



## A refinement and validation of the Monash Canine Personality Questionnaire (MCPQ)

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### ABSTRACT

The investigation of canine personality has failed to find strong agreement between studies as to its structure. The area has been hampered by a reliance on human personality models and by a tendency to limit the types of dogs used as subjects. These problems were recently addressed during the development of the Monash Canine Personality Questionnaire (MCPQ). In this follow-up study, over 450 participants provided demographic information about themselves and their dog and completed the MCPQ for their dog. Structural Equation Modelling results necessitated reassessing the original data and reanalysis suggested a more succinct questionnaire, the MCPQ-R, to measure five dimensions of canine personality very similar to those revealed in earlier work (extraversion, motivation, training focus, amicability and neuroticism). Owner reports of personality were generally consistent across demographic variables for all five canine personality subscales. There was no association between any subscale score and owner gender or education level, or dog sex or sexual status (desexed or not desexed). Significant, but generally weak associations were found for owner age and Extraversion ( $r = 0.17$ ,  $P < 0.001$ ), owner knowledge of their dog and Training Focus ( $r = 0.22$ ,  $P < 0.001$ ), time spent inside and Extraversion ( $r = -0.13$ ,  $P = 0.007$ ), dog age and Extraversion ( $r = 0.14$ ,  $P = 0.004$ ), Training Focus and Extraversion ( $r = 0.13$ ,  $P = 0.007$ ), dog height and Neuroticism ( $r = -0.20$ ,  $P < 0.001$ ) and dog height and Amicability ( $r = 0.2$ ,  $P < 0.001$ ), dog weight and Neuroticism ( $r = -0.17$ ,  $P < 0.01$ ) and dog weight and Amicability ( $r = 0.19$ ,  $P < 0.01$ ). There were also few differences in personality ratings across recognised purebred dog breed groups, although Working Dogs and Terriers scored significantly more highly on the Extraverted subscale than other groups ( $P < 0.001$ ) and Working Dogs and Gundogs scored more highly on the Training Focus subscale ( $P < 0.001$ ). These results are consistent with the view that the MCPQ-R assesses a construct, canine personality, which is relatively stable and comprised of five dimensions.

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### 1. Introduction

Personality in dogs has been investigated by several groups, with existing literature showing mixed results as to the structure of canine personality. In particular, the personality dimensions identified have been varied in their

number and nature (Hart and Miller, 1985; Svartberg and Forkman, 2002; Jones and Gosling, 2005). This may be partly because of two limitations in existing studies, identified by Jones and Gosling (2005). These are, first, that existing studies often rely on unique populations of dogs, such as guide dogs or police dogs, where heterogeneity of personality traits may be restricted and, second, that personality traits from the human psychological literature are typically applied to dogs without initially testing the assumption that dogs and humans have the same

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personality dimensions. Reconciliation of the variable results is made even more difficult by a lack of follow-up studies attempting to replicate initial findings in independent samples. In human personality research, constant revisions and modifications of personality models in response to ongoing studies has led to much stronger results.

In a previous paper (Ley et al., 2007) we described the development of a canine personality scale, the Monash Canine Personality Questionnaire (MCPQ), using an adjective-based methodology similar to that used in the formulation of a popular model of human personality, the Big Five Model (BFM) (John, 1990). A comprehensive list of personality adjectives (67), considered by experienced people to be applicable to dogs, was given to a large sample (1016) of companion dog owners for them to rate how well each word applied to their dog. The data were subjected to exploratory principal component analyses and five factors were identified and then confirmed in a number of follow-up analyses. These were well represented by just 41 adjectives (see Table 1) and were tentatively labelled extraversion, self-assuredness/motivation, training focus, amicability and neuroticism; although it was noted that additional research was required to establish whether these names were appropriate and whether the factors are both reliable and valid. In our conceptualisation (see Table 1) extraversion describes the perceived energy level of the dog; self-assuredness/motivation characterises a dog's perceived persistence in the face of distractions (for example begging for food, finding a particular toy); training focus describes the perceived trainability of the dog; amicability refers to how the dog is perceived to tolerate other individuals, be they humans, dogs or other animals; and the last factor, neuroticism, describes how cautiously or nervously a dog is perceived to behave.

