Correlation between the size of companion dogs and the profile of the owner: a cross-sectional study in Italy

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Abstract: The correlation between people characteristics and ownership of dog of a given size over others was investigated surveying a sample of Italian dog owners over the Internet. The regression analyses revealed predictors which were significant in differentiating owners of small dogs from the others. They were significantly more likely to have a low education level, to live in a house without a yard and to have given importance to dog size in the pet selection process, for accommodation-related reasons. They were more likely to have purchased their dogs as puppies from a pet shop early in their life (30-50 days old) and to dress up their pets. However, they were less likely to train their dogs and to purchase insurance against third-party liability. These findings may be useful to those working within the pet health and welfare professions, to assess population changes, in terms of human-pet bonds and animal care.

Key Words: dog size; canine; survey; dog ownership.

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Introduction

According to the most recent data from Eurispes Italia Report (2014), pet ownership fell by 16% compared to the previous year: Italian households having at least one pet decreased from 55.3% in 2012 to 39.4% in 2013. Multiple reasons have been hypothesized as being potentially responsible for this decline, including financial difficulties, frenetic lifestyle, lack of time to care for a pet. However, dogs remained the most common companion animals in Italy, with 53.7% of all pet-owning households having one, despite their being the most demanding domestic species in terms of costs and commitment (Eurispes Italia Report, 2014). Moreover, data by recent national and international market research publishers on the pet industry showed that dog ownership trends are changing in terms of size, with pet owners increasingly favoring smaller dogs. In Italy, a slight increase in dogs of small size has been recorded in pet-owning households (Euromonitor cited in Report Assalco – Zoomark, 2014). In the U.S., small dogs' share of dog-owning households rose significantly between 2000 and 2010 (Packaged Facts, 2012). The ongoing economic reality cannot fully explain such fluctuations, considering that both these growths came mainly at the expense of medium dogs, rather than the larger ones. This shift in dog preferences could, instead, reflect selection for functional traits or be the consequence of cyclical changes in fashion and fads. Understanding the demographics and predictors at a household level may be of importance in fields such as public health (Kitala et al., 2001; Robinson and Pugh, 2002) or social psychology (Hart, 2000; McNicholas and Collis, 2000), or of commercial interest in the provision and marketing of veterinary medicine services and products (Wise et al., 2003). Although some factors associated with the pet preference, selection process and management have been identified (Budge et al., 1997; Coren, 1999; Podberscek and Gosling, 2000; Roy and Cristenfeld, 2004; Bennett and Rohlf, 2007; Gazzano et al., 2013), to the authors' knowledge, little focus has been directed towards the characteristics and behaviors of dog owners in relation to the size of

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the owned pet. We believe that dog size could be an effective criterion to characterize the type of owner. In fact, due to selective breeding by humans, domestic dogs today exhibit an extremely wide range of body types and behaviors, and both dog-related factors (e. g. physiological needs, life span and behaviors) (Greer et al., 2007; Arhant et al., 2010) and owner-related factors (e. g., the required time and costs to care for) associated to different sizes vary materially. We examined size (weight) patterns for pet dog population in Italy and derived a multivariable model for ownership of each dog size, in order to find factors which might enable dog ownership trends to be monitored and predicted.

Materials and methods

Questionnaire design

Participants were recruited via the internet. The questionnaire was posted online and published in the media (pet magazines and websites). To undertake the survey, respondents had to identify themselves as being over 18 years of age and as the main carer for a dog in their household. Respondents who owned more than one dog answered questions about their most recently acquired dog. The survey consisted in 40 multiple choice, single answer questions, which were made mandatory. If needed, optional follow-up questions based on the answer the respondents provided in a previous question were asked. Reports were considered valid if respondents answered all the mandatory questions, while partial reports were discarded. Each mandatory field in the survey corresponded to a potential risk factor and they were grouped into four categories: owner demographics, dog acquisition, dog keeping and dog demographics (Appendix A).

Statistical analysis

Statistical analyses were performed using SPSS version 21.0 (SPSS). Pearson's χ^2 goodness-of-fit test was used to study the overall frequency distribution of dogs in the observed sample according to their size. Pearson's χ^2 test of independence was applied in 2x2 contingency tables to investigate the differences in the frequency distribution of dog sizes between owners with and without experience with previous dogs. Adjusted residuals (ARs) determined which cells had the largest difference between observed and expected values, enabling to assess the nature of the relationship between the categorical variables. The ARs were considered significant for values $\geq +2$ or ≤ -2.

