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# Owner Attachment and Problem Behaviors Related to Relinquishment and Training Techniques of Dogs

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Problematic behaviors are a significant reason for relinquishment, and relinquished dogs are more likely to have problem behaviors. This study utilized standardized surveys of owners (companion animal guardians) relinquishing their dogs to shelters and dog owners visiting vaccination clinics. “Relinquishing” and “continuing” owners were asked questions in the following categories: demographic information, training methods and tools, frequencies in which their dogs engaged in problematic behaviors, and attachment to their dogs. “Relinquishers” were also asked to provide their reasons for relinquishment. The results of 129 surveys (80 relinquishing and 49 continuing) showed that relinquishers scored lower on companion animal attachment than continuing owners. Pit bull-type dogs were represented more in the relinquishing group. Relinquished dogs were no less likely to have attended training classes than continuing dogs. In both groups, owners who used punishment-based collars reported less satisfaction with their dogs’ overall and leash-walking behaviors. Pit bull-type dogs were reported to be no less well behaved compared with all other breeds combined. Sixty-five percent of relinquishers reported some behavioral reason for relinquishment. Forty-eight percent of relinquishers indicated that at least 1 problem behavior was a strong influence on their decision to relinquish.

*Keywords:* dog, behavior, shelter, attachment

Problematic behaviors have been established as a significant reason for relinquishment and euthanasia, and it has been documented that relinquished dogs

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have problem behaviors (Diesel, Brodbelt, & Pfeiffer, 2009; Salman et al., 2000; Segurson, Serpell, & Hart, 2005; Sigler, 1991). The number of dogs euthanized annually in American shelters due to behavioral problems is speculated to potentially be in the millions (National Council on Pet Population Study and Policy, 1997). Behavior, therefore, has a considerable impact on the welfare of canine companions and on the human-nonhuman animal bond.

In addition to problematic behaviors, or perhaps as a sequela of them, a weakened attachment is likely related to relinquishment. Attachment is a complex phenomenon that can be described as a combination of time and activities spent with the pet (companion animal), interest and emotional closeness toward the pet, knowledge about the pet and his or her care, and behavioral responses to the pet (Melson, 1990). Prior studies have shown that there is a correlation between strength of owner (companion animal guardian) attachment and relinquishment to shelters (Kobelt, Hemsworth, Barnett, & Coleman, 2003; Serpell, 1996), but none of the studies used validated survey tools. One study (Segurson et al., 2005) that used a validated survey tool demonstrated that dogs relinquished to shelters were more likely to have problem behaviors than those in the general population. However, neither owner attachment nor the training methods used were evaluated. There is also evidence that breeds differ in their behavior (Duffy, Hsu, & Serpell, 2008; Turcsán, Kubinyi, & Miklósi, 2011). As with most studies of companion animals with problem behaviors, it is the owner's perception that a behavior is a problem, and this is often due to unmet expectations and potential owner-dog mismatch.

Researchers have demonstrated a correlation between training and techniques utilized in training and the incidence of problematic behaviors. They also found that obedience training was correlated with a decrease in unwanted behaviors (Alexander, Friend, & Haug, 2011; Clark & Boyer, 1993; Jagoe & Serpell, 1996), increased adoptability from a rescue shelter (Hays, 2004), and retention of dogs in a household (Duxbury, Jackson, Line, & Anderson, 2003). There is a wide variety of training methods and tools used to train dogs, from positive reinforcement-based methods (utilizing such rewards as food and praise) to positive punishment-based aversive methods (utilizing such punishments as giving collar corrections, pinning a dog to the ground, and yelling). Tools often associated with the delivery of positive punishment include choke/slip collars, prong/pinch collars, and shock collars. Dogs who had worn a head collar, most often used by people who utilize positive reinforcement-based techniques, were more likely to be retained in their homes than dogs who did not wear one of these collars (Duxbury et al., 2003).

