Classification of Behavior Problems in Dogs: Distributions of Age, Breed, Sex and Reproductive Status

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ABSTRACT

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One hundred and seventy behavior problems were observed in 105 dogs referred for behavior-problem management by practicing veterinarians. Ninety percent of the observed behavior problems were classified within three major categories: aggression; stimulus reactivity; separation-related. Aggression and stimulus reactivity problems were further sub-divided by their predominant behavioral components, i.e. excessive approach or avoidance in relation to the target stimuli. The mean age for dogs presented for problem behavior was 3.4 years, which did not differ as a function of diagnostic category ($P > 0.05$). The distributions of different types of aggression seen in dogs and the most frequent pair-wise combinations of different types of aggression in the sample were described. Significantly more intact males and neutered females were referred for aggressive and stimulus reactivity behavior problems ($P < 0.001$), but dogs with separation-related problems did not differ ($P > 0.05$). The value of identifying the predominant components of behavior problems for clarifying the direction of behavior change was discussed.

INTRODUCTION

The identification of behavior problems in dogs is a process that begins with obtaining a detailed behavioral history of the problem event from the owner, followed by an identification of the functional and causative properties of the problem behavior sequence (Borchelt and Tortora, 1979; Borchelt and Voith, 1982a). A functional classification of the behavior sequence is determined by identifying the relationship between the dog, its behaviors, the dog's owner and other environmental variables (Borchelt and Voith, 1982a; Hart and Hart, 1985). Once the behaviors are classified and the controlling variables identified (e.g. physiologic, eliciting, reinforcing, etc.), a treatment procedure can be administered.

The present study was done to determine (1) the distribution of dog behav-

ior problems and their predominant behavioral components for the most fre-
quently observed behavior problems, and (2) the relatedness of several subject
variables to different behavior-problem categories. Problem behaviors were
identified following the process described above, and assigned to categories
according to similarities in the contexts in which the behaviors occurred.

METHOD

An initial 5–10-min telephone interview was conducted for each of the 105
clients referred by practicing veterinarians for dog behavior problems. All 105
clients completed a 1–3-h session during which an identification of the problem
was made. Problem behaviors for the 105 cases were classified according to
similarities in their functional and causative properties (i.e. motivational or
behavioral context) and were placed within one of three major categories:
"aggression"; "stimulus reactivity"; "separation-related". Seventeen problem
behaviors (10% of the 170 total behavior problems) could not be classified
within the above categories, and were designated as "other".

Diagnostic categories

Aggression
Behaviors placed within the aggression category consisted of approach and
avoidance (defensive) components of agonistic behaviors directed toward other
dogs or people.

Approach components included any combination of lunging, snarling,
growling and biting, usually associated with dominance signs, postures or sig-
nals directed toward the victim (usually a family member). Play bouts be-
tween the dog and victim preceded the aggression in some cases, and escalation
of an attack was frequently elicited by physical or oral punishment or merely
by a failure to remain motionless after the attack onset. The context within
which the aggression occurred helped to further identify the type of aggression
exhibited (e.g. dominance, protective/territorial, intraspecific or possessive).

Defensive components consisted of lunging, snarling, growling or biting,
usually associated with exaggerated submissive signs, postures or signals di-
rected toward the victim. Approach–avoidance behaviors or attempts to ap-
proach from behind the victim preceded an attack in several cases. Aggression
seemed to be avoidance-motivated, and attacks were rarely escalated if the
distance between the dog and its victim increased following the initial attack.
Identification of the attack context aided in determining the type of defensive
aggressive shown (e.g. pain-elicited, fear-elicited, possessive, etc.).

Only agonistic behaviors per se were classified within the aggression cate-
gory. Excessive, non-aggressive behaviors that may have preceded growling
and biting were not included in the aggression category. Aggression reliably

followed such reactive behaviors in 30 of 63 cases. Thus, it was necessary to separate a behavioral sequence into smaller units that could potentially be classified within the different problem categories. Even when, as in some cases, the initial non-aggressive behaviors were highly correlated with lunging, snapping, growling or biting, it was helpful to maintain the behavioral integrity of the aggression category and classify the prefix behaviors as an approach or avoidance component in the category described below. Differential treatment for the separately categorized behaviors could then be considered.