Owners were then divided into three groups, based on their dog size: SS (small size, < 10 kg), MS (medium size, 10-25 kg) and LS (large size, > 25 kg). Comparisons of owner's and dog's categorical responses among the three groups of owners were made using the Pearson's χ^2 test of independence, in order to examine statistically significant differences as a preliminary screening. Multinomial logistic regression (MLR) models were then developed to assess the association between dog size (dependent variable, Y) and each of the risk factors (independent variables, X) for which there were significant group differences. The medium size was the group with the highest frequency, therefore at first it was used as the reference category. The forward entry method of MLR was employed. It started with a model that only included the intercept. Then at each step, the term whose addition caused the largest statistically significant change in -2 Log Likelihood was added to the model, until only significant variables associated with values of $P < 0.05$ remained. The existence of an overall relationship between the dependent variable (dog size) and combination of independent variables, as well as of a relationship between individual independent variables and dog size was based on the statistical significance of the chi-square statistic. The Wald χ^2 test was performed to evaluate if the predictors for which a significant effect was detected were also significant in differentiating the "small-size" and/or "large-size" groups from the "medium-size" (reference) group. The odds ratio [Exp(B)] for the predictors was calculated to evaluate the strength of such relationships. The odds between response categories of X variables were calculated indirectly, by dividing the Exp(B) values by each other, if necessary. The A two-sided $P < 0.05$ was considered statistically significant.

Appendix A. Questionnaire items.

Owner demographics	
Region of Italy:	Center, North, South or foreing Country
Living area:	rural, urban
Gender:	female, male
Age range (in years):	> 60, 18-30, 30-60
Education:	secondary school or less, high school, university
Marital status:	single, married/common law relationship, divorced/separated, widow
Household composition:	one-person, multi-person
Member of household:	mother, father, daughter, son, other, single-family
Presence of children:	yes, no
House with yard:	yes, no
Prior dog:	yes, no
Prior dog breed:	pure, mixed, both
Prior dog size:	small (< 10 kg), medium (10-25 kg), large (> 25 kg), miscellaneous
Paid for prior dog:	yes, no
Dog acquisition	
Relevance of dog size:	yes, no
Reason of dog size preference:	better suitability for the house, aesthetical appeal, the only available, prize-related
Reason for dog acquisition:	companionship, utility (e. g., guarding, work, sport, pet therapy), the dog needed a home
Source of the dog:	breeder, friend/relative, pet shop, shelter/rescue organization, stray, bred by respondent, other
Type of acquisition:	bought, adopted, given as a gift, bred it
Prize of purchase:	€0, €1-100, €101-500, €500
Dog keeping	
Owner's view of the dog:	family member, friend, simply an animal
Number of dogs owned:	1, 2, 3, > 3
Wish to add a new dog:	yes, intend to; yes, but too complicated to care for; yes, but too expensive, no
Household pets of other species:	yes, no. If yes, please specify: cat, rabbit, reptile, ferret, small rodent, bird, fish, multiple species
Number of veterinary visits/year:	0, 1, 2, > 2
Professional training courses:	yes, no. If yes, please specify the aim: dog education, dog behavior rehabilitation. If no, please specify the reason: lack of time, not necessary, ineffective, too expensive
Ever thought giving up the dog:	yes, no. If yes, please specify the reason: dog behavior, cost commitment, time commitment, other
Use of pet sitters:	yes (sometimes), yes (every day), no
Holidayng:	with the dog, without the dog
Practice to buying dog clothes:	yes, no. If yes, please specify the reason: to provide warmth or waterproofing in cold weather, because I like to dress my dog up, because my dog likes to wear chothes
Practice to buying dog toys:	yes, no. If yes, please specify the frequency: twice/year, once/month, more than once/month
Third party liability insurance:	yes, no
Type of dog food adiministered:	commercial, home-prepared
Influence of prize in food choices:	yes, no
Dog demographics	
Current age (years):	<1, 1-3, 3-6, 6-9, >9
Age at acquisition:	30-50 days, 50-90 days, 3-12 months, > 12 months, home-bred
Gender:	male, female
Sexual status:	entire, neutered
Breed:	mixed, pure breed
Size:	small (< 10 kg), medium (10-25 kg), large (> 25 kg)

