ORIGINAL RESEARCH ARTICLE

Who Cares? Exploring the Demographics and Proportion of People Providing Care for Community Cats in Seven Study Communities in the United States

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Abstract

Introduction: While several studies have evaluated the demographics of pet ownership in the US, few studies have explored the demographics and proportion of the population that feed community cats. This research examines these questions in seven geographically diverse study communities. The concept of capacity for caring is advanced as a way to quantify a community's ability and willingness to provide for community cats.

Methods: A web-based panel survey was distributed and received 6,318 responses. The survey was administered in seven different study communities as part of a larger survey. Individuals were asked a series of demographic and socioeconomic questions as well as whether they fed community cats.

Results: The profile of people feeding community cats is diverse with Black and Hispanic respondents emerging as more likely to feed cats than White respondents. Results indicate that an average of 30% of people feed community cats, and that most feed three or fewer cats. Significant variation in the proportion of people feeding cats is seen across the seven study communities, perhaps driven by the number of cats in the different communities. Confirming findings of previous studies, individuals who have pets of their own are also significantly more likely to feed community cats.

Conclusion: The results indicate that communities have a relatively high capacity to care for community cats. This research also adds an equity perspective to programs aimed at removal of community cats from their spaces. Cat caregivers are diverse and generally reflect their respective communities. Policymakers should consider the impact to the cats and their caregivers before implementing programs that target removal of community cats from their outdoor homes.

Keywords: *community cats*; *feral cats*; *feeding cats*; *DEI*

In the United States, stray cat intakes greatly exceed the number of owner surrendered intakes and contribute disproportionately to the number of the animals euthanized each year.[1] Yet, many of these cats are thriving in their outdoor environment and are cared for by the humans who share their community.[2] When considering programs such as returning socialized cats to the field, some groups may be concerned that there will not be anyone caring for the cats. One way to consider this is to explore a community's Capacity for Caring, a measure of the potential proportion of the community that would provide for cats they do not own. Identifying the proportion of community members providing care for these animals as well as exploring the socioeconomic profile of these individuals can provide much insight into the capacity for caring.

It is also important to note that the cats are not the only beneficiary of this caring. Recent research by Neal and Wolf has found that individuals providing care for community cats are just as attached to their cats as individuals who 'own' cats.[2] Programs that result in the killing of healthy community cats have been shown to cause distress among individuals who had been caring for them.[3]

Existing data about feeding free-roaming cats

A few surveys over the years have been done on this topic. These surveys have shown that feeding 'stray' cats is a relatively common activity (10–26%, depending on the survey).[4–9] Table 1 provides a summary of the surveys found in a review of the literature. It is important to note that the surveys vary in geographic focus and

Table 1. Past surveys on the feeding of free-roaming cats

Survey year	Reported by	Method/Location	Results
1999	Levy et al., 2003	Random-digit telephone survey of 587 households in Alachua County, FL	12% of households and 14% of pet-owning households *(and 17% of cat owners)* fed unowned free-roaming cats
2005	Kass et al., 2013	Random-digit telephone survey of 1,000 households in Santa Clara County, CA	7% of households fed stray cats
2007	Lord, 2008	Random-digit telephone survey of 703 Ohio residents	26% of respondents *and 53% of cat owners* reported feeding free-roaming cats during the previous year
<2014	Levy et al., 2014	Random-digit telephone survey of 446 households in one target zip code of Alachua County, FL	11% of respondents reported feeding an average of 4.3 community cats each
2016	APPA, 2017–2018 Survey	Online survey with a national sample of 12,581 pet owners	17% of **pet owners** cared for free-roaming cats, 93% of them providing food and water
2018	APPA, 2019–2020 Survey	Online survey with a national sample of 10,090 pet owners	14% of **pet owners** cared for free-roaming cats, 91% of them providing food and water

ways of reporting the proportions, and few reported the exact questions used, which makes direct comparisons challenging.

A 1999 random-digit telephone survey of 587 households in Alachua County, Florida, found that 12% of households and 14% of pet-owning households fed free-roaming cats, with 3.6 free-roaming cats fed per household on average. Households that fed free-roaming cats were more likely to own pet cats than households that did not feed free-roaming cats.[4] They reported that residence type (single-family detached vs. attached) and percent of college students (student vs. not) were not significantly different than those who did not feed cats.

Kass et al. reported the results of a 2005 random telephone survey with 1,000 households throughout Santa Clara County, California (except Palo Alto). Results found that 'many individuals fed stray cats: 7% of household respondents admitted to feeding an average of 3.2 cats, a decrease from 10% with an average of 3.4 cats in 1993'.[5]

In another survey, Lord used a random-digit-dialing telephone survey of Ohio residents 18 years and older in order to characterize attitudes toward and perceptions of free-roaming cats. She found that 184 of 703 respondents (26.2%) 'reported that they had fed free-roaming cats during the previous year', and that 'rural residents were significantly more likely to feed free-roaming cats than suburban or urban residents'.[6] Levy et al. conducted a randomized telephone survey of households in one target zip code of Alachua County, Florida, finding that 11% of respondents 'acknowledged feeding an average of 4.3 community cats each. Feeders cared for cats primarily in their own neighborhoods (*n* = 23, 47%) or on their own properties (*n* = 13, 27%)'.[7]

More recently, according to the American Pet Products Association, an estimated 17% of pet owners feed free-roaming cats, and 26% of cat owners cared for free-roaming cats as of 2016, wherein 93% of cases care

included food and water.[8] In a similar survey in 2018, APPA reported 14% of pet owners cared for free-roaming cats.[9]

