

Evaluation of association between retention in the home and attendance at puppy socialization classes

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Objective—To evaluate associations between retention of dogs in their adoptive homes and attendance at puppy socialization classes and other factors.

Design—Epidemiologic survey.

Animals—248 adult dogs that were adopted as puppies from a humane society.

Procedure—Owners completed questionnaires regarding demographics, retention of the dogs in the homes, and the dogs' early learning events.

Results—Higher retention in the homes was reported for dogs that participated in humane society puppy socialization classes, were female, wore headcollars as puppies, were handled frequently as puppies, were more responsive to commands, slept on or near the owner's bed, or lived in homes without young children.

Conclusions and Clinical Relevance—Results suggest several practices that veterinarians may recommend to enhance the likelihood that puppies will remain in their first homes, such as enrolling 7- to 12-week-old puppies in early learning and socialization classes. The lower rate of retention of dogs in homes with children emphasizes the importance of helping owners develop realistic expectations, knowledge, and effective tools to manage interactions between their children and dogs. (*J Am Vet Med Assoc* 2003; 223:61–66)

Each year, millions of healthy dogs are euthanatized in animal shelters after being relinquished by their owners.¹ In a recently published study² of 12 animal shelters in the United States, dogs < 2 years old comprised the largest percentage of relinquished dogs.

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Behavior problems are an important factor in relinquishment.³⁻⁶ Many factors go into the decision to retain or relinquish a dog. One study⁷ comparing populations of surrendered versus nonsurrendered dogs in the same geographic region identified numerous risk factors for relinquishment, including acquisition from a shelter, lack of participation in obedience classes, lack of veterinary care, being sexually intact, unrealistic owner care expectations, and behavior problems.

Puppy socialization classes introduce puppies, in a safe and nonthreatening way, to a variety of smells, sounds, sights, walking surfaces, equipment, and interactions with unfamiliar people and dogs in an effort to ensure adequate socialization. We hypothesized that in addition to the behavioral effects of adequate socialization, there may be unidentified benefits of puppy socialization classes that result in owners who are more satisfied with their dogs and that retention of dogs in the home would provide a measure of that overall satisfaction. The purpose of the study reported here was to evaluate associations between retention of dogs in their adoptive homes and attendance at puppy socialization classes and other factors.

Materials and Methods

Dogs—Dog adoption and puppy socialization class attendance records of a humane society^a for June 1994 through March 2001 were reviewed. To be included in the study, dogs must have been adopted from the humane society at 5 to 10 weeks of age after having been originally relinquished to the humane society along with littermates and must have belonged to litters with at least 2 puppies that were enrolled in humane society puppy socialization classes from 7 to 12 weeks of age and at least 2 puppies that were not enrolled in these classes.

Questionnaire—Questionnaires^b were mailed to owners of 428 dogs belonging to 57 litters that met the initial inclusion criteria. Age of dogs at the time of the mailing ranged from 1 to 6.5 years. Internet address-locating services and available employer and residential information were used to contact owners whose questionnaires were returned as undeliverable by United States mail. Telephone interviews were attempted for all eligible households that did not return a questionnaire. Trained volunteers made 3 to 5 attempts per nonrespondent, during daytime and evening hours, before excluding that household from the study.

Questionnaires contained 26 multipart forced-option questions for information regarding the dogs' early learning events, including participation in puppy socialization classes; the amount of early handling received; participation in training classes when ≥ 4 months old; where the dogs slept; type of collar used; and various owner demographic factors, such as location of residence, type of residence, and number and ages of humans in the household.

Early handling scores were determined via a 4-part question that asked how frequently the dog was handled (paws, ears, mouth, groomed coat, and brushed teeth) as a puppy. Responses were scored as 0 (never), 1 (occasionally), and 2 (often). Responses were summed for a single early handling score from 0 to 8 for each dog. Reliability of response to commands was evaluated by a 4-part question that asked owners to rate their dogs' response to the specific commands come, sit, stay, and lie down. Responses for each command were assigned a numeric score of 4 for dogs that responded to the command $\geq 95\%$ of the time, 3 for 70 to 94%, 2 for 50 to 69%, and 1 for $< 50\%$. Scores for each command were summed for a single reliability of response to commands score of 4 to 16 for each dog.

