out sound of thunder ("white noise")
- Act happy
- Counter-condition (obedience, play ball, tug o' war, etc.)
- Can try desensitization—preferably in non-storm season using custom sets of tapes; mildly effective; worth doing but not the answer
- Storm Defender® jacket (anti-static)
- Pharmacologic treatment

Medication:

Pharmacological adjunctive treatment to desensitization or frank pharmacological suppression of the phobic reaction may be the only way to go in some cases. Success has been achieved with medications such as alprazolam (Xanax) +/- a beta-blocker (propranolol). Recently, we have had some success with serotonin re-uptake inhibitor drugs (SSRIs). A publication indicated that 50% of storm phobic dogs were improved on treatment with clomipramine (Clomicalm→) and alprazolam (Xanax→).

SITUATIONAL FEARS

Dogs are social animals and form strong bonds with people, so it is not surprising that they may feel somewhat anxious when separated from their social group. Most dogs adapt well to the typical daily separation from their owners. Unfortunately, problems can arise when an overly dependent dog develops a dysfunctionally strong attachment to its owners. The separation anxiety dog is distinguished by:

a.) signs of distress primarily when left alone
b.) over-attachment when the owner is present

Separation anxiety may be manifested as destruction to the owner's property and other behaviors that may be dangerous for the dog or annoying for people sharing the dog's environment. It is important to realize that the dog is not doing these things to get even with

the owner for leaving the dog, out of boredom, or due to lack of obedience. These dogs are not being destructive out of “spite” or “anger”; they are truly distressed at the prospect of being left behind. Consider instead that the dog's dependence on the owner is so great that it becomes anxious when the owner leaves. The dog must find an outlet for this anxiety, and its methods of doing so may cause considerable damage. Also consider that, no matter how flattering the dog’s constant attention to the owners may seem, it is not fair to the dog to allow it to be so stressed by the owner's absence that it must resort to one of these unwanted behaviors to alleviate its tension.

For some dogs, the anxiety when left alone is evident as soon as the dog joins the household. In these cases, the dog may be genetically predisposed to anxiety, may have had inappropriate or insufficient socialization experiences during the juvenile period, or a combination of both. For some dogs, no initiating trigger can be identified. Symptoms of separation anxiety may develop gradually over time or may appear in full-blown form the first time they are left alone under the right circumstances.

The onset of separation anxiety frequently occurs after the dog is exposed to some experience that interrupts the social bond. This can occur when owners board the dog for vacation, a change in the owner’s work schedule, a household member leaves due to divorce, death, or college, or when the dog is relocated to a new house or household.

Overly indulgent owners may promote this condition in predisposed dogs and contribute towards its maintenance and exacerbation. Owners of dogs that experience separation distress are often nurturing, empathetic people who spend a lot of time with their dog. They allow the dog to follow them around the house and encourage the exuberant welcome the dog gives them when they return home. Less nurturing owners may help instill independence in the dog thus circumventing the worst throws of the problem and permitting its gradual resolution.

Separation anxiety may be confused with other separation-related behavior problems that occur in the owner’s absence but are not necessarily associated with an over-attachment to the owner. Such problems include excessive and destructive exploratory behavior, nuisance barking, unrelated house-training problems, and uncomplicated barrier frustration. These problems occur in dogs that are under-stimulated and do not necessarily indicate a dysfunctional bond with the owner.

Physical destruction of the environment is typically evidenced by excessive chewing, digging, and scratching in areas near doors and windows (“barrier frustration”). These areas may represent exit routes for the dog as it attempts to reunite itself with the owner. If the dog is confined to a crate or its movements are restricted by a gate, destruction is usually centered around the crate door or the gate itself. The dog may seriously injure itself during these escape attempts. Attempts to free itself from barriers may result in broken nails or teeth, a bloody mouth, or more extensive injuries from tearing through glass and wood. Dogs may also destroy property that carries the owner's scent such as bedding, furniture, clothing, or shoes that are left lying in the open.

Vocalization: Barking, howling, and/or whining also are common signs of separation anxiety. Distress vocalizations and active seeking behavior occur when many social animals are separated from their companions. Such distress vocalizations represent the dog's attempt to reunite the social unit. Excessive vocalization may occur primarily at the time of the owner's departure or may continue throughout the duration of the owner's absence. Owners are often unaware that their dog is distressed by the departure, and it is only when neighbors complain about the excessive vocalization that they become aware that their dog has a separation problem.

