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Commentary for special issue on feline behavior

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Still the newest of the veterinary specialties in North America, veterinary behavioral medicine has come of age. There is no greater evidence of growth than the nascent paradigm shifts either discussed in, or suggested by, the papers in this volume. Because one measure of a scientific endeavor is the discussion it engenders, it is also hoped that this volume will encourage debate, leading to further paradigm shifts.

In '*Thinking outside the box: feline elimination*', Jacqui Neilson emphasizes and provides guidelines for investigating one factor in feline elimination complaints/disorders that a decade ago was all but ignored: social interactions. As we come to appreciate the extent to which our own compromised olfactory systems mislead us about the importance of olfactory signals for our patients, we will further acknowledge the effects of such signaling on normal feline behaviors (Pageat and Gaultier, 2003; Passanisi and Macdonald, 1990; Verberne and de Boer, 1976). Hopefully, we'll also collect much-needed data on the role of olfactory signals in both anxious and abnormal behaviors, particularly those involved in complaints about elimination (Frank et al., 1999; Hunthausen, 2000). Additionally, the role postulated for anxiety in behavioral complaints involving feline elimination (Overall, 1997), is borne out by new paradigms for management and treatment involving both behavioral and environmental enrichment, and medication.

The interactive role for feline social systems in the forms of aggression with which veterinarians are faced is emphasized in '*Fractious cats and feline aggression*'. The classification system of aggressions used here is a phenotypic one, meant to help distinguish between aggressions that might be part of normal social interactions (e.g., intermale aggression, dispersal aggression, retaliatory aggression) and those that step over the edge into the realm of the abnormal. One key factor that we often neglect is emphasized here in the development of aggression: the role for continued exposure and learning (e.g., pain-induced aggression, play aggression, fear-induced or defensive aggression). The blurring of the lines between normal and abnormal feline aggression hinted at in this paper are real—they are a function of our lack of knowledge about how behavioral conditions develop. If anxiety-based feline aggression has a causal pattern similar to other anxiety based conditions like obsessive-compulsive disorder, both a familial or genetic 'predisposition' and a social stressor play roles in the development of the aggression (Overall and Dunham, 2002). We must begin to accept and further elucidate the complexity of feline social relationships and responses. In fact, the extent to which the cat deviates from 'normal' in aggression or any other suite of behaviors may depend on ontogeny, multiple gene effects, and pleiotropic environmental effects (Nijhout, 2003). Finally, Bonnie Beaver again reminds us that all things physical can affect all things behavioral, honing the point that behavior belongs in veterinary medicine and that veterinary behavioral medicine fills a unique niche otherwise ignored.

Along with John Bradshaw's group in the UK, Sharon Crowell-Davis's group in the USA has spurred a renaissance in the study of feline interactions and signaling. This renaissance has allowed us to view cats as they really are: richly complex, social creatures. New data have confirmed that the extent to which cats exhibit affiliative behavior (Lowe

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and Bradshaw, 2001) or are perceived to exhibit such behavior (Lowe and Bradshaw, 2002) depends on both early exposure to humans and on human expectations. Crowell-Davis et al. provide a wonderful discussion of the functions of some common feline signals, reminding us why Herodotus, when he encountered cats in 5th century Egypt, named them '*ailuroi*'—tail-wavers.

In '*Social organization in the cat: a modern understanding*', the authors raise the much-debated issues of the effects of 'dominance' and social rank on group interactions. It is important for the readers to know that debate about whether 'dominance' has any role in the study of behavior is almost as old as the field, itself.