Owners were also asked to indicate whether they had used collars, such as a standard flat dog collar, choke chain, headcollar or head halter, prong or pinch collar, electric bark collar, citronella bark collar, underground electronic fencing collar, or other electric shock collar on their dog when it was a puppy. Responses included used most of the time, used occasionally, and did not use.

For certain analyses, dogs were allocated to 1 of 3 groups on the basis of whether and where they attended puppy socialization classes. Group 1 included dogs that were adopted from the humane society and participated in puppy socialization classes at the humane society, group 2 included dogs that were adopted from the humane society and did not participate in puppy socialization classes, and group 3 included dogs that were adopted from the humane society and participated in puppy socialization classes somewhere other than the humane society.

Statistical analyses—Univariate analyses, including χ^2 and Fisher exact tests, were performed to evaluate the association between the factors in each question on the questionnaire and retention of dogs in their homes. Variables with P values < 0.1 in the univariate analysis were included in multivariate analyses. Logistic regression was used to measure the strength of association, as represented by the odds ratio, among various factors and the likelihood of retention of dogs in the home. Logistic regression analysis was performed with 2 models. Model I ($n = 248$) included data from the first 8 questions on the questionnaire and included all owners that responded to the questionnaire, which allowed examination of demographic variables, such as location of residence, type of residence, number and ages of humans in the household, and puppy socialization class attendance, and retention in the home. Of those 248 owners, 223 answered the remaining questions pertaining to postweaning events and were included in model II ($n = 223$). For all final analyses, a value of $P \leq 0.05$ was considered significant. Because our study population consisted of groups of littermates, we made an adjustment for the possible effect of litter by including it as a variable in the multivariate analysis. To adjust for effects on retention rates, we included duration between adoption and completion of the questionnaire as a variable in the multivariate analysis.

Results

Owners in 90 of the 428 homes could not be contacted by any means. Information was available for 260 of 338 questionnaires for an overall response rate of 77% among owners who could be contacted. These responses represented 54 of the 57 litters. In 43 (80%) of these 54 litters, responses were obtained for at least 1 puppy that did and did not attend the humane society puppy socialization classes.

Of the 260 questionnaires completed, 9 were excluded from study, because the dog had remained in the home

< 1 week and did not participate in puppy socialization classes. Results from 3 questionnaires were excluded, because the owners did not indicate how long the dog had been in the home, making it difficult to assess attendance in puppy socialization classes. Therefore, results of 248 questionnaires were included in our study.

Two hundred of 248 dogs were in the original adoptive homes at the time owners completed the questionnaires. Of the 48 dogs no longer in their homes, 30 had been relinquished to animal shelters, 9 had been given to another home, 4 had died accidentally, 3 had been euthanized because of behavior problems, and 2 were reported as lost or stolen. Twenty-two of the 32 owners who reported reasons for relinquishing their dog to a shelter or for finding it a new home indicated behavior problems as the reason.

All 248 owners answered the first 8 questions on the questionnaire regarding demographics, participation in puppy socialization classes, and retention in the home. Thirteen of 248 owners answered only the first 8 questions and no longer owned their dogs. Twelve of 235 answered most of the remaining questions, and 223 owners completed the additional sections of the questionnaire concerning postweaning events.

