Dog and owner demographic characteristics and dog personality trait associations

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ARTICLE INFO

ABSTRACT

The aim of this study was to analyze the relationships between four personality traits (calmness, trainability, dog sociability and boldness) of dogs (*Canis familiaris*) and dog and owner demographics on a large sample size with 14,004 individuals. German speaking dog owners could characterize their dog by filling out a form on the Internet. There were five demographic variables for dogs and nine for owners. Two statistical methods were used for investigating the associations between personality and demographic traits: the more traditional general linear methods and regression trees that are ideal for analyzing non-linear relationships in the structure of the data. The results showed that calmness is influenced primarily by the dog's age, the neutered status, the number of different types of professional training courses (e.g. obedience, agility) the dog had experienced and the age of acquisition. The least calm dogs were less than 2.5 years old, neutered and acquired after the first 12 weeks of age, while the calmest dogs were older than 6.9 years. Trainability was affected primarily by the training experiences, the dog's age, and the purpose of keeping the dog. The least trainable dogs had not received professional training at all and were older than 3 years. The most trainable dogs were those who participated in three or more types of professional training. Sociability toward conspecifics was mainly determined by the age, sex, training experience and time spent together. The least sociable dogs were older than 4.8 years and the owners spent less than 3 h with the dog daily. The most sociable dogs were less than 1.5 years old. Males were less sociable toward their conspecifics than females. Boldness was affected by the sex and age of the dog and the age of acquisition. The least bold were females acquired after the age of 1 year or bred by the owner. The boldest dogs were males, acquired before the age of 12 weeks, and were younger than 2 years old. Other variables, including the owner's gender, age, education, previous experience with dogs, the number of people and dogs in the household, and purpose of keeping the dogs had minor, but detectable effects. The results suggest that on-line questionnaires are a very effective means for collecting data about dog behavior, especially if owners are motivated by instant feedback. However, note that the characteristics of dogs in the present study were reported by the owners, and the associations with the traits do not necessarily represent a causal relationship.

1. Introduction

Personality is often defined as an individual's distinctive pattern of behavior (besides feeling and thinking) that is consistent across time and situations (e.g. Pervin and John, 1997). Personality studies in dogs have become very popular in the last decade. With the keywords "dog" and "personality or temperament," Jones and Gosling (2005) found 51 references from science databases published between 1934 and 2004. In November 2008, according to our literature search in the Web of Knowledge,

this number had increased with at least 30 recent publications. Extensive reviews have also been published recently (e.g. Jones and Gosling, 2005; Diederich and Giffroy, 2006). This indicates that dog personality is a matter of great public concern, and besides theoretical interest, it has a wide range of practical applications, including significant influence on the dog–human bond.

So far, personality research has focused on (1) developing tools for characterizing behavior (e.g. Sheppard and Mills, 2002; Hsu and Serpell, 2003; Ley et al., 2008), (2) looking at breed (genetic) differences (e.g. Wilsson and Sundgren, 1997; van Oers et al., 2005; Svartberg, 2002, 2006; Strandberg et al., 2005), and (3) studying the effect of development or stability of the behavior characteristics over an extended time. In the latter case, individuals are repeatedly tested in early puppyhood, at a juvenile age (time of sexual maturation) and later in adulthood with the aim of evaluat-

ing the predictability of certain early behavioral characteristics (e.g. Wilsson and Sundgren, 1998; Slabbert and Odendaal, 1999).

Importantly, however, as Jones and Gosling (2005) pointed out, the vast majority of dogs tested were in working contexts, and pet dogs, with a fuller representation of dog breeds, were relatively neglected. Also, they mention that few studies investigated dogs over the age of 4 years, so we know little about how aging affects personality traits. The situation is similar with neutering, although previous studies suggest that there are several personality differences between intact and neutered dogs (e.g. Podberscek and Serpell, 1996). Recent studies have started to compensate for this imperfection and investigated the associations between dog behavior and independent variables. For example, Bennett and Rohlf (2007) studied the relationship between demographic variables (several were unusual, like the amount of experience the owner reported having with dogs, owners' age, family size, etc.) and dog behavior with a questionnaire survey in 413 adult individuals. They found that problematic behaviors were associated with numerous owner and dog characteristics, although most differences were small. For example, the number of people in the household positively correlated with aggression and disobedience. Dogs acquired from a pet shop had more problematic behaviors. However, involvement in professional training courses and other shared activities decreased the occurrence of problematic behaviors (see also Kobelt et al., 2003; Jagoe and Serpell, 1996 for similar results, both based on questionnaires, with several relatively rarely observed characteristics).