Inappropriate elimination: Dogs with separation anxiety may become so distressed in their owners absence that they urinate or defecate in the house. When this occurs only in the owner's absence, such "inappropriate" elimination is not indicative of a loss of house training, but rather a physiological response to the extreme distress the dog is experiencing from being alone. House soiling typically occurs within 30 minutes of the owner's departure as the dog becomes more anxious.

TREATMENT OF SEPARATION ANXIETY

Break Cycle of Anxiety: One of the first steps in treating this condition is to break the cycle of anxiety. Every time the dog becomes anxious when the owner leaves, its frustration is reinforced until it becomes absolutely frantic every time the owner exits the house. "Doggie Daycare" or hiring a pet sitter often is a better alternative for dogs that initially are resistant to treatment.

Counterconditioning: Owners should give the dog an acceptable item to chew, such as a long-lasting food treat only when they go out. The goal is to have the dog associate this special treat with the owner's departure. Treats to try include hollow bones stuffed with peanut butter or soft cheese, drilled out nylon bones, or hollow rubber chew toys such as Kong toys similarly enhanced (place in freezer before giving it to the dog to make it last longer). Give the bone to the dog before the owner is prepared to depart. The chew toy should be used only as a reward to offset the anxiety triggered by the owner's departure. Hiding a variety of these delectable food treats throughout the house may occupy the dog such that the owner's departure is less stressful. As an additional form of occupational therapy, the dog can also be fed its meals in a food puzzle (Buster Cube or Boomer Ball with holes drilled) and alternate it with the other food-stuffed toys; this will keep the dog occupied for a longer period at mealtime. Such delectable treats should be picked up upon the owner's return.

Independence Training: Independence training is one of the more important aspects of the program and involves teaching the dog to "stand on its own four feet" when the owner is present with the express intention that the dog's newfound confidence will spill over into times when the owner is away. The owner needs to make the dog more independent by reducing the bond between themselves and the dog to a more healthy level of involvement. Decreasing the

bond is the hardest thing for most owners to accept. We all acquire dogs because we want a strong relationship with them, but the owner needs to accept that the anxiety the dog experiences in their absence is destructive to it. Essential components of the independence training program are as follows:

- Avoid catering to the dog's attention-seeking behavior; owners should ensure they initiate all interactions.
- Owners should minimize the extent to which the dog follows them by teaching the dog to remain relaxed in one spot, such as its bed. To accomplish this, it is helpful if the owners train the dog to perform a sit-stay or down-stay while gradually increasing the time period that the dog holds the command and remains separated from the owners. If the dog will not remain in a sit or down-stay on command and insists on following, the owner can make use of a tether or kiddy gate.
- The dog should become accustomed to being separated from the owner when the owner is home for varying lengths of time and at different times of day. Owners can set up child gates to deny their dog access into the room in which they are doing something (i.e., reading, watching television, cooking, etc.). The dog should be instructed to lie down and stay on a dog bed outside the room. As previously mentioned, owners can provide an extended-release food treat or toy to keep the dog calm and distracted. Once the dog is able to tolerate being separated from its owners by a child gate, they can graduate to shutting the door to the room so the dog cannot see them.
- The dog should not be allowed to sleep in bed with the owner as this only fosters dependence. In fact, it is best if the dog is not even allowed to sleep in the owner's bedroom. First, the owner needs to train the dog to sleep in its own bed on the floor in the owner's bedroom. The dog may have to be taken to its bed several times before it gets the message that the owner really wants it to sleep in its own bed. If the dog will not follow instructions, the owner may need to tie it to a fixture in the room with a short tether. Alternatively, owners can train the dog to enjoy sleeping in a crate to prevent unwanted excursions. Do not use a crate if it causes more anxiety and distress for the dog. Once the dog will tolerate sleeping in its own bed in the owner's bedroom, the owner can move the dog's bed outside of the bedroom and use a child gate or barrier to keep the dog out. Gradually move the dog's bed by means of a mobile barrier or child gate which is incrementally relocated to oblige the dog to sleep closer to, and eventually where it is left when the owner is separated from the dog during the day. Always remember to reward the dog with praise or a food treat for remaining in its bed.

