Evaluation of a behavioral assessment questionnaire for use in the characterization of behavioral problems of dogs relinquished to animal shelters

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Objective—To evaluate a behavioral intake questionnaire in animal shelters for the presence of biased results and assess its use in the characterization of behavioral problems of dogs relinquished to shelters.

Design—Cross-sectional study.

Animals—54 dogs being relinquished to a shelter and 784 dogs belonging to veterinary clients.

Procedure—Owners who were relinquishing their dogs and agreed to complete the behavioral questionnaire were alternately assigned to 1 of 2 groups; participants were aware that information provided would be confidential or nonconfidential (ie, likely used for adoption purposes). Data from confidential and nonconfidential information groups were compared, and the former were compared with data (collected via the questionnaire) regarding a population of client-owned dogs.

Results—Analyses revealed significant differences in 2 areas of reported problem behavior between the confidential and nonconfidential information groups: owner-directed aggression and stranger-directed fear. Compared with client-owned–group data, significantly more relinquished shelter dogs in the confidential information group were reported to have owner-directed aggression, stranger-directed aggression, dog-directed aggression or fear, stranger-directed fear, nonsocial fear, and separation-related behaviors.

Conclusions and Clinical Relevance—Among persons relinquishing dogs to a shelter, those who believed questionnaire responses were confidential reported owner-directed aggression and fear of strangers in their pets more frequently than relinquishers who believed responses were nonconfidential. Confidentiality had no apparent effect on the reporting of other assessed behavioral problems. Results suggest that behavioral questionnaires may sometimes provide inaccurate information in a shelter setting, but the information may still be useful when evaluating behavior of relinquished dogs. (*J Am Vet Med Assoc* 2005;227:1755–1761)

Behavioral problems are a leading cause of relinquishment of dogs to shelters; in their decision to relinquish, 47% of people cite behavioral reasons as a contributing factor.[1-3] The most common behavioral reasons for relinquishment include aggression toward people, aggression toward animals, escaping, destruction, disobedience, house soiling, and excessive barking.[4] Although increasing the number of dogs adopted from shelters can potentially improve welfare and decrease the euthanasia rate among relinquished dogs, without valid behavioral screening and assessment tools, shelter personnel may be unknowingly allowing dogs to be adopted that may be unsuitable for or pose a public health risk to the adopting family.

Many shelters rely on observation-based behavior evaluation tests performed by shelter personnel as a method of assessing a dog's behavioral profile and potential public health risk.[5] However, these tests are often either of uncertain or unknown reliability and validity[6] or are too extensive to replicate in most shelter environments.[7,8] Because behavior is assessed in a novel and potentially stressful environment, often in 1 brief evaluation, there is a possibility that 1 or more behavioral problems that could become apparent in the adoptive home may not be detected.

An alternative behavioral assessment technique is to obtain historical information about pets. An interview with or a questionnaire completed by a person who is relinquishing a dog has the potential to provide information about the dog's behavior in its former home.[9] However, an owner may be tempted to be less than candid about serious problem behaviors, such as human-directed aggression, to increase the likelihood that the dog will be adopted.[10] This possibility would reduce the usefulness of data collected via a questionnaire or an interview; additionally, the information obtained may be misleading and potentially dangerous. Accordingly, the primary purpose of the study reported here was to evaluate a behavioral questionnaire in animal shelters for the presence of biased results by investigating whether owners who were relinquishing dogs would be inclined to provide more candid responses to the questionnaire if they believed that this information was to be held confidential from shelter staff members (who owners might presume would determine their dog's outcome). Specifically, the aim was to test the null hypothesis that owners who were informed at the outset that their questionnaire responses would be shared with and used by shelter staff to make adoption deci-

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sions would score their dogs no differently from owners who were promised confidentiality in this regard.

Risk factors for relinquishment of pets to a shelter identified in previous studies[2,3] include behavioral problems such as aggression toward people, aggression toward animals, and destruction. These studies provided useful information but did not evaluate specific behavioral diagnoses that could be used to more accurately characterize the nature of behavioral problems in shelter animals and assess potential public health risks. Therefore, a second purpose of the study reported here was to assess the use of a behavioral questionnaire in the characterization of behavioral problems of dogs relinquished to shelters by statistical comparison of questionnaire-derived behavioral profiles of shelter dogs with profiles reported via the same questionnaire by owners of dogs not being relinquished to shelters. Results were expected to provide information about the types and prevalence of problem behaviors in shelter dogs, compared with a population of client-owned dogs that were not being relinquished to a shelter.