Stimulus reactivity

Behavioral identification of the second most frequently represented category, stimulus reactivity, was derived from the results of an exploratory behavior study using German shepherd and Beagle puppies (Wright, 1983). By 8.5 weeks of age, exploratory behaviors differentiated into two separate behavioral mechanisms; locomotor activity and stimulus reactivity (labels used to describe two factors resulting from a factor analysis of five dependent variables). The latter factor involved reactions to novel stimuli. These responses, to a variety of stimulus objects, ranged from excessive avoidance to overly assertive investigation and contact with the objects. As it was used in the present study, stimulus reactivity is conceptually similar to the same factor named in the 1983 study and to reactivity measures described in gerbils (Rosenfeld et al., 1978) and mice (Simmel and Eleftheriou, 1977); in these studies excessive approach and avoidance behaviors were elicited by identifiable stimulus objects. The present use of stimulus reactivity was different from the above studies, however, because the dogs' reactive behaviors were associated with stimuli that were in many cases no longer novel.

Behaviors classified within the stimulus reactivity category were characterized by excessive approach or avoidance in reaction to a particular stimulus or class of stimuli. Approach components frequently included barking or running in the direction of stimuli such as a moving vehicle, a sudden "unexpected noise" or a front door (on hearing a doorbell). Dogs focused their attention on the specific targets and demonstrated heightened levels of behavioral arousal, or "reactivity", during the problem event.

Behaviors characterized by excessive avoidance included barking, shaking or withdrawing from the target stimulus, and the dogs frequently moved to a "safe" location behind their owners, to a corner of a room or under a couch or bed. These behaviors were often associated with submissive postures, varying from "normal" to exaggerated. The most common eliciting stimuli included approaching people (both familiar and unfamiliar), thunder and doorbells. Included within this category were phobic reactions to specific stimuli (Hothersall and Tuber, 1979).

Separation-related

Behavior classified as separation-related included destruction of items in the home, inappropriate elimination, hyperactivity, escape attempts, excessive barking and behavioral depression that occurred in the owner's absence (Hothersall and Tuber, 1979, Borchelt and Voith, 1982b). In most cases, problem behaviors were observed during initial absences (e.g. when owners left for work) or immediately prior to an owner's return home. For other dogs, symptoms were manifest after a second or third absence (e.g. when, after arriving home, the owners left again) or as a result of notable changes in the home environment (e.g. the addition or loss of a family pet, a change in the owner's work schedule or moving to a new home). For 3 cases a cause could not be identified.

RESULTS

Diagnosed cases

A total of 170 category-specific behavior problems were classified for 105 dogs, resulting in an average of more than 1.6 problems/dog. Aggression and stimulus reactivity were the most frequent problems exhibited ($n=63$ and 62, respectively), followed by separation-related ($n=28$) and "other" ($n=17$). Only 18/63 aggression cases exhibited only aggression, and 14/62 dogs diagnosed for stimulus reactivity had only reactivity problems. The aggression and stimulus reactivity categories together accounted for 30/45 cases where more than one kind of problem was identified, followed by cases exhibiting aggression/separation-related/stimulus reactivity disorders ($n=6$). The remaining 9 cases with multiple behavior problems were classified in other category-combinations.

Within the aggression category, 22 dogs exhibited only approach components, 10 dogs exhibited only defensive components, and 31 demonstrated both components. Table I shows that the four most frequent pair-wise combinations of different types of aggression were dominance/possessive (avoidance component, $n=15$), dominance/intra-specific (approach component, $n=11$), dominance/protective–territorial ($n=10$) and protective–territorial/possessive (avoidance component, $n=10$). Table II indicates the number of dogs showing each type of aggression, with a total of 141 different instances of aggression in 63 dogs.

Within the stimulus reactivity category, 21 dogs demonstrated approach components, 26 exhibited avoidance components, and 15 dogs showed both approach and avoidance components (to different stimuli). The two classes of stimuli that most frequently elicited stimulus reactivity behaviors were people approaching, reaching for the dog or moving quickly ($n=44$), and doorbells or knocking at the door ($n=12$). Forty of the 62 dogs exhibiting stimulus

TABLE I

Most frequent pair-wise combinations of aggression[1]

Pair-wise aggression combinations	Number
Dominance and possessive avoidance	15
Dominance and intra-specific	11
Dominance and protective/territorial	10
Protective/territorial and possessive avoidance	10
Protective/territorial and intraspecific	
Intra-specific and possessive avoidance	6
Fear-elicited and possessive avoidance	5
Pain-elicited and possessive avoidance	4
Punishment-induced and possessive avoidance	4
Total	72

[1]Several cases were represented more than once (e.g. for dogs with more than two types of aggression).

reactivity behaviors also had aggression disorders, but only 30 reactivity behaviors were related to (e.g. preceded) the dogs' aggression.