Departures and Returns: Many owners erroneously feel that if separation is so stressful, then they should spend more time with their dog before they leave. Unfortunately, this often exacerbates the condition. Everyone in the family should ignore the dog for 15-20 minutes before leaving the house and for at least 10-20 minutes after returning home. Departures should be quick and quiet. A non-emotional goodbye is acceptable as the owner gives the dog a long lasting food toy such as a Kong toy stuffed with peanut butter or cream cheese. Similarly, prolonged and exuberant greetings should be avoided. This evens out the emotional roller

coaster ride that these dogs otherwise experience with overly emotional departures and exuberant greetings from owners when they return home. When departures and returns generate less anxiety and excitement, the dog will begin to feel less tension in the owner's absence. Remember to reward calm behavior.

Medication: Medication is often used in conjunction with the above treatment strategies and is generally helpful. Traditionally antidepressants like clomipramine (Clomicalm), fluoxetine (Prozac), or amitriptyline (Elavil) are recommended. Clomicalm has recently been FDA approved for use in dogs to treat separation anxiety.

Additional Recommendations

- Some dogs with separation anxiety actually manage to escape the house, so we recommend that the dog wear identification tags with a buckle collar. Owners may also want to consider tattooing or micro-chipping the dog so it can be identified if it panics and escapes.
- Audio or video recording the dog's behavior when the owner departs can often help to confirm a diagnosis of separation anxiety.
- Make a recording of normal household sounds when the owner is home and play the tape for the dog when it is alone.
- Many people wonder about getting a pet for their dog so the dog won't be lonely when the owners are away. This almost never works, because the excessively tight bonding is between the owner and the dog, not between another animal and the dog. Having company has no effect on the distress the dog feels when the owner leaves.
- Owners may play tug-o-war games with the dog and let it win as such interaction builds confidence. However, if the dog starts to growl, it may be necessary to back off from this approach.
- Dogs should never be punished for the physical consequences of their distress when separated from the owners. In fact, punishment can exacerbate any underlying anxiety and worsen the behavior problem. Dogs do not make the association between making a mess and being punished for it at a later time. They also cannot reason that if they don't make a mess in the future, they won't be punished. Owners often report that their dog looks "guilty" when the owners return home to destruction or urine or feces on the floor. The dog is not exhibiting guilt as we know it. The dog has learned that when owners are present and a mess exists, the dog is in trouble. If someone who had never scolded the dog went into the house, and a mess was present, the dog would not look "guilty". In an attempt to avoid punishment, the dog may respond with submissive postures which the owner misinterprets as "guilt" or "remorse." Submissive postures are actually an effort to appease the owner and avoid confrontation.

FELINE CONDITIONS

Cats can show fearfulness in response to the same challenges as dogs, but their reaction is somewhat different. When they are frightened by animate cues (e.g., people or other cats), their first response is to run and hide (flight). Cats may show aggression, either directed at the fear-inducing person or animal or redirected to one alongside. Other possible responses to fear-inducing stimuli, such as freezing and appeasement, are not seen in cats. Of all the possible fearful reactions, aggression is the most commonly presented behavioral problem. **Feline affective defense behavior** was described earlier. Fearful states are accompanied by signs of autonomic arousal, such as pupillary dilatation, increased heart rate and blood pressure, and piloerection. Fearful posturing of cats is designed to intimidate rather than to appease.

Fear of living things—people especially—is a fairly common fear of cats. Genetic tendencies are rarely to blame, leaving environmental influences most instrumental. The two main ways in which cats can acquire fear are:

a.) Improper socialization during the critical period of learning (2-7 weeks)
b.) Adverse experiences (especially when young)

Fear of inanimate cues, such as thunderstorms, are less commonly reported in cats than in dogs. Such fears may actually be less common. Alternatively, their relatively low frequency might be a consequence of the fact that cats are less demonstrative than dogs, tending to hide away from scary stimuli.

Separation anxiety occurs in cats—as it does in dogs—though, once again, the signs are more subtle, and the condition is reported less frequently. Typically, affected cats are extremely bonded to their owners and become distressed when left alone. Rather than pacing and panting and engaging in destructive behavior like dogs, cats tend to become depressed and withdrawn and may engage in anxiety-related urine marking behavior in their owner's absence (a **cardinal** sign) or self-licking/hair pulling.

