Diagnosing Behavior Problems

A Guide for Practitioners

Elizabeth Stelow, DVM

KEYWORDS

• Canine • Feline • Behavior • Aggression • Anxiety • Behavior history

KEY POINTS

- Clinicians play an important role in diagnosing problem behaviors as a precursor to treating them. This requires a protocol for gathering historical behavioral and health information, direct observation and examination of the animal, and a broad knowledge base of medical and behavioral differential diagnoses for those findings.
- Aggression and anxiety are the most commonly reported behavior problems in dogs. In cats, elimination problems and aggression are the most prevalent. Other important diagnoses for these species are cognitive dysfunction and abnormal repetitive behaviors.
- A diagnosis of aggression should include the target (owners, unfamiliar people, other dogs, other cats, other animals), and the most likely motivation (fear, territoriality, resource guarding, play, and others).
- Fears, phobias, and anxieties require identification of the triggers, whether being left alone, loud noises, or a combination of many triggers, because treatment is directed at the cause.
- The first question to answer in canine and feline elimination problems must be, "Is this urine marking, toileting, or both?" Treatment plans are different for each of these problems.

INTRODUCTION

The role of the veterinary general practitioner in identifying and treating behavior problems among their patients is a crucial one. An estimated 40% of all pet dogs and cats in the United States exhibit problem behaviors.[1,2] These problems take an enormous toll: in numerous studies, behavior problems are listed as the number one reason for relinquishing a dog and the number two reason, behind surrendering entire litters, for relinquishing a cat.[3]

The author has nothing to disclose.
UC Davis, Veterinary Medical Teaching Hospital, 1 Shields Avenue, Davis, CA 95616, USA
E-mail address: eastelow@ucdavis.edu

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Not all veterinarians seem to be equally prepared to address behavioral issues in their patients. In a 2004 article, Siebert and Landsberg[4] outlined findings from several surveys of practicing veterinarians. A 2001 survey by McMillan and Rollin found that only 25% of veterinarians inquire regularly about the patient's behavior.[5] A 2004 survey by Greenfield and colleagues[6] found that veterinarians in small animal practices ranked knowledge about behavior sixteenth among those skills most important for a new veterinary school graduate.

The relative lack of behavior knowledge is apparent to clients, as well. In a 2002 study, Bergman and coworkers[7] found that only 26% of the 500 owners of urine-marking cats that were surveyed had contacted their veterinarians about the problem. The other 74% assumed the veterinarian would be of no help and turned to the Internet and other resources. Of the 70 veterinarians surveyed, only two-thirds could correctly distinguish between urine marking and toileting when given the facts of a case.[7]

One concern is that, in the absence of a good foundation in the diagnosis and treatment of behavioral problems, a clinician's solution might be to send the owners to a nearby trainer to seek resolution. But, thinking of every behavioral problem as a "training problem" and not evaluating the underlying diseases (eg, fear, anxieties), may preclude effective treatment.[8] The two things a veterinarian can do that even the most qualified trainer cannot are to diagnose disease conditions and prescribe medications.

OBSTACLES TO ACCURATE DIAGNOSES

Terminology

One of the more frustrating barriers to a clear, concise behavioral diagnosis is the lack of a consistent, universally accepted lexicon of diagnostic terminology. In many behavioral disorders, the pathophysiologic abnormalities have not been established or agreed on.[8] In others, specialists agree on the basis for certain diagnoses, but not what those diagnoses should be called.[9] The result is that some practitioners use diagnostic categories, whereas others use functional categories to name their diagnoses.[8] Although it would be ideal to have a set naming pattern for behavioral diagnoses, because this would theoretically lead to the most targeted treatment plans, much work has yet to be done.[9] The best a practitioner can do is to be clear in naming a diagnosis about the triggers, response, and context whenever possible.