Demographic data on who is feeding cats are even more limited as previous studies about feeding free-roaming cats either surveyed a narrow geographical area, did not report the demographic data of people feeding cats, or relied on a sample drawn from association with a community cat organization. For example, Neal and Wolf[2] surveyed individuals associated with Alley Cat Advocates, a nonprofit organization that provides care for community cats in Jefferson County, Kentucky. They reported that caregivers to community cats tended to identify as White (91% of 290 caregivers surveyed) and female (78% of caregivers), with an income distribution fairly similar to the present study, with slightly less people in the higher income tiers ($75k and above) and more in the range of $35k–$75k. Likewise, Zasloff found similar demographic trends in caregivers in Hawaii. They surveyed 75 caregivers of free-roaming cats and reported 74% of them were female, 58% White, and 92% were pet owners, most of them having cats. They also report the income distribution of participants, which, when converted to 2021 terms, is fairly similar to that of cat feeders in the current study as reported in Table 2.[10]

Another limitation of these studies is that they relied on a sample population derived from individuals affiliated with community cat organizations. Animal welfare volunteers overall typically skew White and female, and so the findings here are not surprising.[11] For example, in a study of 426 animal welfare volunteers, 90% identified as female and 93% as White, both of which were found to be significantly higher than their respective rates for the general volunteer population (which was characterized by a 2007 Bureau of Labor Statistics report on volunteering in the US).[11] Furthermore, stereotypes persist about who cares for community cats with even formal research extending the idea of the 'crazy cat lady' or the cat caregiver as mentally ill or a science denier.[12,13]

Understanding the demographics of individuals providing care for free-roaming cats is one way to identify which portions of the population may most benefit from programs that serve these cats (such as access to sterilization and vaccination as well as follow-up medical care). Furthermore, demographics can show which human populations are negatively impacted by public policies that prevent activities like Trap, Neuter, and Release. This research aims to contribute to this understanding by generating a better understanding of the demographics of cat caregivers and the portion of the population they represent through a large sample of survey respondents from seven geographically diverse regions in the United States.

Methods

Data collection

Seven unique study communities were selected based on two sets of criteria. First, communities were part of the Humane Animal Support Services (HASS) Pilot Program Partners, and second, communities were geographically diverse in terms of regional location in the US. HASS is a national, nonprofit organization that seeks to encourage innovation and community collaborations to improve outcomes for animals and people.[14] There are 22 Pilot Partners who are active participants in their programs and commit to sharing data with HASS.[14] Study communities were generally defined by their Metropolitan Statistical Area (MSA). Metropolitan Statistical Areas are developed by the Office of Management and Budget and represent groups of entire counties that have high levels of interaction surrounding population centers.[15] Exceptions were made in lower population study communities, where the feasibility of achieving the desired sample size was deemed unlikely due to small or nonexistent MSAs. In these instances (Cabot, Arkansas, and New Hampshire), general geographic areas were used as large as necessary to achieve a feasibility likelihood for the desired sample size. In these two instances, entire states were included in the recruitment. The study communities included Cabot, Arkansas; Dallas, Texas; Fresno, California; Detroit, Michigan; Palm Valley, Texas; and Washington, D.C. Desired sample size was estimated at 1,000 responses with a goal of having adequate statistical power and confidence for the various demographic groups being analyzed.

This research relied on the distribution of a web-panel survey that was electronically administered from June to July of 2021. Please see Appendix 3 for a copy of the survey questions used in this research. Recruitment was managed through a survey company, which uses a database of individuals who have expressed a willingness to complete surveys. The recruitment email did not indicate that the survey was related to animals or animal ownership and instead a representative sample of the communities was sought. Upon agreeing to participate in the survey, all respondents were asked 'Do you put out food for stray cats in the neighborhood that do not sleep in your house?' All respondents were also asked a series of demographic questions. Participants were then asked a screener question about whether or not they currently or recently owned pets. Those who responded affirmative then completed a series of additional questions not included as part of this research. For those who did not own any animals recently, the survey was ended. This research focuses on the question listed above about feeding stray cats, the demographic questions, and whether those feeding cats currently own pets.

Data analysis

Analysis was carried out in R (version 4.2.2). To evaluate the demographic make-up of people who fed cats, two comparisons were made. First, the full survey sample in each study community was compared to the demographic profile of that community, to evaluate the representativeness of the survey responses. Then, the demographic make-up of people who fed cats in each community and across the whole survey sample was compared to those who did not feed cats.

For the first comparison, a demographic profile of each study community was constructed by aggregating data from all counties, from which the study community had survey responses. The indicators included in the comparison were race/ethnicity, income, education, and homeownership status. County-level data for each of these indicators were obtained from the 2022 5-year American Community Survey using the Census API. For income and education, values were grouped to match the survey questions (e.g. people earning <$10,000 and $10,000–15,000 were joined to match the survey's <$15,000 group). For each variable, only responses with missing values for that variable were removed: 388 for income (30–75 in each community), five for race, zero for education, and five for homeownership status.

Appendix 1 shows the full comparison of each study community's sample to its aggregated Census data. Overall, the survey sample is representative of the various study communities, with two exceptions that are apparent across communities: the survey sample under-represents Hispanic people as well as people at the highest income group of $150,000 and more. While this is a minor limitation of the study, the under-representation does not have a significant impact on the conclusions of the research. Given the generally representative nature of the respondents, no attempt at weighting the results was made. Appendix 2 shows the list of counties that make-up each study community based on the survey responses.

