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Owner-companion dog interactions: Relationships between demographic variables, potentially problematic behaviours, training engagement and shared activities

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Abstract

Many companion dogs occupy a privileged position in our society, living closely with human caretakers who go to great lengths to provide for their needs and desires. Others fare less well, being abandoned or killed, many because they are believed to exhibit behaviour problems. The aim in this study was to investigate the frequency of potentially problematic behaviours experienced by a convenience sample of companion dog owners and to establish if the presence of these behaviours was associated with demographic variables, involvement in dog training activities and participation in other dog-human interactions. Potentially problematic behaviours were reported to occur by the 413 adult participants only infrequently, but fell into five factors; disobedience, unfriendliness/aggression, nervousness, anxiety/destructiveness and excitability. Each of these factors was associated with a number of owner and dog characteristics. Engagement in training activities was predictive of lower scores being obtained for many of the behaviours, as well as increased involvement in shared activities. Some of the behaviours, particularly the perceived friendliness of the dog, were also predictive of involvement in shared activities. This confirms that strategies designed to increase participation in dog training

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activities and promote canine sociability may have significant benefits for both companion dog owners and their dogs.

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1. Introduction

The domestic dog (*Canis familiaris*) is regarded as a highly trainable species (Prestrude and O'Shea, 1996). Despite this, thousands of dogs are surrendered to animal shelters annually because of perceived behaviour problems (Patronek et al., 1996; New et al., 2000; Marston et al., 2004). This is a significant animal welfare issue. In addition, misbehaving dogs cause road accidents, community disputes, property damage and injury (Ashby, 1996; Sacks et al., 1996). Establishing the prevalence of perceived dog behaviour problems in the community is an important issue, which has previously been addressed in several different contexts (Adams and Clark, 1989; Beaver, 1994; Guy et al., 2001; Hiby et al., 2004; Wells and Hepper, 2000). A recent study in Australia by Kobelt et al. (2003), for example, found that overexcitement and jumping up on people were common behaviours among dogs, as were rushing at people or other dogs and excessive barking. Kobelt et al. (2003) also found that specific 'problem behaviours' were associated with general disobedience, owner experience and the amount of time spent by the owner with his or her dog, and that dogs who attended obedience training were more likely to obey their owner's commands. This is consistent with previous reports that participation in obedience training is associated with a significantly reduced prevalence of canine behaviour problems (Clark and Boyer, 1993; Jagoe and Serpell, 1996) and an increased probability of a positive outcome following adoption of a dog from a welfare shelter (Patronek et al., 1996; Marston and Bennett, 2003).

Perhaps surprisingly, then, it was reported in 1999 that only 24% of dog owners attend formal obedience training classes (Coren, 1999). It is not known whether this apparent lack of interest in formal dog training occurs because many owners have dogs that do not, or are at least not perceived to, demonstrate problematic behaviours, or whether owners who do experience behavioural difficulties feel unwilling or unable to learn how to address these behaviours. Perhaps many owners simply train their dogs at home, accessing training knowledge via books, videos or informal conversations with friends and family members.

There were four aims in this study. The first was to ascertain the perceived frequency of potentially problematic canine behaviours in a large convenience sample of companion dog owners. The second was to see if these varied with relevant demographic variables. Third, we investigated whether participants engaged in several dog training activities and, if so, whether this engagement was associated with or predicted the presence of potentially problematic behaviours. Fourth, we examined whether dog owners participated in a number of shared activities with their dog and whether this was associated with or predicted by the presence of potentially problematic behaviours and/or engagement in training activities.

2. Method

2.1. Participants

Participants were recruited via two techniques. First, 150 paper copies of the questionnaire, including reply paid envelopes, were distributed to pet shops and veterinary clinics in the city of Melbourne, Australia. A total of 46 questionnaires were returned. Second, the survey was posted on the internet for a period of 7 months and was publicised at local pet shops and veterinary surgeries and in the media. Three hundred and sixty seven participants submitted questionnaires via this method, resulting in a total sample size of 413.

The mean age of participants was 35.8 years (S.D. = 12.3, range = 18–76 years). The majority of respondents (85%) were female. Participants were drawn from all Australian states although the majority came from Victoria (40%). Just over 10% (10.4%) of the sample lived in a country other than Australia. Over half of the participants resided alone or in a two person household (59%) and just over one fifth (22.3%) lived with one or more children. All participants reported owning at least one dog. Many reported owning a second dog (44.1%) and 36.5% reported owning a cat. The majority had owned a dog previously (83.1%), although the range of experience varied considerably ($M = 22.4$, S.D. = 13.7, range = 1–60 years). The most common reason for dog acquisition in the sample was companionship (85.2%). Other common reasons for acquisition were because the dog needed a home (4.6%), for protection (2.7%) and for showing (2.2%).

Half of the sample had acquired their dog through a breeder (50.1%). Most others were acquired through an animal shelter (14.3%), pet shop (11.4%), from a friend or relative (10.7%) or as a stray (9.2%). A small proportion (2.4%) had been bred by their current owner. Most participants reported that they were the main person responsible for their dog's care (63%). Another 32.7% shared this responsibility with at least one other person. Only 3.4% reported that a person other than themselves was primarily responsible for the dog.

The mean age of dogs in the sample was 5.1 years (S.D. = 3.7), however this statistic was influenced by several very old dogs (range = 3 months–19 years). One quarter of the sample was under 2 years of age, another quarter was between the ages of 2 and 4 years and another quarter was under 8 years, with the remaining quarter being spread between 9 and 19 years. Most dogs in the sample had been acquired as puppies, with the mean age at acquisition being 7 months (S.D. = 14). Although the range was from 0 (owner bred) to 13 years, three quarters of the sample had been acquired by their owner before four months of age. There were slightly more female dogs (53.3%) than male dogs (46.2%) in the sample. As is customary in Australia, the majority of dogs were de-sexed (78%) rather than sexually entire (21.5%). Within the total sample, 9.2% were entire females, 12.4% were entire males, 44.3% were desexed females and 34.1% were desexed males.