Results

Survey participant demographics

We collected 1250 owner's valid reports (100% of questionnaires received). The majority of respondents were female (77%). There was a good spread across the age ranges, with the highest percentage in the 30 to 60 age group (59%). Thirty-six per cent of respondents were in the 18-30 age group and 5% aged < 60. Participants were drawn from all over Italy, although the majority came from the Northern regions (59%) and lived in urban (88%) rather than rural (12%) settings. Twenty-seven per cent of owners lived in Central Italy, while 14% lived in the Southern regions. Just 0.2% of the sample lived in a country other than Italy. Almost half of participants (47%) identified themselves as single (and never married) and 45% were married or had a life partner. The remaining participants were divorced (7%) or widow (1%). Most of participants resided in a childless (81%) and multi-person household (84%), and half of them were sons or daughters of the householder (50%). More than half of the respondents (55%) had a high school diploma, whereas 40% had a university degree and 5 % had attended secondary school only. More than half of the respondents (53%) lived in houses with yards. The majority of survey respondents had owned at least a dog previously (69%). Previous dogs were either mixed breed (39%) or purebred (34%), medium and large size dogs (34% and 29%, respectively) rather than small (19%). A smaller proportion of owners had previous experience caring for dogs of both breed types (27%) and of various sizes (18%). Fifty-one per cent of participants reported that the dog size was important in choosing the pet, and the top reasons for choosing the selected dog size were appearance-related (43%, "liking dogs of that size") and house-related (37%, "best suited to the respondent's house"). Twenty per cent of owners indicated other, unspecified reasons. The most common primary reason for dog acquisition in the sample was companionship (68%). Other reasons were providing the dog with a home (24%), and utility (8%). The most frequent suppliers were friends/relatives (32%), followed by breeders (24%), animal shelters/rescue organizations (22%) and pet shops (4%). Eleven per cent of dogs were found wandering/abandoned and 7% had been bred by their current owner. The majority of dog owners paid nothing for their pet (63%), mostly because they were stray or shelter dogs (49%). Of those who did pay for their pets (37%), 50% spent over €501, 38% spent €101-500 and 12% spent less than €100. Most of the respondents perceived their animal as a member of the family (88%), rather than a friend (7%) or simply an animal (5%), and have never thought to give him/her away (98%). A conspicuous number of respondents (60%) reported owning only one dog, 27% had a second dog and 13% owned 3 or more dogs. Nearly three-fourths (74%) of respondents would like to acquire another dog, however, only 31% were actually about to proceed, while the majority expressed concerns about the commitment (34%) and the costs (9%). More than half (54%) of respondents were keeping only dogs as household pets. Among multi-species households, cats were the most frequently reported (54%), followed by fish (12%), reptile pets (4%), house rabbits (3.5%), avian pets (3%) and small rodents (1.5%). Twenty-two per cent of owners had multiple pets of different species. The vast majority of participants took their dog to the veterinarian more than twice each year (54%), 31% at least twice each year, 13% once/year and 2% never. Only 35% had participated in professional training courses with their dog. No need of the dog (56%), excessive cost (20%) and lack of time (20%) were the most common reasons for not attending training courses. The remaining 4% per cent of these respondents indicated that training courses are ineffective. The majority of owners took out third party liability insurance for their dog (57%), although it is not mandatory in our Country, did not dress up their dog (65%), were used to buying dog toys (79%), although not frequently (67% twice a year *vs* 33% ≥ once a month), reported to take their dog on holidays with them (55%) and never used pet-sitting services (91%). Of owners having a wardrobe for their dogs, 87% were female, 97% said they dressed them for cold weather, 2% for they liked to dress the dogs up and 1% for they believed that their dog liked to wear clothes. A considerable number of survey respondents (79%) reported feeding their dog commercial pet food, rather than home-prepared food, not being moti-

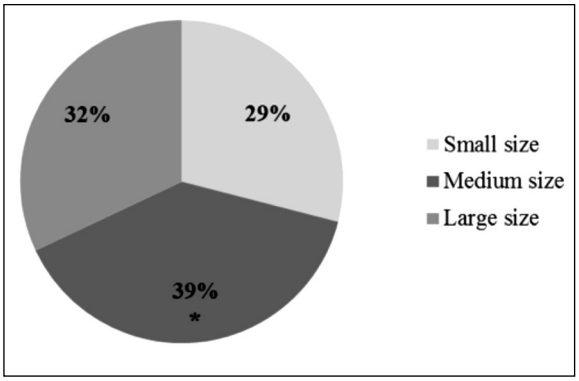

Fig. 1. The total number of dogs in the study (expressed as percentages), according to the size. * Pearson's χ^2 goodness-of-fit test=18.117, df=2, $P < 0.05$.

vated by price in their food choices (77%). As regards the dogs, 28% of the sample was between 1 and 3 years old, one quarter between 3 and 6 years, 18% between 6 and 9 years, 20% was older than 9 years and the remaining 9% was under 1 year of age. Most dogs in the sample had been acquired as puppies, particularly when they were 50-90 days old (41%); 23% between 30 and 50 days old, 17% between 3 and 12 months and 16% when they were older than 12 months. The remaining dogs (3%) were house born. Dog gender was quite evenly split between females (51%) and males (49%). The majority of dogs were sexually entire (55%) rather than de-sexed (45%). Within the total sample, 18% were entire females, 37% were entire males, 34% were de-sexed females and 12% were de-sexed males. Just over a half of the owners (55%) reported that their dog was purebred but, as we did not ascertain whether or not these dogs were registered with an appropriate breed society, we grouped them for analysis according to whether their owner believed them to be purebred or crossbred.

The prevalence of dog sizes among the sample population of owners in this study is presented in Fig. 1. Dogs of medium size were significantly more frequent (39%) than both small and large-sized dogs (29% and 32%, respectively). Statistically significant differences were found in the size of dogs between first-time and experienced owners (Table 1): the majority of first-time owners had small (36.3%) rather than medium (31.7%) or large dogs (24.3%). Pearson's χ^2 test in 2x2 contingency tables revealed significant differences in the reasons for preference of dogs of different sizes

Table 1. Size distribution of the sample population of dogs (n = 1250) across the different levels of past experience of the owner.

Groups	Dog owners		Pearson's χ^2 test of Independence		
	Novice	Experienced	value	df	P
Small size					
C	134	235	7.331	1	0.007
EC	113.4	255.6			
ARs	2.8	-2.8			
Large size					
C	96	299	10.737	1	0.001
EC	121.3	273.7			
ARs	-3.3	3.3			
Medium size					
C	154	332			N.S.
EC	149.3	336.7			
ARs	0.6	-0.6			

Abbreviations: C - count; EC - expected count; ARs - adjusted residuals. Pearson's χ^2 test of Independence Significance: $P < 0.005$.