For the second comparison, between feeders and non-feeders in each community and across the whole

Table 2. Number of responses and percentages of cat caretaking by study community

Study community	N (% of survey)		Feed free-roaming cats (% of respondents)		Pet owners		% of pet owners who feed free-roaming cats	
	n	%	*n*	%	*n*	%	*n*	%
Cabot	864	14	264	31	674	78	264	39
Dallas	993	16	315	32	736	74.1	315	43
Fresno	875	14	287	33	722	82.5	287	40
Metro Detroit	1,113	18	295	26	734	65.9	295	40
New Hampshire	871	14	130	15	628	72.1	130	21
Palm Valley	629	10	295	47	531	84.4	295	56
Washington DC	973	15	242	25	663	68.1	242	36
Summary	6,318		1,828	29	4,688	74	1,828	39

survey, the variables used were the same ones listed above. Categories reported were exactly as chosen by respondents in the survey. Results are reported in a table as absolute numbers and percentages. Respondents with a missing value in either variable (race, income, education, homeownership) were only removed from the comparison of that variable.

Additionally, chi-square tests were performed for each pair of study community and demographic variable to evaluate whether the distribution of feeders and non-feeders was different for that variable and study community. For this analysis, 5,930 records with complete data for all four variables were used out of the 6,318 valid survey responses. Additionally, race/ethnicity values that were consistently low across communities – American Indian/Alaska Native (23 responses in the survey), Asian (79), multiple races (48), other (10), and Native Hawaiian or other Pacific Islander (6) – were all grouped to the 'Other' category for the race/ethnicity chi-square test. Finally, five comparisons were modified to remove categories that had less than five respondents in their contingency table entry: in Palm Valley and New Hampshire, Black respondents were removed from the race/ethnicity comparison between feeders and non-feeders (four and seven Black respondents from these communities, respectively); in Dallas and Washington DC, lower-than high school was removed from the education (22 and 14 total respondents, respectively), and in Palm Valley, $150,000+ was removed from the income category (20 respondents in total).

As another way to analyze the data, univariate logistic regression models were fit for each of the demographic variables predicting feeding outdoor cats as well as a multivariate logistic regression model containing all of them together. This can help isolate the overlap between the demographic variables. The primary goal of the model was not as much to create a strong predictive model of feeding cats and more about identifying whether trends that seemed true in the bivariate analysis hold true when also holding other demographic variables constant. The

independent variables entered into the model were annual income group, race/ethnicity, own/rent housing, housing type, study community, and current pet ownership status. The categorical variables were split into dummy variables with the reference categories being < $15k annual income, White, own house, multifamily with outdoor access, Cabot (study community), and currently do not have any cats or dogs residing in their household.

For the multivariate analysis, only they complete 5,930 records were used. For the univariate analysis, the records with complete data for that variable were used. Additionally, in both models, when using race/ethnicity as a variable, the values with under 100 responses were grouped into the 'Other' group as described for the chi-square analysis.

Results
Table 2 provides the number of responses by study community, the number and percentage of respondents who indicated they fed community cats, and the number and percentage of pet owners (people who currently had a dog or cat in their household) who fed community cats.

Table 3 presents the demographic profile of people who fed cats (feeders) and those who did not. The results of the chi-square tests for the study communities and demographic variables are then shown in Table 4.

The results of the bivariate models are summarized in Table 5. Each section shows value for a separate model with that variable predicting feeding outdoor cats. The results of the multivariate model are then summarized in Table 6.

For all respondents who reported feeding outdoor cats, data on the number of cats they usually feed are presented in Table 7. The mean number of cats fed was 2.48, and the median was 2.00.

Discussion
The results of this work indicate that a very diverse group of people have the potential to benefit from programs aimed

Table 3. Comparing the demographic profile of cat feeders (F) and non-feeders (N) in the survey

Variable	Cabot		Dallas		Fresno		Metro Detroit		New Hampshire		Palm Valley		Washington DC		All combined	
	N[a]	F[a]	N	F	N	F	N	F	N	F	N	F	N	F	N	F
Race/Ethnicity																
Asian	0.8	1.5	4	4.1	5.6	5.2	4.3	4.4	2.4	3.8	1.2	2	8.5	9.5	4.1	4.3
Black or African-American	18.2	19.3	12.1	14.9	4.8	7	17	25.8	0.4	3.1	0.6	0.7	12.1	14.5	10.1	12.9
Hispanic or Latinx	2	2.7	7.1	9.8	31.1	32.1	1.3	1.7	2.2	6.2	67	70.5	4.8	9.5	11.8	20.5
Multiple races	2.7	0.8	2.9	1.6	6	6.6	2.6	3.1	2.2	3.1	1.8	1.4	2.5	2.1	2.9	2.6
American Indian/ Alaska Native	1.5	1.9	0.7	1	1.9	2.4	0.5	0.3	0.1	1.5	0.3	0.7	0.4	1.2	0.8	1.3
Native Hawaiian or other Pacific Islander	0.2	0.4	0.4	0	0.3	0.7	0.2	0.3	0.1	0.8	0	0	0.3	0.4	0.2	0.3
Other	0.3	0	0.1	0.3	1.4	0.7	1.1	0.7	1.2	0.8	0.6	0.7	0.7	0.8	0.8	0.5
White	74.3	73.5	72.6	68.3	49	45.3	72.9	63.7	91.4	80.8	28.5	24.1	70.8	62	69.3	57.6
Income																
<15k	18.9	21.6	7.1	7.2	16.1	17	8.1	13.7	7.3	8.8	20.8	18.8	5.7	4.2	10.8	13.4
15–35k	28.3	30.2	17.3	8.8	20.6	22.9	18	14.4	18.9	25.6	26.6	27.5	9.5	9.7	19	19.3
35–50k	14.1	16.5	9.9	10.4	18	15.1	15.6	13	14.6	13.6	11.5	17.4	8.2	13.6	13.1	14.2
50k–75k	18.5	14.1	21.4	16.6	20.2	17	21.9	16.9	19.2	16	16.7	9.4	15.4	14	19.2	14.8
75k–100k	10.7	7.1	14.6	17.6	9.1	12.5	13	10.9	16.5	11.2	12.8	11.5	15.3	16.9	13.4	12.7
100k–150k	6.4	7.5	17.1	23.8	11.9	10	14.7	16.2	14.8	18.4	10.3	9.8	21.8	25	14.5	15.6
150k+	3.2	3.1	12.7	15.6	4.2	5.5	8.6	14.8	8.8	6.4	1.3	5.6	24.2	16.5	10	10
Education																
<High School	6.5	7.2	2.8	1	4.8	5.9	3.2	2	3.1	6.2	3.3	4.7	1.9	0	3.6	3.7
High School	33	40.2	23.5	21.3	32	33.1	23.2	26.8	29	31.5	30.8	30.5	13.7	16.5	25.7	28.3
Some College	25.7	23.5	23.3	12.1	25.9	21.3	19.8	15.9	18.5	25.4	25.1	26.4	15.6	14	21.4	19.3
Associate	9.8	6.4	6.8	9.5	9.9	13.6	9.9	8.1	13.2	8.5	13.2	11.5	7.7	8.7	9.8	9.6
Bachelors	16.8	12.9	27.7	27	17.7	14.3	29	20.3	22.1	21.5	19.2	20	32.1	35.1	24.3	21.4
Graduate	8.2	9.8	15.9	29.2	9.9	11.8	14.9	26.8	14	6.9	8.4	6.8	29	25.6	15.2	17.6
Homeownership																
Own	60.9	54.9	67.3	73.7	51.7	51.9	72.8	70.2	60.6	47.7	61	63.7	67.2	69.4	63.8	63
Rent	39.1	45.1	32.7	26.3	48.3	48.1	27.2	29.8	39.4	52.3	39	36.3	32.8	30.6	36.2	37