TERRITORIAL MARKING BEHAVIOR

One of the most objectionable and potentially most life-threatening behaviors that cats exhibit is territorial urine marking behavior in the home. The behavior is most common in unneutered male cats, though females—both intact and spayed—and neutered males may also exhibit the behavior. In intact cats, the behavior is for the most part hormonally driven. Neutering eliminates urine marking in close to 90% of male cats. Likewise, intact female cats that urine mark at around the time of estrus will have this behavior virtually eliminated when they're spayed.

However, as you'll note, some neutered males and spayed females may continue to mark or

start marking after gonadectomy. In some cases, this may be due to the fact that a neutered animal is not an "it" but rather a version of itself operating without the influence of sex hormones. It has been proven in pigs, for example, that a male piglet sandwiched between two other male piglets in utero will be super masculinized by fetal testosterone from its neighbors. It seems quite possible that the same may occur in cats; if this was true, then some neutered males would retain more of their innate masculinity and perhaps might be more likely to display typical male behaviors, including urine marking after they have been neutered.

Similarly, a female fetus sandwiched between two males may become masculinized so that she would be more likely to display male typical behaviors both before and after spaying. That said, residual masculinity is certainly not the sole cause of urine marking in neutered cats and is probably not even the main cause.

These days most people agree that underlying anxiety resulting from conflict is at the heart of most cases of urine marking in neutered cats. In fact, even more specific than that, inter-cat conflict is considered to be the main reason for urine marking. Sometimes the conflict is between cats cohabiting in the same home, and other times the conflict is inspired by outdoor visitors who presumably stress the indoor cat by appearing close to their territory. Other causes of anxiety that can lead to urine marking include moving home, renovations and additions to the home, the absence of certain individuals from the home (as in separation anxiety), the presence of unwelcomed visitors, the arrival of a new baby, and so on.

Diagnosis of Urine Marking:

Although older references may lead you to believe that urine marking is always on a vertical surface, it is certainly not always the case. If a cat urinates on a vertical surface, for example on a wall or on drapes, then you can be fairly sure that the behavior is urine marking. However, if a pool of urine or a damp spot is found on a horizontal surface, it does certainly not rule urine marking out.

The second thing we used to be led to believe was that urine marking involves the deposition of a small volume of urine only, and it is true that in some cases, urine marking cats simply back up to an area to be marked and spritz a few drops of urine at the target location. On the other hand, some cats urinate quite large volumes during the course of urine marking, so the volume of urine expressed is not particularly helpful in diagnosing what's going on.

One thing's for sure, if a cat is seen to back up to a vertical surface with its tail upright and twitching—perhaps treading with its paws at the same time—and then it shoots out a thin stream of urine onto a vertical surface, this is what is called "spraying", and spraying is definitely a marking behavior. For the more difficult to diagnose expressions of urine marking, when, for example, a cat urinates an undetermined volume of urine on a horizontal surface, the key to figuring out what is going on is the location of the urine marking event.

Whereas a simple litter box problem (a.k.a. house soiling, to be dealt with later in the syllabus),

involves cats urinating in one or two locations other than their litter box—usually on a rug or carpet—the locations where urine marking occurs are often quite striking and significant. The reason for this is that urine marking has strategic and signaling functions just like urine marking in dogs; it is not done simply to relieve a full bladder but rather to send a message that remains long after the sender has gone. Some of the signaling may be attributable to pheromones present in the urine, including one sulfur-containing amino acid called felinine. Felinine is present in greatest concentrations in the urine of intact male cats and in lowest concentrations in the urine of spayed females. The incidence of urine marking is somewhat proportional to the level of felinine in the urine. There are certain key sights where urine marking typically occurs, and the list of urine marked areas is remarkably consistent from cat to cat. Here is a list of some of the most commonly marked areas:

- Window sills
- Drapes
- Micro blinds
- Baseboards
- Heating registers
- Computer keyboards
- Briefcases
- Laundry
- Beds
- Shopping bags
- Stovetops
- Electrical appliances (like toasters)

The location of spraying in any particular case can give the veterinarian some clues as to what is stressing the cat. For example, if urine marking is on windows and window sills, micro blinds, and baseboards, the stressors are most likely outside, i.e., neighborhood cats or wildlife. If urine marking occurs on people's beds or on their clothes or shoes, then the cat's anxiety most likely has something to do with one or the other of the owners. When the urine is deposited on a heating register, it is usually because odors from a different area of the house are wafting up through the register on a plume of warm air, bringing challenging or threatening scents from other areas of the house, such as a basement. It is not quite clear why cats like to urinate on stovetops and electrical appliances, but it has been postulated that this is due to the heating effect of electricity running through wires, causing the release of urea-like odors from heated plastic insulation around them (urea is a component of many plastics). Thus, in the latter instance, the stove or toaster poses a fake threat of another animal and the cat "overmarks" the supposed usurper's scent.