The aim in this study was to use the 41-item MCPQ to further explore the personality of Australian companion dogs. We were interested in testing whether the five factors identified previously were sufficiently stable to reappear in a smaller sample, therefore supporting the construct validity of the five dimensions of personality described by the MCPQ. We were also interested in

examining average ratings on the five personality subscales believed to measure these personality dimensions and the range of variability evident in a broad canine population. Most importantly we were interested in whether canine personality subscale scores might differ depending on owner characteristics, such as age, sex, education and location or type of residence, or depending on dog attributes, such as breed, size, age, sex, sexual status (desexed or not desexed), physical build, height and weight. Although the popular media tends to associate some canine characteristics, such as aggressiveness or friendliness, with certain breeds or types of dog, such as Rottweilers or Labrador Retrievers, the extent to which these stereotypes are accurate is unknown.

## 2. Materials and method

### 2.1. Participants

Participants were 588 adults, at least 18 years of age, who owned a dog aged at least 18 months of age. They were recruited through the Victorian Canine Association, veterinary clinics and dog training establishments around metropolitan Melbourne, and from around Australia through reports of the study in local and national media outlets. Following the protocol used in Ley et al. (2007), questionnaires were removed from analysis if the respondent was younger than 18 years old, spoke a language other than English as their first language, or reported that their dog was less than 18 months of age. Twenty-three questionnaires were returned with greater than 20% missing data and were rejected from the analyses. Several people also returned two or more questionnaires, describing separate dogs. To ensure independence of the data, only one randomly selected questionnaire was retained for each participant. In all, 455 questionnaires were retained, representing 360 female (79.1%) and 95 male (20.9%) participants. The age range was from 18 to 86 years with the mean age being  $48.5 \pm 13.9$  years.

Participants were generally well educated, with most of the sample having completed at least high school (education level: primary school, 0.5%; vocational training, 6.9%; high school, 34.7%; undergraduate degree, 25.4%; postgraduate degree, 20.8%; other, 11.7%). Most lived in suburban areas (Housing location: inner city, 3.3%; suburbs, 76.2%; country town, 9%; country property (farm), 11.5%) and most lived in a separate house on either a suburban or larger block of land (housing type: flat/apartment, 0.5%; town house/unit/granny flat, 10.1%; house on suburban block, 52.4%; house on block of quarter acre (approximately 0.1 ha) or more, 29.5%; farm, 7.5%). Over half (55.2%) the respondents reported having owned or lived with more than five dogs in their lifetime, while 20.3% had owned/lived with 4–5 dogs, 18.1% with 2–3 dogs and only 6.4% with only one dog. Whether this is unusual or not is unknown, but it must be

**Table 1**

Words in the five canine personality subscales derived from the Monash Canine Personality Questionnaire (MCPQ) and those retained in the MCPQ-Revised (MCPQ-R).

Extraversion	Self-Assuredness/Motivation (Motivation) <sup>a</sup>	Training Focus	Amicability	Neuroticism
Active	Assertive	Attentive	Easy going	Fearful
Energetic	Determined	Biddable	Friendly	Nervous
Excitable	Independent	Intelligent	Non-aggressive	Submissive
Hyperactive	Persevering	Obedient	Relaxed	Timid
Lively	Tenacious	Reliable	Sociable	<b>Cautious</b>
Restless	<b>Dominant</b>	Trainable	<b>Gentle</b>	<b>Sensitive</b>
<b>Eager</b>	<b>Nosey</b>	<b>Clever</b>	<b>Happy-go-lucky</b>	
<b>Enthusiastic</b>	<b>Opportunistic</b>		<b>Unaggressive</b>	
<b>Exuberant</b>	<b>Proud</b>			
<b>Quiet</b>	<b>Thorough</b>			

**Bolded words:** words retained in the MCPQ-R.

Note: Those words retained as part of the MCPQ-R are presented first (alphabetically), followed by those included in the MCPQ but removed from the MCPQ-R.

<sup>a</sup> The name of this subscale was revised from Self-Assuredness/Motivation in the MCPQ to Motivation in the MCPQ-R.

recognised that our convenience sample may be biased towards enthusiastic dog owners.

