An Analysis of the City of Los Angeles Pet Population and Attitudes Towards Pet Adoption and Spay/Neuter

Doug McKee for Humane America Animal Foundation, 2000

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1. Introduction

This paper reports and analyzes some of the results of a 2-part random-digit dial telephone survey of 517 City of Los Angeles households. Interviews were conducted by Davis Research, LLC in English and Spanish. We identify the key characteristics of the pet population and pet owners, and identify the groups that are most willing to adopt a pet or alter a pet. This information will allow animal welfare groups in Los Angeles to most efficiently target adoption and spay/neuter programs.

Among other things, we found that while ethnic background is a significant predictor of pet ownership, it is not a significant predictor of willingness to adopt a dog. We also found that younger, dog-owning, home-owning households are most likely to be willing to adopt a dog and younger, cat-owning, childless households are most likely to be willing to adopt a cat. We found no significant correlation of ethnic background or age with willingness to alter a pet, but we did find that homeowners between 25 and 40 were most likely to have an unaltered pet.

2. Characteristics of the Pet Population

As shown in the following table, we found that Los Angeles residents are much less likely to have pets than the national average. And while the average number of dogs per dog-owning household was close to the national average (1.48 vs. 1.41), the average number of cats was much lower (1.57 vs. 2.40).

	City of Los Angeles	National (based on 1998/1999 APPMA Pet Owners Study)
Fraction of households with at least 1 dog or 1 cat	26.7%	–
Fraction of households with at least 1 dog	19.9%	39.1%
Fraction of households with at least 1 cat	13.0%	32.1%
Fraction of households with at least 1 dog and 1	6.19%	–
Average number of dogs per dog-owning household	1.48	1.41
Average number of cats per cat-owning household	1.57	2.40

We found that there were slightly more female dogs and cats than male dogs and cats and that while a large fraction of dog owners have altered their pets, cat owners are much more likely to have unaltered pets. Female pets seem to be altered slightly more often than males, with the trend more significant with cats.

	Female	*Male*
Dogs	55.8%	44.2%
Cats	56.9%	43.1%

	Altered	*Unaltered*
Dogs	80.0%	20.0%
Female	77.4%	22.6%
Male	83.3%	16.7%
Cats	67.2%	32.8%
Female	72.7%	27.3%
Male	60.0%	40.0%

By far the most common source of both dogs and cats is either a friend or a relative. Not one cat owner reported getting their cat from a breeder, while the same number of people reported getting their dog from a breeder as from the city pound/shelter. The one cat that was reported as "Other" was from a yard sale. If we aggregate these numbers, we find that about 25% of dogs are coming from pet stores or breeders, about 25% are being adopted from shelters, and about 50% are coming from friends, relatives, the street, or home litters. For cats, on the other hand, we find that only about 10% are coming from pet stores, 35% from shelters, and 55% from friends, relatives, the street, or home litters.

Source of pet	Dogs	Cats
Private charity organization or Humane Society	7%	9%
City pound/shelter	16%	25%
Pet store	10%	9%
Off the street as a stray	10%	11%
Ad in the newspaper	0%	2%
Breeder	16%	0%
Friend or relative	35%	35%
Born in owner's	6%	9%
Other	0%	2%

(Column totals do not necessarily add up to 100% due to rounding)

When we looked at the number of households that feed cats they do not own ("strays"), we found that while there are far fewer households that feed strays than own cats (5% vs. 13%), the fact that the average number of strays fed is much higher (2.53 vs. 1.57) means that fed strays account for 40% of the population of owned and fed stray cats. Similar fractions have been reported for San Diego, CA (35.7%) and Santa Clara County, CA (40.6%) by Karen Johnson et.al. of the National Pet Alliance.

Fraction of households that feed cats they do not own ("strays")	5.0%
Average number of stray cats fed per stray cat-feeding household	2.53

According to the California Department of Finance, there are 3,704,993 people living in households in the city of Los Angeles with approximately 2.973 persons per household.[Ref1] This means there are approximately 1,246,000 households in the city of Los Angeles. We use this number to extrapolate total numbers of dogs, cats and fed stray cats in the city:

	City of Los Angeles
Number of dogs	367,000
Number of unaltered dogs	73,400
Number of cats	254,000
Number of unaltered cats	83,300
Number of fed stray cats	157,600

3. Characteristics of Pet Owners

In the following tables, the percentages shown are of all households that have the column characteristic. Note that this means the percentages next to "Has an altered pet" are of *all households* not just households that have pets.