(χ^2=105.876, df=10, $P < 0.05$): house-related reasons were more frequently reported by small dog owners (45% *vs* 13% medium and 29.2% large dog owners), while aesthetic appeal was the most frequent reason among large dog owners (52% *vs* 24,7% medium and 23% small dog owners). Most of medium dog owners did not give relevance to the size (40.3%) compared to those of either small or large dogs (11.9% and 29.2%, respectively). As regards current dog ownership, we recorded an increase of 10% in small dogs compared to the previous experience, whereas a decrease of 1.6% and 5% was recorded in acquisition of medium and large dogs, respectively (Fig. 2).

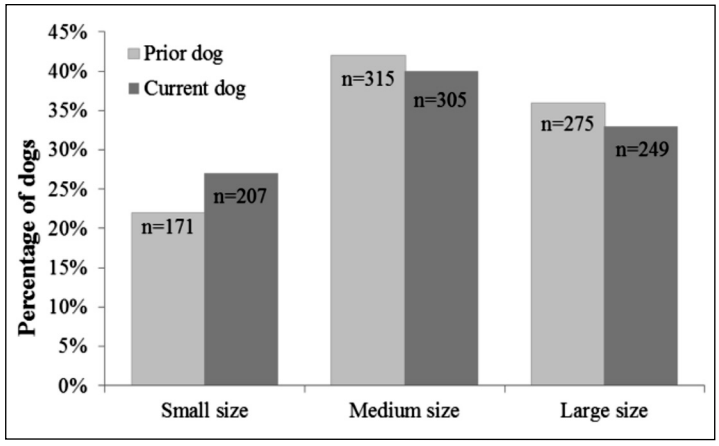

Fig. 2. Comparison between the proportions of dogs owned currently and in the past by the respondents (n = 761), according to the body size (owners who answered "miscellaneous sizes" when questioned about past dogs were excluded). n = actual number of dogs.

The variables which showed a significant general association with dog size were submitted to MLR analysis. The likelihood ratio test revealed an improvement over the intercept-only model, demonstrating that the logistic model provided a better fit to the data (-2 log likelihood of the inter-

Table 2. Likelihood Ratio Tests.

	Model Fitting Criteria	Likelihood Ratio Tests		
Effect	-2 Log Likelihood of Reduced Model	χ^2	df	P
Intercept	1962.916	0.000	0	
Region of Italy	1970.668	7.752	6	0.257
Education	1977.039	14.123	4	0.007
House yard	1971.734	8.818	2	0.012
Previous dog size	2025.075	62.159	8	0.000
Dog age at adoption	1985.854	22.938	8	0.003
Sexual status	1975.080	12.165	6	0.058
Breed	1987.001	24.085	2	0.000
Relevance of dog size	1980.311	17.395	2	0.000
Reason of dog size preference	2017.325	54.409	10	0.000
Dog source	2010.671	47.755	12	0.000
Reason for dog acquisition	1985.129	22.213	4	0.000
Professional training	2006.262	43.346	2	0.000
Third party liability policy	1973.521	10.604	2	0.005
Dog clothes	2031.834	68.918	2	0.000
Dog toys	1966.259	3.343	2	0.188
Type of dog diet	1969.486	6.570	2	0.037
Influence of dog diet prize	1973.375	10.459	2	0.005

P has a statistical significance at 0.05.

cept-only model =2727.378; -2 log likelihood of the final model=1940.101, χ^2=787.276, df=96, P = 0.001). The variables that caused a significant improvement in model fitting ($P < 0.05$) are reported in Table 2. Of these variables, those that differentiated significantly among groups are reported in Tables 3 and 4 and discussed below. No significant differences were found for medium dogs versus large dogs (data not shown).

Table 3. Parameter estimates: small dogs vs medium dogs.