However, surveying problematic behaviors exposes only a facet of dog personality. People who would voluntarily complete a questionnaire about their dogs' behavior experience relatively few problematic behaviors (Bennett and Rohlf, 2007). The interaction of demographic variables in a large sample of dog owners might reveal yet uncovered associations.

In this study, we aimed to reveal associations between dog personality traits and both dog and owner demographic variables in a large sample size. Demographic variables were chosen mainly based on previously described effects in the literature, like dog's age and sex (in test batteries: see Wilsson and Sundgren, 1997; Seksel et al., 1999; Strandberg et al., 2005; Saetre et al., 2006; Svartberg, 2006; in questionnaire-based ratings of individual dogs: Jagoe and Serpell, 1996; Hsu and Serpell, 2003; Rooney and Bradshaw, 2004; Ley and Bennett, 2008), but some sparsely investigated variables were also introduced, like the dog's age at acquisition, number of people and dogs in the household, owner's experience with previous dogs, purpose of keeping the dog and time investment in the dog.

In the present study, we used the Internet as the medium for reaching a large audience within a short time period. Our sample is representative of people who are relatively engaged with their dog: they are probably reading dog magazines, are interested in the popular dog literature and are keen on learning some new aspects of their dog's personality. Accordingly, the present sample is a sub-population of German speaking dog owners, but could be considered to resemble dog owners in Western Europe with similar socioeconomic status. External validity of the present questionnaire was investigated by looking at reports available in the literature on dog personality and behavior.

2. Method

2.1. Subjects

In this study we collected owner's reports on 14,004 dogs. Owners filled in an on-line questionnaire in German which was advertised in the "Dogs" magazine (published by Living at Home Multi Media GmbH, Hamburg, August 2007 issue) and the magazine's website (www.dogs-magazin.de). It was accompanied by a short article and was available from the end of August 2007 to the beginning of January 2008. The first questionnaire arrived on August 28, 2007 and the last one on January 8, 2008.

Dogs younger than 1 year old (26.8%) were excluded from this sample, because literature suggests that their behavior cannot be considered as stable over time. After this correction, the sample size was 10,519. The sample comprised 267 breeds which were represented by 1–527 individuals per breed (the latter was the Labrador Retriever). 3920 dogs were categorized by their owners as mixed-breed. The descriptive statistics of the sample are presented in Table 1. The mean age (±S.D.) of the dog in the sample was 4.2 ± 3.1 years. 56.1% of the dogs were males. 43.1% of the dogs were neutered (39% of males and 48% of females). Half of the dogs were acquired before the age of 12 weeks (53.7%), and only 1.9% were bred by the owner. Approximately one-third of the dogs (35.3%) had not participated in any kind of professional training courses. The respondents were mainly female (79.6%). The majority of them (64.9%) were between 31 and 60 years old, and only 5.3% were younger than 18 years old. Most of the respondents (40.3%) had secondary education, 26.0% had high school, 22.3% had primary school and 11.4% had a university degree. The average number of people in the households (±S.D.) was 2.8 ± 1.4. The majority (41.7%) of the respondents resided in a two-person household. Participants reported owning only one dog (66.9%) or two dogs (20.6%). Family member (93.3%) was marked as the most common purpose of keeping the dog. Other, non-exclusive functions were mentioned less frequently (hobby: 49.5%; protection: 10.1%; other work: 2.0%, breeding: 2.4%). 66.8% of the respondents had experience in keeping a dog previously (the mean (±S.D.) number of previous dogs was 1.2 ± 2.2). Approximately 70% of the respondents claimed spending more than 3 h with the dog per day and playing with it every day.

2.2. Procedure

Dog owners were asked to complete two different questionnaires.

1. The "Demography Questionnaire" inquired about demographic attributes of the dog and the owner and social attributes of their interactions (Table 2).
2. The "Personality Questionnaire" was based on a 48-item Human Personality Inventory which is available at de.outofservice.com/bigfive/ (Copyright: John, 2000) and adapted for dog behavior (Table 2).

42 owners were asked to complete the questionnaire a second time, 1 day after the first completion.

2.3. Statistical analysis

SPSS 13.0 was used for the analysis. To condense the items of the Personality Questionnaire, principal component analysis was used with Varimax rotation with Eigenvalue > 1 (Kline, 1994). The number of extracted factors was decided after visual inspection, using the rules of the Scree test (Cattell, 1966). Factor scores were calculated automatically by the SPSS software using the Regression method. Cronbach's alpha was calculated to assess the internal reliability of extracted factors and for testing the repeatability of the questionnaire (DeVellis, 1991). Univariate general linear model tested the main and all two-way interaction effects of independent variables on the personality traits. Dog age, number of people in