The dogs currently owned by the respondents ranged in age from 18 months to 18 years, with the mean age being  $6.6 \pm 3.6$  years and the median being 6.0 years. As is typical in Australia (McHarg et al., 1995), most of the dogs were desexed (79.3%), and both sexes were equally represented (males: 50.6%, females: 49.4%). Eighty-two dog breeds, from all seven breed groups (Toys, Terriers, Gundogs, Hounds, Working Dogs, Utility and Non-Sporting) recognised in Australia by the Australian National Kennel Council (ANKC), were represented in the group. Dogs of mixed breed made up 32.9% of the sample. A list of the breeds represented and a summary of the physical characteristics of the canine sample (weight, height, physical build) is provided in Table 2. As can be seen, most of the dogs were small to medium in size and 73.4% weighed less than 26 kg. This

tendency towards small to medium dogs was also reflected in the data collected on height, with 75.7% of the dogs being described as medium or low in height. Nearly half (49.6%) the dogs were described as lean in build while 31.5% were described as heavy.

The age at acquisition ranged from birth to 14 years (mean 8.8, S.D. 18.6) although the distribution on this variable was highly skewed. Most of the dogs (61.8%) had been acquired as puppies aged between 8 and 12 weeks old and almost 15% had been owned by their current owner since birth. On a six-point scale ranging from 1 ('not very well') to 6 ('really well'), nearly all participants reported that they knew their dog well or really well (1 = 0.5%, 2 = 0.5%, 3 = 0.2%, 4 = 0.9%, 5 = 7.4%, 6 = 90.5%). Most dogs were also reported to spend a substantial amount of time indoors (0% of time = 6.2%, 20% of time = 10.6%, 40% of time = 8.4%, 60% of time = 19.8%, 80% of time = 39.4%, 100% of time = 15.6%).

**Table 2**

Dog breeds represented in sample and description of physical characteristics.

Group 1: Toys	N	%	Group 2: Terriers	N	%	Group 3: Gundogs	N	%	Group 4: Hounds	N	%
Australian Silky Terrier	2	0.4	Airedale Terrier	2	0.4	Cocker Spaniel	8	1.8	Afghan Hound	2	0.4
Bichon Frise	3	0.7	Australian Terrier	3	0.7	Cocker Spaniel (American)	2	0.4	Australian Dingo	2	0.4
Cavalier King Charles Spaniel	5	1.2	Border Terrier	1	0.2	Curly Coated Retriever	4	0.9	Basenji	1	0.2
Chihuahua (Long)	2	0.4	Fox Terrier (Smooth)	1	0.2	Pointer	1	0.2	Basset Hound	1	0.2
Chihuahua (Smooth)	1	0.2	Fox Terrier (Wire)	4	0.9	German Shorthaired Pointer	3	0.7	Beagle	10	2.2
Chinese Crested	2	0.4	Jack Russell Terrier	11	2.4	Golden Retriever	14	3.1	Borzoi	2	0.4
Griffon Bruxellois	1	0.2	Sealyham Terrier	1	0.2	Hungarian Vizsla	5	1.1	Dachshund (Min. Long)	1	0.2
Japanese Chin	2	0.4	Staffordshire Bull Terrier	8	1.8	Irish Setter	4	0.9	Dachshund (Min. Wire.)	1	0.2
Maltese	4	0.9	Tenterfield Terrier	4	0.9	Labrador Retriever	24	5.3	Irish Wolfhound	1	0.2
Miniature Pinscher	1	0.2	Welsh Terrier	2	0.4	Large Munsterlander	1	0.2	Pharaoh Hound	1	0.2
Papillion	1	0.2	West Highland White Terrier	4	0.9	Weimaraner	3	0.7	Rhodesian Ridgeback	4	0.9
Pekingese	2	0.4			Welsh Springer Spaniel	1	0.2	Saluki	1	0.2	
Pomeranian	4	0.9						Whippet	11	2.4	
Pug	2	0.4									
Tibetan Spaniel	1	0.2									
Total group 1	33	7.1	Total group 2	41	9.0	Total group 3	70	15.5	Total group 4	38	8.1
Group 5: Working Dogs	N	%	Group 6: Utility	N	%	Group 7: Non-Sporting	N	%	Non-ANKC Breeds	N	%
Australian Cattle dog	2	0.4	Akita	2	0.4	Chow Chow	1	0.2	Mixed breed	146	32.1
Australian Kelpie	9	2.1	Alaskan Malamute	2	0.4	Dalmatian	3	0.7			
Australian Shepherd	3	0.7	Boxer	5	1.1	Great Dane	2	0.4			
Bearded Collie	2	0.4	Dobermann	6	1.3	Lhasa Apso	1	0.2			
Border Collie	22	4.9	Rottweiler	4	0.9	Poodle (Standard)	8	1.8			
Collie (Rough)	5	1.1	Samoyed	1	0.2	Poodle (Miniature)	3	0.7			
German Shepherd Dog	16	3.6	Schnauzer	4	0.9	Poodle (Toy)	3	0.7			
Maremma Sheepdog	2	0.4	Schnauzer (Miniature)	3	0.7	Schipperke	1	0.2			
Puli	1	0.2	Siberian Husky	4	0.9	Shar-pei	3	0.7			
Shetland Sheepdog	2	0.4			Shih Tzu	1	0.2				
Welsh Corgi (Cardigan)	1	0.2									
Welsh Corgi (Pembroke)	5	1.1									
Total group 5	70	15.5	Total group 6	31	6.8	Total group 7	26	5.8	Total mixed breed	146	32.2
Weight range (kg)	N	%	Height range	N	%	Physical build	N	%			
<5	40	11.3	Very low	7	2.0	Very thin	24	7.0			
6–10	73	20.7	Low	120	34.3	Thin	35	10.2			
11–20	74	20.9	Medium	145	41.4	Lean	170	49.7			
21–30	98	27.8	Tall	75	21.4	Heavy	108	31.6			
31–40	54	15.3	Very tall	3	0.9	Very Heavy	5	1.5			
41–50	9	2.6									
>50	5	1.4									
	353	100		350	100		342	100			