Confounding Etiologies

Is it medical? Is it behavioral? Is it both? Behavior is often the first noticeable indicator of a medical or disease process; and these processes may affect behavior in several ways:

- An acute illness may present with lethargy, social withdrawal, decreased response to stimuli, decreased appetite, and other signs. It may be that these behaviors are programmed to avoid the spread of disease.[10]
- In chronic disease, behavior changes may be the first clinical signs noted by the owner. Endocrine diseases that cause polyuria and polydipsia may lead to a noticeable increase in water consumption and inappropriate urination. Pain may lead to irritability and reduced activity. Partial seizures may manifest as repetitive behaviors.[10]
- Proinflammatory cytokines, numerous "stress" pathways, gut microbes, medications, dietary supplements, and other factors are increasingly shown to have behavioral manifestations via any number of physiologic processes.[10]

The discussion of medical differentials is presented later.

APPROACH TO DIAGNOSING BEHAVIOR PROBLEMS: AN OVERVIEW

For a practitioner to address problem behaviors among their patients, it is crucial to know what behaviors to screen for. Although the most common problems can change ranking over time, their status in the "top problems" list is consistent.

For dogs, the behavior problems most commonly reported are aggressive behaviors (toward owners, strangers, and other dogs), anxieties (separation, noise, generalized), destructiveness, house-soiling, unruliness, and compulsive behaviors.[2,11] Aggressive behaviors in the dog include growling, snarling, snapping, and biting. In nearly all studies, aggression ranks as the number one unacceptable behavior problem, followed by anxieties.[2,8,11,12]

For cats, the list contains elimination (spraying, toileting), aggression (toward owners, strangers, and other cats), destructiveness, and compulsive behaviors. In most studies, elimination is ranked as the number one behavioral reason for relinquishment of the cat, followed by destructiveness (clawing of furniture) and aggression.[1,8,12,13]

How Is an Accurate Diagnosis Achieved?

When an owner presents a pet for evaluation of a problem behavior, or one is uncovered during a routine vet visit, there are several questions the veterinarian must answer. Is the behavior described or witnessed normal for that species? If so, is there a reason for the owner to find it unacceptable? If not, can I determine why it might have arisen? What medical issues must I rule out to treat the correct underlying cause?[10]

Without further examination, the answers to these questions are usually elusive. Therefore, a complete diagnostic plan should contain the following elements[10]:

- Detailed history (medical and behavioral)
- Observation
- Minimum database
- Knowledge of medical differentials for common problem behaviors
- Understanding of specific diagnostic criteria for common problem behaviors
- Ability to assess prognosis

Each of these is discussed in detail next.

How Can I Get a Detailed History?

A detailed history is the primary diagnostic tool of the behavior case. It is most expedient to use a form that prompts owners for the background details needs. **Table 1** provides recommended elements. Objective descriptions of the behaviors are more useful than subjective assessments of the cause; but, there is often a limit to what the owners can tell you about body language and specific triggers, because most owners do not have a sophisticated awareness of behavior in their pets.[14]

How Can I Best Observe the Problem?

There are two ways of seeing the pet's behavior: direct observation and video provided by the owner. Although in-room observations are important, you may not see the behavior in question. Instead, you will observe how comfortable the pet is in new surroundings and with the owners. You will see whether the owners are nervous about the pet or underestimate the threat it may cause. If two pets are brought for intraspecific fighting, you will see how they interact in a stressful environment; for safety, it is important to have two family members for two dogs, in case tensions rise during the appointment.

Table 1
Owner history form elements

Basic information	Signalment and presenting complaint Acquisition history (age, source) Diet and exercise regimens Medical history and current medications/supplements Training history, including trainer names, types (private, group, board and train)
Environment	Family members living in the home (humans, other pets) Type of home, neighborhood, pet's access in the home and yard Whether the pet can see people, cats, or dogs pass by the house; how he reacts when he sees them
Owner description of incidents	What the pet and the owner are doing before, during, and after a typical incident Focus on the trigger, the pet's body language and recovery time, and the owner's response to the incident The age of onset, progression over time, and current intensity/frequency of the problem Number and severity of bites; whether any have been reported to the authorities The owner's attempts to correct the problem; outcome of each type of attempt
Owner information	Each owner's level of bond with the pet Each owner's goals for outcome

Data from Landsberg G, Hunthausen W, Ackerman L. Behavior problems of the dog and cat. 3rd edition. Edinburgh (United Kingdom): Saunders; 2013.