[a]F: feeders, N: non-feeders. All values are in percentages.

Table 4. Chi-square test results for each community and demographic variable

	Race		Income		Education		Homeownership	
Study community	χ^2	*P*	χ^2	*P*	χ^2	*P*	χ^2	*P*
Cabot	0.54	0.91	6.22	0.40	7.39	0.19	1.75	0.19
Dallas	6.47	0.09	19.42	<u>0.00</u>	33.23	<u>0.00</u>	3.64	0.06
Fresno	1.29	0.73	5.80	0.45	9.49	0.09	0.03	0.87
Metro Detroit	13.09	<u>0.00</u>	20.46	<u>0.00</u>	28.21	<u>0.00</u>	0.66	0.42
New Hampshire	11.20	<u>0.00</u>	6.16	0.41	10.23	0.07	7.11	<u>0.01</u>
Palm Valley	4.09	0.13	9.93	0.08	6.00	0.31	0.00	0.98
Washington DC	10.89	<u>0.01</u>	12.13	0.06	3.37	0.50	0.02	0.89
All Combined	97.55	<u>0.00</u>	23.55	<u>0.00</u>	16.2	<u>0.01</u>	0.68	0.41

Columns on the left indicate the chi-square value and the *P*-value on the right. Underlined values are $P < 0.05$.

Table 5. Separate univariate logistic regression model predicting feeding outdoor cats

Predictors[a]	Estimates	CI[b]	P[c]
Intercept	0.34	0.31 − 0.38	**<0.001**
Income [15–35k]	−0.04	−0.09 − 0.00	0.050
Income [35–50k]	−0.03	−0.08 − 0.02	0.208
Income [50–75k]	−0.10	−0.14 − −0.05	**<0.001**
Income [75–100k]	−0.06	−0.10 − −0.01	**0.016**
Income [100–150k]	−0.03	−0.08 − 0.01	0.184
income [150k+]	−0.05	−0.10 − 0.00	0.065
Intercept	0.26	0.25 − 0.28	**<0.001**
Race/Ethnicity [other]	0.04	−0.00 − 0.08	0.069
Race/Ethnicity [Latino]	0.16	0.13 − 0.19	**<0.001**
Race/Ethnicity [Black]	0.09	0.05 − 0.13	**<0.001**
Intercept	0.29	0.28 − 0.31	**<0.001**
Own rent [rent]	0.01	−0.01 − 0.03	0.393
Intercept	0.35	0.33 − 0.38	**<0.001**
Housing [attached multifamily without outdoor access]	−0.08	−0.13 − −0.04	**<0.001**
Housing [detached single family]	−0.07	−0.09 − −0.04	**<0.001**
Housing [other]	−0.11	−0.17 − −0.05	**<0.001**
Intercept	0.31	0.28 − 0.34	**<0.001**
Study community [Dallas]	0.01	−0.03 − 0.06	0.542
Study community [Fresno]	0.03	−0.02 − 0.07	0.234
Study community [Metro Detroit]	−0.04	−0.08 − 0.00	0.067
Study community [New Hampshire]	−0.16	−0.20 − −0.11	**<0.001**
Study community [Palm Valley]	0.17	0.12 − 0.21	**<0.001**
Study community [Washington DC]	−0.06	−0.10 − −0.01	**0.009**
Intercept	0.13	0.11 − 0.15	**<0.001**
Has pet [Dog]	0.10	0.07 − 0.13	**<0.001**
Has pet [Cat]	0.18	0.14 − 0.22	**<0.001**
Has pet [Both Dog and Cat]	0.40	0.37 − 0.43	**<0.001**
Observations		5,930	

[a]Reference values in the model were set as follows: <$15k (annual) income, White, owns their house, housing type of multifamily with outdoor access, Cabot study community, and does not own cats or dogs. Each line represents a predictor, and its value is in brackets.
[b]At the 95% level. Standard deviations for coefficients are not shown.
[c]P-values under 0.05 are bolded.