The existence of a hierarchy has been postulated to be a stress-reducing device (Collias, 1953); however, situations where hierarchies are most rigidly maintained are also ones where measures of stress are high (Rowell, 1966). In '*Social organization in the cat: a modern understanding*' 'dominance' is defined as a function of dyads: the animal who 'submits' or gives way to another as a result of prior interactions is considered the 'subordinate' while the individual inducing such behavior is the 'dominant' animal in the pairing. 'Dominance' has been traditionally defined as individual's ability, generally under controlled situations, to maintain or regulate access to some resource (Hinde, 1967, 1970; Landau, 1951; Rowell, 1974). Given that the definition of 'dominance' can be further refined as a description of winning or losing staged contests over resources (Archer, 1988; Horwitz et al., 2002), and that a winning outcome needn't confer priority of access to those resources (Archer, 1988), we must accept that variable distributions of resources (e.g., litter boxes, food dishes) will lead to variable hierarchical classifications. Crowell-Davis et al. indeed report such variable patterns.

My concerns about such terminology primarily focus on two related issues: (1) the extent to which the labeling of an event, interaction, or pattern of interactions may interfere with our ability to truly understand behaviors and signals, in-context, and (2) the extent to which, if we subscribe to a hierarchical system, we are then tempted or constrained to force all interpretations of behaviors into that system. Such practices have encouraged humans to treat dogs inhumanely under the guise of being 'dominant' to them, and have likely resulted in the injury or death of many dogs because we have reinforced a truly pathological animal as 'dominant'. I am concerned that we may be headed down the same path for cats.

Both concerns have merit. All lumping, ranking, or grouping algorithms lump, rank, or group, *whether such relationships truly exist*. In other words, if you use an algorithm that sorts relationships into dyads or linear hierarchies, you get a dyad or a linear hierarchy, regardless. In such cases we have blurred our understanding of the true nature of interactions and may be focusing on an artifact (Landau, 1951; Taylor and Elwood, 2003).

These concerns are not new: the potential to mislead was Rowell's primary concern when she published her ground-breaking study on the intricacies of baboon social interactions (Rowell, 1967). In fact, when free-ranging baboon interactions were classified by behavioral types (e.g., friendly, approach–retreat), and then analyzed according to specific behaviors of the participants, no 'dominance' system was noted. In fact, a much more complex, elegant system of interactions that reflected relatedness, age, sex, social history, et cetera became apparent. This is important and bears directly on how we view cats for two reasons.

First, by reducing cat roles and interactions to those described by the labels 'dominant' and 'subordinate' we are missing the elegance of context-dependent, fluid, truly social interactions. Second, I have a concern unique to veterinary behavioral medicine: if we are determined to fit feline behaviors into the 'dominant-subordinate' paradigm, we have increased the chance that we will assume that pathological behaviors are normal. The context in which I see the greatest risk is that 'bully' cats—cats that are unwilling to allow others to live with them unmolested—may be inadvertently supported by a misapplication of the 'dominant' label. Without a full contextual evaluation that distinguishes between normal and abnormal behaviors, the 'dominance–subordinate' paradigm can obscure what's really occurring and cause us to do our patients a great disservice.

Most social behaviors, when fully examined, are not characterized by agonistic encounters, but by fluid, context-specific deferential behaviors (Overall, 1997). Deference is not analogous to submission or subordination. Deference is about relative status that is freely given, not imposed. The animal to which most others defer is the animal that behaves most appropriately given the context, not the animal which must always be at the door first, or must eat first. In fact, a need to control regardless of context can be neither adaptive, nor normal. The role for deferential behaviors is suggested by Crowell-Davis et al. when they discuss the variability in the behavior of high ranking animals. This honest portrayal of actual feline

behaviors has likely paved the way for a paradigm shift, intended or not, where in order to be internally consistent and to understand meaningful data, we dispense with labels and concentrate on the actual biology of behaviors and signaling.

In '*Paradigms for pharmacologic use as a treatment component in feline behavioral medicine*' I attempt to provide a rationale for choice and use of behavioral medications that is based on understanding the underlying mechanism of the drug in questions. Incorporated into this article are new data on the relative lack of side effects, when medication is used appropriately, and advice on how to make treatment choices.

Finally, Peter Neville issues a call for the modern synthesis to include a humane approach to understanding and meeting the mental and physical needs of the domestic cat. While I think most veterinary practitioners would agree with premise of this call, few are likely to agree on what's best for the cat, or whether human behaviors are a reflection of degree of 'attachment'.