Univariate analysis—Of the 248 dogs, 123 were female, and 125 were male. Analysis of data obtained from questionnaires revealed no significant differences in demographics of owners between dogs that were retained, compared with dogs that were not retained in their homes (Table 1). No significant difference in the rate of retention was found among dogs whose owner lived in a metropolitan area, a surrounding suburb, or a small town or rural area. No significant difference in retention was found between dogs whose owner lived in a single-family home, compared with owners in an apartment, duplex, condominium, town home, or mobile home. Dogs that attended training classes at ≥ 4 months of age were no more or less likely to be retained than dogs that did not attend these classes ($n = 229$). There were 87 dogs that participated in puppy socialization classes at the humane society (group 1), 132 dogs that did not participate in socialization classes (group 2), and 29 dogs that participated in socialization classes somewhere other than the humane society (group 3). There were no significant differences between groups in sex of the dogs or whether there were children < 6 years old or from 6 to 12 years old in the home. There were no significant differences in the mean duration between puppy adoption and when owners completed the questionnaire among groups.

The duration between adoption and when owners completed the questionnaire (in 6-month intervals) was inversely associated with retention of the dog in the home. In other words, the longer the period between adoption and completion of the questionnaire, the lower the retention.

Dogs in group 1 were more likely to be retained in their homes, compared with dogs in group 2 or 3. Excluding the 29 dogs in group 3 and comparing only dogs from groups 1 and 2 yielded a lower P value.

Female dogs in groups 1 and 3 were more likely to be retained in their homes, compared with females in

Table 1—Variables associated with retention of dogs in their adoptive homes

Variable	No. of dogs	Retention rate	%	P value
Locale	245			0.391
City		64/75	85.3	
Suburb		123/158	77.9	
Other (rural, small metropolitan)		10/12	83.3	
Type of dwelling	248			0.583
Single family home		180/225	80.0	
Other ^a		20/23	87.0	
Single parent family	248			0.241
Yes		19/27	70.4	
No		181/221	81.9	
Ages of family members	248			0.001*
Children < 6		24/44	54.6	
No children < 6		176/204	86.3	
Children 6–12		59/83	71.1	0.011*
No children 6–12		141/165	85.5	
Children 13–18		57/70	81.4	0.986
No children 13–18		143/178	80.3	
Adults 65+		5/8	62.5	0.186
No adults 65+		195/240	81.3	
Dog's sex	248			0.019*
Male		93/125	74.4	
Female		107/123	87.0	
Puppy class group (3 categories)	248			0.031*
1 ^b		78/87	89.7	
2 ^c		100/132	75.8	
3 ^d		22/29	75.9	
Puppy class group (2 categories)	219			0.016*
1		78/87	89.7	
2		100/132	75.8	
Early handling	230			0.011*
High (scores 4–8)		150/166	90.4	
Low (scores 0–3)		49/64	76.6	
Headcollar	231			0.008*
Used		81/86	94.2	
Did not use		117/145	80.7	
Choke chain	232			0.755
Used		57/65	87.7	
Did not use		142/167	85.0	
Prong or shock	232			0.545
Used		21/23	91.3	
Did not use		178/209	85.2	
Reliability to commands	229			0.001*
High (score 14–16)		82/88	93.2	
Medium (score 10–13)		77/84	91.7	
Low (score 4–9)		40/57	70.2	
Where sleeps at night	235			0.001*
On or next to bed		149/161	92.6	
Elsewhere		51/74	68.9	

*Significant ($P < 0.05$) difference among or between groups.
^aApartment, duplex, condominium, town home, or mobile home. ^bPuppies adopted from humane society and attended puppy socialization classes. ^cPuppies adopted from humane society and attended no classes. ^dPuppies adopted from humane society and attended different puppy socialization classes.

group 2. Male dogs in group 1 were more likely to be retained in their homes, compared with males in groups 2 or 3. Female dogs were more likely to be retained in their homes, compared with male dogs. Dogs with early handling scores of 4 to 8 were more likely to be retained in their homes, compared with dogs with early handling scores ≤ 3 . Dogs with reliability of response to command scores of 10 to 16 were more likely to be retained in the home, compared with dogs with scores of 4 to 9. Dogs that wore headcollars occasionally or frequently when they were puppies were more likely to be retained in their homes, compared with dogs that did not wear headcollars as puppies. No significant associations were found between retention of the dog in the home and use of choke chains, prong collars, or shock collars. All dogs in

groups 2 and 3 that wore headcollars as puppies were retained in their homes. Dogs that slept on or next to the owner's bed were more likely to be retained in their homes, compared with a group that included dogs that slept in a crate near the bed, slept in another room, were confined in the house at night away from the family, or slept outside or in the garage. Dogs that lived in homes without children < 6 years old were more likely to be retained in their homes, compared with dogs that lived in homes with children < 6 years old. Dogs that lived in homes without children from 6 to 12 years old were more likely to be retained, compared with dogs that lived in homes with children in this age category.