Table 6. Multiple logistic regression model predicting feeding outdoor cats

Predictors[a]	Estimates	CI[b]	P[c]
Intercept	0.17	0.12 − 0.23	**<0.001**
Income [15–35k]	−0.04	−0.08 − 0.00	0.071
Income [35–50k]	−0.02	−0.06 − 0.03	0.485
Income [50–75k]	−0.08	−0.12 − −0.04	**<0.001**
Income [75–100k]	−0.04	−0.09 − 0.00	0.060
Income [100–150k]	−0.02	−0.06 − 0.03	0.480
Income [150k+]	−0.02	−0.07 − 0.03	0.525
Race/Ethnicity [other]	0.04	0.00 − 0.08	**0.032**
Race/Ethnicity [Latino]	0.08	0.04 − 0.12	**<0.001**
Race/Ethnicity [Black]	0.12	0.09 − 0.16	**<0.001**
Own_Rent [rent]	0.02	−0.01 − 0.04	0.188
Housing [attached multifamily without outdoor access]	−0.04	−0.08 − 0.00	0.071
Housing [detached single family]	−0.05	−0.08 − −0.02	**<0.001**
Housing [other]	−0.06	−0.11 − 0.00	0.053
Study community [Dallas]	0.03	−0.01 − 0.07	0.172
Study community [Fresno]	0.01	−0.03 − 0.06	0.554
Study community [Metro Detroit]	−0.00	−0.04 − 0.04	0.862
Study community [New Hampshire]	−0.12	−0.17 − −0.08	**<0.001**
Study community [Palm Valley]	0.13	0.08 − 0.18	**<0.001**
Study community [Washington DC]	−0.03	−0.07 − 0.01	0.149
Has pet [Dog]	0.09	0.06 − 0.12	**<0.001**
Has pet [Cat]	0.21	0.17 − 0.25	**<0.001**
Has pet [Both Dog and Cat]	0.40	0.37 − 0.43	**<0.001**
Observations		5,930	
R^2/R^2 adjusted		0.156/0.152	

[a]Reference values in the model were set as follows: <$15k (annual) income, White, owns their house, housing type of multifamily with outdoor access, Cabot study community, and does not own cats or dogs. Each line represents a predictor, and its value is in brackets.
[b]At the 95% level. Standard deviations for coefficients are not shown.
[c]P-values under 0.05 are bolded.

at supporting the sterilization and return of community cats to their outdoor homes. Not only are cat feeders as (or even more) diverse as non-feeders, they are perhaps much more common in the study communities than previous surveys would indicate. As shelters consider approaches to community cat management, the results of this work are important to consider. The results of the work can be used in a number of different ways. First, this work supports the idea that providing care for community cats is not a 'fringe' activity. In other words, individuals from all walks of life in a community are providing for cats. Furthermore, as past research has indicated, many of these caregivers have a strong bond with their cats. Given the diverse nature of the feeder population, it may have equity implications if these animals are targeted for removal. The results also show that a large proportion of community members provide for community cats, suggesting the caring capacity of communities is relatively large.

Demographics of people feeding cats – a diverse group
The results of this survey suggest feeding outdoor cats is more common than shown in previous surveys. On average,

Table 7. Number of cats usually fed by respondents who feed outdoor cats

Number of cats fed	N	%
1	529	28.9
2	578	31.6
3	381	20.8
4	140	7.6
5	53	2.9
6 or more	147	8
Total	1,828	100

about 30% of people surveyed feed community cats, and this varied by study community from a low of 15% in New Hampshire to a high of 47% in Palm Valley. This number is higher than the surveys discussed in the introduction. The same is true for the percentage of pet owners who feed free-roaming cats. This may be due to the broader geographic scope of analysis, the number of cats in the individual communities selected for study as well as the wording of the question. If we assume that study communities are currently operating a maximum caring capacity, then the upper limit seen in this research was 47%.

Moving onto the demographic profile of feeders and non-feeders, across the whole survey and within each study community, people who feed cats have a very similar make-up to that of the survey sample as a whole. Most chi-square tests were not significant, suggesting that there were no noticeable differences between feeders and non-feeders. Yet, some did show differences, which are worth examining by variable.

Beginning with race/ethnicity, there was always a lower percentage of White respondents among non-feeders, with the differences ranging from 1 to 9 percentage points. Most notably, in Metro Detroit, 25.8% of cat feeders are Black as opposed to 19.3% of survey respondents. New Hampshire is the second community in which this difference resulted in a significant difference in the chi-square test. These two, with the combined effect of the rest of the study communities, contributed to the observed differences between feeders and non-feeders across all communities: 69.3% White among non-feeders vs. 57.6% among feeders, 11.8% vs 20.5% Hispanic or Latinx, and 10.1% vs 12.9% Black. The undersampling of Hispanic or LatinX individuals does not meaningfully negate these finds and instead would suggest that feeders are even more diverse if the results of Hispanic respondents were weighted to reflect the exact demographic profile of the study communities individually or in aggregate.

Income was also significant in two study communities, Dallas and Metro Detroit, as well as across the survey. These differences do not suggest a clear pattern: overall, there are slightly more non-feeders in the 50k–75k income group (19.2% vs 14.8%), which is offset by small differences across other groups. This produced a significant chi-square result without implying a practical difference in income between the groups. Undersampling of upper-income groups would not impact these results in a meaningful way.