Before the appointment, ask the owner for video of the pet at home and, if safe to get, an occurrence of a problem. This step is crucial for suspected separation anxiety, because the behaviors occur when no one is home to witness them.[15,16]

How Do I Approach a Physical Examination and Medical Diagnostics?

It is crucial to attempt to identify any influence of medical issues on behavior. Changes in behavior are the first signs of emerging medical problems. There is a higher index of suspicion of an underlying medical condition when the behavior change is sudden or appears later in life.[17,18] Most behavior issues in the dog arise at a mean age of 2.5 years (except anxieties, at an average 6.5 years).[2] In cats, the mean age for presentation of behavior problems is 5.5 years (except ingestive problems at closer to 1.5 years).[13] Thus, if a middle-aged dog suddenly becomes aggressive or anxious, extra care should be spent on medical diagnostics and physical examination.

Beyond a physical examination, a thorough work-up includes basic laboratory work (complete blood count, serum biochemistry panel, urinalysis, T4 in the cat), and any other laboratory test warranted by physical examination findings. For possible joint pain or uroliths, consider radiographs. Gastrointestinal differentials may require ultrasound or endoscopy.[10,18]

DIAGNOSTIC CRITERIA FOR SPECIFIC PROBLEMS

Aggression

Aggression, particularly toward people, is the number one diagnosed behavior problem in dogs and the number two in cats.[1,13,19] Therefore, it is important for the general practitioner to be able to diagnose and treat it effectively.

One challenge is that "aggression" is not a complete behavioral diagnosis; rather, it is a clinical sign of a medical or behavioral problem.[20] Perhaps for that reason, aggression is an easy and a difficult diagnosis to make. We all think we know it when we see (or read owner accounts about) it. Yet, sometimes a clinician is uncertain about the true nature of the behavior described. Video can aid the diagnosis, based on the behavior and body language of the patient.

Once aggressive behaviors have been identified, the actual diagnosis requires defining the motivation behind them and the victims. Possible victims include owners, strangers, or both; other dogs inside and outside the household; other cats in the household; or other species.[11,13]

The part of the diagnosis that involves motivation is often more complicated. Considering just two published sources, one can see the wide variety of motivations attributed to canine aggression: maternal (toward people or pups), redirected, food-related, possessive, predatory, impulse-control, idiopathic, conflict-related, resource guarding, fear-related, territorial/protective, pain-induced/irritable, play, dominance-related, intraspecific miscommunication, intraspecific dominance/status-related, and pathophysiologic.[9,10] Many of these represent different flavors of "fear," including territorial, redirected, food/resource guarding, possessive, and pain-related. Also, "dominance" aggression can apply only to intraspecific aggression and does not include aggression toward people.[21]

Feline aggression is often divided into the following categories: play/predatory, fear-related, petting-induced, redirected, pain-induced, territorial, intercat (household), and hormonally mediated. Play aggression sounds harmless but can inflict sometimes-severe injury on people; it is characterized by stalking before an attack. Petting-induced aggression may happen after a few pets or several minutes of petting.[10]

To determine which motivations are most likely in a given case, the context and the body language of the animal are both relevant. Unfortunately, owners are not equally skilled at providing this information. Unless the aggression occurs in the presence of the clinician, there is sometimes incomplete information about motivation, which is important mainly because of its effect on prognosis.[10]

Inappropriate Elimination

Although cats and dogs sometimes relieve themselves in the house, they often have different reasons for doing so. For the problem to be properly addressed, diagnostics must uncover the reason.[9]

Feline elimination

For cats, inappropriate elimination is the number one reported problem behavior.[9] It can take two main forms: toileting/litter box aversion and urine marking. It is essential that the clinician distinguish between these early in the diagnostic process, because the treatments are different.[7] The article by Leticia Mattos de Souza Dantas', article "Vertical or Horizontal? Diagnosing and Treating Cats Who Urinate Outside the Box," in this issue provides a thorough differentiation between feline urine marking and toileting.