Subject variables

Age

The 105 dogs ranged in age from 0.25 to 11.5 years, and averaged approximately 3.4 years. Three t-tests were done to determine whether dogs with problems classified within the three categories differed in age from the population

TABLE II

Number of dogs showing each type of aggression classified by the predominant behavioral component

Aggression[1]

Agonistic — approach component					Agonistic — avoidance component					
DOM	P/T	IN	POS	RED	FE	PaE	POS	PuI	IN	MAT
37	20	20	4	0	16	8	25	8	3	0
		Total=81					Total=60			
									Grand total = 141	

[1]Aggressions described as dominance (DOM), protective/territorial (P/T), intra-specific (IN), possessive (POS) and re-directed (RED) are classified as agonistic approach components of aggression. Agonistic avoidance components consist of fear-elicited (FE), pain-elicited (PaE), possessive (POS), punishment-induced (PuI), intra-specific (IN) and maternal (MAT) aggression.

TABLE III

Distribution of diagnosed males and females by breed group

Breed	Number	Male	Female
Sporting	24	19	5
Mixed	24	12	12
Working	18	8	10
Terrier	14	6	8
Non-sporting	11	8	3
Hound	8	6	2
Toy	6	4	2
Total	105	63	42

average. Age differences were not demonstrated for any of the categories in comparison to the group mean ($P > 0.05$).

Breed

Breeds were identified according to their inclusion in the American Kennel Club (1980). Dogs not included in the A.K.C. roster, and dogs whose breed could not be determined, were designated as "mixed" breeds. Of the 105 cases observed, mixed breeds were most frequently represented ($n = 24$), followed by Cocker spaniels ($n = 8$), German shepherds ($n = 7$), English Springer spaniels ($n = 5$), Doberman Pinchers ($n = 5$), Golden retrievers ($n = 4$) and Dachshunds ($n = 4$).

Table III shows the total number of male and female cases observed, grouped according to the six A.K.C. categories. Overall, the sporting and mixed breeds were most frequently presented for problem behaviors ($n = 24$), followed closely by the working breeds ($n = 18$).

Sex and reproductive status

Of the 105 dogs observed, 50 were intact males (48%), followed by (in decreasing frequency) neutered females ($n = 29$, 28%), intact females ($n = 13$, 12%) and neutered males ($n = 13$, 12%). Table IV indicates that overall, and within each of the three diagnostic categories, reproductively intact males exhibited the majority of the 170 behavioral problems. Four χ^2 analyses were done to determine the relatedness of sex and reproductive status for the total number of dogs observed and for those exhibiting problems within the three diagnostic categories. The results showed a significant relationship between sex and reproductive status for the total number of dogs observed ($\chi^2 = 39.39$, $\phi = 0.48$, $P < 0.0001$), for dogs exhibiting problems of aggression ($\chi^2 = 30.29$, $\phi = 0.69$, $P < 0.0001$) and for stimulus reactivity ($\chi^2 = 11.29$, $\phi = 0.43$,

TABLE IV

Frequency of behavior problems for intact and neutered males and females within problem behavior categories[1]

Category	Number	Male intact	Male neutered	Female intact	Female neutered
Aggression	63	36	6	3	19
Stimulus reactivity	62	29	9	8	16
Separation-related	28	14	4	5	5
Other	17	8	2	4	3
Total	170	87	21	20	42

[1]One hundred and five dogs exhibited 170 behavior problems, resulting in an average of 1.60 problems/dog. Fifty-four of the dogs were diagnosed for multiple behavior problems.

$P < 0.0008$). A significant relationship was not found for separation-related problems ($P > 0.05$). For each of the significant relationships, the dogs most likely to be referred for behavior problems were intact males and neutered females. A comparison group of dogs 9 months of age and older was sampled by asking three referring veterinarians to supply information on sex and reproductive status for the dogs in their practices. The distribution for those dogs ($n = 9063$) included the following categories: 3054 intact males; 812 neutered males; 3284 intact females; 1913 neutered females. The distribution was non-random ($\chi^2 = 263$, $\phi = 0.17$ $P < 0.0001$), yet the relationship between sex and reproductive status for the comparison dogs was different from the dogs presented for aggression and stimulus reactivity.