Just under half of all dogs in the sample were reported to be of medium size (48.6%), 31.2% were classified as small and 20.2% were described as large. Just over one third of the sample (33.9%) reported that their dog was mixed breed (crossbred). Although we recorded the breed type for purebred dogs we did not ascertain whether or not these dogs were registered with an appropriate breed society and it was not possible to determine

whether the dogs were really purebred or just believed to be so by their owner. Rather than analysing dogs by breeds or breed groups, therefore, we simply grouped the dogs for analysis according to whether their owner believed them to be purebred or crossbred.

2.2. Measures

A preliminary questionnaire was constructed based on available literature. This was evaluated by two focus groups consisting of convenience samples of six adult dog owners. It was then piloted on another convenience sample of 15 adult dog owners and refined according to the feedback obtained. The final questionnaire was divided into four sections. The first section, Section A, collected demographic information about the participant and the type of dog that they owned. Section B contained the nine item interaction subscale from the Monash dog owners relationship scale (MDORS, Dwyer et al., *in press*), which assesses the frequency with which the respondent engages in typical shared activities (listed in Table 1) with their dog. The respondent indicates whether they engage in each of

Table 1

Descriptive statistics pertaining to the extent to which adult companion dog owners who completed a survey about their dog's behaviour reported engaging in various shared activities with their dog and the extent to which they reported engaging in various dog training activities

	Valid cases	Mean score	S.D.	Min	Max	Percentiles		
						25	50	75
Shared activities items ^a								
Kiss	410	2.79	1.66	0	4	1	4	4
Hug	411	3.78	0.70	0	4	4	4	4
Take in car	412	2.30	1.14	0	4	1	3	3
Groom	408	2.01	1.02	0	4	1	2	3
Buy gifts	411	1.26	0.83	0	4	1	1	2
Give treats	412	3.25	0.97	0	4	3	4	4
Play games	412	3.62	0.73	0	4	3	4	4
Take visiting	411	1.61	1.19	0	4	1	2	3
Sit with	412	3.72	0.85	0	4	4	3	4
Training engagement items ^b								
Read Books	411	3.14	1.97	0	6	2	3	5
Discuss with friends/family	410	3.61	1.89	0	6	3	4	5
Attend training	411	2.33	2.43	0	6	0	1	5
'Shared activities' composite scale ^c	398	24.30	5.31	7	35	21	25	28
'Training engagement' composite scale ^d	410	9.06	5.23	0	18	5	9	13

^a Survey respondents rated how often they engaged in each 'shared activity' on a five-point scale (0: never, 1: monthly, 2: weekly, 3: every few days and 4: daily).

^b Survey respondents rated how often they engaged in each 'training activity' on a seven-point scale (0: never, 3: sometimes, 6: always).

^c Raw scores from the 'shared activities' variables were summed for each respondent to produce a composite scale with possible range of 0–36.

^d Raw scores from the 'training engagement' variables were summed for each respondent to produce a composite scale with possible range of 0–18.

the activities never, monthly, weekly, every few days or daily. Section C contained three items designed to assess the level of involvement in dog training by the respondent. Each item (listed in [Table 1](#)) was rated on a seven-point scale. The end points of the scale were labelled ‘never’ and ‘always’ and the midpoint was labelled ‘sometimes’, but intermediate points were left undefined. Section D included 24 statements (listed in [Table 2](#)) about the dog’s perceived behaviour. Each was answered on a seven-point scale, labelled the same as the items in Section C.

2.3. Data analysis

All data were entered into SPSS for Windows (Version 12). Reverse scoring was conducted for some items in Section D so that high scores on each variable were indicative of the presence of potentially problematic behaviours. For items probing behaviours normally deemed to be undesirable (see [Table 2](#)), such as ‘My dog digs holes inappropriately,’ a response of ‘never’ on the seven-point scale received a score of 0 and a response of ‘always’ received a score of 6. In contrast, for items probing behaviours normally deemed to be desirable, such as ‘My dog is friendly towards other dogs,’ a response of ‘never’ received a score of 6 and a response of ‘always’ received a score of 0. In order to reduce the number of variables in the statistical analyses the nine items from the MDORS were summed to produce a single ‘shared activities’ score (see [Dwyer et al., in press](#)). Principal components analysis, followed by varimax rotation using Kaiser normalisation, was carried out separately on the data from Sections C and D. For each analysis, the initial solution was subjected to a visual inspection of the eigenvalues, the scree plot, the amount of variance explained by the solution and the ease of interpretation of the factors contained therein. Several additional analyses were then conducted, varying the number of factors extracted and other statistical parameters, until the most satisfactory solution in terms of interpretability was identified. For Section C a single factor was found to underlie the pattern of data obtained. The items in this section were therefore summed into an aggregate value representing ‘training engagement’. For Section D several factors emerged, as described below. The items in these factors were summed for each participant to generate subscale scores. Summing the items instead of using the factor scores was felt to be appropriate in this context as we hope to administer the scales to additional samples in the future and would like to draw direct comparisons amongst the various studies conducted.

Pearson’s correlation coefficients were used to ascertain if scores on the behaviour subscales were associated with each other, continuous demographic variables, shared activities or training engagement. Each of the behavioural subscales was also explored using independent groups *t*-tests or one way analyses of variance followed by Tukey’s post hoc tests to see if there were group differences across the categorical demographic variables. Multiple regression techniques were employed to ascertain whether the behavioural variables could be statistically predicted by the demographic variables and/or training engagement, and whether the shared activities variable could be predicted by the behavioural variables, training engagement or demographic variables. Stepwise regression procedures were used after outliers were removed using the criterion suggested by [Tabachnick and Fidell \(1996\)](#). Throughout all analyses, pair-wise deletion was used to accommodate instances of missing values.