Feline toileting Inappropriate toileting in cats results when a cat voids the contents of its bladder or rectum someplace other than the litter box. With inappropriate urination, in contrast to urine marking, the urine is most often left on a horizontal surface and the cat is often seen in a typical squatting posture of urination. Cats may even dig before or after inappropriate toileting.[22]

The cat may be avoiding the litter box for any of several reasons. Commonly, there is recent history of a lower urinary tract or constipation problem that caused pain in the litter box. The cat does not want to risk that pain again, so chooses a different substrate or location. As his issue resolves and urination/defecation no longer hurts, he finds that this new substrate is more comfortable than the litter box.

Other reasons include a new box/litter/location that the cat does not like, poor litter box hygiene, another cat creating social tension near the box, mobility problems that make getting to or into the box difficult, or something scary happening near the box. A good history and medical diagnostics often uncover everything necessary for this diagnosis. If either urine or feces are left in the box (but not the other) chances are there is an underlying medical problem versus a problem with the box.[10,22]

Feline urine marking Urine marking has little to do with the litter box. In fact, most marking cats still urinate and defecate in their box. Urine marking is a chemical signal to other cats. If owners witness the marking behavior, they generally note a small amount of urine being deposited on a socially significant vertical surface (eg, threshold, bannister) by a cat that is treading with his back feet while his tail quivers and he stares with eyes half closed into the distance.[22] It is less common for small amounts of urine or feces to be left on socially significant horizontal surfaces; and most horizontally marking cats also mark vertical surfaces.[10,22]

Urine marking, as a form of communication, is a normal behavior outdoors, but unacceptable indoors. It is most often attributable to the presence of outdoor cats around the house; challenging social dynamics among indoor cats; or changes within the home or family, including moves, new people/pets, and schedule changes. An adequate history, along with the reports of small amounts of urine on vertical surfaces, are typically enough to make a tentative diagnosis.[10]

The medical differentials for urine marking and urination include urinary tract infection, calculi, neoplasia, hyperthyroid, feline interstitial cystitis, feline leukemia virus, and feline immunodeficiency virus. For defecation outside the box, differentials include tenesmus, dyschezia, and feline infectious peritonitis.[18]

Canine elimination

The dog that urinates or defecates in the home may also do so for a variety of reasons. Urination can be toileting or urine marking, just as in cats. Toileting, if behavioral in nature, is most likely attributable to either incomplete house training or inadequate access to the outdoors to eliminate. If lapses in house training happen only when the owners are gone, separation anxiety or other cause of autonomic stimulation should be explored. Submissive and excitement urination happen at specific times and in the presence of people, so are easy to identify. Medical differentials to consider include urinary or gastrointestinal inflammatory processes, any cause of polyuria/polydipsia or diarrhea, or cognitive decline.[9]

Urine marking in the home is far less common in dogs than cats. It may reflect social tension among household dogs, concern over dogs that pass by windows, undesired visitors to the home, or other cause of stress or trigger of territoriality. The biggest challenge with the diagnosis of urine marking in the dog is that the posture assumed is usually identical to that of toileting.[9,10]

Anxieties, Fears, and Phobias

Both colloquially and in veterinary literature, there is great overlap and confusion among the terms “fear,” “phobia,” and “anxiety.” For the purpose of this discussion, anxiety is a state of arousal as a response to uncertainty or the prospect of real or

imagined danger. Its clinical signs are fairly nonspecific and include increased respiratory and heart rate, trembling, increased salivation, pacing, circling, seeking closeness, and transient anorexia.[23,24]

A phobia is an excessive and usually persistent fear of a specific and discernible object or situation. Responses include autonomic arousal and marked behavior signs, often directed at escape.[23,24]

Fear represents sympathetic alarm response to a threatened or present danger. It occurs most often in proximity to the threatening stimulus and is typically brief in duration. Specific fear behaviors fall into several categories, including classic fear responses (panting, shaking, trembling, pacing, whining), avoidance behaviors (escape attempts, hiding, destructiveness, digging, frantic running), and attention-seeking (pawing at or following owner).[18,25] Unlike anxieties and phobias, fear, in response to a legitimate threat, is an adaptive response.[23,24,26]

There are several categories of fear that require different types of treatment. Simple fears are those that are triggered by a single, identifiable stimulus. Complex fears are those with multiple triggering stimuli that cause increased anxiety between triggers. Phobias, as described previously, are extreme responses and can include panic. A good history of the problem can distinguish among these fear types. The development of fearful behaviors seems to vary by type. Some fears seem to be associated with a traumatic exposure. Others seem to be a function of lack of exposure during a formative period or sensitization via repeated exposure. Genetics is a risk factor, as is social transmission via exposure to another animal expressing fear.[23,27]