							95% Confidence Interval for Exp(B)	
	B	**Std. Error**	**Wald**	**df**	**Sig.**	**Exp(B)**	**Lower Bound**	**Upper Bound**
Intercept	-3.087	0.547	31.889	1	0.000			
Owner demographics								
[education=secondary school]	0.684	0.355	3.711	1	0.050	1.982	0.988	3.976
[education=high school]	-0.149	0.185	0.591	1	0.442	0.868	0.604	1.246
[education=university]	0[b]			0				
[no house yard]	0.537	0.189	8.089	1	0.004	1.711	1.182	2.476
Dog demographics								
[age at acquisition=>12 months]	-0.032	0.323	0.010	1	0.921	0.969	0.515	1.822
[age at acquisition=30-50 days]	1.648	0.561	8.640	1	0.003	5.195	1.732	15.584
[age at acquisition=0-30 days]	0.339	0.283	1.437	1	0.231	1.404	0.806	2.444
[age at acquisition=50-90 days]	-0.375	0.272	1.904	1	0.168	0.688	0.404	1.171
[dog age at acquisition=3-12 months]	0[b]			0				
Dog acquisition								
[relevance of size=yes]	0.905	0.227	15.875	1	0.000	2.473	1.584	3.861
[reason of size preference=other]	0.684	0.280	5.949	1	0.015	1.981	1.144	3.431
[reason of size preference=liking]	0.333	0.284	1.374	1	0.241	1.396	0.799	2.437
[reason of size preference=house suitability]	0.833	0.328	6.459	1	0.011	2.299	1.210	4.370
[reason of size preference=availability]	-0.043	0.541	0.006	1	0.936	0.958	0.331	2.768
[reason of size preference=costs]	1.412	1.445	0.955	1	0.329	4.105	0.242	69.748
[reason of size preference=not important]	0[b]			0				
[source=breeder]	1.153	0.445	6.722	1	0.010	3.169	1.325	7.579
[source=other]	-0.021	0.462	0.002	1	0.964	0.980	0.396	2.424
[source=shelter]	-0.320	0.344	0.864	1	0.353	.726	0.370	1.426
[source=pet shop]	1.305	0.568	5.285	1	0.022	3.688	1.212	11.222
[source=friend/relative]	1.270	0.343	13.686	1	0.000	3.562	1.817	6.982
[source=stray]	0[b]			0				
Dog keeping								
[no training]	1.174	0.213	30.269	1	0.000	3.233	2.129	4.912
[no insurance]	0.505	0.192	6.894	1	0.009	1.657	1.137	2.416
[dog clothes]	1.072	0.189	32.065	1	0.000	2.922	2.016	4.236

Factors for which a statistically significant effect emerged are reported. Significance: $P < 0.05$. Exp(B): Exponentiation of the B coefficient (odds ratio), CI: Confidence interval.

Table 4. Parameter estimates: small dogs vs large dogs.

							95% Confidence Interval for Exp(B)	
	B	Std. Error	Wald	df	Sig.	Exp(B)	Lower Bound	Upper Bound
Intercept	-1.367	0.489	7.815	1	0.005			
Owner demographics								
[education=secondary school]	0.827	0.336	6.051	1	0.014	2.286	1.183	4.418
[education=high school]	-0.006	0.171	0.001	1	0.971	0.994	0.711	1.389
[education=university]	0[b]			0				
[no house yard]	0.863	0.183	22.326	1	0.000	2.370	1.657	3.390
Dog demographics								
[age at acquisition=>12 months]	0.205	0.356	0.330	1	0.566	1.227	0.610	2.468
[age at acquisition=30-50 days]	0.697	0.256	7.408	1	0.006	2.008	1.216	3.318
[age at acquisition=0-30 days]	0.659	0.597	0.718	1	0.506	0.370	0.121	0.135
[age at acquisition=50-90 days]	0.258	0.302	0.729	1	0.393	1.294	0.710	2.338
[dog age at acquisition=3-12 months]	0[b]			0				
Dog acquisition								
[relevance of size=yes]	0.590	0.246	5.759	1	0.016	1.804	1.114	2.921
[reason of size preference=other]	0.757	0.261	8.427	1	0.004	2.131	1.279	3.553
[reason of size preference=liking]	0.272	0.273	0.996	1	0.318	1.313	0.769	2.242
[reason of size preference=house suitability]	1.020	0.308	10.998	1	0.001	0.774	0.518	5.066
[reason of size preference=availability]	0.302	0.497	0.368	1	0.544	1.352	0.520	3.585
[reason of size preference=costs]	1.941	1.383	1.970	1	0.160	6.964	0.463	104.685
[reason of size preference=not important]	0[b]			0				
[source=breeder]	0.723	0.518	1.969	1	0.161	2.061	0.751	5.656
[source=other]	-0.994	0.571	3.032	1	0.082	0.370	0.121	1.133
[source=shelter]	-0.318	0.441	0.521	1	0.470	0.725	0.307	1.725
[source=pet shop]	1.785	0.748	5.694	1	0.017	5.962	1.376	9.743
[source=friend/relative]	0.619	0.443	1.948	1	0.163	1.856	0.779	4.424
[source=stray]	0[b]			0				
Dog keeping								
[no training]	1.120	0.207	29.243	1	0.000	3.066	2.043	4.601
[no insurance]	0.755	0.197	14.680	1	0.000	2.129	1.446	3.133
[dog clothes]	1.693	0.224	57.048	1	0.000	5.438	3.504	8.439

Factors for which a statistically significant effect emerged are reported. Significance: $P < 0.05$. Exp(B): Exponentiation of the B coefficient (odds ratio), CI: Confidence interval.

Discussion

This cross-sectional study first explored many significant issues, as the distribution of companion dogs based on their size in Italy. In our sample, 39% of all dogs were medium, 29% small and 32% large size. The present research had the common limitations and self-selection bias of a volunteer survey as people more interested in dog related topics and eventually more committed to their dog are more likely to participate. Nonetheless, these percentages were consistent with the most up

to date market data concerning the dog population in Italy (Report Assalco - Zoomark, 2014). The exact number of invitees was unknown because this was a web-based questionnaire, and we were not able to calculate a response rate. However, the rate of participants logging onto the web site was found to be comparable to the response rate for face-to-face interviews elsewhere (Heiervang and Goodman, 2011). Additionally, in our study 100% of returned reports were valid in terms of rate of full response (completing all sections of the interview).