Multivariate analysis—In model I (which referred to the first 8 questions), female dogs were more likely

Table 2—Odds ratios for variables associated with retention of dogs (n = 248) in their adoptive homes for data obtained from a questionnaire

Variable	Odds ratio	95% CI	P value
Sex			0.005*
Male	1.0	NA	
Female	2.9	1.4–6.0	
Puppy class group			0.039*
2 ^c	1.0	NA	
1 ^b	3.1	1.3–7.3	
3 ^d	1.2	0.4–3.3	
Children < 6 years old			< 0.001*
No	1.0	NA	
Yes	0.2	0.1–0.4	
Duration since adoption	0.8	0.7–0.9	< 0.007*

*Significant ($P < 0.05$) difference from referent category.
 CI = Confidence interval. NA = Not applicable (referent category).
 See Table 1 for remainder of key.

Table 3—Odds ratios for variables associated with retention of dogs (n = 223) in their adoptive homes for data obtained from a questionnaire

Variable	Odds ratio	95% CI	P value
Sex			0.008*
Male	1.0	NA	
Female	4.2	1.5–12.2	
Children < 6 years old			< 0.001*
No	1.0	NA	
Yes	0.1	0.04–0.37	
Used headcollar			0.029*
No	1.0	NA	
Yes	3.8	1.1–12.9	
Sleeps on or near bed			< 0.001*
No	1.0	NA	
Yes	10.1	3.5–29.4	
Duration since adoption	0.7	0.6–0.9	< 0.001*

See Tables 1 and 2 for key.

to be retained in their homes, compared with male dogs. Children < age 6 in the home was significantly inversely associated with retention of the dog in the home. Dogs in group 1 were more likely to have remained in their homes, compared with dogs in groups 2 or 3. There was no significant difference in retention between dogs in group 3 and dogs in group 2. Duration since adoption was significantly inversely associated with retention of the dog in the home (Table 2).

In model II (which examined postweaning variables in 223 dogs), children < age 6 in the home was significantly inversely associated with retention of the dog in the home. Female dogs, dogs that slept on or near the owner's bed, and dogs that wore headcollars as puppies were more likely to be retained in their homes. Duration since adoption was significantly inversely associated with retention of the dog in the home (Table 3).

Discussion

Our intention in giving owners the option of completing only the first 8 questions was to optimize the response rate by making it easier for owners intimidated by the questionnaire to provide us with information regarding retention, demographics, and training class participation. This resulted in 2 multivariate models. Model I included owners who answered the first 8 questions. Model II included only that subset of owners who completed the first 8 questions and also answered the remaining questions concerning post-

weaning events. The results indicate that the association between participation in puppy class and retention varied with the differences in these 2 populations and was associated with retention in certain, but not all, circumstances.

We were unable to contact 90 of the original 428 owners. In 1 study,³ moving was a common reason indicated by owners who relinquished their dogs to shelters. It is possible that many of the owners we could not reach had moved and no longer owned their dogs. From the remaining owners, our response rate was high. Response rates appeared to be influenced by the duration from adoption of the dog to completing the questionnaire, as we had difficulty gaining information from owners with older dogs. This was true for all dogs in those litters, regardless of group, which maintained the comparability of the 3 groups. Results of our study depended on the owners' recall of past events. Our study included dogs that were from 1 to 6.5 years of age at the time the questionnaires were completed. Owners of older dogs may have had more difficulty recalling details of their dogs as puppies than owners of younger dogs. This should not affect retention data or group data, which were verified by computer records, but could affect the reliability of owners' information regarding their dogs' postweaning events.