Who Done It?

One of the difficulties in determining precisely what's going on in a case of supposed urine marking in cats is which cat is actually doing it in a household where there are multiple cats. It's really quite common for the owner not to be completely clear about this and obviously to treat

the wrong cat would not produce the right results. If there is any doubt as to which of the cats in a multi-cat household is urine marking, there are a few methods by which this can be fathomed out. The first most obvious method is separation; if for example, two cats are kept in two different areas of the house then if the urine marks appear in the area in which Cat A is confined, then Cat A must be the culprit. The trouble with this approach is that sometimes separating the cats alleviates the anxiety which causes the urine marking and so neither cat urine marks during the period of sequestration.

Another method is to dye the *supposed* offending cat's urine bright green with fluorescein dye. To do this, take 3-5 tips of fluorescein ophthalmic strips and place them in a gel cap to be administered orally to the cat. Within hours greenish color urine will be produced which will fluoresce brightly under UV light. The problem with this approach is that the fluorescein-tinted urine can leave yellow stains on peoples' walls and carpets, and these stains can be very tricky to get out.

The third method is, in my opinion, overly complicated and cumbersome and involves a metallic strip which, when placed in strategic areas, will complete a circuit and ring an alarm when a cat urinates in that spot. The owner can then come running and theoretically catch the cat in the act.

Treatment of Urine Marking:

The first thing to do is to identify the stressor—the cause of the cat's territorial anxiety and thus its motivation for spraying. If feuding between cats is responsible, this issue can be dealt with directly by separation and gradual reintroduction as described in the notes in Feline Aggression. If the stressor is unwelcomed visits from outside animals, there are several methods by which exposure to these perceived outside threats can be minimized. One is by simply drawing blinds or blocking access to windows or rooms where cats are exposed to these challenges, and another involves making the yard an unwelcoming place for unwelcomed visitors. This can be achieved by either burying mothballs or blood meal in the soil around strategic areas of the house, by using repellant, rain-resistant citrus crystals that are distributed around the periphery of the property, or through the use of motion sensitive lawn sprinklers, noise makers, and flashing lights which will alarm and drive away unwelcomed visitors.

If the stress is due to the arrival of a new baby or a new resident in the home, then the goal of treatment is to improve the relationship between the cat and these other parties through counter-conditioning and controlling exposure. The bottom line, however, is that none of these methods is universally successful in addressing cats' urine marking, and in fact, it's almost fair to say that treatment of this problem by behavioral means alone is virtually impossible.

Certainly, odor plays some role in propagating urine marking as cats are driven to urinate on previously soiled areas to refresh the urine mark as its odor fades. Without addressing this aspect of urine marking, almost any attempt to control this unwanted behavior will fail. To illustrate the power of the olfactory drive in urine marking, it is helpful to note certain

experiments performed at the University of California/Davis where cats were urine-marking cats rendered anosmic (it was arranged that they could no longer smell anything at all). Cats rendered anosmic during the course of these experiments ceased urine marking, as the whole point of the exercise—leaving an olfactory signal—was lost. That said, rendering cats anosmic by means of zinc sulfate aerosols or surgery is inhumane.

Pharmacological Treatment:

Because of the inefficacy of the latter treatments, veterinarians have tried numerous anti-anxiety medications over the years to treat this otherwise refractory problem. In the early days, synthetic progesterones (progestins) were used, perhaps addressing the issue of residual maleness noted above. However, progestins are not always effective and have serious potential side effects, including adrenal cortical suppression, a diabetogenic effect, and in dogs at least, memory hyperplasia and tumors. One of the next drugs to be used was the tricyclic antidepressant amitriptyline (trade name Elavil), and that's not a bad treatment, but it does not always work.