Despite the medium size dogs were the most prevalent, different patterns emerged based on whether the owners had prior experience with dogs or not. A significantly higher proportion of first-time owners in our sample had a small size dog, mostly (45%) because they believed it to be best suited to their house. On the other hand, large sized dogs were those significantly more frequent among experienced owners, whose choice was mostly (52%) driven by aesthetic appeal. However, experienced owners interviewed highlighted a recent trend towards the purchase of smaller dogs. In general, a 10% upturn in the selection of small sized dogs was observed compared to the prior dog experience, while both medium and large sized dogs showed a downturn. This trend closely resembled the one emerging from the most recent market analysis reports (Packaged Facts, 2012; Report Assalco – Zoomark, 2014; Euromonitor International, 2014). The increased popularity of small dog breeds has been related to their convenience and reduced costs (Eurimotor International, 2010). Not surprisingly, the largest decline was recorded for the large dogs, which could be the most expensive to own. Most of all, accommodation-related and dog appearance-related were the most, equally important, reasons for the shift in respondents' choice, while only one (out of 193) of them put forward economic arguments. The population age had also been considered as a possible driver of the shift towards small dogs (Packaged Facts, 2012), among old and young pet owners alike, along with increased urbanization and because they might be easier to manage. However, we found no relationship between dog ownership and age of the respondents. Further studies are needed to understand whether the current increase in people preference of small dogs in Italy is a real trend, that will continue in the years ahead, or just a short-term fashion. In order to give an accurate evaluation of the current situation, we identified some interesting differentiators that affected the likelihood to own a dog of a size over another, which was an additional significant issue examined in this study. Multivariable regression modeling revealed many notable differences, particularly of owners of small dogs *versus* owners of either large or medium size dogs. Education and living environment of the owners were strong predictors, strengthening the hypothesis that the socioeconomic status, rather than mere financial standing and money, might have contributed to the observed trends. People having lower educational levels were found to be more likely to relinquish than those with education beyond high school (Salman et al., 2000) so educational level of the owner have to be consider a socioeconomic factor that might predict pet relinquishment. Whilst, in general, pet ownership has been found to negatively correlate with education level (Kogan et al., 2012), in the UK a higher level of academic qualification was positively correlated with cat ownership and negatively correlated with dog ownership (Murray et al., 2010). Our findings showed that owners of small dogs were significantly more likely to have low school education and this may suggest that such owners were less prepared to make informed choices about dog acquisition. They were also 2 times more likely to live in a house without a yard than owners of medium or large dogs. This could perhaps reflect a minor desire of less educated owners to provide outside access for their small pets, or otherwise their belief that the garden dictates the size of the chosen dog. The theme "accommodation" recurred across the survey in these owners' responses. For example, owners of small dogs, who were 2 times more likely to have indicated the size as been relevant in their dog acquisition decision, cited a better suitability for the house as the principal reason of their preference. This contrasts with scientific knowledge that spatial area and activity are not likely to be the most important factors affecting psychosocial well-being of dogs, regardless of their size (Hetts et al., 1992). Dogs are highly social animals, for whom social isolation has been shown to be even more harmful than spatial restriction (Hetts et al., 1992). They establish an attachment bond towards their owners, who act as a secure base for dogs (Mariti et al., 2013).

Moreover, owners of small dogs were almost 4 times more likely to have purchased their animal from a pet shop and 3 times more likely to have acquired their dog when he/she was 30-50 days old, rather than older, than owners of different-sized dogs. This finding raises some concern as, in a previous study (Pierantoni et al., 2011), we found that a significantly higher proportion of dogs purchased from pet shops early in their life (30-40 days old) showed fear and anxiety related behaviors in their adulthood. Therefore, providing assistance to owners at the point of selection and acquisition might help them make well-informed decisions. No significant differences were found across the size of the dogs in the attitude of owners towards dog services such as pet sitting and veterinary care. Nonetheless, owners of small dogs were 3 to 4 times less likely to have attended any professional training courses and 2 times less likely to have purchased a pet insurance against third party liability than owners of large and medium dogs. Owners have been already reported doing significantly less training with small dogs (Kobelt et al., 2003; Arhant et al., 2010). There seems to be the perception that small dogs do not need to acquire specialized abilities to live in proximity of humans as larger dogs do, probably because their behavioral problems can be less serious. Accordingly, more than half of owners of small dogs in our sample answered "because my dog does not need it" when motivating their lack of involvement in training activities, even if they had been found to rate their dogs as more excitable, disobedient, impulsive, and more likely to bite, when compared with owners of large dogs (Guy et al., 2001; Bennet and Rohlf, 2007). Moreover, a recent study (McGreevy et al., 2013) highlighted a correlation between small size and certain behavioral problems. Whether this is due to nature or nurture (or a little of both) is still not known. The incidence of such behaviors might have been increased through genetics in the process of breeding for smaller size, but it may also be due, at least partially, to overprotective and overindulgent treatment. In our study, owners of small dogs were 3 times more likely to buy clothes for their dog than owners of medium dogs, and 5 times more likely than owners of large dogs. Consistent with a recent analysis reporting that women dress up their dogs more than men do (Trujillo, 2013), 82% of these small dog owners in our study were females. Most of them (97%) stated that they buy clothes to their pet for practical reasons, "to provide warmth or waterproofing in cold weather", while 3% stated "because I like to dress my dog up", following a typical anthropomorphizing tendency.