As indicated above, 45 dogs were classified for more than one category of behavior problem (see Diagnosed cases). Two analyses were conducted to determine the relatedness of sex and reproductive status for dogs exhibiting single and multiple behavior problems. The results showed a significant relationship for dogs with multiple problems ($\chi^2 = 10.14$, $\phi = 0.43$, $P < 0.0014$) and for dogs having a single behavior problem ($\chi^2 = 12.28$, $\phi = 0.49$, $P < 0.0005$); intact males and neutered females accounted for most of the disorders. Thus, dogs showing single and multiple behavior problems were distributed similarly by sex and reproductive status.

Diagnosed cases

The average number of behavior problems exhibited per dog was similar to that reported by Borchelt (1983). In the latter study, 373 problems were observed in 258 dogs ($m = 1.45$/dog), compared to 170 problems in 105 cases in the present study ($m = 1.60$).

Subject variables

Age

Dogs averaged 3.4 years of age overall and within each diagnostic category. We wondered why the average was not lower, e.g. why more dogs younger than 1 year of age were not presented for assessment and treatment. It may be that compared to older dogs, younger, less mature dogs were not as likely to exhibit serious patterns of aggression or do as much damage in a home environment. Some owners reported that they attempted to correct early signs of problem behavior themselves before they sought help. Many owners hoped that their young dog would "grow out of it", while others who were interviewed attempted or completed obedience training, usually prior to the dog's second birthday. However, in these cases, and in those reported elsewhere, successful completion of an obedience training course had little effect on resolving behavior problems (Voith and Borchelt, 1982, p. 658; Voith et al., 1986). The time spent with these early attempts at solutions may have allowed the problem behaviors to become more serious in nature and more frequent in occurrence. Several clients reported that our program was a last resort. Many of these owners explicitly stated that if nothing could be done about their dog's behavior, the animal would have to be destroyed. Thus, perhaps very young dogs were not observed as frequently because of the reasons stated above, and the older dogs were observed less often because owner's attempts to correct the problem failed and the dogs were destroyed. More information is needed concerning these possibilities.

Sex and reproductive status

Borchelt (1983) reported that intact males in his sample were much more likely to be aggressive than neutered males (86–14%), and neutered females (68%) were more likely to be aggressive than intact females (32%). When sex and reproductive status were analyzed for the combined non-aggression categories, differences were not significant ($\chi^2 = 2.69$, $P > 0.10$). However, Borchelt did not determine the contribution of sex and reproductive status to disorders classified within his different diagnostic categories. Such an analysis would have been informative for comparisons with the present results.

It is clear from the present data that male dogs were presented for behavior problems more than were female dogs (Table III). When reproductive status was also considered, intact males and neutered females accounted for more problems than intact females and neutered males (Table IV). The same relationship between sex and reproductive status was demonstrated when subjects were partitioned into the categories of aggression and stimulus reactivity. Although the association of sex and reproductive status with aggression (especially with dominance and possessive aggression) has previously been reported

(Houpt, 1977; Voith and Borchelt, 1982; Borchelt, 1983), the present data provide evidence that these subject variables may also be associated with reactivity disorders, i.e. excessive approach or avoidance elicited by identifiable stimuli. However, there did not seem to be a relationship between sex and reproductive status and separation-related problems. The question arises as to what extent are the processes that mediate reactivity and aggressive behaviors similar? Borchelt observed that "...many of the aggressive problems are associated with non-aggression problems involving fear and anxiety" (Borchelt, 1983, p. 51). In our sample, 30 dogs exhibited both stimulus, reactivity and aggression problems (another 6 cases also exhibited separation-related disorders), yet only 6 dogs exhibited avoidance components exclusively for stimulus reactivity and aggression. Further research is needed to clarify the relatedness of these problem behaviors and their underlying causes.

The present classification system is useful because it simplifies the transition from behavior problem identification to a clearly conceptualized management program for the client. Where counter-conditioning is recommended, this is especially the case. For problems exhibiting excessive approach components, counter-conditioning should be directed at influencing behaviors that decrease proximity to the eliciting stimuli. For excessive avoidance components, counter-conditioning should be aimed at increasing assertive behaviors and increasing proximity to the identifiable stimuli. Once influenced, the changed behaviors can be maintained by reinforcing or other controlling stimuli (praise, food, etc.). Whether the behaviors occur within the contexts of aggression or of stimulus reactivity, the direction of behavior change is opposite to the primary component the dog exhibits. Of course, a clearer understanding of the causative properties of the problem behaviors will facilitate a more effective treatment. Answers to questions concerning the factors that underlie multiple behavior problems should also help contribute to the effectiveness of treatment procedures designed to resolve behavior problems in dogs.

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