## 2.2. Materials

In addition to the demographic information described above, the MCPQ consists of 41 words (Table 1). Participants rated, using a six-point scale, how well each word described their dog, with 1 being 'really doesn't describe my dog', and 6 being 'really describes my dog'.

## 2.3. Procedure and data analysis

Several techniques were used to distribute the questionnaire. Some were distributed in person, by the authors, at two community-based, volunteer-run dog obedience schools in the suburbs of Melbourne. Others were distributed through metropolitan veterinary clinics. The Victorian Canine Association distributed the questionnaire by mail to 200 of its members chosen randomly from its membership database. Additional participants were recruited when they contacted the authors after hearing about the study in local media. All questionnaires were returned anonymously by mail. The data were analysed with SPSS (version v16.0).

In a previous paper (Ley et al., 2007) we reported a five factor model of canine personality, generated using three independent groups of participants. To validate the structure of the canine personality model described in our previous paper, the data collected in the current study using the MCPQ were subjected initially to principal components analysis (PCA). The five factor solution identified was compared, using structural equation modelling (SEM), to the model generated previously. As the results of the SEM suggested instability in the initial model, the original data from Ley et al. (2007) were revisited. By assessing factorial invariance across the three independent groups of participants it was possible to assess the equality of factor models across groups (Hair et al., 1998, p. 591). The results of this analysis suggested a stable model when 15 words were removed from the MCPQ (see Table 1). This new model was tested using the data collected from the 455 participants in the current study using several goodness-of-fit indices: the Normed Chi Square (CI/DF), Root Mean Square Approximation of Error (RMSEA), Comparative Fit Index (CFI) and Root Mean Square Residual (RMR).

Because the results of these tests were considered satisfactory (see below), raw scores for the 26 items used to generate the revised model of canine personality (Table 1, bold words) were used to calculate five separate subscale scores for each dog, one representing each of the five personality dimensions identified. This was done by summing the raw scores for each word on each subscale and then dividing this number by the maximum score possible for that subscale. The result was then converted to a percentage, creating a subscale score for each personality dimension for each dog that can be easily compared with other administrations of the revised MCPQ questionnaire (identified as the MCPQ-R) and also for comparing results across the subscales (Cohen et al., 1999).

These subscale scores were used as variables for additional analyses reported below. Correlations between the subscale scores and owner and dog characteristics were calculated where appropriate, using Pearson's correlations coefficients when the data were normally distributed and Spearman's rho when the data were not normally distributed. Significant correlations were investigated further by examining relationships between other variables where relevant. When correlations could not be calculated because the data were nominal or ordinal, multivariate analysis of variance (MANOVA) was used to investigate differences in personality subscale scores across demographic groups. Due to the large number of tests conducted, a correction was applied with the alpha value for statistical significance in all analyses reduced to  $P < 0.01$  (Tabachnick and Fidell, 2001).