This study extends existing knowledge, mainly based on anecdotal and marketing data, on dog ownership dynamics, providing empirical evidence of the different pet adoption and retention strategies used by owners of small dogs, which may underlie the widely seen increase in small dog popularity. Ownership dynamics are worth investigating, as they may have numerous ramifications for a number of key areas of the companion animal health market. One of these is the pet food industry as a significant growth in the small dog population could restrict volume sales growth, given that smaller dogs eat less than larger breeds. At the same time, size-specific foods, which are higher in both price and value, should help pet food manufacturer maintain good market performance. The smaller dog trend could shift the focus of veterinary care, increasing the frequency of genetic disorders (Herzog, 2006), and have consequences for the human-animal bond as well, promoting attitudes, behaviors and beliefs which can affect attachment levels.

Conclusions

In summary, dog-keeping is important both economically and socially, as it is wide-spread among human cultures, with about one-fourth of all households worldwide including at least a dog (PFMA, 2014). In this study we characterized dog ownership focusing on companion dog size, in order to help understand and predict the current increase in preferences for small dogs. The results might be useful to those working in the fields of public health, social science and veterinary science, including veterinarians, rescue charities, insurance companies, pharmaceutical companies, pet food manufactures as well as those studying the field of human-animal interactions.

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Code of Ethics Policy Statement

This survey study involved anonymous data collection and did not require approval.

References

Arhant, C., Bubna-Littitz, H., Bartels, A., Futschik, A., Troxler, J. Behaviour of smaller and larger dogs: Effects of training methods, inconsistency of owner behaviour and level of engagement in activities with the dog. Appl. Anim. Behav. Sci. 2010; 123 (3): 131-142.

Bennett, P.C., Rohlf, V.I. Owner-companion dog interactions: relationships between demographic variables, potentially problematic behaviours, training engagement and shared activities. Appl. Anim. Behav. Sci. 2007; 102: 65-84.

Budge, R.C., Spicer, J., St. George, R., Jones, B.R. Compatibility stereotypes of people and pets: A photograph matching study. Anthrozoös. 1997; 10: 37-46.

Coren, S.. Do people look like their dogs? Anthrozoös. 1999; 12: 111-114.

Euromonitor International, 2010. Pet Care: Euromonitor from trade sources/national statistics. Available: http://wwweuromonitor.com.

Euromonitor International, 2014. Pet Humanisation: The Trend and Its Strategic Impact on Global Pet Care Markets. Available: http://www.euromonitor.com/pet-humanisation-the-trend-and-its-strategic-impact-on-global-pet-care-markets/report.

Gazzano, A., Zilocchi, M., Massoni, E., Mariti, C. Dogs' features strongly affect people's feelings and behavior toward them. J. Vet. Behav. 2013; 8 (4): 213-220.

Greer, K.A., Canterberry, S.C., Murphy, K.E. Statistical analysis regarding the effects of height and weight on life span of the domestic dog. Res. Vet. Sci. 2007; 82 (2): 208-214.

Guy, N.C., Luescher, U.S., Dohoo, S.E., Spangler, E., Miller, J.B.,Dohoo, I.R.Bate, L.A. A case series of biting dogs: characteristics of the dogs, their behaviour, and their victims. Appl. Anim. Behav. Sci. 2001; 74: 43-57.

Hart, L.A 2000. Psychosocial benefits of animal companionship. In: Fine AH (Ed.) Handbook on Animal-Assisted Therapy: Theoretical Foundations and Guidelines for Practice. San Diego, Academic Press, pp. 59-78.

Heiervang, E., Goodman, R. Advantages and limitations of web-based surveys: evidence from a child mental health survey. Soc. Psych. Psych. Epid. 2011; 46 (1): 69-76.

Herzog, H. Forty-two Thousand and One Dalmatians: Fads, Social Contagion, and Dog Breed Popularity. Soc. Anim. 2006; 14 (4): 383-397.

Hetts, S., Clark, J.D., Calpin, J.P., Arnold, C.E., Mateo, J.M. Influence of housing conditions on beagle behaviour. Appl. Anim. Behav. Sci. 1992; 34:137-155.

Kitala, P., McDermott, J., Kyule, M., Gathuma, J., Perry, B., Wandeler, A. Dog ecology and demography information to support the planning of rabies control in Machakos District, Kenya. Acta Trop. 2001; 78: 217-230.