The finding of lower retention with increased time since adoption should not be equated with greater risk of relinquishment with time for any individual dog. Sufficient information was not obtained for the 48 dogs that were relinquished to evaluate risk during elapsed time. Rather, the finding reflects that as duration between puppy adoptions and when owners completed the questionnaire increased, so did the number of intervals in which relinquishment could develop and the number of dogs relinquished.

The 4 dogs that died accidentally and the 2 that were reported as lost or stolen did not represent conscious decisions of the owners to relinquish their dogs. We included them in our study, because we believe this type of loss may have been prevented by knowledge of canine behavior and common behavior problems that may have been obtained by attending puppy socialization classes. Because our study population consisted of groups of littermates, an adjustment for the effect of litter was made by including it as a variable in the multivariate analysis; however, there was no change in our results.

Group 3 included 29 dogs that participated in puppy socialization classes somewhere other than the humane society involved in the study. These dogs could have been included in group 1. However the program provided by the original humane society was standardized and well documented,⁸ and no single approach or curriculum could be attributed to other training sources. It also seemed inappropriate to group these dogs with dogs that did not attend puppy socialization classes, because the owners did receive advice that may have affected retention results.

In the univariate and multivariate analysis model I of this study, dogs in group 1 were more likely to be retained in their homes than dogs in groups 2 or 3. Multiple factors could have contributed to this result,

including preexisting factors, effects of owner education, and the effects of socialization on dogs.

In this study, owners decided whether to enroll their puppies in socialization classes. Enrollment decisions may have been affected by preexisting factors, such as financial status, level of education, or commitment to the puppy. These same factors could have affected retention rates. It is also possible that there was a sampling effect, because owners who no longer had their dogs may have been less likely to return the questionnaires. Preexisting factors may have also been responsible for differences between results of model I and model II. Model I included all owners, including those who answered only the first 8 questions on the questionnaire. Model II owners may have represented the more capable or committed owners who were more likely to keep their puppy anyway, and for whom puppy class attendance may not have made a difference.

Many of the effects of pet behavior on relinquishment may have more to do with the owners than with the pet.⁹ Owners may be less likely to consider unwanted behavior a problem if they expect that behavior to develop during a normal course of time.⁹ Adopters' lack of information and understanding may be a reason why certain humane society pet adoptions are unsuccessful.^{10,11} According to 1 study,⁷ owners who received helpful advice on pet behavior were at 94% lower risk for relinquishing their pet than owners who received advice that was not helpful.

Owner education was a major component of the humane society puppy socialization classes. Owners whose dogs participated were given verbal and written information regarding canine development and learning theory. Owners were taught procedures for socializing puppies to be comfortable interacting with other puppies, children, women, and men and to accept different environmental stimuli and frequent handling of all parts of their bodies. Owners were taught use of motivation and humane restraint to manage puppy behavior. Learning what to expect as part of natural puppy development and the camaraderie of being in a setting with other owners in the same situation may give owners greater tolerance for the challenges that accompany puppy ownership. Learning effective management tools may enable owners to better resolve unwanted behaviors that typically arise with puppies. Owners who have received this education may also have a greater perception that help is available as their dog matures beyond puppy class age.

Various authors have described the socialization period in dogs as a sensitive period of development, when puppies more readily acquire behaviors that define their future abilities to form social partnerships with other dogs and nonconspecifics, such as humans, cats, sheep, or other livestock.¹²⁻¹⁸ Although opinions vary about the terms used to describe this period and its exact timing, it is generally accepted that the weeks between birth and 13 to 16 weeks are important to the developing social abilities of dogs.