3. Results

Descriptive statistics for items measuring shared activities and training engagement are presented in [Table 1](#). Most respondents reported engaging in several activities with their dog on a regular basis, with mean scores for the shared activities items ranging between 1.26 (How often do you buy gifts for your dog?) and 3.78 (How often do you hug your dog?). The composite scale derived from the nine items had good reliability, with Chronbach's alpha being 0.73. The mean score (possible range 0 = 36) was 24.3 (S.D. = 5.3) and no participant scored below 7. One quarter of the sample scored above 28, indicating that many activities were engaged in on a daily basis by many participants in this study.

The spread of scores on the training engagement variables ([Table 1](#)) was wide. This was particularly evident in relation to attending formal obedience training classes, where the distribution was clearly bimodal. Many people (40.6%) reported having never attended training, while many others (20.3%) reported that they did so 'always'. The other two variables were more evenly distributed. The three items loaded strongly (>0.75) on a single factor, which accounted for 69.48% of the variance. The items were therefore summed to calculate a 'training engagement' composite scale, high scores on which denote a high level of engagement with multiple training activities. This scale had good reliability, with Chronbach's alpha being 0.76. Scores on the scale were bimodal, reflecting the bimodal distribution on one of the variables. While some respondents (8.7%) achieved the highest score possible, reporting that they engaged in several training related activities on an 'always' basis, an equivalent number (7%) reported never engaging in any training related activities.

The 24 items assessing the degree to which owners perceived their dog to exhibit specific behaviours were explored using principal components analyses. As shown in [Table 2](#), a five factor solution was selected as being the most appropriate of those tested. This solution explained just over 45% of the variance and included 23 of the 24 items in this section of the questionnaire.

Using the results of the principal components analysis, five behavioural subscales were created by summing the scores from the relevant items. These subscales were named 'disobedient', 'unfriendly/aggressive', 'nervous', 'anxious/destructive' and 'excitable'. While the first three subscales demonstrated adequate reliability, Chronbach's alpha ([Table 2](#)) was extremely low for the two remaining scales. All subsequent analyses involving these two subscales should therefore be interpreted with caution.

Also shown in [Table 2](#) are the descriptive statistics for each behavioural subscale. Because the item 'My dog barks excessively' did not load on any of the five factors identified, it is presented separately. It is evident from this table that the frequency of the potentially problematic behaviours examined in this study was extremely low. No dog obtained any score approaching the maximum score possible and the percentile scores generally suggest that the dogs in the sample were rarely considered to exhibit the behaviours in question.

Each of the behavioural subscales was correlated with appropriate demographic variables, the results being presented in [Table 3](#). Mean subscale scores obtained by different demographic groups were also compared, the results being presented in [Table 4](#).

Table 2

Factor loadings and descriptive statistics for the behavioural subscales derived from a principal components analysis of survey items probing the frequency with which companion dog owners report specific, potentially problematic, behaviours in their dogs

Item ^a	Factor					
	Disobedient	Unfriendly/ aggressive	Nervous	Anxious/ destructive	Excitable	Barks excessively
My dog does what he/she is told ^b	0.805					
My dog will stay when asked ^b	0.787					
My dog has good manners ^b	0.729					
My dog will sit on command ^b	0.672					
My dog will come when called ^b	0.629					
My dog soils in the house	0.415					
My dog is friendly to strangers ^b		0.731				
My dog is friendly to other dogs ^b		0.642				
My dog is aggressive to people he/she knows		0.638				
My dog is aggressive to strangers		0.584				
My dog is aggressive to other dogs		0.560				
My dog is friendly to people he/she knows ^b		0.519				
My dog is nervous			0.791			
My dog startles easily			0.743			
My dog is timid in new situations			0.672			
My dog is confident in unfamiliar places ^b			0.554			
My dog digs holes inappropriately				0.731		
My dog chews things he/she shouldn't				0.566		
My dog is relaxed most of the time ^b				0.431		
My dog doesn't mind being left alone ^b				0.371		
My dog pulls on the leash when walking					0.616	
My dog jumps up on people					0.544	
My dog shows inappropriate sexual behaviours					0.475	
My dog barks excessively						
% Variance explained	16.87	9.77	7.81	5.89	5.09	
Chronbach α	0.79	0.68	0.68	0.37	0.29	
Descriptive statistics for the derived subscales and 'barks excessively' item ^c						
Valid cases	407	401	406	411	410	411

Table 2 (Continued)

Item ^a	Factor					
	Disobedient	Unfriendly/ aggressive	Nervous	Anxious/ destructive	Excitable	Barks excessively
% Obtaining score of 0	6.3	13.7	12.1	4.6	10.5	48.9
Max score obtained (max score possible)	26 (36)	22 (36)	14 (24)	17 (24)	8 (18)	3 (6)
Mean score	8.11	6.55	5.78	5.66	3.31	0.97
Standard deviation	5.59	4.95	3.73	3.35	2.17	1.18
Percentiles						
25	4	3	2	3	1	0
50	7	6	6	5	3	1
75	12	10	9	8	5	1

^a Survey respondents were asked to rate how often they perceived their dog to exhibit 24 potentially problematic behaviours on a seven-point scale (0: never, 3: sometimes, 6: always).

^b Items that were reverse scored during data entry.

^c High scores on each behavioural subscale are indicative of a greater perceived incidence of potentially problematic behaviours.

Table 3

Correlations between behavioural subscale scores^a derived from dog owners' survey ratings of perceived potentially problematic behaviours in their companion dogs and self reported demographic details about the owners and their dogs

	Disobedient	Unfriendly/ aggressive	Nervous	Anxious/ destructive	Excitable	Barks excessively
Participant age	−0.069	0.031	−0.027	−0.169**	−0.029	−0.105*
	407	401	406	411	410	411
Family size	0.129**	0.103*	0.088	0.060	−0.024	0.096
	407	401	406	411	410	411
Experience with dogs	−0.176**	−0.055	−0.106*	−0.137**	−0.099*	−0.095
	407	398	403	408	407	408
Current age of dog	−0.076	0.200**	0.033	−0.224**	−0.081	0.035
	400	396	399	404	403	404
Age of dog when acquired	0.000	0.027	0.055	−0.009	−0.059	0.008
	403	397	402	407	406	407

^a Higher scores on all subscales are indicative of a greater perceived incidence of potentially problematic behaviours.