In general, the fear/anxiety/phobia behavior issues we most commonly diagnose and treat as veterinarians include separation anxiety, noise aversions, and generalized anxiety disorder. Separation, confinement, and noise aversions are discussed in detail in Kelly C. Ballantyne's article, "Separation, Confinement, or Noises: What Is Scaring that Dog?," in this issue. Generalized anxiety has a different presentation than the others and is discussed later.

Separation Anxiety

Separation anxiety is defined as "problematic behavior associated with anxiety that occurs exclusively in the owner's absence or virtual absence".[16] Canine separation anxiety is thought to affect between 14% and 17% of dogs in the United States and 20% in the United Kingdom.[24] It is a challenge for owners and makes the dog a higher risk for relinquishment because of the stress it places on the owner's relationship with the pet.[24]

Feline separation anxiety has been studied far less than the canine variety, perhaps because of the relative infrequency with which it is reported. Because of the paucity of research on the subject, conjectures about prevalence in the feline population have not been made. Clinical signs most commonly reported are inappropriate elimination (with urination most commonly on the owner's bed), excessive vocalization, destructiveness, and overgrooming.[28]

The clinical signs of canine separation anxiety

A dog that is left alone may exhibit one or many nonspecific signs of anxiety. Most commonly reported are destruction, urination/defecation, self-harm, and/or vocalization; these are reported because the owner can see tangible signs of them or hear reports from neighbors.[29] Other, less obvious signs of anxiety that may occur include panting, freezing, drooling, trembling, restlessness, transient anorexia, and withdrawal. These more subtle signs are noted only with video recording during the time of the owner absence.[15]

Differential diagnoses

There are several medical and behavioral differentials that should be considered for separation anxiety. Destructiveness or rearranging household items can represent hepatic encephalopathy, other anxieties, or cognitive decline. Urination or defecation can signal cystitis, causes of polyuria/polydipsia, seizures, gastrointestinal disease, or high dietary fiber. They may also result from being left without access to an elimination area or being incompletely housetrained. Excessive salivation can be caused by toxin exposure or nausea. Distress vocalization may indicate hepatic encephalopathy, aggression, noise aversion/panic, or social facilitation with a nearby dog. Finally, self-trauma may suggest allergies, neuritis, hepatic encephalopathy, parasites, or a displacement or compulsive repetitive behavior.[24,30]

Noise Aversions

Another pervasive anxiety, in dogs in particular, is noise aversions. The most common noises reported to create fear include thunder, fireworks, gunshots, and any other type of explosion.[24,25,27,31] Its prevalence in the canine population is between 20% and 50%.[23,24,31]

Diagnosis is based entirely on a history of the dog reacting to specific types of noises with any of the fear behaviors described previously.[31] It is important to note from the history how quickly the animal recovers from a fearful incident and whether there is anxiety between incidents, because this can greatly influence the treatment plan.[27] If the types of noises are widely varied and the dog has other types of triggers, the practitioner should consider that a more complex fear or phobia is at play.

Reported differential diagnoses are sparse, but include cognitive dysfunction and hypothyroid (dogs).[23]

Generalized Anxiety

Generalized anxiety is described as a persistent condition reflecting autonomic hyperactivity, hyperreactivity, and hypervigilance, interfering with normal daily social and maintenance behaviors.[9] The dogs are noted by owners to be surveying their surroundings constantly, and usually unable to focus when even slightly "outside their comfort zone."[9] They exhibit an extreme or out-of-context reaction to stimuli that includes panting, pacing, and/or lunging at triggers; in fact, aggression may be the actual presenting complaint. There may be a persistent diarrhea.[9]

Differentials diagnoses

Medical differentials include pain, endocrinopathies, and cardiac disease. In older dogs, cognitive decline should be considered. If the dog has diarrhea, rule out inflammatory bowel diseases, as necessary.[9]