Materials and Methods

Questionnaire—The 103-item version of the Canine Behavioral Assessment and Research Questionnaire (C-BARQ)[a] was used to obtain behavioral information from the owners of relinquished dogs. The development of the questionnaire (formerly known as PennBARQ) has been described in detail.[11] Briefly, the questionnaire consists of a series of 5-point behavioral rating scales and is designed to be used to screen dogs for the presence and severity of problem behaviors. A score of 0 represents the absence of the behavior, with scores of 1 through 4 representing increasing severity of the problem. The questionnaire measures 11 distinct temperament factors or traits, 10 of which have been shown to possess adequate internal consistency (Cronbach $\alpha > 0.7$), and 7 of which were successfully validated by comparison with a population of dogs that had clinically diagnosed behavioral problems. Only these 7 validated factors were used in the present study. The factors were labeled and defined as follows: stranger-directed aggression (9 questionnaire items related to a dog's tendency to respond aggressively to strangers approaching or invading its or its owner's personal space, territory, or home range), owner-directed aggression (8 items related to a tendency to respond aggressively to the owner or other members of the household when stared at, stepped over, scolded, bathed or groomed, approached while in possession of food or objects, or when food or objects are taken away), stranger-directed fear (3 items related to a tendency to respond fearfully when approached directly by strangers), nonsocial fear (6 items related to a tendency to react fearfully to sudden or loud noises and unfamiliar objects and situations), dog-directed fear or aggression (5 items related to a tendency to respond fearfully or aggressively when approached directly by unfamiliar dogs), separation-related behavior (8 items related to a tendency to vocalize or engage in destructive behavior when separated from the owner, which was accompanied or preceded by behavioral and autonomic signs of anxiety including restlessness, loss of appetite, trembling, and excessive salivation), and attachment or attention-seeking behavior (6 items related to a tendency to maintain close proximity to the owner or other members of the household, to solicit affection or attention, and to become agitated when the owner gives attention to third parties).

A dog's score for each factor was calculated as the mean of its scores on each questionnaire item included in that factor. Thus, a score of 1.200 for stranger-directed aggression would reflect the mean score of the 9 questions assigned to that factor for that dog. If a particular respondent did not answer an item included in factor calculation, that respondent was eliminated from the calculation of that factor, and the sample size for statistical purposes was adjusted accordingly. Thus, the sample size for some of the categories was different from others for the same group of respondents.

To determine whether people provided biased responses to the questionnaire on the basis of the perceived impact of the data on their pet's chances of adoption, the questionnaire was introduced by 2 different preambles. The questionnaire for 1 group (the nonconfidential information group) stated that the data collected would be used by shelter personnel to match the dog to an appropriate home; the questionnaire for the other group (the confidential information group) stated that the information provided by respondents would be held confidential.

Participants—To collect data via nonconfidential and confidential questionnaires, people who were relinquishing dogs to either the Sacramento County Department of Animal Care and Regulation or the Sacramento Society for Prevention of Cruelty to Animals were solicited. Trained assistants visited the 2 shelters several days per week over a 2-month period; the cumulative time spent at both shelters was 240 hours. The research assistants requested voluntary participation from people relinquishing their dogs. A person was excluded from participation in the study if the dog being relinquished was < 4 months old, the dog had been owned for ≤ 3 months, the dog was being relinquished for euthanasia, or the person had poor English skills. Subjects were alternately assigned to the confidential or nonconfidential information groups. Thus, it was assumed that there would be no appreciable differences in actual problem behaviors of dogs in the 2 groups. Because we hypothesized that persons assigned to the nonconfidential information group might complete the questionnaire more quickly than persons assigned to the confidential information group, time to complete the questionnaire was recorded for each respondent.