* Significant at $\alpha = 0.05$.

** Significant at $\alpha = 0.01$.

There were few significant results and many of those that were significant reflected only small differences between group means and weak correlations, statistically significant partially due to the large sample size. Scores on the 'disobedient' scale, which measured the degree to which a dog fails to sit, stay, or come when called, soils in the house and is generally considered to lack good manners and be disobedient, were positively associated with the family size of the respondent and negatively associated with the respondent's experience with dogs. Males reported that their dogs were more 'disobedient' than did females [$t(405) = 2.45$, $p = 0.03$] and participants not primarily responsible for the dog believed it to show more of the behaviours in question than did participants who were solely responsible or shared responsibility with another person [$F(2, 400) = 8.48$, $p < 0.001$]. Dogs believed by their owners to be crossbred were more 'disobedient' than dogs considered to be purebred [$t(400) = 2.37$, $p = 0.018$] and there was a significant difference across the size of the dog [$F(2, 373) = 8.78$, $p < 0.001$]. Tukey's post hoc tests revealed that the mean score obtained by small dogs on the subscale was significantly higher than the mean score obtained by medium or large dogs.

The subscale of 'unfriendly/aggressive' measured the extent to which the dogs in the sample were perceived to be generally unfriendly and aggressive towards strange and familiar people and towards other dogs. Very few dogs in our sample scored highly on this subscale, but the scores obtained were positively correlated with the size of the participant's family ($p = 0.04$) and the current age of the dog ($p < 0.001$). Respondents who did not consider themselves to be the primary carer for the dog reported higher levels of 'unfriendliness/aggression' than did both other participant groups [$F(2, 394) = 6.50$, $p = 0.002$]. The source of the dog also led to significant differences on this variable [$F(6, 390) = 4.10$, $p = 0.001$], with post hoc tests showing that dogs purchased from pet shops or shelters were considered by their owners to be more 'unfriendly/aggressive' than were dogs purchased from breeders.

Table 4

Mean scores and standard deviations on the behavioural subscales^a derived from dog owners' survey ratings of perceived, potentially problematic, behaviours in their companion dogs across relevant demographic groups

	Disobedient	Unfriendly/aggressive	Nervous	Anxious/destructive	Excitable	Barks excessively
Participant gender						
Male	9.73* (6.46)	7.27 (4.95)	6.08 (3.63)	5.94 (3.97)	3.02 (1.86)	0.94 (1.19)
Female	7.83 (5.39)	6.41 (4.95)	5.73 (3.75)	5.61 (3.24)	3.37 (2.22)	0.98 (1.18)
Responsibility for dog's care						
Respondent	7.84 (5.55)	6.37 (4.80)	5.60 (3.68)	5.61 (3.45)	3.31 (2.09)	0.98 (1.17)
Shared	8.09 (5.34)	6.52 (5.14)	6.01 (3.83)	5.69 (3.10)	3.32 (2.30)	0.90 (1.18)
Another person	14.07** (6.47)	11.38** (4.11)	8.31* (2.36)	7.00 (3.94)	3.50 (2.59)	1.71 (1.27)
Dog sex						
Female	8.14 (5.67)	6.43 (4.87)	6.11 (3.58)	5.87 (3.20)	3.17 (2.00)	0.95 (1.18)
Male	8.12 (5.54)	6.74 (5.07)	5.45 (3.88)	5.48 (3.50)	3.51 (2.33)	1.00 (1.19)
Dog reproductive status						
Entire	8.67 (6.03)	6.14 (4.53)	4.91 (3.72)	6.40* (3.63)	3.62 (2.26)	0.93 (1.20)
Desexed	7.98 (5.48)	6.69 (5.07)	6.05* (3.69)	5.49 (3.24)	3.25 (2.14)	0.99 (1.18)
Dog type						
Crossbred	9.01* (5.75)	7.09 (5.08)	6.67** (3.39)	6.06 (3.37)	3.73** (2.11)	1.16* (1.25)
Purebred	7.63 (5.47)	6.27 (4.85)	5.32 (3.83)	5.48 (3.34)	3.14 (2.17)	0.88 (1.13)
Dog size						
Small	9.87** (6.24)	6.62 (5.29)	5.78 (3.67)	5.70 (3.25)	3.16* (2.05)	1.05 (1.19)
Medium	7.32 (5.22)	6.48 (4.78)	5.86 (3.84)	5.69 (3.36)	3.59* (2.30)	0.97 (1.17)
Large	7.22 (5.04)	6.78 (4.82)	5.33 (3.67)	5.07 (3.33)	2.91 (2.03)	0.79 (1.08)
Source of dog						
Pet shop	9.15 (5.80)	8.70** (5.07)	7.50* (3.73)	5.91 (3.49)	3.81* (2.15)	1.09 (1.18)
Breeder	7.96 (5.71)	5.61 (4.59)	5.49 (3.77)	5.83 (3.47)	3.28* (2.13)	0.90 (1.14)
Animal shelter	7.98 (5.03)	7.83** (5.23)	6.18 (3.49)	6.15 (3.19)	3.58* (2.25)	1.15 (1.28)
Friend/family	9.16 (6.34)	7.57 (5.32)	5.02 (3.38)	5.07 (3.19)	3.64* (2.36)	1.14 (1.34)
Self bred	6.30 (8.21)	8.20 (5.29)	4.80 (3.85)	3.40 (2.88)	2.00 (2.54)	0.80 (.92)
Stray	7.37 (3.73)	5.84 (4.82)	5.58 (3.67)	5.24 (3.07)	2.47* (1.70)	0.97 (1.17)

^a Higher scores on all behavioural subscales are indicative of a greater perceived incidence of potentially problematic behaviours.

* Significantly higher than italicized group at $\alpha=0.05$ on the basis of independent group *t* test (variables with two levels) or one way analyses of variance followed by Tukey's post hoc tests (variables with more than two levels).