Education is similar to income – Dallas and Metro Detroit are the ones with significant differences between feeders and non-feeders in the chi-square test, but without suggesting a clear pattern in a specific direction. In Dallas, feeders had more people with Graduate degrees and less people with some college education, while in Detroit, there were also more Graduate degree holders among feeders but less 'some college' associates or bachelor degree holders. These are reflected in the cross-community comparison, but while the test is significant, the differences are fairly minor – at most 3 percentage points for any given value. Homeownership was only significant in New Hampshire, where feeders had more renters among them than non-feeders.

To conclude, these results suggest that survey respondents (both those who did and those who did not feed cats) overall had a demographic profile similar to their communities. When there were significant differences respondents who fed cats were consistently from a more diverse demographic than those who did.

There are more young people reporting feeding cats than their share in the study population – 61% of the study population were under 44 years old compared to 79% of people feeding cats. In terms of sex, education, income, and housing situation, people who feed community cats are representative of the survey population as a whole.

As for race/ethnicity, survey respondents skewed a bit Whiter (65.9%) than the general US population (58.9%), with lower percentages of Black (10.9%) and Hispanic/Latinx (14.3%) participants in the survey compared to the general population (13.6% and 19.1%).[16] However, when considering only the subset of participants who fed cats, their race/ethnicity distribution matches the national one almost identically, with no more than 2 percentage point differences for any of the reported groups.[16]

Finally, most respondents fed a relatively small number of cats. In this survey, just over 80% of respondents fed 3 or fewer cats. This finding is relatively consistent with other studies that were based on surveys of known caregivers.[1,9] The confirmation of previous research on this topic is an important finding because it supports the notion that most individuals are providing care for relatively small groups of cats. This is in contrast to the image that some may have of very expansive colonies.

Regression model

In both univariate and multivariate regression models, which included annual income group, race/ethnicity,

own/rent housing, housing type, study community, and pet ownership status, several variables were found to have a statistically significant association with whether or not a person fed community cats. The results of the univariate and multivariate models are overall similar in terms of statistically significant variables and the magnitude of coefficients. Some predictor values that were significant in the univariate model are not so in the multivariate model: income group 75–100k, housing groups other than detached single-family, and Washington DC study community. The composite 'Other' race/ethnicity is the only value turned significant in the multivariate model.

Examining the predictors in the multivariate model, the first factor is income, where the coefficients are all negative and largely not statistically significant, except for the 50–75k group, which means higher income groups are not more likely to feed outdoor cats relative to the baseline <$15k group. For race/ethnicity: Black, Hispanic, and all other non-White groups are more likely to feed cats than White people, with statistically significant positive coefficients. This runs in contrast to most findings regarding the racial and ethnic profiles of most pet owners. While it is outside of the scope of this paper to explore the explanatory factors, it may be that there are simply more community cats in areas of minority population. An additional possible explanatory factor is that individuals who have experienced life challenges are more likely to exhibit empathy driven behaviors,[17] and community cat caregivers have been found to be compassion motivated in choosing to provide for the cats.[18] It is important to note that overall, the regression model only explained about 15% of the variance, which is a relatively low number. It is likely that there are many factors influencing whether individuals feed cats.

When including pet ownership as a predictive factor for feeding cats, owning pets becomes the strongest predictor, with having both dogs and cats being most predictive, followed by cats only, dogs only, or neither – but all the predictors mentioned above continue to remain significant. It is possible that there was response bias in the survey. Most of the survey was about companion animals in the home, and so individuals with animals may have been more likely to respond. There are also two study communities that showed statistically significant results with Palm Valley, having a great likelihood individual would feed cats, and New Hampshire, showing lower rates of feeding. This is perhaps simply a function of the number of stray cats in each community. It is difficult to assess the veracity of this explanation due to no national census of outdoor cats.

One limitation of this study is that it was focused in specific communities which may not reflect the entire United States. The questions about cat caretaking were limited to a single question about providing food. Future surveys that ask more questions regarding the frequency of feeding, degree of other resources provided (such as shelter), and sterilization status would add considerable insight to this important topic. Similarly, this survey was distributed through a web-based platform, meaning that individuals who have limited or no access to the internet or who are not represented in the existing panel database were excluded from potential participation in the data collection. Due to the nature of the survey, mainly questions around experiences with companion animals, response bias may have been introduced with pet owners perhaps more likely to participate. Furthermore, research aiming to both estimate the community cat population and establish the proportion of individuals feeding cats would be able to test the hypothesis that the proportion of the population feeding cats is largely dependent upon the number of free-roaming cats in a community, which may improve the results of the regression model.

Conclusion

Communities show a high capacity for caring for community cats when measured as a function of both the diversity of individuals feeding cats and the current proportion of the community that provides care for the cats. Individuals who provide food for community cats are as or more diverse than individuals not feeding cats in their communities. These findings are relevant for shelters who may question whether their community would care for cats returned to their outdoor homes. These survey findings imply that large portions of the communities are providing for outdoor cats. The finding that these caregivers are diverse also adds an equity lens to any programs aimed at assisting through sterilization, vaccination, and return of these cats. Variances in the proportion of individuals providing for cats may mostly be a function of where there are more cats, which could explain the differences between these results and previous studies, which have chosen a different geographic unit of analysis such as the APPA study that covered the entire United States. Approaches surveying the entire nation would tend to smooth out any regional differences influenced by individual areas of higher cat concentrations. Given this information and the previous study that identified individuals are attached to community cats, attention should be given when designing policies that manage stray cat populations since large portions of the population may be caring for and attached to these animals. Communities such as Louisville Kentucky (see Alley Cat Advocates as example) with an extensive program aimed both at sterilization, vaccination, and release of all stray and community cats as well as ongoing veterinary care for all community cats stand as examples of programs providing exceptional community support.