Results of studies indicate that dogs raised under restricted conditions or deprived of social contact as puppies have impaired social abilities.^{12,19} However, because individual genotypic and environmental

effects may be important determinants of mature behavior, providing early socialization does not guarantee that a dog will not have behavior problems.¹⁸⁻²⁰

Few studies have been published on puppy socialization classes. One study²¹ examined behavioral effects of a puppy socialization program on 6- to 16-week-old puppies and found a positive association with responsiveness to commands but no changes in responses to novel stimuli, handling, or social stimuli. The authors suggested that a minimum amount of social interaction is needed at an early age, but any above that amount (extra socialization) does not necessarily improve social behavior.²¹ Authors of another study¹² found that semi-isolated puppies could be successfully socialized with as little human contact as two 20-minute periods per week. Although in our study, dogs in group 1 had greater retention in the home than littermates in groups 2 or 3, we do not know if they were better socialized. Because genetics and environment influence behavior, and because adequate socialization has not been well defined, assessing effective socialization may be difficult.

In the univariate and multivariate analysis model I of this study, females in group 1 or 3 were significantly more likely to be retained in the home, whereas males were retained in the home significantly more often if they were in group 1, compared with group 2 or 3. Male dogs in group 3 were the least likely to be retained in the home. However, only 11 male dogs were in group 3. This small sample size raises the possibility that this could be a chance finding. Differences in handling and curriculum between puppy socialization classes may result in different behavioral outcomes between male and female dogs.

In the univariate analysis, dogs with high reliability of response to command scores were more likely to be retained in the home than dogs with low reliability of response scores. Independent testing of the dogs' responsiveness to commands would have been better than our owner-reported measure, but this was not possible in our study. Reliability of response to command scores depended on the owners' overall impression of their dogs' abilities. Owners who did not relinquish their dogs may have had a higher (but not necessarily more accurate) opinion of their dogs' abilities than owners who relinquished their dogs.

In the univariate and multivariate analysis model II of this study, dogs that wore headcollars as puppies, slept on or near the owner's bed, and lived in homes without young children were also more likely to be retained.

Dogs that wore headcollars often or occasionally as puppies were significantly more likely to be retained in the home than dogs that did not wear headcollars as puppies. No significant associations were found between retention in the home and the use of choke chains, prong collars, or shock collars. Headcollars can give owners an effective and humane means of controlling their dogs' behavior.²²⁻²⁴ Having greater control may give owners greater confidence and reduce frustration that can lead to relinquishment. Puppies that are better controlled may learn desired behavior more quickly and have reduced chance of learning undesired

behaviors. The humane society puppy socialization classes strongly promoted use of headcollars, which confounds these results. However, the 8 dogs in group 3 and the 16 dogs in group 2 that wore headcollars were all retained in their homes. Use of headcollars was also significantly associated with retention of the dog in model II of the multivariate analyses.

Dogs that slept on or near the owner's bed were more likely to be retained in the home than dogs that slept elsewhere inside the home or were not allowed to sleep in the house. Sleeping in close proximity to the owner may promote bonding, or owners who are initially more bonded to their dog may encourage this close sleeping arrangement. This finding is consistent with findings in other studies^{25,26} that indicate there is no relationship between behavior problems and dogs sleeping on the owner's bed.

In our study, dogs in homes without young children were more likely to be retained than dogs in homes with young children. This finding is consistent with findings in other studies.^{7,9-11} Small children compete for the time and attention of adults, and having a puppy increases the responsibility for the adults in the home. Children are often the reason behind acquiring a dog; however, unrealistic expectations make relinquishment more likely.⁹⁻¹¹ Children are also more likely to be bitten and seriously injured than adults.^{27,28} Behavior of young children may be alarming to dogs. Children may not be developmentally capable of understanding canine behavior or modifying their own behavior.

Our findings indicate that there is a need to educate owners that dogs are not always compatible with children. Great effort and vigilance may be required to successfully integrate a dog into a home with children or children into a home with a dog. Veterinarians may be able to educate owners by encouraging preadoption counseling and developing realistic expectations, knowledge, and effective tools to manage interactions between children and dogs.

^aAnimal Humane Society, Golden Valley, Minn.

^bAvailable from the corresponding author on request.

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