## 3. Results

### 3.1. Structural equation modelling

Structural equation modelling using the data from the previous study suggested that a stable 26-item solution could be extracted from the 41 items administered as part of the MCPQ. This solution was tested using the data from the current study. Four goodness-of-fit indices were

calculated: Normed Chi Square (CI/DF); Root Mean Square Approximation of Error (RMSEA); Comparative Fit Index (CFI); and Root Mean Square Residual (RMR). The RMSEA, recommended to be 0.05–0.08 to be a reasonable fit (Kline, 2005), was 0.06. CFI was 0.9, also considered a reasonably good fit (Kline, 2005). To be considered a good fit, RMR needs to be close to zero (Smith and McMillan, 2001) and, for the current study, was 0.19. The CI/DF was significant (CI = 949.5, d.f. = 339,  $P < 0.001$ ). However, because the Chi Square test is known to be overly sensitive to sample size, in that large sample sizes can lead to a significant Chi Square value and lead to rejection of a model inappropriately (Smith and McMillan, 2001) and given that all other fit indices were reasonable, the model was concluded to be an acceptable fit to the available data from this study.

The revised model of canine personality derived from these analyses consists of five dimensions, four of which (extraversion, training focus, amicability, neuroticism) appear analogous to those which emerged from the previous study using the MCPQ (Ley et al., 2007). The MCPQ dimension we called self-assuredness/motivation was not replicated in this study and cannot be derived from the revised, 26-item, questionnaire that has emerged. Rather this dimension was reduced to become one containing words specifically relating to motivation. It is therefore referred to as the dimension of motivation in the remainder of this paper.

The five personality dimensions are each represented by a series of adjectives (Table 1, bold words). These were used to calculate five personality subscale scores (Extraversion, Motivation, Training Focus, Amicability, Neuroticism) for each dog rated as part of this study. The subscale reliabilities were assessed using Cronbach's alpha and mean inter-item correlations as recommended by John and Soto (2007, p. 469). Cronbach's alpha ranged from 0.74 to 0.87 while the mean inter-item reliabilities ranged from 0.37 to 0.53, matching ranges for mean inter-item correlations of human personality questionnaire subscales (John and Soto, 2007, p. 473). Taken together, these results suggest reasonable internal reliability for each of the subscales derived from the 26-item MCPQ-R.

### 3.2. Descriptive information about the canine personality scales

The means, standard deviations, ranges, minimum scores, maximum scores and percentiles for each personality subscale are shown in Table 3. Training Focus and Amicability scores were the most negatively skewed of the subscales with half of all dogs scoring between 66.67 and 88.89 for Training Focus and between 66.67 and 93.33 for Amicability. The Neuroticism subscale was the only subscale positively skewed, with half the dogs scoring between 29.17 and 62.50. Perhaps surprisingly, at least one dog obtained the maximum score possible on each of the five subscales. The largest range of scores was obtained for the Neuroticism and Extraversion subscales while the Training Focus subscale had the smallest range. Neuroticism and Extraversion also shared the lowest minimum score.

**Table 3**

Mean, standard deviation, range, median and quartiles of Monash Canine Personality Questionnaire-Revised (MCPQ-R) subscale scores.

	Personality dimensions				
	Extraversion	Motivation	Training Focus	Amicability	Neuroticism
Mean (%)	63.06	67.09	77.03	77.66	45.79
S.D.	19.38	16.78	14.42	16.96	19.94
Minimum (%)	16.67	20.00	30.56	20.00	16.67
Maximum (%)	100.00	100.00	100.00	100.00	100.00
Range	83.33	80.00	69.44	80.00	83.33
Percentiles					
25	50.0	56.7	66.7	66.7	29.2
50	61.1	66.7	77.8	80.0	41.7
75	77.8	80.0	88.9	93.3	62.5

### 3.3. Relationships between canine personality subscale scores and owner and dog characteristics

There were few significant correlations between the canine personality subscale scores and owner and dog characteristics. Owner age was found to negatively correlate with the dog's score for Extraversion ( $r = -0.17$ ,  $n = 437$ ,  $P < 0.001$ ), with older owners reporting that their dogs were less extraverted. Extraversion scores also decreased as dog age increased ( $r = -0.24$ ,  $n = 435$ ,  $P < 0.001$ ), however no correlation was found between dogs' and owners' ages. The amount of time that the dog spent inside correlated negatively with Extraversion scores ( $r = -0.13$ ,  $n = 435$ ,  $P = 0.007$ ) and positively with both dog age ( $r = 0.14$ ,  $n = 448$ ,  $P = 0.004$ ) and owner age ( $r = 0.17$ ,  $n = 450$ ,  $P < 0.001$ ). The owners' rating of their knowledge of their dog was positively correlated with the dogs' score for Training Focus ( $r = 0.22$ ,  $n = 403$ ,  $P < 0.001$ ). Training Focus was also positively correlated with the dog's age ( $r = 0.13$ ,  $n = 408$ ,  $P = 0.007$ ). No significant results were found for owner sex, education level, housing type or location, or the number of dogs lived with or owned over the owner's lifetime and any of the five personality subscales.