Positive reinforcement methods have been shown to be equally or more effective than punishment-based methods for teaching desired behaviors and eliminating undesired behaviors, and they result in better trained dogs overall (Hiby, Rooney, & Bradshaw, 2004; Rockwood & Bain, 2007). In one study, working

dogs ranked higher in performance when trainers used positive reinforcement-based techniques than those trained who were trained with positive punishment-based techniques (Haverbeke, Laporte, Depiereux, Giffroy, & Diederich, 2008). Furthermore, the use of aversive training methods has been shown to be associated with problem behaviors such as anxiety, stress, aggression, and house soiling (Herron, Shofer, & Reisner, 2008; Reisner, Houpt, & Shofer, 2005; Schilder & van der Borg, 2004).

Because aversive training methods have resulted in increased stress and poorer performance of dogs in the presence of their trainers (Haverbeke et al., 2008), owner-dog attachment may be adversely affected when these training methods are implemented. Thus, nonaversive methods of training should have a positive impact on companion dog welfare through effectiveness in teaching desirable behaviors, reduced correlation with the occurrence of problematic behaviors, and a strengthened owner-dog bond. All of the aforementioned can result in a lower rate of relinquishment and euthanasia, and therefore, increased welfare of domestic dogs.

Our study was conducted with in-person surveys of two types of owners: those relinquishing dogs to shelters and those visiting vaccination clinics, merging standardized and validated survey tools (Johnson, Garrity, & Stallones, 1992). We attempted to address the following goals: to measure the level of attachment of both relinquishing owners and clients at vaccination clinics for their dogs; to determine if there is correlation between training tools, overall behavioral satisfaction, and owner attachment; and to document reasons for relinquishment.

We tested three hypotheses:

1. Owners relinquishing dogs to shelters ("relinquishing owners") will have had a significantly weaker attachment to their dogs than owners not relinquishing their dogs ("continuing owners").
2. Relinquishing owners will have been less likely to have attended training classes compared with continuing owners.
3. Relinquishing owners will have been more likely to have used punishment-based techniques and tools associated with punishment-based techniques than continuing owners.

## METHODS

### Selection

The study was approved by the Institutional Review Board on Human Subjects Study. Two groups of dog owners were solicited during shelter hours of operation during July and August of 2010. A power analysis was not performed a priori.

Relinquishing owners were solicited from three animal shelters: Sacramento Society for the Prevention of Cruelty to Animals (SPCA), the Sacramento County Animal Care and Regulation (County), and the City of Sacramento Animal Care and Control (City), which were all located in Sacramento, California. Continuing owners were solicited from owners at vaccination clinics held at these three shelters. Vaccination clinics are places in which owners can have their pets preventatively vaccinated but with limited veterinary examination. The reason for soliciting continuing owners from these vaccination clinics was the potential that those seeking medical care at these facilities would most likely relinquish their dogs to that specific shelter; however, we could not state this for certain. There is no evidence that owners who take their dogs to vaccination clinics are less attached to their dogs compared with those who take their dogs to a traditional veterinary clinic (Helms & Bain, 2009). The SPCA had regularly scheduled vaccination clinics during most hours of operation, whereas the County and City shelters had once monthly mobile vaccination clinics during specific hours.

### Pilot Test

While developing the survey tools, owners at the University of California School of Veterinary Medicine (UCD-SVM) Veterinary Medical Teaching Hospital were asked to fill out the continuing owner survey and make comments regarding the clarity of questions and length of time it took to fill out the survey. We evaluated their answers to open-ended questions in order to best design the closed-answer questions. The same was done for relinquishing owners at City and County. The surveys were subsequently rewritten on the basis of responses and comments received.

### Survey

The surveys were offered in English and Spanish. Surveys from relinquishing dog owners were completed by one investigator (J. K.) via in-person interviews or handed directly to owners to fill out at the SPCA and County shelters. At the City shelter, a paid shelter staff employee handed the survey to relinquishing dog owners so that they could fill it out. Surveys were distributed during hours of operation in which the public was allowed to relinquish dogs. Surveys from continuing dog owners were completed by the same investigator via in-person interviews or handed directly to owners to fill out at the shelters. Surveys distributed at the SPCA were filled out during normal hours of regularly scheduled vaccination clinics. At the City and County shelters, data were collected during two monthly clinics.