Abnormal Repetitive Behaviors

Abnormal (sometimes called "maladaptive") repetitive behaviors in dogs and cats are a varied and poorly defined group of diagnoses, the causes of which are not well understood. Included among these diagnoses are stereotypic, compulsive, and displacement behaviors. The predisposing factors are shared among them and include genetics, conflict, frustration, and anxiety.[32]

Stereotypic behaviors

Stereotypies are patterned and unvarying and serve no clear purpose. Examples include carnivores pacing in zoos and cribbing horses. The key types of stereotypy are oral (hooved stock and primates) and locomotor (carnivores and rodents). The specific predisposing factor seems to be frustration, often caused by extreme

confinement. For that reason, few cats and dogs are diagnosed with stereotypic behaviors. One rare exception is a kenneled dog that develops a repetitive locomotor behavior.[33]

Compulsive behaviors

These are far more common than stereotypes in cats and dogs. They are locomotor (tail chasing, spinning), hallucinatory (fly-snapping), self-injurious (acral lick), and oral (pica, flank sucking). Two hallmarks of compulsive behaviors are that they are not easily interrupted and they tend to interfere with normal maintenance activities.[32,34] The typical age of onset of compulsive behaviors is 12 to 36 months for dogs and 24 to 48 months for cats. Many of the cats and dogs diagnosed with compulsive behaviors have one or more concurrent behavior diagnoses, including aggression, separation anxiety, attention seeking, and others.[34] Medical differentials for compulsive behaviors include primary gastrointestinal disease, pain, pruritus, seizure activity, and urinary tract disease.[32,35]

Displacement behaviors

The third category of repetitive behaviors is displacement behaviors, which are any normal behavior that is displayed out of context as a response to conflict between two competing motivations; the chosen behavior seems irrelevant in the setting it is produced. An example is a dog that wishes to eat but whose dish is guarded by an aggressive conspecific; in this context, the dog chooses to groom himself, displaying what can only be perceived as a displacement behavior.[36]

Cognitive Dysfunction

The aging brain is prone to several changes that, although anatomic or physiologic in nature, affect behavior. These include the buildup of β-amyloid plaques in the hippocampus and cerebral cortex; reduced glucose uptake and metabolism in the brain; oxidative damage in the brain; and perivascular changes, including arteriosclerosis and infarcts. What the owner notices is commonly thought of as cognitive decline.[10]

The clinical signs of cognitive dysfunction in the dog are disorientation, changes in social interactions, loss of housetraining, disturbances in the sleep-wake cycle, and changes in activity levels or ability to learn. Medical differentials include thyroid abnormalities, diabetes, pain, seizure activities, and other diffuse brain or central nervous system disease.[10]

In the cat, the most common clinical signs are increased vocalization, nighttime restlessness, loss of housetraining, disorientation, aggression, and anxiety. Medical differentials include pain, thyroid disease, renal disease, hypertension, and forebrain disease.[4]

For a more complete discussion on cognitive dysfunction, see Eranda Rajapaksha's article, "Special Considerations for Diagnosing Behavior Problems in Older Pets," in this issue.

ASSESSING PROGNOSIS

A behavior evaluation is not complete without offering the owner an assessment of prognosis. **Table 2** shows all the elements to be considered before formulating a prognosis.

Each plan likely has management elements that avoid allowing the pet to practice its unwanted behaviors; prognosis relies heavily on the owners' acceptance of and ability to implement these management strategies. Other key factors include age of onset and duration of the problem, predictability, and response to treatment.[9] It is important to assess how the client reacts to finding that the goal of treatment of most behavior

Table 2
Elements of a behavioral prognosis

Pet factors	How well-diagnosed is the problem? Is the pet otherwise healthy? How severe are the clinical signs? How recently did the pet develop this behavior? How predictable is the behavior? How easily can the stimuli be controlled or removed? How high is the risk of injury?
Owner factors	How interested are the clients in understanding the diagnoses? How committed are the owners to the pet? How much work is this pet for these owners? How familiar are the owners with behavior modification techniques? Can these owners refrain from punishing their pet? How capable are the owners of implementing the plan? How reasonable are the owners' goals?