Differences in the five personality subscale scores across the seven ANKC-recognised breed groups (Table 2) were statistically significant ( $F(40, 1454.3) = 2.32$ ,  $P < 0.001$ ; Wilks' Lambda = 0.76; Partial eta squared = 0.05). Post hoc tests revealed statistically significant differences between the breed groups for Extraversion ( $F(8, 337) = 3.99$ ,  $P < 0.001$ ; Partial eta squared = 0.09) and Training Focus ( $F(8, 337) = 2.98$ ,  $P = 0.003$ ; Partial eta squared = 0.07). Working Dogs ( $M = 65.13$ ,  $S.D. = 1.95$ ) and Terriers ( $M = 66.22$ ,  $S.D. = 2.56$ ) were rated as significantly more extraverted by their owners, and Toys as less extraverted ( $M = 53.26$ ,  $S.D. = 2.93$ ). Working Dogs ( $M = 82.05$ ,  $S.D. = 1.93$ ) and Gundogs ( $M = 80.73$ ,  $S.D. = 1.91$ ) were rated significantly higher on the Training Focus subscale, while significantly lower mean scores for Training Focus were obtained by Toys ( $M = 74.43$ ,  $S.D. = 2.90$ ) and Hounds ( $M = 69.12$ ,  $S.D. = 2.50$ ).

Differences in personality subscale scores across canine physical characteristics were rarely significant, the exception being the comparison across different dog weights and heights and the subscales Neuroticism and Amicability. The Neuroticism subscale was found to correlate negatively

with weight ( $r = -0.171$ ,  $n = 339$ ,  $P < 0.01$ ) and height ( $r = -0.197$ ,  $n = 337$ ,  $P < 0.001$ ). The Amicability subscale correlated positively with the dog's weight ( $r = 0.185$ ,  $n = 338$ ,  $P < 0.01$ ) and height ( $r = 0.195$ ,  $n = 336$ ,  $P < 0.001$ ).

### 3.4. Correlations between the personality subscales

Correlations between the personality subscale scores revealed four significant relationships, shown in Table 4. The Neuroticism subscale correlated negatively with the Motivation subscale ( $r = -0.27$ ,  $n = 414$ ,  $P < 0.001$ ) and the Amicability subscale ( $r = -0.26$ ,  $n = 430$ ,  $P < 0.001$ ). The Amicability subscale was positively correlated with the Training Focus subscale ( $r = 0.35$ ,  $n = 399$ ,  $P < 0.001$ ). The strongest correlation was for the relationship between the Motivation subscale and the Extraversion subscale ( $r = 0.44$ ,  $n = 410$ ,  $P < 0.001$ ).

## 4. Discussion

Analysis of data collected in this study using the MCPQ prompted a minor revision of the model of canine personality developed previously (Ley et al., 2007), and

**Table 4**

Correlations between the five subscales of the MCPQ-R.

	Motivation	Training Focus	Amicability	Neuroticism
Extraversion				
<i>r</i>	0.444	-0.002	0.001	-0.086
<i>P</i>	0.000*	0.972	0.978	0.076
<i>n</i>	410	400	428	430
Motivation				
<i>r</i>		0.083	0.083	-0.226
<i>P</i>		0.012	0.095	0.000*
<i>n</i>		392	411	414
Training Focus				
<i>r</i>			0.350	-0.067
<i>P</i>			0.000*	0.179
<i>n</i>			399	430
Amicability				
<i>r</i>				-0.275
<i>P</i>				0.000*
<i>n</i>				430

\*  $P < 0.001$ .

a corresponding revision of the MCPQ. The new model retains five personality dimensions, four (extraversion, training focus, amicability, neuroticism) virtually identical to those described previously. The fifth dimension identified in our previous study was self-assuredness/motivation, which has now been replaced by a personality dimension that we believe is more appropriately identified by the simpler label of motivation. Each of these five personality dimensions can be assessed using the MCPQ-R, a 26-item scale which is comprised of five personality subscales (Extraversion, Training Focus, Amicability, Neuroticism, Motivation).