All survey participants were notified that no identifying information would be collected and that shelter staff would not see the responses of their survey, thus

helping to allay concerns of the owners that the surveys would affect the care and treatment of their dogs. It was conveyed to them that the care or treatment of their dogs was not dependent on whether they took part in the study. The survey was labeled with the UCD-SVM logo, and contact information was clearly from the university. The investigator wore a badge that identified her as a UCD-SVM student. The surveys were directly placed into a provided envelope that was immediately sealed. Sampling from both groups was via convenience sampling in which some owners were not asked to take part in the survey to ensure the investigator's safety from potentially aggressive dogs or from owners who were overtly emotional during relinquishment. Exclusion criteria included dogs less than 4 months of age to decrease the chance of having a dog enter the study as an unplaced puppy from a whelped litter. A dog was also excluded if he or she had been owned for less than 3 months to allow us to focus on the relationship between training tools, overall behavioral satisfaction, and owner attachment (New et al., 2000). Dogs who were relinquished specifically for euthanasia for medical reasons were also excluded to avoid additional emotional trauma to these owners.

Owners were asked closed- and open-ended questions in the following categories via a questionnaire (available from M. B. upon request): demographic information of the owner and dog, training methods and tools, frequency in which his or her dog engaged in problematic behaviors, satisfaction with the behavior of his or her dog as well as with the methods and tools used for training, and owner attachment to his or her dog via the validated Lexington Attachment to Pets Scale (LAPS; Helms & Bain, 2009; Johnson et al., 1992). Relinquishing owners were asked closed- and open-ended questions regarding their reasons for relinquishing their dogs to a shelter, including unemployment, foreclosures, and other financial considerations, with scores ranging from 0 to 5 for each choice (0 being *no influence*, 5 being *a very strong influence*). They were also asked closed- and open-ended questions regarding behavioral reasons for relinquishment, with scores ranging from 0 to 5 for the following behaviors (0 being *no influence*, 5 being *a very strong influence*): feces/urine in the home, destruction in the home, escaping the home/yard, excessive barking, fearfulness, barking/growling at people, barking/growling at dogs, nipping/biting people, nipping/biting dogs, excessive excitement, and leash pulling on walks. For the two questions, owners also had a choice to fill in "other" and rate that choice.

### Statistical Analysis

Statistical analyses were performed via computerized statistical software (STATA 9, Statacorp, College Station, TX). Ordinal data, including the mean responses from LAPS, satisfaction with the behavior of the dog, some demographic data, and types of training methods utilized were evaluated using a Mann-Whitney

rank sum test. Chi-square and Fisher's exact tests were utilized to evaluate categorical data. All tests were two-tailed, and significance was set at  $p < .05$ .

## RESULTS

To obtain surveys from relinquishing owners, 22 days were spent at SPCA, 5 days were spent at County, and 4 days were spent at City. To obtain surveys from continuing owners from vaccination clinics, 22 days were spent at SPCA, 1 day was spent at County, and 2 days were spent at City.

A total of 206 surveys were conducted. There were 128 surveys conducted using owners relinquishing their dogs, and 78 were conducted using continuing owners. Of these surveys, 129 were usable (80 from relinquishing owners [71 from SPCA, 4 at County, and 5 at City] and 49 from continuing owners [30 from SPCA, 13 from County, and 6 from City]). Two Spanish-translated surveys from relinquishing owners were completed. The demographic information of the dogs and owners are included in Tables 1 and 2.

There was no statistical difference in the owner gender (Fisher's exact,  $p = .09$  and  $.15$ ) and attachment ( $z = 0.06$  to  $0.53$ ,  $p = .15$  and  $.95$ ) between all three locations for both relinquishing and continuing owners, respectively. Owner's satisfaction with the behavior of their dogs was significantly lower in County compared with the other two shelters for the relinquishing owners ( $z = 2.63$ ,  $p = .009$ ) but not for all other comparisons ( $z = 0.87$  to  $1.17$ ,  $p = .06$  to  $.38$ ). However, there was a relatively low percentage of surveys collected at County (13%). Despite the difference between County and the other two shelters, the results of all three shelters were combined when analyzing the data.