** Significantly higher than italicized group at $\alpha=0.01$ on the basis of independent group *t* test (variables with two levels) or one way analyses of variance followed by Tukey's post hoc tests (variables with more than two levels).

The third subscale ‘nervous’ measured whether dogs in the sample were considered by their owners to be lacking in confidence in unfamiliar places and nervous, prone to startling easily and timid in new situations. Scores on this subscale were negatively associated with the participants’ experience with dogs ($p = 0.03$) and there was a significant group difference for the variable ‘perceived responsibility’ [$F(2, 399) = 3.54, p = 0.03$]. Post hoc tests revealed that participants who were solely responsible for their dog’s care cited fewer ‘nervous’ problems than people who were not responsible for the dog. Desexed animals also scored more highly on this subscale than did entire animals [$t(402) = 2.56, p = 0.01$] and crossbred dogs were reported to be more ‘nervous’ than were purebred dogs [$t(399) = 3.5, p = 0.001$]. The source of the dog was significant [$F(6, 395) = 2.82, p = 0.01$], with post hoc tests showing that dogs purchased from pet shops were considered to be significantly more ‘nervous’ than dogs bred by the present owner.

Consistent with its poor statistical reliability, the fourth subscale, ‘anxious/destructive’, appeared to be more complex than the preceding subscales. Two of the items probe whether the dog appears anxious or intolerant of isolation and the remaining two items assess whether the dog chews or digs destructively. While any results obtained using this scale should be treated with caution, the fact that these four items load on the same factor is consistent with the view that dogs who chew and dig often tend to do so because of anxiety or frustration. It is of interest, therefore, that, while the mean score on this subscale was very low (Table 2), only 4.6% of the sample obtained a score of zero. This indicates that most dogs are believed to dig or chew inappropriately, mind being left alone or appear anxious at least some of the time. There was a small positive association between scores on the ‘anxious/destructive’ subscale and the participants’ age ($p = 0.001$), and a small negative association between the subscale and the participants’ experience with dogs ($p = 0.006$). The current age of the dog was also negatively correlated with this variable ($p < 0.001$), and sexually intact dogs obtained a higher mean score than desexed dogs [$t(407) = 2.29, p = 0.02$].

The fifth subscale, ‘excitable’ contained three items relating to the dogs’ tendency to act out in an excitable manner; jumping up on people, pulling on the lead and/or engaging in inappropriate sexual behaviour. The reliability of this subscale was too poor to allow definitive conclusions about its association with demographic groups to be drawn, but it is instructive that dogs in our sample generally obtained very low scores on this subscale (Table 2), with just over 10% obtaining a score of zero on all three items. Scores on the ‘excitable’ subscale were weakly but significantly negatively correlated with the respondent’s experience with dogs ($p = 0.046$). Crossbred dogs were reported to be more ‘excitable’ than purebred dogs [$t(403) = 2.63, p = 0.009$] and there was a significant effect for dog size [$F(2, 375) = 3.18, p = 0.04$], with post hoc tests showing that medium and small dogs were more ‘excitable’ than large dogs. There was also an effect for source of dog [$F(6, 399) = 2.33, p = 0.03$], with dogs bred by their present owner considered to be less ‘excitable’ than other dogs in the study.

The final variable explored was ‘barks excessively’. As is apparent from Table 2, the dogs in our sample were not generally considered by their owners to bark excessively. Scores on this single variable clustered tightly around the mean of 0.97 and no dog obtained a score higher than 3 (barks excessively sometimes) on the seven-point (0–6) scale. Almost half of the sample (48.9) obtained a score of 0 (never barks excessively). Barking

excessively was negatively correlated with participant age ($p = 0.03$) and crossbred dogs were perceived to bark excessively more frequently than were purebred dogs [$t(404) = 2.33, p = 0.02$].

To determine whether the behavioural variables were associated with training engagement and shared activities a correlation matrix was generated (Table 5). This revealed that many of the behavioural variables were significantly positively intercorrelated, although the correlations were generally modest. The strongest correlation (negative) was between ‘training engagement’ and scores on the ‘disobedient’ subscale. Other strong correlations (positive) were between ‘shared activities’ and ‘training engagement’, the ‘unfriendly/aggressive’ subscale and the ‘nervous’ subscale, and the ‘disobedient’ subscale and the ‘anxious/destructive’ subscale. ‘Excessive barking’ was also moderately correlated with the ‘disobedient’ subscale. Both ‘training engagement’ and ‘shared activities’ were significantly negatively correlated with four of the behavioural variables: ‘disobedient’, ‘unfriendly/aggressive’, ‘nervous’ and ‘barks excessively’.

To determine which variables best predicted the presence of potentially problematic behaviours in dogs, a series of stepwise multiple regression analyses (Table 6) were conducted with the behavioural variables entered as criterion variables. Variables entered as predictors were training engagement, participant gender, age, family size and experience with dogs, dog sex, reproductive status, type, size and age. These were chosen on the basis of the earlier results showing them to be significantly associated with at least some of the variables of interest, and also on the basis of theoretical interest. For example, we were interested to see if dog sex or reproductive status were predictive of any of the behavioural variables, even though few group differences were evident in earlier analyses.

Four variables accounted for 17.3% of the variance in predicting ‘disobedient’ behaviours ($F(4, 370) = 19.29, p < 0.001$). The strongest significant predictor was ‘training engagement’, with the size and current age of the dog and the participants’ experience with dogs also contributing significantly to scores on this subscale. For the ‘unfriendly/aggressive’ subscale, just two variables predicted 7% of the variance ($F(2, 368) = 13.79, p < 0.001$), ‘training engagement’ again being the strongest significant predictor, followed by the current age of the dog. Two variables also significantly accounted for 5% of the variance in predicting scores on the ‘nervous’ subscale ($F(2, 371) = 10.54, p < 0.001$), ‘training engagement’ again being the strongest significant predictor followed by whether the dog was considered to be purebred or crossbred. A significant amount of variance (6%) on the ‘anxious/destructive’ subscale was also predicted by two variables ($F(2, 372) = 12.83, p < 0.001$) but, on this subscale, the current age of the dog was a stronger predictor than ‘training engagement’. On the ‘excitable’ subscale two dog-related variables accounted for 3% of the variance ($F(2, 372) = 5.21, p = 0.006$), with the type of dog (purebred versus crossbred) being the strongest significant predictor followed by whether the dog was desexed or not. Finally, the ‘barks excessively’ variable was significantly predicted by just one variable ($F(1, 373) = 7.86, p = 0.005$); ‘training engagement’.