Average scores on the personality subscales suggest that the typical Australian dog is perceived by its owner to be moderately extraverted and motivated. It is also perceived to be easily trained, to get along well with humans, dogs and other animals and to be neither neurotic nor fearless, rating about half-way between the two extremes of the Neuroticism subscale of the MCPQ-R.

These results paint a very positive picture of how Australians view their dogs and it is possible that they are misleading. The respondents for the current study were self-selected and it is likely that people who are quite attached to their dogs and who view them in a positive light are more likely to volunteer for a study of this nature. In addition, the issue of social desirability bias (SDB), which occurs when respondents answer items on a questionnaire in an untruthful but socially desirable manner (Edwards, 1959), should be considered. SDB is considered to be a relatively stable personality trait (Phillips and Clancy, 1972) that is difficult to control in self-report studies, although using anonymous responding methods and distant administration methods, such as was done in the current study, can reduce it (Nancarrow and Brace, 2000). While owner attitudes towards their dogs can be affected by their dogs' behaviour (O'Farrell, 1997) there is no reason to believe that owners would generally be untruthful in describing their companion animals. Moreover, the demographic information from this group of dogs and their owners matches other information available about Australian dogs (McHarg et al., 1995; Kobelt et al., 2003) and an additional study by our group (also using a self-selected sample) has confirmed that most dog owners are generally very satisfied with their canine companions (Bennett and Rohlf, 2007). To establish how representative the self-report data are requires that the questionnaire data gathered from dog owners are compared with reports from objective observers and that a random sample (not self-selected) of dog owners is tested. While additional studies are planned to address the first of these issues, ethical constraints on research make it impossible to avoid the problems associated with self-selected samples.

Owner characteristics of age, sex, education level, and location and type of housing were all compared with canine personality ratings. Almost none of the owner characteristics had a systematic relationship with the personality ratings of the dogs. This is of interest because it adds weight to the claim that canine personality is most likely a valid construct, reflecting differences inherent within individual dogs rather than the effects of environmental influences associated with different 'types' of

owners. If, for example, all dogs belonging to highly educated females living in inner city areas were described as having a similar personality, and this was different from the personality reported for dogs owned by poorly educated females living in rural areas, then one might suspect either that the owners were selecting their animals very carefully, which seems unlikely given that most dogs are purchased prior to the age of eight weeks (McHarg et al., 1995), or that the environment was influencing the personality ratings to a degree inconsistent with the belief that dogs express individual differences in personality styles that are at least partially based in their genetics.

The only exception to the finding of a lack of association between canine personality ratings and owner characteristics was with respect to owner age, which was negatively associated with scores on the Extraversion subscale. It is possible that elderly participants interpreted the words in the Extraversion subscale differently than did younger participants. If so, this would be problematic in terms of the validity and reliability of the MCPQ-R or the validity of the underlying construct of canine personality. However, it seems reasonable to assume that this aspect of dog personality may actually vary across owner age, with dogs belonging to older owners being less extraverted than those belonging to younger owners. Although no significant correlations were found between owner age and physical characteristics of the dogs, such as age, weight, height or build, older people may select less extraverted dogs or may be less tolerant of, or less encouraging of, extraverted behaviour. Consistent with this is our finding that older owners tend to report that their dogs spend more time indoors. This variable was also found to be negatively associated with the Extraversion subscale. At present the nature of the relationships between owner age, dog extraversion and time spent inside is not clear. Future research is required to investigate this finding in more depth.

A positive relationship between scores on the Training Focus subscale and the owner's rating of how well they know their dog was also found. Previous studies have found that approximately 20% of dog owners engage in formal training (Coren, 1999; Bennett and Rohlf, 2007) so it is possible that people who intend training and otherwise spending time with their dogs purposefully select dogs from breeds that they think will be highly trainable. Alternatively, it is possible that Training Focus does not reflect a pure personality dimension at all, with scores being biased by the amount of time and energy an owner puts into developing rapport with their companion dog. This will require further study.