For comparison with scores of dogs being relinquished, scores were collected for a population of owned (nonrelinquished) dogs; data were collected from 784 clients of the Veterinary Hospital of the University of Pennsylvania who had visited the hospital in the preceding 3 years with a dog for which the behavioral assessment questionnaire was completed (client-owned group).[11] Data from client-owned dogs that were < 1 or > 7 years old were excluded, along with data from dogs that had severe or chronic health problems and dogs that had been examined because of a behavioral problem. Clients of the veterinary teaching hospital were asked to check a box if their pet had any severe or chronic health problems or had been examined because of a behavioral problem; data from client-owned dogs were excluded from the study on the basis of this answer. For comparison of client-owned–dog scores with scores for relinquished shelter dogs, only the questionnaires from the confidential information group were included on the assumption that the information from that group would be a more accurate reflection of the behavior of dogs being relinquished to shelters.

Statistical analysis—Responses of the confidential information group were compared with those of the nonconfidential information group in 2 ways. First, the distributions of zero scores (which could reflect either the absence of behavioral problems or a deliberate attempt by an owner to misrepresent the dog's prevalence of behavioral problems) and nonzero scores were compared by use of a Fisher exact test.[12] Second, a Mann-Whitney *U* test was used to compare the distribution of questionnaire scores on each of the behavioral factors between the 2 groups.[b]

Table 1—Demographic information obtained from behavioral assessment questionnaires completed for dogs by persons who were relinquishing those dogs to shelters.

Variable	Confidential information group* (% [n])	Nonconfidential information group* (% [n])
Characteristics of relinquishers		
Men	63 (17/27)	63 (17/27)
Women	37 (10/27)	33 (9/27)
Couples	0 (0/27)	4 (1/27)
Characteristics of relinquished dogs		
Sex		
Male	48 (13/27)	67 (18/27)
Female	37 (10/27)	33 (9/27)
Unknown	15 (4/27)	0 (0/27)
Reproductive (neuter) status		
Neutered	33 (9/27)	30 (8/27)
Sexually intact	37 (10/27)	37 (10/27)
Unknown	30 (8/27)	33 (9/27)
Age		
≤ 6 mo	0 (0/27)	7 (2/27)
> 6 to 12 mo	37 (10/27)	22 (6/27)
> 12 to 24 mo	19 (5/27)	22 (6/27)
> 24 to 48 mo	15 (4/27)	15 (4/27)
> 48 mo	30 (8/27)	33 (9/27)
Duration of ownership by relinquisher		
< 6 mo	15 (4/27)	11 (3/27)
6 mo to 1 y	26 (7/27)	37 (10/27)
> 1 to 2 y	15 (4/27)	22 (6/27)
> 2 to 5 y	33 (9/27)	15 (4/27)
> 5 y	11 (3/27)	15 (4/27)

*The questionnaire for the confidential information group stated that information provided by respondents would be held confidential; the questionnaire for the nonconfidential information group stated that the data collected would be used by shelter personnel for adoption purposes. Mean time required to complete questionnaire was 12.2 minutes in the confidential information group and 10.9 minutes in the nonconfidential information group.

A simplified scoring system was used to reflect an overall assessment of the presence or absence of behavioral problems. Mean score data were divided into 2 categories: ≤ 1 (low to no evidence of behavioral problems) and > 1 (moderate to severe behavioral problems). χ^2 Tests were used to compare the distribution of these categories between the shelter-derived confidential information group and the client-owned group.[12] Attachment or attention-seeking scores were not included in this analysis because the distribution of scores for this factor did not lend itself to this type of binary categorization.

Prevalence odds ratios and 95% confidence intervals were calculated to compare the prevalence odds of behavioral problems in the confidential group of relinquished dogs versus client-owned dogs.[13] χ^2 Tests were used to compare the distribution of neuter status (neutered vs sexually intact dogs), sex of dog, and sex of person completing the questionnaire between the 2 groups.[12] Age of the dog, duration of ownership, and amount of time to complete the questionnaire were compared by use of a Student *t* test.[13] A value of $P < 0.05$ was considered significant.