Data from Overall KL. Manual of clinical behavioral medicine for dogs and cats. St Louis (MO): Mosby; 2013; and Landsberg G, Hunthausen W, Ackerman L. Behavior problems of the dog and cat. 3rd edition. Edinburgh (United Kingdom): Saunders; 2013.

problems is to control, not to cure, and that response to treatment is more unpredictable than most medical conditions.[8] Still, client compliance is likely the single most important factor in prognosis.[9]

SUMMARY

The remainder of this issue, full of articles written by the fresh voices of veterinary behavior, lays out the treatment plans recommended for the behavior problems described previously. Together, they work as a complete game plan for some of the key behavior problems a clinician is likely to diagnose.

REFERENCES

1. Amat M, Ruiz de la Torre JL, Fatjó J, et al. Potential risk factors associated with feline behavior problems. Appl Anim Behav Sci 2009;121:134–9.
2. Martinez AG, Pernas GS, Casalta FJD, et al. Risk factors associated with behavioral problems in dogs. J Vet Behav 2011;6:225–31.
3. Salman MD, Hutchison JM, Ruch-Gallie R, et al. Behavioral reasons for relinquishment of dogs and cats to 12 shelters. J Appl Anim Welf Sci 2000;3:93–106.
4. Seibert LM, Landsberg GM. Diagnosis and management of patients presenting with behavior problems. Vet Clin North Am Small Anim Pract 2008;38:937–50.
5. McMillan FD, Rollin BE. The presence of mind: on reunifying the animal mind and body. J Am Vet Med Assoc 2001;218(11):1723–7.
6. Greenfield CL, Johnson AL, Schaeffer DJ. Frequency of use of various procedures, skills, and areas of knowledge among veterinarians in private small animal exclusive or predominant practice and proficiency expected of new veterinary school graduates. J Am Vet Med Assoc 2004;224(11):1780–7.
7. Bergman L, Hart BL, Bain M, et al. Evaluation of urine marking by cats as a model for understanding veterinary diagnostic and treatment approaches and client attitudes. J Am Vet Med Assoc 2002;221:1282–6.
8. Horwitz DF. Differences and similarities between behavioral and internal medicine. J Am Vet Med Assoc 2000;217:1372–6.

9. Overall KL. Manual of clinical behavioral medicine for dogs and cats. St Louis (MO): Mosby; 2013.
10. Landsberg G, Hunthausen W, Ackerman L. Behavior problems of the dog and cat. 3rd edition. Edinburgh (United Kingdom): Saunders; 2013.
11. Bamberger M, Houpt KA. Signalment factors, comorbidity, and trends in behavior diagnoses in dogs: 1644 cases (1991–2001). J Am Vet Med Assoc 2006;229: 1591–601.
12. Podberscek AL. Positive and negative aspects of our relationship with companion animals. Vet Res Commun 2006;30:21–7.
13. Bamberger M, Houpt KA. Signalment factors, comorbidity, and trends in behavior diagnoses in cats: 736 cases (1991-2001). J Am Vet Med Assoc 2006;229: 1602–6.
14. Mariti C, Gazzano A, Moore JL, et al. Perception of dogs' stress by their owners. J Vet Behav 2012;7:213–9.
15. Palestrini C, Minero M, Cannas S, et al. Video analysis of dogs with separation-related behaviors. Appl Anim Behav Sci 2010;124:61–7.
16. Cannas S, Frank D, Minero M, et al. Video analysis of dogs suffering from anxiety when left home alone and treated with clomipramine. J Vet Behav 2014;9:50–7.
17. Overall KL. Medical differentials with potential behavioral manifestations. Vet Clin North Am Small Anim Pract 2003;33:213–29.
18. Frank D. Recognizing behavioral signs of pain and disease: a guide for practitioners. Vet Clin North Am Small Anim Pract 2014;44:507–24.
19. Fatjó J, Amat M, Mariotti VM, et al. Analysis of 1040 cases of canine aggression in a referral practice in Spain. J Vet Behav 2007;2:158–65.
20. Sueda KLC, Malamed R. Canine aggression toward people: a guide for the practitioner. Vet Clin North Am Small Anim Pract 2014;44:599–628.
21. Yin S. Low stress handling, restraint and behavior modification of dogs and cats. Davis (CA): CattleDog Publishing; 2009. p. 52–73.
22. Rodan I, Heath S. Feline behavioral health and welfare prevention and treatment. St Louis (MO): Elsevier; 2016.
23. Mills D. Management of noise fears and phobias in pets. Practice 2005;27: 248–55.
24. Sherman BL, Mills DS. Canine anxieties and phobias: an update on separation anxiety and noise aversions. Vet Clin North Am Small Anim Pract 2008;38: 1081–106.
25. McCobb EC, Brown EA, Damiani K, et al. Thunderstorm phobia in dogs: an Internet survey of 69 cases. J Am Anim Hosp Assoc 2001;37:319–24.
26. Tiira K, Sulkama S, Lohi H. Prevalence, co-morbidity and behavioral variation in canine anxiety. J Vet Behav 2016;16:36–44.
27. Levine ED. Sound sensitivities. In: Horwitz D, Mills D, editors. BSAVA manual of canine and feline behavioural medicine. Quedgeley (United Kingdom): British Small Animal Veterinary Association; 2009. p. 159–68.
28. Schwartz S. Separation anxiety syndrome in dogs and cats. J Am Vet Med Assoc 2003;222:1526–32.
29. Storengen LM, Boge SCK, Strøm SJ, et al. A descriptive study of 215 dogs diagnosed with separation anxiety. Appl Anim Behav Sci 2014;159:82–9.
30. Voith VL, Borchelt PL. Separation anxiety in dogs. Compend Contin Educ Pract Vet 1985;7(1):42–52.
31. Blackwell EJ, Bradshaw JWS, Casey RA. Fear responses to noises in domestic dogs: prevalence, risk factors and co-occurrence with other fear related behaviour. Appl Anim Behav Sci 2013;145:15–25.