Authors' contributions

SN: conceptualization, formal analysis, project administration, writing - original draft, writing - review & editing,

TK: formal analysis, visualization, writing - original draft, writing - review & editing.

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Appendix 1. Demographic make-up of study communities compared to census data
All values are in percentages.

Variable	Cabot		Dallas		Fresno		Metro Detroit		New Hampshire		Palm Valley		Washington DC		All Combined	
	Survey	Census	Survey	Census	Survey	Census	Survey	Census	Survey	Census	Survey	Census	Survey	Census	Survey	Census
Race/Ethnicity																
Asian	1	1.1	4	7	5.5	6.8	4.3	4.9	2.6	2.6	1.6	0.8	8.8	15.3	4.2	8.2
Black or African-American	18.5	19.8	13	15.1	5.5	3.1	19.3	20.2	0.8	1.3	0.6	0.4	12.7	20.4	10.9	15.2
Hispanic or Latinx	2.2	5.6	8	28.4	31.4	55.3	1.4	4.8	2.8	4.3	68.6	91.9	6	19.8	14.3	25.1
Multiple races	2.1	3.3	2.5	2.9	6.2	2.7	2.7	3.7	2.3	3.1	1.6	0.3	2.4	3.9	2.9	3.2
American Indian/Alaska Native	1.6	0.3	0.8	0.2	2.1	0.4	0.4	0.2	0.3	0.1	0.5	0.1	0.6	0.2	0.9	0.2
Native Hawaiian or other Pacific Islander	0.2	0.1	0.3	0.1	0.5	0.2	0.3	0	0.2	0	0	0	0.3	0	0.3	0.1
Other	0.2	0.2	0.2	0.3	1.1	0.3	1	0.4	1.1	0.3	0.6	0.1	0.7	1	0.7	0.5
White	74	69.6	71.2	46	47.8	31	70.5	65.8	89.8	88.3	26.4	6.4	68.6	39.4	65.9	47.5
Income																
<15k	19.7	11.5	7.1	6.8	16.4	9.4	9.6	9.4	7.5	5.8	19.9	15.4	5.3	5.7	11.6	7.8
15–35k	28.9	20.6	14.5	12.4	21.4	15.8	17.1	14.5	19.9	11.5	27	23.4	9.5	8.8	19.1	12.9
35–50k	14.8	13.4	10.1	10.5	17	11.7	14.9	11.2	14.5	9	14.4	12.8	9.5	7.1	13.5	9.9
50–75k	17.1	17.4	19.8	16.6	19.1	17.3	20.5	15.9	18.7	15.1	13.2	17	15.1	12.6	17.9	15.3
75–100k	9.5	12.5	15.6	13.1	10.2	13.4	12.4	12.8	15.7	13.1	12.2	11	15.7	11.8	13.2	12.6
100–150k	6.7	13.7	19.3	18.1	11.2	16.6	15.1	16.9	15.3	19.9	10	12.3	22.6	19.4	14.8	17.7
150k+	3.2	10.9	13.7	22.6	4.6	15.8	10.3	19.3	8.4	25.5	3.3	8.1	22.2	34.6	10	23.7
Education																
<High School	6.7	10.4	2.2	13	5.1	22.9	2.9	8.6	3.6	6.2	4	31.1	1.4	11.1	3.6	12.8
High School	35.2	33.8	22.8	22.9	32.3	25.7	24.2	25.6	29.4	27.2	30.7	25.5	14.4	20.8	26.4	23.9
Some College	25	21.9	19.7	20.5	24.3	23.4	18.8	21.9	19.5	17.5	25.8	18.1	15.2	15.3	20.8	19.3
Associate	8.8	8.2	7.7	7.4	11.1	8.6	9.4	9.1	12.5	10.1	12.4	5.9	7.9	6.8	9.8	7.7
Bachelors	15.6	16.2	27.5	23.3	16.6	13	26.7	20.3	22	23.7	19.6	13.5	32.9	24.8	23.5	21.5
Graduate	8.7	9.5	20.1	12.9	10.5	6.4	18.1	14.5	13	15.4	7.6	5.9	28.2	21.2	15.9	14.7
Homeownership																
Own	59.1	69.4	69.3	65.3	51.8	57.3	72.1	73.6	58.7	76.6	62.3	69.9	67.8	64.1	63.6	66.6
Rent	40.9	30.6	30.7	34.7	48.2	42.7	27.9	26.4	41.3	23.4	37.7	30.1	32.2	35.9	36.4	33.4

Appendix 2. Responses by county and study community

Study community	County	N of responses (% of community)	
		n	%
Cabot	Pulaski County, AR	209	24.2
	Faulkner County, AR	83	9.6
	Saline County, AR	78	9
	Garland County, AR	72	8.3
	White County, AR	51	5.9
	Lonoke County, AR	43	5
	Jefferson County, AR	41	4.7
	Pope County, AR	28	3.2
	Hot Spring County, AR	23	2.7
	Clark County, AR	20	2.3
	Jackson County, AR	20	2.3
	Arkansas County, AR	19	2.2
	Independence County, AR	18	2.1
	Van Buren County, AR	17	2
	Conway County, AR	14	1.6
	Ouachita County, AR	13	1.5
	Stone County, AR	12	1.4
	Cleburne County, AR	10	1.2
	Drew County, AR	8	0.9
	Lincoln County, AR	8	0.9
	Yell County, AR	8	0.9
	Bradley County, AR	7	0.8
	Grant County, AR	7	0.8
	Monroe County, AR	7	0.8
	Montgomery County, AR	6	0.7
	Woodruff County, AR	6	0.7
	Desha County, AR	5	0.6
	Searcy County, AR	5	0.6
	Cleveland County, AR	4	0.5
	Perry County, AR	4	0.5
	Pike County, AR	4	0.5
	Prairie County, AR	4	0.5
	Calhoun County, AR	3	0.3
	Dallas County, AR	3	0.3
	Ashley County, AR	2	0.2
	Howard County, AR	1	0.1
	Polk County, AR	1	0.1