In the table below, we can see that ethnic background is strongly correlated with whether a household has a pet, but interestingly, it does not seem to affect whether a given household has an unaltered pet or feeds stray cats. This could be partially due to a small number of observations – only 50 households reported having unaltered pets, and just 15 households reported feeding stray cats.

Ethnic background	Caucasian	Hispanic	Asian	African-American	Other	Chi-Square p-value
Has a dog	33.1%	14.1%	8.3%	16.7%	5.3%	< 0.0001
Has a cat	25.5%	5.7%	2.8%	10.0%	15.8%	< 0.0001
Has an unaltered pet	13.4%	8.1%	2.8%	10.0%	10.5%	0.2662
Feeds stray cats	5.1%	3.6%	4.4%	13.6%	12.5%	0.3105

Older people seem much more likely to have cats and feed stray cats, but age seems to have no effect on whether a household has a dog or an unaltered pet.

Age	Under 25	25-34	35-44	45-54	55-64	65+	Chi-Square p-
Has a dog	23.4%	19.6%	21.1%	25.4%	21.9%	9.3%	0.41 07
Has a cat	10.5%	7.0%	13.7%	22.4%	15.6%	14.0%	0.08 33
Has an unaltered pet	9.7%	13.0%	13.7%	3.0%	6.3%	7.0%	0.19 90
Feeds stray cats	4.9%	0.0%	5.1%	8.9%	15.0%	9.5%	0.12 22

Age:	Under 35	35+	Chi-Square
Has a dog	21.3%	20.3%	0.8216
Has a cat	8.8%	16.5%	0.0129
Has an unaltered pet	11.3%	8.4%	0.3569
Feeds stray	2.8%	8.2%	0.0617

In the tables below, you can see that families with very young children have fewer pets than average, but by the time the children are over 13 years old, the family has more pets (altered and unaltered) than average. The feeding of stray cats seems correlated with households having no children, but we don't have enough data to be sure.

Children	Have Children (Under 19 years)	No Children	Chi-Square p-value
Has a dog	18.5%	21.6%	0.5139
Has a cat	10.6%	15.7%	0.2204
Has an unaltered pet	10.6%	9.0%	0.3569
Feeds stray cats	4.0%	6.7%	0.4264

Children	Have Children Under 3 years	No Children Under 3 years	Chi-Square p-value
Has a dog	10.3%	21.5%	0.1312
Has a cat	7.7%	13.8%	0.4409
Has an unaltered net	10.3%	9.8%	1.0000
Feeds stray cats	2.6%	5.7%	0.7020

Children	Have Children From 3 to 7 yrs	No Children From 3 to 7 yrs	Chi-Square p-value
Has a dog	7.4%	22.9%	0.0082
Has a cat	3.7%	15.2%	0.0236
Has an unaltered net	5.6%	10.8%	0.3152
Feeds stray cats	1.9%	6.1%	0.3176

Children	Have Children From 8 to 13 yrs	No Children From 8 to 13 yrs	Chi-Square p-value
Has a dog	20.3%	19.9%	1.0000
Has a cat	15.3%	12.4%	0.5221
Has an unaltered net	15.3%	8.4%	0.1392
Feeds stray cats	3.4%	5.8%	0.7438

Children	Have Children From 13 to 18 yrs	No Children From 13 to 18 yrs	Chi-Square p-value
Has a dog	39.1%	16.3%	0.0010
Has a cat	19.6%	11.7%	0.1540
Has an unaltered pet	17.4%	8.4%	0.0987
Feeds stray cats	4.4%	5.4%	1.0000

Households that own houses (as opposed to apartments or other types of dwellings) are much more likely to have dogs and significantly more likely to have cats. While having a house also makes a large difference in the likelihood of having an unaltered pet, it seemingly makes no difference in whether the household feeds stray cats.

House	Own a House	Does not Own a House	Chi-Square p-value
Has a dog	40.2%	9.2%	<0.0001
Has a cat	20.6%	8.7%	0.0077
Has an unaltered pet	17.5%	4.9%	<0.0001
Feeds stray	6.2%	4.9%	0.7807

4. Assessing Willingness to Adopt

While the percentages of people willing to adopt pets are small, they add up to a fairly large number of people – much larger than the 33,738 dogs and 22,518 cats that were euthanized by the City of Los Angeles according to the city's Department of Animal Services.