The final analysis conducted was a stepwise multiple regression analysis, with which we investigated whether scores on the ‘shared activities’ subscale were predicted by any of the demographic or behavioural variables (Table 7). Variables entered as potential predictors into the analysis were ‘training engagement’, participant gender, age, family size and

Table 5
Correlations between behavioural subscales, training engagement subscale and shared activities subscale, derived from dog owners' survey ratings^a

	Disobedient	Unfriendly/ aggressive	Nervous	Anxious/ destructive	Excitable	Barks excessively	Training engagement	Shared activities
Disobedient	1	0.185** 0.000	0.208** 0.000	0.265** 0.000	0.080 0.107	0.234** 0.000	-0.345** 0.000	-0.150** 0.003
	413	396	400	405	404	405	404	393
Unfriendly/aggressive		1	0.296** 0.000	0.088 0.079	0.045 0.365	.211** 0.000	-.201** 0.000	-0.253** 0.000
		401	395	399	398	399	398	386
Nervous			1	0.207** 0.000	0.110* 0.027	0.176** 0.000	-0.184** 0.000	-0.200** 0.000
			406	404	403	405	403	392
Anxious/destructive				1	0.123* 0.013	0.170** 0.001	-0.085 0.086	-0.010 0.844
				411	408	409	408	396
Excitable					1	0.028 0.571	-0.014 0.773	0.024 0.638
					410	408	407	395
Barks excessively						1	-0.144** 0.004	-0.178** 0.000
						411	408	397
Training engagement							1	0.338** 0.000
							410	395
Shared activities								1 398

^a Higher scores are indicative of a greater incidence of perceived potentially problematic behaviours, training engagement and shared activities respectively.

* Significant at $\alpha = 0.05$.

** Significant at $\alpha = 0.01$.

Table 6

Stepwise multiple regression analyses of behavioural subscales derived from dog owners' survey ratings of perceived, potentially problematic, behaviours in their companion dogs

	Standardized coefficients		Significance ^a
	Beta	<i>t</i>	
Disobedient subscale			
Constant	–	15.41	0.000
Training engagement	–0.34	–6.94	0.000
Size of dog	–0.16	–3.28	0.001
Age of dog	–0.12	–2.45	0.015
Experience with dogs	–0.11	–2.18	0.030
Unfriendly/aggressive subscale			
Constant	–	10.57	0.000
Training engagement	–0.18	–3.44	0.001
Age of dog	0.174	3.41	0.001
Nervous subscale			
Constant	–	12.13	0.000
Training engagement	–0.16	–3.06	0.002
Type of dog	–0.14	–2.80	0.005
Anxious/destructive subscale			
Constant	–	17.11	0.000
Age of dog	–0.24	–4.77	0.000
Training engagement	–0.12	–2.39	0.017
Excitable subscale			
Constant	–	9.72	0.000
Type of dog	0.16	–2.92	0.004
Reproductive status	0.08	–1.99	0.047
Barks excessively variable			
Constant	–	10.49	0.000
Training engagement	–0.14	–2.80	0.005

^a Only variables that were significant predictors are shown.

Table 7

Stepwise multiple regression analysis of shared activities scale derived from companion dog owners' survey ratings

	Standardized coefficients		Significance ^a
	Beta	<i>t</i>	
Shared activities			
(Constant)	–	14.32	0.000
Training engagement	0.26	5.26	0.000
Unfriendly/aggressive	–0.12	–2.56	0.011
Age of participant	–0.18	–3.77	0.000
Number of people in household	–0.15	–3.15	0.002
Barks excessively	–0.13	–2.65	0.009
Gender of participant	0.12	2.54	0.012
Age of dog	–0.11	–2.25	0.025
Size of dog	–0.09	–2.12	0.035

^a Only variables that were significant predictors are shown.

experience with dogs, dog sex, reproductive status, type, size and age, 'disobedience', 'unfriendly/aggressive', 'nervous', 'anxious/destructive', 'excitable' and 'barks excessively'.

Eight variables combined to account for 24.6% of the variance in predicting scores on the 'shared activities' scale ($F(8, 362) = 14.79, p < 0.001$). The strongest significant predictor was 'training engagement', followed by the perceived 'unfriendliness/aggressiveness' of the dog, the age of the participant, the number of people in the household, whether the dog was believed to bark excessively, the gender of the participant and the age and size of the dog. Scores on the remaining behavioural subscales ('disobedience', 'nervous', 'anxious/destructive' and 'excitable') were not significant predictors of 'shared activities' and nor were the participants' experience with dogs or the dogs' sex, reproductive status or type (crossbred versus purebred).

4. Discussion

The first aim in this study was to ascertain the perceived frequency of canine behaviours, believed to be potentially problematic for dog owners, in a relatively large convenience sample of companion dog owners. It was found that the behavioural variables included in the study fell into five factors, with only one variable, 'barks excessively', being excluded from the optimal factor solution. These factors were named 'disobedient', 'unfriendly/aggressive', 'nervous', 'anxious/destructive' and 'excitable'. While three of the factors demonstrated good reliability all results concerning the final two should be interpreted with caution. Mean scores on each of the subscales, derived by summing the items in each factor, and on the remaining single variable (barks excessively) were uniformly low, falling in the bottom half of the possible range and often within the bottom third. Given that the lowest point on each item was labelled 'never' and the midpoint labelled 'sometimes' this indicates that the respondents to our survey experienced few of the potentially problematic behaviours that we explored.