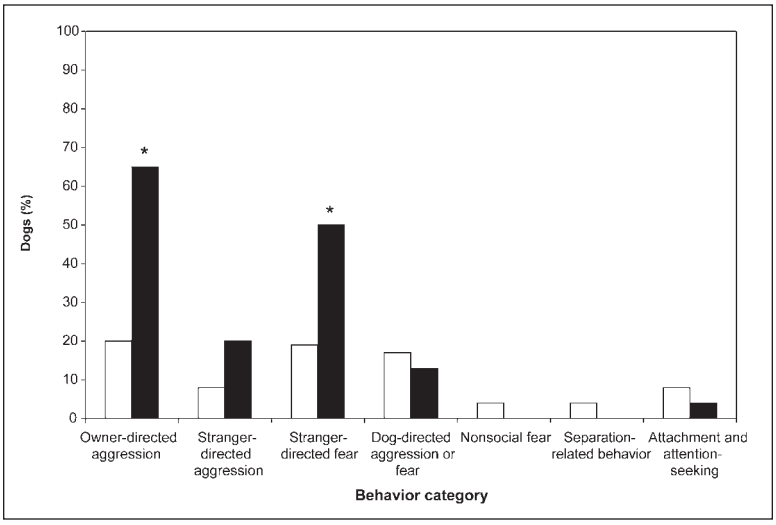

Figure 1—Percentage of dogs assigned a mean score of 0 for various behavioral categories by persons who completed a behavioral assessment questionnaire as the dogs were relinquished to a shelter. A score of 0 represented the absence of the behavior, and scores of 1 through 4 represented increasing severity of the problem. Respondents were informed that their responses would be kept confidential (open bars; n = 27) or that the responses would be nonconfidential and used by shelter personnel to match the dog to an appropriate adoptive home (solid bars; 27). *Value for the nonconfidential information group differs significantly ($P < 0.05$) from that of the confidential information group in this behavioral category.

Results

Comparison of data collected from confidential and nonconfidential information groups—Of 204 people that relinquished dogs during observation hours, 100 (49%) met the inclusion criteria; of these 100 individuals, 54 completed the questionnaire (27 were assigned to the confidential information group, and 27 were assigned to the nonconfidential information group). The most common reasons for exclusion were relinquishment of a stray dog or a dog for euthanasia. The time taken to complete the questionnaire by participants in the confidential information group appeared to be greater than that taken by participants in the nonconfidential information group (mean time to completion, 12.3 and 10.9 minutes, respectively); however, this

difference was not significant. The number of dogs relinquished by men, women, or couples did not differ significantly. The characterization of dogs in the 2 groups with regard to age, neuter status, duration of ownership by the relinquisher, and breed was comparable between groups (**Table 1**).

Statistical analyses revealed significant differences in 2 variables between the confidential and nonconfidential information groups. With regard to aggression toward owners and members of the family, the score for dogs relinquished by respondents in the confidential information group (median score, 0.500; mean score, 0.683; n = 25) was significantly (P = 0.001) greater than the score for dogs relinquished by respondents in the nonconfidential information group (median score, 0.000; mean score, 0.234; 23). With regard to stranger-directed fear, the score for dogs relinquished by respondents in the confidential information group (median score, 1.000; mean score, 1.235; n = 27) was significantly (P = 0.029) greater than the score for dogs relinquished by respondents in the nonconfidential information group (median score, 0.084; mean score, 0.646; 24). Analyses of the remaining 5 factors (stranger-directed aggression, dog-directed aggression or fear, nonsocial fear, separation-related problems, and attachment or attention-seeking behavior) did not reveal significant differences in questionnaire scores between the 2 groups. χ^2 Analysis of the frequency of zero scores achieved similar measures of significance (**Figure 1**).