The extent to which cats are neutered/de-sexed and, or allowed to run free is governed by both the country's culture and local law (Clancy et al., 2003; Levy et al., 2003). While Neville asserts that the stimulation of an outdoor environment is the native and preferable one for the cat, this view fails to acknowledge that the world has changed. Cats have always starved, become ill, and been attacked by other animals, but it is only since the industrial revolution that the means by which maiming and death can occur have so multiplied. The more crowded the cat's habitat, the more likely catastrophes occur. In the USA, free-ranging cats have an average lifespan—depending on the population—of somewhere between 3 and 5 years, where as indoor cats frequently live longer than 20 years, with an average age of at least 12 years (Childs and Ross, 1986). We can all do the math. Just as risks and trade-offs of modern life affect decisions we make about our own well-being, they also affect how we work with our clients and patients. While some cats are miserable when kept indoors, many others who have been rescued from the streets are too willing to never see the outdoors again. Their welfare is not represented here. Additionally, we know that outdoor cats are more likely to be exposed to and infected by parasites, some of which are zoonotic agents, when compared with indoor cats (Buffington, 2002; Spain et al., 2001). For clients who are immunosupressed, this is not a trivial concern.

This is not to say that indoor living is trouble-free, and it is here that Neville is absolutely correct in noting that stress can manifest itself in different ways. In fact, if relations between cats are not good, any disease with an immune-mediated component, including common conditions like feline lower urinary tract disease (FLUTD), worsens (Buffington, 2002). However, it is inappropriate and usually wrong to attribute most truly behavioral conditions to only 'boredom' (which is usually undefined), under-stimulation, and social 'stress'. Rigorous studies (e.g., Overall and Dunham, 2002) strongly suggest that the genetic liability provides a response surface with which social and environmental stressors interact. When this occurs the responses are complex, but they are not normal and they are almost never relieved by social and environmental intervention alone.

That said, most indoor cats could benefit from all of the interventions that Neville lists, and more. Humans are unlikely to fully extend their own intellects—we have all but neglected those of our canine and feline companions. By providing such mental and physical stimulation, we may well also be saving cats lives in more ways than one. If the findings for dogs (Rooney et al., 2001) are also applicable for cats, people who play and interact best with their cats are more likely to keep them and invest in them. Given that behavioral concerns are still the primary reasons for pet relinquishment or abandonment (Scarlett et al., 1999, 2002), anything that we can do to strengthen the relationship between pets and their people must be done. In additions to the interventions suggested in Neville's paper, we should encourage clients to have their kittens participate in some form of kitten classes, and to realize that all cats would benefit from learning 'tricks' and 'training' skills that we have traditionally viewed as relevant only for dogs (Coffey and Seksel, 1998; Hunthausen and Seksel, 2002; Seksel, 2001).

The view expressed by Neville that behavioral medication is used to mask, distort, or modify unwanted/undesirable 'normal' behavior is outdated. No rational treatment includes utilization of medication to 'mask' normal behavior (Overall, 2001; Overall et al., 2003). However, compassion and science demand that we realize that the most 'normal' neurochemistry can be distorted by repeated stress or distress, and as part of an integrated treatment program, neurochemistry can benefit from medication. Furthermore, I would hope that most veterinarians prescribe medication for the patient only when it is the best choice, not because they wish to please the client. While I disagree with Neville's assumptions about this topic, I am happy that he may have encouraged us

to think more closely about ethics, something we should never stop doing (Kipperman, 2003). In fact, a review of the more recent literature strongly suggests that both veterinary medicine, in general, and veterinary behavioral medicine, in particular, may have caught up with Neville's concerns (McMillan, 1999, 2002; Overall et al., 2003).

It is hoped this issue will contribute to the continued well-being of our feline patients, not just by providing information, but by stimulating debate and innovative thought processes, and spurring the collection of more and better data. This issue demonstrates just how desperately such advances are needed.

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