While it is difficult to draw valid conclusions without a comparison group, it is highly likely that our results are at least partially a function of the convenience sample employed. Presumably, only those people who are relatively engaged with their dog would voluntarily complete a questionnaire about their dog's behaviour, and such people might be expected to have reasonably well behaved dogs. Consistent with this explanation, three quarters of the sample obtained a relatively high score on the 'shared activities' subscale that we extracted from the MDORS (Dwyer et al., *in press*). Normative data for the MDORS is not yet available but the scores indicate that members of our sample kissed, hugged and groomed their dogs regularly, that they took their dogs visiting and riding in the car, that they bought them gifts and treats, played games with them and spent time simply sitting with them. Many dogs in the community probably do not enjoy such 'privileges' on a regular basis so it will be important in future to extend this study by targeting less committed owners. Nonetheless, our results are important in suggesting that the vast majority of dog owners, who are sufficiently engaged with their dogs to respond to an anonymous questionnaire, only infrequently experience potentially problematic behaviours. This is encouraging and consistent with

information that dog ownership remains extremely popular and rewarding despite increasing urbanisation.

The second aim in this study was to examine scores on the behavioural measures in relation to the demographic information collected about the participant and their dog. A number of significant findings emerged although most differences between group means were small and correlations between variables were generally weak to moderate. Not surprisingly, the amount of experience a participant reported having with dogs was an important factor in influencing dog behaviour, with experience and undesirable behaviours being weakly or moderately negatively correlated for four of the six behavioural variables. This supports findings reported by Kobelt et al. (2003) and Jagoe and Serpell (1996). Participant gender was significant only for general 'disobedience' and participant age was of little consequence, except in relation to 'anxiety/ destructiveness' and 'excessive barking'. Older participants reported that their dogs were more likely to dig holes or chew things inappropriately, and/or to appear anxious and mind being left alone. They also reported that their dogs were less likely to bark excessively. It is possible that the relationship between participant age and dog behaviour is influenced by a moderator variable. For example, since dog size was associated with scores on some of the behavioural subscales in our study, a tendency for older people to own smaller dogs and to keep them inside the house may account for their reporting more anxiety/destructiveness and less excessive barking.

Family size was significantly correlated with two of the behavioural subscales, with dogs from larger families being rated as more 'disobedient' and more 'unfriendly/aggressive' than dogs from smaller households. This may reflect a diffusion of responsibility for the dog's training in larger households, increased tolerance of undesirable behaviour or simply a lack of time on the part of the adults in the family to address problematic behaviours in their pet dogs. Interestingly, when the respondent considered a person other than themselves to be primarily responsible for the dog they were describing, they scored it more highly on all of the behavioural subscales; the differences between groups being significant on three of the six variables. Very few respondents in our study (3.4%) did not feel at least partially responsible for the dog they described and perhaps these people chose to participate simply so that they could criticize the behaviour of a particular dog. Alternatively, perhaps the vast majority of our participants, who did feel responsible for the dog they described, tended to view its behaviour more favourably than was really warranted. It has previously been reported that there is an association between pet behaviour and owner attachment levels (Serpell, 1996). The relationship between perceived behaviour, actual behaviour and owner characteristics is an interesting one that deserves further investigation.

Dog related factors were perhaps less consistently associated with specific behaviours than might be expected given previous findings (Guy et al., 2001; Wells and Hepper, 2000), although this was also found in Kobelt et al's. (2003) study. There were no significant differences due to the sex of the dog and the dogs' reproductive status was associated with significant differences on only two of the six behavioural measures, 'anxiety/ destructiveness' and 'nervousness'. While desexed dogs were considered to be more nervous or timid than sexually intact dogs, they were also rated as less anxious and engaged in fewer destructive behaviours. Dogs believed to be crossbred fared more poorly on all

scales than did those believed to be purebred; being significantly more ‘disobedient’, ‘nervous’, ‘excitable’ and ‘barking excessively’ more often. This is unlikely to be a function of genetic differences between purebred and crossbred dogs, but may reflect differences in the level of commitment to dog training between owner groups. Participants were not asked to disclose the purchase price for their dog in this study, but the owners of purebred dogs typically pay more for their dogs and may be more committed to their care and training.

Smaller dogs were considered to be more ‘disobedient’ than large dogs and both small and medium dogs were more ‘excitable’ than large dogs. Kobelt et al. (2003) reported that larger dogs were more likely to attend formal obedience training than small dogs, perhaps because behavioural problems are considered to be more serious in larger dogs, but they did not report behavioural differences across dog size. Perhaps surprisingly, while the current age of the dog was positively associated with ‘unfriendliness/aggressiveness’ and negatively associated with ‘anxious/destructive’ behaviours, the age of acquisition of the dog was not correlated with any behavioural outcomes. This challenges a common misconception amongst members of the public that dogs will be more obedient and ‘fit into’ the family better if purchased as puppies, although it should be noted that the source of the dog was associated with differences on three of the behavioural subscales. This effect was somewhat inconsistent, however dogs purchased from pet shops generally scored more highly on the behavioural subscales than did dogs obtained from other sources. We were not able to ascertain if ‘pet shop’ dogs do actually exhibit more potentially problematic behaviours than do dogs from other sources. Perhaps ‘pet shop’ dogs are less adequately socialised as puppies than are other dogs, perhaps their parents are selected less carefully or perhaps the experience of being in a pet shop has lasting effects. Of course it might also be the case that people who buy puppies from pet shops, like those who buy crossbred rather than purebred dogs, may devote less time to training than do other owners, or such people may simply report more potentially problematic behaviours than do others, independently of the dog’s actual behaviour. These possibilities clearly warrant further research as, if dogs purchased from pet shops do consistently display more potentially problematic behaviours, this issue should be addressed.