Next came diazepam (Valium), but Valium only worked in about 70% of cats, and relapse occurred in over 90% of them upon discontinuation of the treatment. In addition, diazepam itself can cause fulminant hepatic failure. Next came the mild anti-anxiety drug buspirone whose feline use was developed here at Tufts. Buspirone was somewhat less effective than Valium but did not carry any of the serious adverse consequences of use and had a lower recidivism rate upon discontinuation of treatment.

Throughout the 1990s the tricyclic anti-depressant clomipramine (trade name Clomicalm) became popular, and it was said to meet with 80% success. But finally in the early 2000s, it was published that fluoxetine (veterinary trade name Reconcile) beat them all with between 90-100% efficacy in almost all cats treated (more on this in the Pharmacology chapter).

Clean-Up:

It was mentioned earlier that residual odors were a constant provocation for continued urine marking and, therefore, it is clear that these odors must be somehow addressed. In the past, veterinarians have used various enzymes and bacterial products (e.g., Nature's Miracle and AIP), but more recently a chemical approach attacking the molecules that cause the odors (sulfur and the minor? containing molecules) has been marketed under the trade name Zero Odor; this is our preferred treatment to date.

Summary:

- Urine marking used to be a highly refractory condition which led to the surrender and therefore the untimely demise of all too many cats.

- Currently, urine marking is eminently treatable using a three-pronged approach:

1.) First, address and deal with, as far as possible, all anxiety-promoting situations and circumstances within and without the home.
2.) Second, use a pharmacological agent to reduce anxiety. The preferred agent at present is the selective serotonin re-uptake inhibitor fluoxetine (human trade name Prozac; veterinary trade name Reconcile).
3.) Third, engage thorough clean-up of all urine marks, using if necessary a black light to identify them and a chemical odor neutralizer (Zero Odor) to nix them.

- If all these areas are addressed systematically and consistently with good follow-up with the client, there is no reason that the vast majority of cases of urine marking can be successfully treated.

NOTE: While urine marking is the most common form of marking with products of excretion, fecal marking (otherwise known as middening), sometimes also occurs. In this case the deposition of feces is strategic—for example, on one side of the bed where a particular person has slept and sends a clear message. Treatment of middening is precisely the same as treatment of urine marking, as it is an analogous behavior that simply utilizes and alternative excretory signal.

Additional note of interest: Cats that urine mark or engage in middening often use their litter box quite consistently for the purpose of elimination, i.e., there appears to be no problem of litter box aversion. Cats with litter box problems, however (dealt with later in the syllabus), are often reluctant to use the litter boxes or may not use it at all.

TREATMENT OF FEAR-BASED CONDITIONS

Treatment of feline fears is similar to treatment of canine fears, that is, systematic desensitization with counterconditioning. To reiterate, the essential features of systematic desensitization and counterconditioning are:

1.) Identify the fear-inducing stimulus (including other associated cues) and *isolate the cat from it*.
2.) Devise a method of controlling the intensity of the fear-inducing stimulus for representation in a controlled manner.
3.) Introduce the fear-inducing stimulus at a low intensity while counter-conditioning the cat to a different expectation of the event (e.g., bring out a food puzzle toy).
4.) Gradually increase the intensity of the stimulus until it is at a previously fear-inducing level using a stepwise approach (systematic desensitization).

Important Factors to Remember Concerning Treatment for Fear:

1.) For fear-inducing stimuli that are rarely encountered, the situation (prn) use of anti-anxiety medications is usually the best approach (e.g., a visit to the vet's office). The owner must be able to anticipate the fear-inducing event, and the medication must be given such that the anxiolytic (anti-anxiety) effect is in effect prior to the exposure to the fear. The appropriate drug and dosage differs between individuals. For more pervasive problems, pharmacological treatment should be combined with behavior modification.

2.) How quickly a treatment regime works depends on the severity of the fear and the frequency of the treatment sessions. Moderate fears can take a few weeks to resolve while severe fears may take as long as three to four months. Even if treatment sessions are a week apart, the fear can be successfully treated.

Alternative Treatments:

1.) **Flooding** can be used to treat mild fears or fears with several stimuli (e.g., fear of street noise). As the term implies, flooding involves bombarding the cat with the fearful stimuli until the cat's fear extinguishes. This method should be used with great care.
2.) **Pharmacological desensitization** for fears when the intensity of the stimulus cannot be controlled or the fear-inducing stimulus is not known.