Appendix 2. Continued

Study community	County	N of responses (% of community)	
		n	%
Dallas	Dallas County, TX	391	39.4
	Tarrant County, TX	251	25.3
	Collin County, TX	129	13
	Denton County, TX	74	7.5
	Johnson County, TX	25	2.5
	Parker County, TX	17	1.7
	Ellis County, TX	14	1.4
	Rockwall County, TX	13	1.3
	Hunt County, TX	12	1.2
	Kaufman County, TX	12	1.2
	Navarro County, TX	8	0.8
	Anderson County, TX	6	0.6
	Van Zandt County, TX	6	0.6
	Wise County, TX	5	0.5
	Fannin County, TX	4	0.4
	Henderson County, TX	4	0.4
	Lamar County, TX	4	0.4
	Hood County, TX	3	0.3
	Freestone County, TX	2	0.2
	Hopkins County, TX	2	0.2
	Palo Pinto County, TX	2	0.2
	Rains County, TX	2	0.2
	Somervell County, TX	2	0.2
	Bosque County, TX	1	0.1
	Cooke County, TX	1	0.1
	Erath County, TX	1	0.1
	Hill County, TX	1	0.1
	Leon County, TX	1	0.1
Fresno	Fresno County, CA	439	50.2
	Tulare County, CA	188	21.5
	Merced County, CA	114	13
	Madera County, CA	60	6.9
	Kings County, CA	59	6.7
	Stanislaus County, CA	9	1
	Mariposa County, CA	5	0.6
	Tuolumne County, CA	1	0.1
Metro Detroit	**Wayne County, MI**	**495**	**44.5**
	Oakland County, MI	**332**	**29.8**
	Macomb County, MI	**265**	**23.8**
	Monroe County, MI	7	0.6
	St. Clair County, MI	7	0.6
	Lapeer County, MI	3	0.3
	Livingston County, MI	2	0.2
	Washtenaw County, MI	2	0.2

Appendix 2. Continued

Study community	County	N of responses (% of community)	
		n	%
New Hampshire	Hillsborough County, NH	255	29.3
	Rockingham County, NH	185	21.2
	Merrimack County, NH	101	11.6
	Strafford County, NH	95	10.9
	Cheshire County, NH	53	6.1
	Grafton County, NH	47	5.4
	Belknap County, NH	43	4.9
	Coos County, NH	33	3.8
	Sullivan County, NH	31	3.6
	Carroll County, NH	28	3.2
Palm Valley	Hidalgo County, TX	373	59.3
	Cameron County, TX	225	35.8
	Starr County, TX	18	2.9
	Willacy County, TX	13	2.1
Washington DC	Fairfax County, VA	348	35.8
	Loudoun County, VA	148	15.2
	Montgomery County, MD	94	9.7
	Frederick County, MD	60	6.2
	Charles County, MD	57	5.9
	Arlington County, VA	51	5.2
	Frederick County, VA	33	3.4
	Alexandria city, VA	32	3.3
	Stafford County, VA	27	2.8
	Calvert County, MD	26	2.7
	Prince George's County, MD	26	2.7
	St. Mary's County, MD	18	1.8
	Warren County, VA	13	1.3
	Fauquier County, VA	8	0.8
	Jefferson County, WV	8	0.8
	Clarke County, VA	4	0.4
	King George County, VA	4	0.4
	Hampshire County, WV	4	0.4
	Prince William County, VA	3	0.3
	Winchester city, VA	3	0.3
	Fulton County, PA	2	0.2
	Falls Church city, VA	2	0.2
	Washington County, MD	1	0.1
	Queens County, NY	1	0.1

Appendix 3. Survey questions used

1. Are you:
   - Male
   - Female
   - Other/non-binary

2. Which of the following categories include your age?
   - Under age 18 [END SURVEY]
   - 18–24
   - 25–34
   - 35–44
   - 45–54
   - 55–64
   - 65 or older

3. Please indicate your zip code.

4. What is the highest level of school you have completed or the highest degree you have received?
   - Less than high school degree
   - High school degree or equivalent (e.g. GED)
   - Vocational/technical training
   - Some college but no degree
   - Associate degree
   - Bachelor's degree
   - Graduate degree

5. Do you put out food for stray cats in the neighborhood that do not sleep in your house?
   - Yes
   - No

6. [IF YES] How many stray cats do you usually feed? Use your best guess if necessary, and the average if the number varies by day.
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6 or more

7. Do you own or rent your current residence?
   - Own/buying
   - Rent

8. What type of building is your residence? (please check only one)
   - Detached single family
   - Attached/multifamily with direct access to the outdoors (can open back door to let pet out)
   - Attached/multifamily without direct access to the outdoors
   - Other (specify)

9. How much total combined money did all members of your HOUSEHOLD earn in 2020, before taxes?
   - Less than $15,000
   - $15,000–$34,999
   - $35,000–$49,999
   - $50,000–$74,999
   - $75,000–$99,999
   - $100,000–$149,999
   - $150,000 or more

10. What is your race or ethnicity?
    - American Indian/Alaska Native
    - Asian
    - Black or African-American
    - Hispanic or Latino
    - Native Hawaiian or other Pacific Islander
    - White
    - Multiple races
    - Other (please specify)