Compared with continuing owners, relinquishing owners were more likely to keep their dogs outside 100% of the time (Fisher's exact,  $p = .03$ ) and had more children under the age of 18 living in their households ( $z = 2.03$ ,  $p = .04$ ). Relinquished dogs were significantly older ( $z = -2.1$ ,  $p = .04$ ), and if they were male, they were more likely to be intact (Fisher's exact,  $p = .03$ ). There were not differences between the two groups in owner demographic information (age of owner, having children or not, ethnicity, race, and gender of owner). Hispanic ethnicity was separated because the United States Census Bureau (2010) distinguishes ethnicity as being of Hispanic or Latino origin.

Relinquished dogs were significantly older ( $z = -2.85$ ,  $p = .004$ ) and in the house for a longer length of time ( $z = -2.1$ ,  $p = .04$ ). Due to the relatively high number of purebred and mixed-breed Chihuahuas and Pit bull-type dogs in the study, a separate evaluation of the data was undertaken. Chihuahua or Chihuahua mixes and Pit bull-type or Pit bull-type mixes made up 17% and 15% of the reported breeds or breed mixes, respectively. Pit bull-type dogs were represented more in the relinquishing owners' group than the continuing group



TABLE 1  
Canine Demographic Information

<i>Variable</i>	<i>Combined</i> ( <i>n</i> = 129)	<i>Relinquished</i> ( <i>n</i> = 80)	<i>Owned</i> ( <i>n</i> = 49)
<b>Location</b>			
City shelter	10 (8%)	5 (6%)	7 (14%)
County shelter	18 (14%)	4 (6%)	14 (28%)
SPCA	99 (78%)	70 (88%)	29 (58%)
<b>Sex</b>			
Male intact	28 (22%)	22 (28%)	6 (12%)
Male castrated	47 (36%)	24 (30%)	23 (47%)
Female intact	20 (15%)	13 (16%)	7 (14%)
Female spayed	32 (25%)	20 (25%)	12 (25%)
Unknown	2 (2%)	1 (1%)	1 (2%)
<b>Weight</b>			
<30 lbs	56 (44%)	28 (35%)	28 (57%)
>30 lbs	70 (54%)	49 (61%)	21 (43%)
Unknown	3 (2%)	3 (4%)	0
<b>Age (years)</b>			
Mean $z^* = -2.1, p = .04$	3.66 ( <i>SE</i> = 0.3)	4.14 ( <i>SE</i> = 0.418)	2.85 ( <i>SE</i> = 0.367)
<b>Mixed vs. Purebred</b>			
Mixed breed	81 (63%)	53 (66%)	28 (57%)
Purebred	45 (35%)	24 (30%)	21 (43%)
Unknown	3 (2%)	3 (4%)	0
<b>Attended Training Classes?</b>			
<i>n</i> = 122	<i>n</i> = 75	<i>n</i> = 47	
Yes	25 (20%)	14 (19%)	11 (23%)
No	97 (40%)	61 (81%)	36 (77%)
<b>Length of Ownership (years)</b>			
Mean	2.93 ( <i>SE</i> = 0.298)	3.29 ( <i>SE</i> = 0.42)	2.34 ( <i>SE</i> = 0.37)
<b>Laps</b>			
Mean $z^* = 2.85, p = .006$	2.98 ( <i>SE</i> = 0.048)	2.88 ( <i>SE</i> = 0.068)	3.14 ( <i>SE</i> = 0.052)

*Note.* Pound equivalents: <13.6 kg and >13.6 kg. LAPS = Lexington Attachment to Pets Scale; SPCA = Society for the Prevention of Cruelty to Animals.

\* = significant differences between relinquished and owned dogs.

(Fisher's exact,  $p = .03$ ). Number and percentages of specific breeds can be found in Table 3.

Relinquishing owners scored lower on pet attachment than continuing owners ( $z = 2.85, p = .006$ ). When evaluating owners' satisfaction with their dogs' overall behavior, approximately one third selected 5 on a scale of 1 to 5, indicating that they were *very satisfied* with their dogs' overall behavior. Owners who were less than *very satisfied* with their dogs' behavior also scored lower on pet attachment ( $z = -3.8, p = .0001$ ). When comparing intact with castrated male dogs, owners of intact male dogs were more likely to state that they were