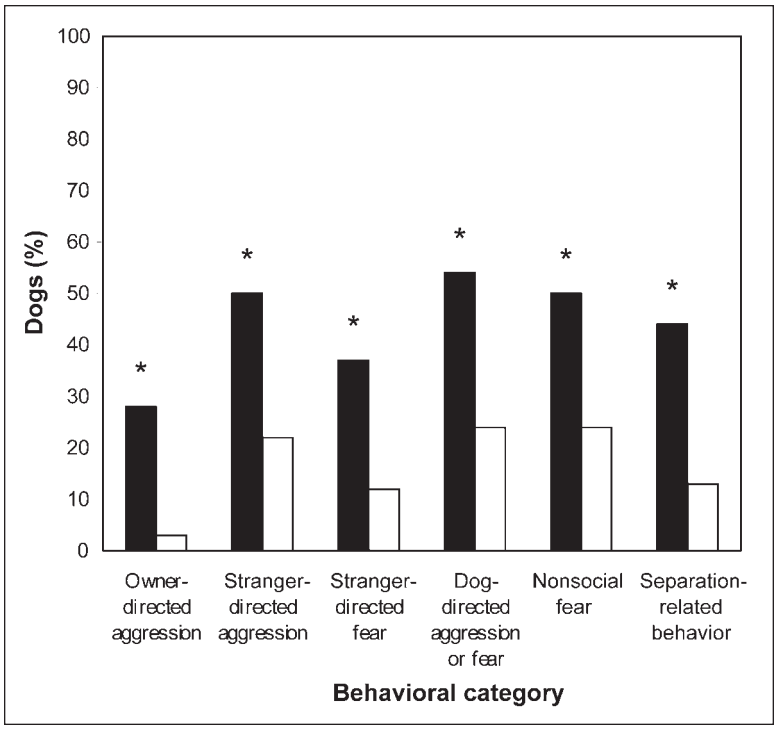

Figure 2—Percentage of dogs that were being relinquished (confidential information group, solid bars; n = 27) and client-owned dogs (open bars; 784) for which questionnaire respondents assigned a score ≥ 1 (ie, moderate to severe problem) for 6 behavioral categories. *Value for relinquished dogs differs significantly (P < 0.001 to 0.003) from that of the client-owned dogs in this behavioral category.

Association of behavioral problems with relinquishment to a shelter—Because the confidential and nonconfidential information groups differed with regard to 2 assessment categories and these differences were considered likely reflections of bias, data from only the confidential information group were used for comparison with data collected from the questionnaires completed for 784 client-owned dogs. There was no significant difference in age, sex, or neuter status between shelter dogs in the confidential information group and the client-owned dogs.

χ^2 Analysis of the frequencies of behavioral factor scores of ≤ 1 and > 1 from the confidential information group, compared with frequencies among the client-owned group, revealed 6 behavioral factors that were associated with significant differences in scores between groups (**Figure 2**). Compared with client-owned dogs, dogs being relinquished to shelters were more likely to have scores ≥ 1 for owner-directed aggression (P < 0.001), stranger-directed aggression (P = 0.001), stranger-directed fear (P < 0.001), aggression or fear toward dogs (P = 0.001), nonsocial fear (P = 0.003), and separation-related behavior (P < 0.001; **Table 2**).

Table 2—Prevalence odds ratios and 95% confidence intervals for behavioral problems among dogs that were being relinquished to a shelter (as indicated by responses to a behavioral assessment questionnaire completed by relinquishers who had been told that the information provided would remain confidential), compared with problems among client-owned dogs (as indicated by responses of veterinary clients of a referral hospital who completed the same questionnaire).

Behavioral category	No. of dogs in confidential information group*	No. of client-owned dogs *	Odds ratio†	95% Confidence interval
Owner-directed aggression	7/25	24/695	10.87	4.15–28.49
Stranger-directed aggression	9/25	131/606	3.63	1.64–8.01
Stranger-directed fear	10/27	91/739	4.19	1.86–9.42
Dog-directed aggression or fear	13/24	138/587	3.85	1.68–8.78
Nonsocial fear	12/24	152/646	3.25	1.42–7.38
Separation-related behavior	11/25	93/715	5.25	2.31–11.92

*Expressed as number of dogs with problem behavior per number of dogs for which data were collected regarding the behavioral category. †Odds ratio is expressed as the odds of a dog in the confidential information group with a mean score > 1 for the behavioral category, compared with the client-owned–dog group.

Overall, the most frequently reported behavioral problem for the confidential information group of shelter dogs was dog-directed aggression or fear (13/24 [54%] dogs); the least reported behavioral problem was owner-directed aggression (7/25 [28%] dogs). Among client-owned dogs, dog-directed aggression or fear (138/587 [24%] dogs) and nonsocial fear (152/646 [24%] dogs) were most prevalent; owner-directed aggression was least frequently reported (24/695 [4%] dogs; Figure 2).