The third aim in the study was to investigate whether the participants engaged in one or more dog training activities and, if so, whether this engagement was associated with dog behaviours. Scores on the ‘training engagement’ scale varied widely. While the sample was reasonably normally distributed across two of the variables comprising the scale, reading books about dog training and discussing training with friends and family, the distribution for attending dog training was bimodal, with many participants having never attended formal training activities and many others being engaged with formal training on a regular basis. A previous report that only 24% of dog owners ever attend dog training classes (Coren, 1999) may have quite substantially underestimated dog owners’ engagement with training, as other sources of information are clearly important. However, it is also possible that engagement in training has increased since the time of the previous publication or that our sample included a disproportionate number of dedicated dog trainers. In this respect it is interesting that, even in our sample of presumably highly committed dog owners, sufficiently interested in their dog to respond to our survey, there were still many persons who did not ever attend formal obedience training. This is an important finding given the

established links between participation in obedience training and a reduced prevalence of canine behaviour problems (Clark and Boyer, 1993; Jagoe and Serpell, 1996) and also the documented outcomes for many dogs that exhibit behavioural problems (Patronek et al., 1996; New et al., 2000; Marston et al., 2004). Work is currently underway in our laboratory to investigate peoples' attitudes towards dog training and also their satisfaction with the range of training services available.

As expected based on previous studies (Clark and Boyer, 1993; Jagoe and Serpell, 1996; Kobelt et al., 2003) 'training engagement' was moderately negatively associated with most of the behavioural subscales and made a significant contribution to predicting scores on these subscales. Dog owners who engaged in dog training activities reported that their dogs were less 'disobedient' and more friendly/less aggressive towards strange and familiar people and other dogs. These dogs were also reported to be less nervous and less likely to bark excessively. The methodology used in this study did not permit us to investigate a causal relationship between training engagement and dog behaviours. It seems likely that training engagement promotes 'better' behaviour in dogs, and common sense dictates that those with problem dogs should be more likely, rather than less likely, than other owners to engage in training activities. However, it is possible that owners of dogs who are 'naturally' well behaved are more likely to engage in training activities, perhaps because these activities are more enjoyable when shared with a well behaved dog. Perhaps people who intend to engage in training are also more careful in their selection of dogs to begin with. We were also unable to ascertain whether an owner's engagement with training actually led to dogs exhibiting fewer of the behaviours in question, or if it simply meant that the owner perceived fewer of these behaviours than did other dog owners. It is possible that there is no difference in the behaviour of the dogs concerned, but that owners who have invested time and money in training are simply more likely to rate their dogs as being better behaved, either because they expect this to be the case or because they have more knowledge of 'normal' dog behaviours.

Training engagement was, perhaps surprisingly, not negatively associated with scores on the 'anxious/destructive' subscale or with 'excitable' behaviours such as jumping up on people, pulling on the leash and engaging in inappropriate sexual conduct. Perhaps these issues are not adequately covered by the sources of training information available, or perhaps they are largely determined by the genetic makeup of the dog or its environment and are not particularly amenable to training. Alternatively, since both of these subscales had poor statistical reliability it is possible that the findings are misleading and they clearly require independent confirmation before being accepted. We did not ask participants to describe the type of training they engaged in, although previous studies (Hiby et al., 2004) suggest that this may have a substantial impact on dog behaviour. This issue is currently being investigated in our laboratory and will be reported at a subsequent date. The important thing to note at present is that participation in training activities is associated with a significantly reduced prevalence of canine behaviours that are potentially problematic for dog owners.

The fourth and final aim in this study was to ascertain whether members of the sample participated in shared activities with their dog and whether their level of involvement was predicted by the demographic information collected, 'training engagement', or the presence of behavioural problems. As expected, most participants in our self-selected sample did engage in many shared activities with their dogs, most of whom were acquired specifically as companions. The extent to which owners engaged in activities with their

dogs was moderately associated with ‘training engagement’. It was also negatively associated with the dog being considered to be ‘unfriendly/aggressive’, ‘nervous’, ‘disobedient’ or to ‘bark excessively’. The strongest predictor of ‘shared activities’ was ‘training engagement’, with a number of demographic variables (age, gender and family size of the participant and age and size of the dog) also having a significant effect. The only behavioural variables to make a significant contribution to predicting the ‘shared activities’ scale were the perceived ‘unfriendliness/aggressiveness’ of the dog and the extent to which it was considered to bark excessively.

It would be expected that demographic variables would significantly predict the number of activities an owner engages in with their companion dog. What has been demonstrated in this study, however, is that the owner’s perception of their dog’s behaviour is associated with the extent to which the dog is included in its owner’s activities, and that this, in turn, is significantly influenced by the owner’s engagement in training activities. Serpell (1996) previously reported an association between dog behaviour and owner attachment, but it is interesting to consider whether this relationship may be mediated by involvement in shared activities. Of course, a major limitation in this study is that we were not able to ascertain causal relationships between the variables. While it is likely that some people with poorly behaved, unfriendly/aggressive dogs are unable to engage in shared activities because of their dog’s behavioural problems, it is equally likely that some dogs develop poor manners and become unfriendly or aggressive because they have limited opportunities to share activities with their owner. It would be interesting to explore this issue prospectively, perhaps by following puppies and their owners from the time of acquisition.

5. Conclusions

Three main conclusions emerged from this study. First, the vast majority of companion dogs owned by people willing to voluntarily complete a survey about dog behaviours are considered by those responsible for their care to rarely display behaviours identified in the literature as being potentially problematic for dog owners. Second, engagement in a range of training activities, but not only attending formal training classes, is predictive of a lower frequency of reported behavioural problems. Third, the extent to which owners engage in training activities and the extent to which their dogs are perceived to be unfriendly or aggressive, are predictive of engagement in a range of shared activities. This suggests that interventions which aim to increase involvement in dog training and improve dog sociability may have significant implications for companion animal owners through reducing behavioural problems. Such interventions may also have significant implications for companion dogs, whose welfare is likely to be considerably improved if they are sufficiently well mannered and sociable to engage in shared activities with their owners.

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