32. Tynes VV, Sinn L. Abnormal repetitive behaviors in cats and dogs: a guide for practitioners. Vet Clin North Am Small Anim Pract 2014;44:543–64.
33. Rushen J, Mason G. A decade-or-more's progress in understanding stereotypic behavior. In: Mason G, Rushen J, editors. Stereotypic animal behaviour: fundamentals and applications to welfare. 2nd edition. Wallingford (WA): CABI; 2006. p. 1–18.
34. Overall KL, Dunham AE. Clinical features and outcome in dogs and cats with obsessive–compulsive disorder: 126 cases (1989-2000). J Am Vet Med Assoc 2002;221:1445–52.
35. Zulch HE, Mills DE, Lambert R, et al. The use of tramadol in a Labrador Retriever presented with self-mutilation of the tail. J Vet Behav 2012;7:252–8.
36. Hetts S, Heinke ML, Estep DQ. Behavior wellness concepts for general veterinary practice. J Am Vet Med Assoc 2004;225:506–13.

FURTHER READINGS

Flannigan G, Dodman NH. Risk factors and behaviors associated with separation anxiety in dogs. J Am Vet Med Assoc 2001;219:460–6.
Overall KL, Dunham AE, Frank D. Frequency of nonspecific clinical signs in dogs with separation anxiety, thunderstorm phobia, and noise phobia, alone or in combination. J Am Vet Med Assoc 2001;219:467–73.
Patronek GJ, Glickman LT, Beck AM, et al. Risk factors for the relinquishment of dogs to an animal shelter. J Am Vet Med Assoc 1996;209:572–81.
Perry G, Seksel K, Beer L, et al. Separation anxiety: a summary of some of the characteristics of 61 cases seen at a Sydney, Australia behaviour practice. In: Mills D, Levine E, Landsberg G, et al, editors. Current issues and research in veterinary behavioral medicine. West Lafayette (IN): Purdue University Press; 2005. p. 280–2.
Scarlett JM, Salman MD, New JG, et al. The role of veterinary practitioners in reducing dog and cat relinquishments and euthanasias. J Am Vet Med Assoc 2002;220:306–11.
Voith VL. The impact of companion animal problems on society and the role of veterinarians. Vet Clin North Am Small Anim Pract 2009;39:327–45.
Wright JC, Nesselrote MS. Classification of behavior problems in dogs: distributions of age, breed, sex and reproductive status. Appl Anim Behav Sci 1987;19:169–78.