TABLE 2  
Owner Demographic Information

<i>Demographic</i>	<i>Combined</i>	<i>Relinquished</i>	<i>Owned</i>
Location	<i>n</i> = 129	<i>n</i> = 80	<i>n</i> = 49
City shelter	12 (9%)	5 (6%)	7 (14%)
County shelter	18 (14%)	4 (6%)	14 (28%)
SPCA	99 (77%)	70 (88%)	29 (58%)
Age	<i>n</i> = 123	<i>n</i> = 76	<i>n</i> = 47
19–24	15 (12%)	6 (8%)	9 (19%)
25–40	45 (37%)	30 (39%)	15 (32%)
41–60	50 (41%)	29 (39%)	21 (45%)
>60	13 (10%)	11 (14%)	2 (4%)
Gender	<i>n</i> = 128	<i>n</i> = 79	<i>n</i> = 48
Male	50 (39%)	36 (46%)	14 (29%)
Female	78 (61%)	43 (54%)	34 (71%)
Marital Status	<i>n</i> = 115	<i>n</i> = 71	<i>n</i> = 44
Never married	22 (19%)	9 (13%)	13 (30%)
Married/Domestic partnership	63 (55%)	41 (58%)	22 (50%)
Separated	8 (7%)	5 (7%)	3 (7%)
Divorced	18 (16%)	13 (18%)	5 (11%)
Widowed	4 (3%)	3 (4%)	1 (2%)
Number of Children	<i>n</i> = 121	<i>n</i> = 76	<i>n</i> = 45
Mean ( $\pm$ SE)	1.14 ( <i>SE</i> = 0.11)	1.28 ( <i>SE</i> = 0.14)	0.91 ( <i>SE</i> = 0.176)
Median	1 (range 0–5)	1 (range 0–5)	0 (range 0–4)
Ethnicity	<i>n</i> = 129	<i>n</i> = 76	<i>n</i> = 53
Of Hispanic ethnicity	18 (14%)	10 (13%)	8 (30%)
Not of Hispanic ethnicity	103 (86%)	66 (87%)	37 (70%)
Primary Race	<i>n</i> = 122	<i>n</i> = 76	<i>n</i> = 46
White	89 (72%)	59 (78%)	30 (65%)
Asian	22 (18%)	10 (13%)	11 (24%)
Black	9 (7%)	5 (7%)	4 (9%)
Hawaiian/Pacific Islander	2 (2%)	1 (1%)	1 (2%)
American Indian/Alaskan Native	1 (1%)	1 (1%)	0
Annual Income	<i>n</i> = 94	<i>n</i> = 57	<i>n</i> = 37
<\$10,000	11 (11%)	9 (16%)	2 (5%)
\$10,000–29,999	16 (17%)	12 (21%)	4 (11%)
\$30,000–49,999	16 (17%)	8 (14%)	8 (22%)
\$50,000–69,999	10 (11%)	7 (12%)	3 (8%)
\$70,000–89,999	21 (22%)	12 (21%)	9 (24%)
\$90,000–109,999	8 (9%)	4 (7%)	4 (11%)
\$110,000 or greater	12 (13%)	5 (9%)	7 (19%)

(continued)

TABLE 2  
(Continued)

<i>Demographic</i>	<i>Combined</i>	<i>Relinquished</i>	<i>Owned</i>
Employment Status	<i>n</i> = 112	<i>n</i> = 69	<i>n</i> = 43
Full-time	61 (54%)	36 (52%)	25 (58%)
Part-time	9 (8%)	5 (7%)	4 (9%)
Unemployed and seeking employment	13 (12%)	9 (13%)	4 (9%)
Unemployed and not seeking employment	7 (6%)	5 (7%)	2 (5%)
Retired	11 (10%)	8 (12%)	3 (7%)
Student	11 (10%)	6 (9%)	5 (12%)
Highest Level of Education Completed	<i>n</i> = 116	<i>n</i> = 73	<i>n</i> = 43
Less than high school	1 (1%)	1 (1%)	0
High school/GED	19 (16%)	13 (18%)	6 (14%)
Some college	31 (27%)	20 (27%)	11 (26%)
2-year college degree	21 (18%)	15 (21%)	6 (14%)
4-year college degree	23 (20%)	11 (15%)	12 (28%)
Master's degree	16 (14%)	10 (14%)	6 (14%)
Doctoral degree/PhD	2 (2%)	2 (3%)	0
Professional degree (i.e., MD, DVM, JD)	3 (2%)	1 (1%)	2 (4%)

*Note.* GED = general education development; SPCA = Society for the Prevention of Cruelty to Animals.