Canine age was negatively correlated with the Extraversion subscale and positively correlated with the Training Focus subscale. Both of these findings are consistent with human personality research demonstrating that experience and culture have an effect on some aspects of personality expression (McCrae et al., 2000). While extraverted people remain extraverted across their lifetime relative to other people, for example, they typically become less extraverted over time (McCrae et al., 2000). Extraversion ratings in dogs may show the same reduction with age, as is seen for extraversion in

people. In the Big Five Model of human personality, Conscientiousness is a dimension that describes organised, dutiful and self-disciplined behaviour and that has been shown to increase over time (McCrae et al., 2000). The positive correlation of Training Focus scores with canine age may therefore reflect a similar pattern in dogs as is seen in human personality research. It must be remembered, however, that the current study was cross-sectional in design. To establish the stability of personality ratings in dogs, a longitudinal study investigating how personality ratings change over the canine lifespan is required.

Significant differences in personality ratings across recognised breed groups were found for only two subscales, Extraversion and Training Focus. Working Dogs and Terriers scored significantly higher than other groups on the Extraversion subscale, a finding that is not surprising since both of these groups contain several breeds renowned for their energy levels. Working Dogs scored slightly higher than Terriers, although previous reports describe Terriers as typically energetic, excitable, playful, and spirited (McGreevy, 2002; Australian National Kennel Council, 2004). Even the early work by Scott and Fuller (1965, pp. 198, 207) found that the wire-haired Fox Terriers in their study moved more on quieting tests, and rated highest on total reactivity test scores. The current results may reflect the high number of Border Collies included in the Working Dog sample, a breed that is very popular in Australia and well known for its high energy level. The finding that Working Dogs and Gundogs rated highest on Training Focus is also consistent with the documented heritage of these dog groups. Both contain breeds with a long history of working closely with humans, either moving sheep or cattle or finding and retrieving shot game (Mery, 1968, pp. 60–66; Coppinger and Schneider, 1995). Today, members of these breed groups, such as the German Shepherd Dog and Labrador Retriever, dominate working dog careers, being commonly employed as police dogs, military dogs and search dogs (Wilsson and Sundgren, 1997; Jones and Gosling, 2005).

Analysis of relationships between dog characteristics and the personality subscales revealed four significant findings relating to weight and height. Height was associated negatively with ratings for Neuroticism, indicating that owners who considered their dogs to be very short tended to rate the dogs as more neurotic than others, while owners with very tall dogs tended to rate them as less neurotic. A similar result was also seen with weight and the Neuroticism subscale; that is, heavier dogs were rated as less neurotic than lighter weight dogs. The Amicability subscale was positively correlated with both weight and height. Dogs rated as more amicable tended to be heavier and taller than animals rated as less amicable. These results match anecdotal reports that some breeds in the Toy group are difficult to train, irritable and neurotic. It seems likely that canine physical characteristics may be linked with personality characteristics because of the intense selection for physical and behavioural characteristics in the shaping of different breeds. Further research is clearly required to replicate these results and validate them with independent measures, but identification of the

physiological basis of any relationship between personality and physical characteristics may be important in facilitating owner-dog matching.

Some of the canine personality subscales were significantly correlated with each other. The positive association between Extraversion and Motivation was quite strong, as was the positive association between Training Focus and Amicability. Less strong were the negative associations between Neuroticism and Amicability and Motivation. Correlations between personality dimensions have also been identified in other species. For example, a positive correlation between conscientiousness and agreeableness has been identified in humans (Witt et al., 2002). Associations between personality dimensions are particularly interesting and may have evolutionary significance if they are conserved across species, but additional research is required to ascertain the reliability of these findings in canines before speculation about their development over time is warranted.

## 5. Conclusions

This study continues the characterisation of the personality of dogs kept as companions, using an instrument only recently developed using a large sample of Australian dogs and modified slightly on the basis of the data collected. The dogs in our sample were found to score, on average, moderately on personality subscales believed to measure extraversion and motivation, more strongly on subscales measuring training focus and amicability and more weakly on a subscale believed to assess neuroticism. Owner and dog characteristics were only infrequently associated with personality ratings and, when significant relationship was observed, these may reflect real differences in the dogs included in the study. The fact that canine personality subscale scores derived from the MCPQ-R are not associated with owner or dog demographics supports the use of this scale as a measure of dog personality and also supports the construct of canine personality as a valid and sensible way of describing individual differences in this species. While additional work is required to further establish the reliability and validity of the MCPQ-R, once canine personality can be successfully measured it will be possible to use this knowledge to build our understanding of individual differences, with considerable benefits for dogs and those required to select, breed and train appropriate companions and co-workers.

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