Discussion

As one of its objectives, the present study was designed to examine the hypothesis that persons relinquishing dogs to a shelter would be more inclined to provide misleading or biased responses to some items of a behavioral questionnaire if they believed that this information would be used by shelter staff to determine their dog's outcome. This hypothesis was examined by comparing behavioral scores obtained from evaluation of a validated 103-item questionnaire. The questionnaire for 1 group stated that the results would be used by shelter personnel to match the dog to an appropriate home, and the questionnaire for the other group stated that the information would be held confidential. Between the confidential and nonconfidential information groups, there were no significant differences in reported scores for stranger-directed aggression, dog-directed aggression or fear, nonsocial fear, separation-related behavior, and attachment or attention-seeking behavior. Assuming that the actual behavior of dogs in the 2 groups was comparable, these results suggest that, for some behavioral categories, people relinquishing dogs to shelters will provide useful answers on intake questionnaires. However, there were significant differences in scores for owner-directed aggression and stranger-directed fear between the confidential and nonconfidential information groups. This raises concern because aggression toward household members is a major cause of dog bites in the United States.[14-17] Because of the seriousness of this problem, this misrepresentation by persons relinquishing dogs is a major public health concern.

In several studies,[2,4,18,19] aggression toward humans has been identified as the most common behavioral cause of relinquishment or return of adopted dogs to shelters. It is understandable that people adopting a dog from a shelter do not desire a dog that could behave aggressively toward them or family members. Because most people who are relinquishing their dog to a shelter hope that someone else will adopt it,[20] it is logical to conclude that comments on aggressive behavior toward humans (especially those within the household) are most likely to be influenced by whether the questionnaire information was confidential or nonconfidential. Interestingly, there was no significant difference in scores for stranger-directed aggression between the confidential and nonconfidential information groups. Perhaps only behaviors considered to be the most serious to the relinquishers were reflected as significant differences. This may reflect a perception that stranger-directed aggression is less likely to influence adoptability or that such behavior may even be desirable.

Because results of the present study provide evidence of misrepresentation on some aspects of the behavioral assessment questionnaire, it is unknown whether people who report no behavioral problems by assigning a score of 0 to their dog on shelter intake questionnaires truly have a problem-free dog or are providing biased answers in an effort to increase their pet's likelihood of adoption. The significantly higher frequency of zero scores for some behavioral categories in the nonconfidential information group suggests that some of these zero scores probably reflect bias by the relinquishers. Shelter personnel should be aware that completed intake forms that include no evidence of a particular behavioral problem in dogs may sometimes be inaccurate. Use of a validated questionnaire, such as that used in the study of this report, can help shelter staff to focus detailed behavioral evaluations on dogs for which relinquishers provide ambiguous information or report no behavioral problems. Further evaluation of this issue is warranted to determine whether different approaches to the presentation and administration of a questionnaire can address this problem.

Although the results of the present study question the reliability of some items included in a behavioral assessment questionnaire when it is completed at the time of relinquishment of a dog, it is important to note that relinquishers who knew that the questionnaire data may affect their dog's outcome still frequently disclosed behavioral concerns about the pet. Thus, despite its limitations in a shelter setting, the questionnaire used in the study of this report can help shelter personnel to identify dogs with behavioral problems, thus allowing intervention to reduce the risk of aggressive events in the future and decreasing the likelihood that the adopting family will be dissatisfied with its new dog. The questionnaire used in the present study provides important information about the pet that is being relinquished and takes approximately 12 minutes to complete. The value of the data collected (as determined in our study) should help shelter staff to justify the inconvenience of questionnaire completion to people who are relinquishing dogs to shelters.

The results of the comparison between behavioral assessment scores assigned to relinquished dogs and client-owned dogs indicated that dogs that were being relinquished to a shelter were more likely to be described as having moderate to severe levels of dog-directed aggression or fear, stranger-directed aggression, stranger-directed fear, owner-directed aggression, nonsocial fear, and separation-related behaviors. These results are consistent with previous reports[2-5] of an increased risk of relinquishment to shelters for dogs with behavioral problems, compared with dogs that were not being relinquished to shelters.