TABLE 3  
Breeds of Dogs as Reported by Owners

<i>Breed</i>	<i>Combined (n = 126)</i>	<i>Relinquished (n = 77)</i>	<i>Owned (n = 49)</i>
Chihuahua			
Purebred	8	5	3
Mixed	14	8	6
Pit bull-type			
Purebred	12	10	2
Mixed	7	5	2
Labrador retriever			
Purebred	6	4	2
Mixed	4	4	0
German shepherd			
Purebred	2	2	0
Mixed	7	6	1
Golden retriever			
Purebred	4	0	4
Mixed	2	2	0

*Note.* All other breeds, purebred and owner-selected mixes of those breeds, totaled 5 or less. If the owners stated that their dogs were mixed breeds, the breeds in the table were the first ones written by the owners.

very satisfied with their dogs' behavior ( $\chi^2[1, n = 75] = 5.59, p = .018$ ), and they were no more likely to state that behavior problems (specifically aggression) were reasons for relinquishment than the owners of castrated dogs. Taking into consideration all owners (relinquishing and continuing), those who used collars that are primarily used via punishment-based methods (choke and prong collars) reported less satisfaction with their dogs' overall behavior and leash-walking behavior, respectively ( $z = 2.26, p = .024$ ;  $z = 2.2, p = .03$ ).

Taking into consideration all owners, owners of Pit bull-type or Chihuahua dogs were no more likely to state that they were less than very satisfied with their dogs' behavior compared with all other breeds combined, respectively ( $z = -0.85, p = .39$ ;  $z = -1.4, p = .16$ ).

When asked to assess behavioral problems as a reason for dog relinquishment on a scale from 0 to 5 (0 being *no influence*, 5 being *a very high influence*), for those for whom we received complete data from these questions (80 of 84), 52 of 80 relinquishing owners (65%) selected scores from 1 to 5, indicating some problem behavior had some role in their decision to relinquish their dogs. When assessing stronger influences of these behavior problems with scores from 3 to 5, 39 of 80 owners (49%) indicated that at least one problematic behavior was a relatively strong influence on their decision to relinquish.

With regard to aggression (barking/growling and nipping/biting at people and/or dogs), 38 of the relinquishing owners (48%) selected scores from 1 to 5, indicating that aggression had some role in their decision to relinquish their dogs. When assessing a stronger influence of aggression with scores from 3 to 5, 23 owners (29%) indicated that aggression was a relatively strong influence on their decision to relinquish. Reasons for relinquishment are summarized in Table 4.

Regarding other pets in the household, there were no differences in the mean number of cats or dogs in the households of those who relinquished their dogs compared with those who did not (cats:  $z = -0.32, p = .75$ ; dogs:  $z = 0.147, p = .88$ ), and there were no differences regarding whether they had a cat or dog in the household (cats:  $\chi^2[1, n = 129] = 0.2, p = .6$ ; dogs:  $\chi^2[1, n = 129] = 1.4, p = .23$ ). In evaluating those relinquishing owners in which moving had strongly influenced their reason for relinquishment ( $n = 27$ ), 48% of them still had at least one other dog remaining in their household, which was not significantly different from those who stated that moving had not strongly influence their decision ( $\chi^2[1, n = 80] = 0.1, p = .75$ ).

We also determined that finances did not strongly influence reasons for relinquishment, as 42% of relinquishing owners had at least one other dog remaining in their household, which was not significantly different from those who had stated that finances did not strongly influence their decision ( $\chi^2[1, n = 79] = 0.03, p = .86$ ). Data on income reported by owners can be found in Table 5.