	Fraction of households willing to adopt	Total households willing to adopt in City of LA
Dog	9.5%	118,370
Cat	7.7%	95,942
Dog or Cat or both	11.8%	147,028
Dog and cat	3.3%	41,118

When people responded that they were unwilling to adopt a dog or cat, we asked them why. The top 3 reasons people gave for not being willing to adopt a dog were:

1. Don't like dogs   (30%)
2. Not allowed where I live (14%)
3. Can't afford one   (10%)

The top 3 reasons people gave for not being willing to adopt a cat were:

1. Don't like cats   (31%)
2. Allergic to cats   (13%)
3. Not allowed where I live (11%)

While we did not have enough observations to accurately perform a Chi-Square test of significance on the correlation between ethnic background and willingness to adopt, we did have enough data to perform the test between Caucasians and Hispanics. This test showed no significant correlation with dogs (p-value: 0.5717). Based on the fact that most groups looking to adopt out dogs primarily serve the Caucasian community, it looks like the Hispanic community could be seriously under-served. The difference in willingness to adopt cats between Caucasians and Hispanics, on the other hand, *is* significant (p-value=0.0062).

Ethnic background	Caucasian	Hispanic	Asian	African-American	Other	Chi-Square p-value
Willing to adopt a dog	10.6%	8.5%	11.8%	7.1%	16.7%	N/A
Willing to adopt a cat	12.9%	4.5%	8.8%	7.1%	16.7%	N/A

We observe there are significant differences with age group, and if we categorize people in just two age groups, the difference in willingness is even more apparent:

Age	Under 25	25-34	35-44	45-54	55-64	65+	Chi-Square p-
Willing to adopt a dog	18.7%	9.7%	5.8%	7.4%	0.0%	7.7%	0.0131
Willing to adopt a cat	15.9%	7.8%	4.6%	7.4%	3.6%	0.0%	0.0135

Age:	Under 35	35+	Chi-Square
Willing to adopt a dog	14.3%	5.8%	0.0052
Willing to adopt a cat	11.9%	4.3%	0.0065

There seems to be a tendency for people with children to be less likely to be willing to adopt a cat, and even though it is not significant given our limited number of observations, it could become significant with a greater sample size. On the other hand, while it looks like there is no correlation between having children and being willing to adopt a dog, the truth seems a little more complex when you look at children of different ages:

Children	Have Children (Under 19 years)	No Children	Chi-Square p-value
Willing to adopt a dog	10.6%	9.0%	0.6936
Willing to adopt a cat	5.3%	9.0%	0.2526

It looks like when families have younger children they tend to want pets less, but as the children grow older (after age 8), they reverse and become more willing to adopt an pet. Of course, none of these trends is significant, but this is most likely due to our small sample size.

Children	Have Children Under 3 years	No Children Under 3 years	Chi-Square p-value
Willing to adopt a dog	7.7%	10.1%	0.7785

Children	Have Children From 3 to 7 yrs	No Children From 3 to 7 yrs	Chi-Square p-value
Willing to adopt a dog	5.6%	10.8%	0.3152

Children	Have Children From 8 to 13 yrs	No Children From 8 to 13 yrs	Chi-Square p-value
Willing to adopt a dog	10.2%	9.7	0.5423

Children	Have Children From 13 to 18 yrs	No Children From 13 to 18 yrs	Chi-Square p-value
Willing to adopt a dog	13.0%	9.2	0.4201

The trend of homeowners being more willing to adopt a dog looks significant, but there is no correlation between homeowners and willingness to adopt a cat.

House	Own a House	Does not Own a House	Chi-Square p-value
Willing to adopt a dog	13.4%	7.0%	0.0866
Willing to adopt a cat	7.2%	6.5%	0.8068

Dog owners and especially cat owners are both significantly more willing to adopt another of the same pet than those people who do not have that kind of pet.

Other Pets	Already own the same kind of pet	Does not already own the same kind of pet	Chi-Square p-value
Willing to adopt a dog	15.8%	8.5%	0.0903
Willing to adopt a cat	18.9%	6.7%	0.0164

Calculating probabilities of willingness to adopt a dog

Once we established the correlations between willingness to adopt and several demographic variables, we estimated how likely a household is to be willing to adopt a

dog or a cat given that we know several things about the household. In particular, assumed the following factors were relevant:

• Age of the person responsible for pets in the household or the head of household if the household doesn't have any pets
• Whether the household currently owns a dog
• Whether the household owns a house

A *logit model* does exactly what we want: it is a function calculated from observed data that will estimate probabilities. To calculate our model, we choose the following variables:

YoungOld: Has the value "1" if the person responsible for pets in household or the Head of household if the household doesn't have any pets is under 35; "0" otherwise
HasDog: Has the value "1" if the household currently owns a dog; "0" otherwise
OwnHouse: Has the value "1" if the household owns a house; "0" otherwise

When we calculated the model to predict willingness to adopt a dog, we got the following coefficients:

Coefficient	Estimate	Standard Error	P-Value
_0 (Intercept)	-2.1387	0.2460	<0.0001
_1 (YoungOld)	0.5887	0.2369	0.0130
_2 (HasDog)	0.3522	0.2419	0.1454
_3 (OwnHouse)	0.3306	0.2279	0.1469

When a coefficient is positive, the corresponding variable increases the probability of a household being willing to adopt a dog. For example, since the coefficient of YoungOld is positive (0.5887), this means that younger households are more willing to adopt a dog

than older households. This confirms what we learned in doing the correlations above, except here we are correcting for the other variables.

Based on this model, dog adoption programs that target young, dog-owning, home-owning households should be significantly more successful programs than similar programs that target the population at large. The following table shows the probabilities predicted by the model for all possible combinations of these variables. In particular, note that a young household that has a dog and owns a house has almost a 30% probability of being willing to adopt a dog:

	Predicted Probability of Willingness to Adopt	Standard Error
Total Population	0.095	0.014
Young, HasDog, OwnHouse	**0.296**	**0.091**
Young, HasDog, NoOwnHouse	0.178	0.075
Young, NoDog, OwnHouse	0.172	0.060
Young, NoDog, NoOwnHouse	0.097	0.028
Old, HasDog, OwnHouse	0.115	0.049
Old, HasDog, NoOwnHouse	0.063	0.036
Old, NoDog, OwnHouse	0.060	0.028
Old, NoDog, NoOwnHouse	0.032	0.015

Calculating probabilities of willingness to adopt a cat

We used exactly the same method to estimate probabilities of willingness to adopt a cat, this time using the following variables:

YoungOld: 1 if the person responsible for pets in household or the head of household if the household doesn't have any pets is under 35, 0 otherwise.
HasCat: 1 if the household has at least one cat, 0 otherwise.
HasChildren: 1 if the household has at least one child under 19, 0 otherwise

Coefficient	Estimate	Standard Error	P-Value
_0 (Intercept)	-0.2320	0.2921	<0.0001
_1 (YoungOld)	0.8403	0.2959	0.0045
_2 (HasCat)	0.9301	0.2833	0.0010
_3	-0.4431	0.2531	0.0800

Based on this model, cat adoption programs targeting young, cat-owning, childless households should be significantly more successful than similar programs targeting the population at large. The following table shows the probabilities predicted by the model for all combinations of these variables. Note that the probability of a young household that has at least one cat already and no children has nearly a 50% probability of being willing to adopt a cat. Also note that this estimate may not be very accurate since the standard error is quite high at 0.147.

	Predicted Probability of Willingness to Adopt a Cat	*Standard Error*
Total Population	0.077	0.012
Young, HasCat, HasChildren	0.288	0.122
Young, HasCat, NoChildren	**0.495**	**0.147**
Young, NoCat, HasChildren	0.059	0.022
Young, NoCat, NoChildren	0.133	0.046
Old, HasCat, HasChildren	0.070	0.043
Old, HasCat, NoChildren	0.155	0.072
Old, NoCat, HasChildren	0.012	0.008
Old, NoCat, NoChildren	0.028	0.015

5. Assessing Willingness to Alter a Pet

Given that there were only 50 households in the survey that had unaltered pets, it was difficult to identify any strong correlations. Since our first survey did not distinguish between dogs or cats when asking if households were willing to alter their pet, we have an even smaller number of observations (21) that distinguish between dogs and cats. For this reason, we only look for correlations with willingness to alter a pet and do not attempt to estimate any models.

	Fraction of households with unaltered pets that are willing to alter them	Total households in City of LA with unaltered pets that are willing to alter them
Willing to alter pet	63%	75,900
Willing to alter dog	59%	41,400
Willing to alter cat	54%	28,900

The reason the willingness to alter a pet looks higher than the willingness to alter a dog or a cat is that participants in part one of the survey were slightly more likely to say they were willing to alter their pets than in part two, and we only have responses the distinguish between dogs and cats in the second part of the survey.

	Caucasian	Hispanic	Chi-Square p-value
Willing to alter pet	71% (15/ 21)	58% (11/ 19)	0.5096

While it looks like Hispanics may be slightly less willing to alter their unaltered pets, the truth is that we don't have enough data to reliably conclude this.