Kobelt, A.J., Hemsworth, P.H., Barnett, J.L., Coleman, G.J. A survey of dog ownership in suburban Australia–Conditions and behavior problems. Appl. Anim. Behav. Sci. 2003; 82: 137-148.

Kogan, L.R., Schoenfeld-Tacher, R., Viera, A.R. The Internet and health information: differences in pet owners based on age, gender, and education. JMLA. 2012; 100 (3): 197-204.

Mariti, C., Ricci, E., Zilocchi M., Gazzano A. Owners as a secure base for their dogs. Behaviour. 2013; 150: 1275-1294.

McGreevy P.D., Georgevsky, D., Carrasco, J., Valenzuela, M., Duffy, D.L., Serpell, J.A. Dog Behavior Co-Varies with Height, Bodyweight and Skull Shape. PLoS ONE. 2013; 8 (12): e80529.

McNicholas, J., Collis, G.M. Dogs as catalysts for social interactions: robustness of the effect. Brit. J. Psychol. 2000; 91: 61-70.
Murray, J.K., Browne, W.J., Roberts, M.A., Whitmarsh, A., Gruffydd-Jones, T.J. Number and ownership profiles of cats and dogs in the UK. Vet. Rec. 2010; 166: 163-168.
Packaged Facts, 2012. Dog Population and Dog Owner Trends in the U.S., p. 13.
PFMA (2014) http://www.pfma.org.uk/pet-population-2014. Accessed November 7, 2014.
Pierantoni, L., Albertini, M., Pirrone, F. Prevalence of owner-reported behaviours in dogs separated from the litter at two different ages. Vet. Rec. 2011; 169 (18): 468-473.
Podberscek, A.L., Gosling, S.D., 2000. Personality and research on pets and their owners: Conceptual issues and review. In: Podberscek A.L., Paul E.S., Serpell J.A., 2000. Companion animals and us: Exploring the relationships between people and pets. Cambridge: Cambridge University Press, pp. 143-167.
Robinson, R.A., Pugh, N. Dogs, zoonoses and immunosuppression. J. R. Soc. Promot. Health. 2002; 122: 95-98.
Roy, M.M., Christenfeld, N.J.S. Do dogs resemble their owners? Psychol. Sci. 2004; 15: 361.
Salman, M.D., New, J.C., Jr., Scarlett, J., Kass, P., Ruch-Gallie, R., Hetts, S. Human and animal factors related to the relinquishment of dogs and cats in 12 selected animal shelters in the United States. J. Appl. Anim. Welfare Sci. 1998; 1: 207-226.
The Assalco - Zoomark Report on Pet Food and Pet Care, 2014. Il cane è il più amato dagli italiani. Parte 4, p. 5.
The Eurispes Italia Report, 2014. Capitolo 4, Scheda 37: Animali domestici, i più cari amici di sempre. http://www.eurispes.eu/.
Trujillo, N., 2013. Gender differences in human-canine relationships. In: Emily Plec (Ed.), Perspectives on Human-Animal Communication. Internatural Communication. Routledge, p. 120.
Wise, J.K., Heathcott, B.L., Sheperd, A.J. Results of the 2002 AVMA survey of US pet-owning households regarding use of veterinary services and expenditures. JAVMA. 2002; 222 (11): 1524-1525.

Correlazione tra la taglia del cane da compagnia ed il profilo del proprietario: uno studio trasversale condotto in Italia

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Sintesi

Lo scopo della ricerca è stato quello di analizzare le caratteristiche di proprietari di cani di taglia diversa, attraverso un questionario somministrato via Internet.

Nel campione analizzato, il 39% dei cani era di taglia media, il 29 di taglia piccola ed il 32 di taglia grande. Una percentuale statisticamente maggiore di persone che possiedono un cane per la prima volta, ha un cane di piccola taglia, poiché ritiene che sia più adatto ad essere tenuto in casa (45%). All'opposto, proprietari esperti preferiscono cani di grossa taglia, soprattutto (52%) per motivi estetici. Le razze di piccola taglia sono preferite per i costi ridotti di mantenimento e, per lo stesso motivo, si assiste ad una contrazione del numero di animali di grossa taglia. Non sembra invece influire la scelta, l'età dei proprietari poiché ci si aspetterebbe che i cani di piccola taglia fossero preferiti da persone di età più avanzata per la miglior facilità nella gestione dell'animale.

Per quanto riguarda il livello di istruzione dei proprietari, è risultato essere inferiore nei proprietari di cani di piccola taglia rispetto alle altre due categorie. La maggior parte di questi cani di piccola taglia sono stati acquistati in un negozio per animali, ad un età media di 30-50 giorni. I cani di piccola taglia frequentano in percentuale minore scuole di educazione cinofila rispetto a cani di media e grossa taglia, poiché i proprietari ritengono che non ve ne sia bisogno.

In conclusione, il possesso di un cane è un fattore importante, sia economico, sia sociale poiché è ampiamente diffuso in molte culture umane e si calcola che almeno un quarto di proprietari di case, possegga un cane. Questi dati possono essere di utilità per coloro che si occupano di salute pubblica, scienze sociali e veterinarie.