TABLE 4  
Reasons for Relinquishment ( $n = 80$ )

<i>Reason</i>	<i>Not a Reason (Score = 0)</i>	<i>Somewhat of a Reason (Scores = 1–5)</i>	<i>Strong Reason (Scores = 3–5)</i>	<i>M (SE)</i>	<i>Median</i>
Behavior (all)	28 (35%)	52 (65%)	39 (49%)	2.53 (0.25)	3
Not enough time for dog behavior (aggression)	28 (47%)	42 (53%)	31 (39%)	1.78 (0.22)	1
Cuts in income	42 (53%)	38 (47%)	23 (29%)	1.66 (0.24)	0
Moving	51 (64%)	29 (36%)	25 (31%)	1.49 (0.24)	0
Vet cost	52 (65%)	28 (35%)	27 (34%)	1.66 (0.26)	0
Food cost	57 (71%)	23 (29%)	17 (21%)	0.95 (0.19)	0
Old/Sick	60 (75%)	20 (25%)	13 (16%)	0.80 (0.18)	0
Dog is too big	69 (86%)	11 (14%)	8 (10%)	0.49 (0.16)	0
Allergies to dog	71 (89%)	9 (11%)	5 (6%)	0.35 (0.13)	0
	73 (91%)	7 (9%)	5 (6%)	0.28 (0.12)	0

## DISCUSSION

In relation to our first hypothesis, the results of our study show that owners relinquishing their dogs were significantly less attached to the dogs. Additionally, they rated their dogs' behavior as less than perfect compared with continuing dog owners. We acknowledge that few dogs in any setting are perfectly behaved in all aspects. Although this result may seem intuitive, our results imply that

TABLE 5  
Owner Income Levels

<i>Income Level</i>	<i>Money Influenced Decision to Relinquish Dog (n = 26)</i>	<i>Money did not Influence Decision to Relinquish Dog (n = 31)</i>
<\$10,000	7	2
\$10,000–29,999	6	6
\$30,000–49,999	4	4
\$50,000–69,999	3	4
\$70,000–89,999	5	7
\$90,000–109,999	0	4
\$110,000 or greater	1	4

*Note.* Owners indicated if their decision to relinquish their dogs was influenced by veterinary costs, food and other animal costs, unemployment or other cuts in income by responding to the question, "How much did each of the following influence your decision to relinquish this dog to the shelter?" ( $n = 57$ ).

there was a break in the owner-pet bond or there was not a significant bond to begin with for these relinquished dogs compared with those of continuing dog owners. However, we cannot neglect the high likelihood that most, if not all, of these owners struggled with the difficult decision to relinquish their dogs and they might not have had adequate resources to help them during the time that they owned their dogs (DiGiacomo, Arluke, & Patronek, 1998).

Our second hypothesis, that owners of relinquished dogs were less likely to have attended training classes compared with continuing owners, was not upheld. One study failed to show a relationship between problem behaviors and attendance at obedience training classes (Voith, Wright, & Danneman, 1992). However, these data may have been skewed by two separate factors: the low number of owners who took their dogs to training classes and the fact that owners might not have taken the specific dogs in the study to training classes due to training and experience through the ownership of another dog, which was information we did not solicit (Shore, Burdsal, & Douglas, 2008).

Our third hypothesis, that relinquishing owners were more likely to have used punishment-based techniques/tools than continuing owners, was not upheld. Although there was not a difference in the frequency of use with punishment-based collars in either the relinquishing or continuing groups, the use of punishment-based methods of training, including use of choke and prong collars, was associated with greater dissatisfaction with their dogs' leash-walking behavior, which is consistent with another study (Hiby et al., 2004).

Whether owners decide to use these types of tools because of the behavior of their dogs or whether the use of these types of tools is at least in part a cause of problematic behavior remains to be determined. If we encourage owners to select dogs based on compatible behaviors, provide an appropriate environment, and train using positive reinforcement methods, we may be able to enhance the human-animal bond and decrease chances of relinquishment to shelters.

Our study partly supported another study in demonstrating a correlation between owner-reported inappropriate behaviors and relinquishment of dogs to shelters (Salman et al., 2000; Salman et al., 1998; Scarlett, Salman, New, & Kass, 1999). It is important that we continue to realize the serious effects that problem behaviors have on the human-animal bond. We did not collect information on the behavior of the dog who remained in the house, so we cannot state whether the relinquished dog was more ill-behaved compared with the remaining dog(s).