Age:	Under 35	35+	Chi-Square
Willing to alter pet	58%	65%	0.762

Since all people with unaltered pets seem fairly equally likely to be willing to alter their pets, it makes more sense to try and model what groups of people are most likely to have unaltered pets, since we have more data on this.

Logit Model to predict ownership of an unaltered pet:

MiddleAge: 1 if the person responsible for pets in household or the head of household if the household doesn't have any pets is between 25 and 45, 0 otherwise.
OwnHouse: 1 if the household resides in a house and owns that house.

While it looked from the correlations that having older children could be a good predictor, it turned out that having older children is actually highly correlated with middle age, and middle age is a much better predictor.

Prob(Has an Unaltered Pet) = F($\_0$ + $\_1$*MiddleAge + $\_2$*OwnHouse)

	Estimate	Standard Error	P-Value
$\_0$ (Intercept)	-2.2365	0.2205	<0.0001
$\_1$ (MiddleAge)	0.4717	0.2154	0.0285
$\_2$ (OwnHouse)	0.7516	0.2203	0.0006

Based on this model, spay/neuter programs that target middle-aged homeowners should be significantly more successful programs than similar programs that target the population at large. The following table shows the probabilities predicted by the model for all possible combinations of these variables:

	Predicted Probability of Having an Unaltered Animal	*Standard Error*
Total Population	0.097	0.013
MiddleAge, OwnHouse	**0.219**	**0.063**
MiddleAge, NoHouse	0.064	0.026
NotMiddleAge,	0.152	0.041
NotMiddleAge,	0.042	0.015

Stray Cats

In the second part of our survey, we asked people who feed stray cats if they would be willing to capture and bring cats to be altered if they were provided with the necessary equipment and instruction, and the surgery was free. While we only found 15 people who fed strays, it turned out that 33% of them (5 of the 15) would be willing to do this. This extrapolates out to 62,000 households in Los Angeles that would be willing to capture and alter stray cats.

6. Survey Analysis Methodology

Part one of our random digit dial telephone survey was conducted by Davis Research during November 1999 and contains 215 observations. We made significant improvements for the second part of the survey and gathered 302 observations during December 1999. Some of the information gathered by the second survey that was not gathered by the first included:

- Distribution of children in the household
- Type of dwelling
- If the household feeds cats that it doesn't own (e.g., stray cats)
- More detail on what pets are and are not altered in the household

Wherever possible, we have pooled the observations, giving us a total of 517. To verify when results were mergeable, we performed Fisher's Exact Chi-Square tests for all comparable categorical variables (e.g., any Yes/No questions) and t-tests for means of the numerical variables (e.g., number of dogs in household).

Category variable	*P-value for Fisher's Exact Test*
Has pet	0.3653
Has dog	0.5037
Has cat	0.5966
Has unaltered pet	0.7635
Willing to adopt a dog	0.8633
Willing to adopt a cat	0.4572
Willing to alter their unaltered pet	0.3771
Under or over 35 years old	0.4570
Ethnic background	0.1356

Numeric variable	P-value for t-test
Number of dogs	0.7951
Number of cats	**0.0426**

Two variables occurred in both surveys but turned out to be unmergeable. First was the number of cats reported per household. We believe the problem with the number of cats is due to the fact that on the first survey we did not make it clear that people should not include any stray cats they may be feeding when calculating the number of cats they have. Second was the source of the pet, the reason being that we recoded the possible categories for the second part of the survey.

Interviews were conducted in English and Spanish.

As an informal verification that our data sampling was indeed random, we compared our observed ethnic distribution of the City of Los Angeles with the ethnic distribution of the County of Los Angeles reported by the California Department of Finance in 1997. The two are indeed similar:

	Caucasian	Hispanic	African-American	Asian	Native American/ Oth
Our study	32%	51%	7%	6%	4%
CA Dept of Finance, 1997	34%	43%	12%	10%	0%

The discrepancy can be explained by the following:
 • Real differences between Los Angeles County and City of Los Angeles
 • Increased size of the Hispanic community since 1997
 • Miscoded answers for the "Other" category

All refusals to answer questions were coded as missing responses. In part one of the survey, if someone answered "Don't Know" to one of the "Would you consider adopting…" questions, this was coded as a "No". We requested income information in part two of the survey, but were unable to use it since over 70% of our respondents refused to answer the question.

All Chi-Square test results for 2x2 matrices reported are Fisher's Exact.

7. References

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