It is noteworthy that results of our study reflect a change from findings of previous studies,[3,9] which indicated that sexually intact dogs were at higher risk for relinquishment to a shelter than neutered dogs. The percentage of sexually intact dogs among client-owned (nonrelinquished) dogs in the present study was similar to that determined in previous studies; however, there were fewer sexually intact dogs in the group being relinquished to a shelter. The reason for this dif-

ference is unknown; it is possible that as a result of an increase in spay-neuter campaigns, the number of sexually intact dogs being relinquished to shelters has gradually declined in proportion to relinquished neutered dogs, compared with the relative proportion determined in studies completed several years earlier.

Although our data indicated significant differences in behavioral assessment scores between relinquished and client-owned dogs, it should be noted that the groups compared during this part of the study represented different populations in different communities, and this may account for some or all differences. Clients that visit a referral veterinary hospital may have dogs with different behavioral profiles, compared with the dogs of people who relinquish pets to shelters. Also, behavioral problems among dogs may differ as a function of the home setting (eg, urban vs suburban) and geographic region (eg, California vs Pennsylvania).

The magnitude of the differences in prevalence of behavioral problems between relinquished dogs and client-owned dogs raises several considerations. Categories of behavior that would logically affect the ease with which a person could keep a pet, namely owner-directed aggression, dog-directed aggression or fear, nonsocial fear, stranger-directed aggression, stranger-directed fear, and separation-related behaviors, had the highest prevalence among dogs that were being relinquished to shelters. The prevalence of serious behavioral problems in relinquished dogs contrasts with attestations by shelter personnel that relinquishment reflects the fact that owners do not have enough time or space for a dog as well as unrealistic expectations and knowledge of normal dog needs and behavior.[9,21] It appears likely that serious behavioral problems are often the primary explanation for the inability of the relinquisher to keep the dog and that a perceived lack of time or space is not the central issue. This highlights the need for primary care veterinarians to provide preventive behavioral health information for their clients.[22]

Studies[23,24] have revealed that dogs obtained from shelters have a higher risk of separation anxiety disorders than dogs obtained from other sources. This finding has raised the question of whether this increased risk is the result of an increased rate of relinquishment of dogs with separation anxiety disorders or whether relinquished dogs develop separation anxiety disorders because of factors in the shelter such as environmental stress and loss of a primary attachment figure. In the present study, the significantly greater prevalence of separation-related behaviors among dogs that were being relinquished, compared with client-owned dogs, suggests that separation anxiety disorders in dogs adopted from shelters are often a preexisting condition.

Because aggression toward people is a serious public health concern, the value of specific categorization of aggression through use of the behavioral assessment questionnaire, such as owner-directed and stranger-directed aggression, is considerable. Whether the aggression reflects primarily genetic or environmental influences, or a combination thereof, an emphasis must be placed on developing reliable methods of behavioral assessment for relinquished dogs to protect public safety. With a clear perspective of the problems that result in relinquishment, measures for identifying problems and for problem prevention and resolution can be developed, thereby reducing the likelihood that dogs will be relinquished to shelters because of behavioral problems and increasing the likelihood that relinquished dogs will be rehomed.

The results of the present study indicate that even a well-designed and validated behavioral assessment questionnaire may not always provide accurate information in a noncontrolled shelter setting. Persons relinquishing dogs to a shelter who knew that their responses to a questionnaire were confidential were more likely to report owner-directed aggression and fear of strangers than relinquishers who believed that shelter staff would assess and use their responses. However, confidentiality had no apparent effect on the reporting of other types of behavioral problems, including stranger-directed aggression, nonsocial fear, separation-related behavior, dog-directed aggression or fear, and attachment or attention-seeking behavior. These findings suggest that behavioral assessment questionnaires may sometimes provide inaccurate information when administered to persons relinquishing dogs in a shelter setting but that this information may still be useful for the evaluation of the behavior of relinquished dogs.

a. Copies of the C-BARQ questionnaire are available on request from Dr. James A. Serpell.
b. Minitab 13 statistical software, Minitab Inc, State College, Pa.

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