Financial concerns ranked near the top, which was likely the result of the serious financial recession that had overtaken the United States for the prior few years, affecting job stability and income. Compared with the rest of the country during the time of data collection, the Sacramento area was greatly affected by high unemployment rate (12.5% during the summer of 2010), furloughs of state government employees, and a high number of home foreclosures (U.S. Department of Labor, n.d.). Although no systematic study has been done regarding

the specific effects of the current financial crisis on relinquishment of dogs and cats to shelters, a review (Nowicki, 2011) summarized the many news reports and statements by shelter managers regarding the increase of relinquished pets to shelters. One such statement was from the director of the SPCA, who stated that there was a 20% increase in relinquishments, identifying foreclosures as the main reason for this increase (Waters, 2008).

There was a study conducted that evaluated the effects of the financial crisis as part of the reason for the sharp increase in the number of unwanted horses in the United States (Holcomb, Stull, & Kass, 2010). However, owners who selected finances or moving as reasons for relinquishing their dogs were as likely to have another dog remaining in their household as those who did not select those reasons for relinquishment. This underscores the likelihood that other reasons, such as behavioral problems, were at least contributing to the owners' reasons to relinquish their dogs.

We recognize that convenience sampling is not the most appropriate manner in which to get complete data. A power analysis was not performed a priori as solicitation for surveys was limited by the researcher's time availability. Some owners of very aggressive-appearing dogs were not interviewed because the interviewer would have had to hold the dog, often Pit bull-type dogs, which could have been a safety issue at vaccination clinics. We are aware that this could have affected our result of Pit bull-type dogs being more likely to be in the relinquished group. However, Pit bull-type dogs are reported to be overrepresented in the population of shelter dogs (Brettman, 2008; DogsBite.org, 2009; K. Hurley, personal communication, October 2, 2012). Our result that owners of Pit bull-type dogs were no more likely to state that they were less than *very satisfied* with their dogs' behavior could have been affected by avoiding interviewing owners holding aggressive dogs.

It would have enhanced the study if owners who requested medical euthanasia for their dogs had been surveyed so that we could fully assess whether there were other reasons for relinquishment aside from medical issues. However, we decided against this so as to not interfere with the owners' grief.

We understand that these data cannot be representative of all populations of dogs in the country or even in Sacramento. We attempted to control between the two groups by soliciting owners attending vaccination clinics at the respective shelters in an assumption that if these owners were to relinquish their dogs, they would return to that particular shelter. However, we cannot predict that this would be the case.

We interviewed two owners who were non-English speakers. In 2010, the percentage of residents in Sacramento County born outside of the United States was 20% (Social Explorer, n.d.). Certainly a lot of them speak fluent English, but approximately 10% of Sacramento-area residents born outside of the United States self-reported that they "speak English less than very well" (CensusScope,

n.d.). This could have affected our results in relation to reasons for relinquishment, owner attachment, and behavioral data. Additionally, owners may be less than truthful when filling out a survey during a potentially emotional time (Segurson et al., 2005). However, by stating in the surveys that confidentiality would be maintained and placing them in closed envelopes at some shelters, we attempted to avoid this issue as much as possible.

To get a more wide-ranging pool of people to fill out the survey, it would be ideal for shelter employees to distribute the survey to every owner relinquishing his or her dog for any reason and to every owner attending vaccination clinics. Without an interviewer present to collect the data regularly, we run the risk of decreased owner compliance and an increased chance of surveys being filled out incompletely, which we determined during the pilot testing phase.

As with all studies that evaluate correlation, we recognize that there are multiple factors that play a role in a companion animal's behavior and the decision to relinquish a pet. We chose to evaluate specific parameters but acknowledge that there are many other factors that play a role in these issues.

## CONCLUSION

Within the limitations of this study, these findings show that the attachment to their dogs was less for relinquishing owners than for continuing owners. It must be stated that there are multiple factors that play a role in their lower attachment. One factor that was elucidated in this study was that owners relinquishing their dogs more frequently stated that they were less than *very satisfied* with their dogs' behavior and that the behaviors of their dogs affected their decision to relinquish them. As a society we should take a multifactorial approach to help keep dogs in their homes, which includes helping owners solve problem behaviors of their dogs with tools that are utilized in humane training.

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