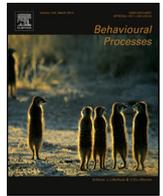




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Assessment of domestic cat personality, as perceived by 416 owners, suggests six dimensions

Pauleen C. Bennett*, Nicholas J. Rutter, Jessica K. Woodhead, Tiffani J. Howell

Anthrozoology Research Group, School of Psychology and Public Health, La Trobe University, Australia

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ABSTRACT

Understanding individual behavioral differences in domestic cats could lead to improved selection when potential cat owners choose a pet with whom to share their lives, along with consequent improvements in cat welfare. Yet very few attempts have been made to elicit cat personality dimensions using the trait-based exploratory approaches applied previously, with some success, to humans and dogs. In this study, a list of over 200 adjectives used to describe cat personality was assembled. This list was refined by two focus groups. A sample of 416 adult cat owners then rated a cat they knew well on each of 118 retained words. An iterative analytical approach was used to identify 29 words which formed six personality dimensions: Playfulness, Nervousness, Amiability, Dominance, Demandingness, and Gullibility. Chronbach's alpha scores for these dimensions ranged from 0.63 to 0.8 and, together, they explained 56.08% of the total variance. Very few significant correlations were found between participant scores on the personality dimensions and descriptive variables such as owner age, cat age and owner cat-owning experience, and these were all weak to barely moderate in strength ($r \leq 0.30$). There was also only one significant group difference based on cat sex. Importantly, however, several cat personality scores were moderately ($r = 0.3–0.49$) or strongly ($r \geq 0.5$) correlated with simple measures of satisfaction with the cat, attachment, bond quality, and the extent to which the cat was perceived to be troublesome. The results suggest that, with further validation, this scale could be used to provide a simple, tick-box, assessment of an owner's perceptions regarding a cat's personality. This may be of value in both applied and research settings.

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1. Introduction

Domestic cats are currently one of the most popular companion animals in the developed world (American Veterinary Medical Association, 2012; European Pet Food Industry Federation, 2014; Pet Food Manufacturers Association, 2016). Australia, for example, is home to approximately 3.3 million pet cats, with around 29% of households owning at least one (Animal Health Alliance, 2013). Surveys of cat owners suggest that they value their cat's affection and company, with most perceiving their cat as a member of their family (Salman et al., 1998; Mahalski et al., 1988). Despite this, many pet cats are abandoned. The Royal Society for the Prevention of Cruelty to Animals (RSPCA) in Australia received 52,804 cats during the 2014–2015 financial year, 17,398 (32.95%) of which were euthanized (RSPCA, 2016). This is unacceptable, prompting repeated calls

for introduction of programs to reduce the overall size of the cat population (Alberthsen et al., 2013; Robertson, 2008). While population control programs are important, they do not address the issue of owned cats being abandoned.

Cat owners' lack of knowledge and misinterpretation of natural cat behavior, along with other factors, such as breed differences, genetic inheritance, and environmental restrictions, have all been identified as contributing factors to behavioral problems in cats (Beaver, 2004; Rieger and Turner, 1999; Salman et al., 1998). These problems manifest in the form of inappropriate elimination, aggression, and destructive activity (Casey et al., 2009; Beaver, 2004; Turner, 1997), which are major causes of cat abandonment (Casey et al., 2009; Serpell, 1996). Cat personality is also one of the most significant influences of cat behavior towards humans (Mertens and Turner, 1988). A recent review of domestic cat personality research by Gartner and Weiss (2013) examined 17 studies, employing a range of different research methodologies, and found that three personality dimensions, labelled Sociable, Curious, and Dominant, showed the highest convergent validity across studies. This review, along with another by Vitale Shreve and Udell (2015)

* Corresponding author at: School of Psychology and Public Health, La Trobe University, Bendigo, P.O. Box 199, Victoria 3552, Australia.
E-mail address: pauleen.bennett@latrobe.edu.au (P.C. Bennett).

also highlighted a lack of consensus in the field, which may mean that some domestic cat personality dimensions have not yet been revealed.

Identification and assessment of personality traits in cats is potentially important because, whilst an individual's personality is subject to some degree of change over time and context, it is relatively stable and enduring, being broadly defined as the set of key characteristics of an individual that makes him/her unique (Cloninger, 2004). Personality is regarded as the interactive product of genetic, cognitive and environmental factors (Phares and Chaplin, 1997) and has been studied in numerous non-human animal species, including octopuses (Sinn et al., 2002), dogs (Ley et al., 2008), hyenas (Gosling, 1998) and chimpanzees, (Gosling and John, 1999), as well as various felid species including domestic cats (Gartner et al., 2014). Attempts have also been made to develop cat personality tests, such as the Feline-ALity™ assessment (ASPCA®, 2007; Weiss et al., 2015), for the purpose of matching shelter cats with potential homes. This instrument was developed using behavioral observations to categorise cat behavior but only measures behavior on independent – gregarious and valence scales. While these features are important in terms of influencing adoption decisions (Fantuzzi et al., 2010; Sinn, 2016), a more comprehensive assessment of cat personality may facilitate better placement of cats in appropriate homes and support research into individual differences in this popular companion animal species.

Gartner and Weiss (2013) concluded that surveys offer a well-accepted and validated way of assessing animal personality. They appear more reliable than behavioral observations and are less subjective than often assumed (Vazire et al., 2007), provided those evaluating the animals have worked with them (or presumably know them in some other context) for some time (Gosling, 2001). In fact, a study by Gosling et al. (2003) demonstrated that people can rate the personality of familiar dogs at least as well as they can rate the personality of familiar people. Ley and her colleagues, in a series of studies concerning dog personality, also established that a short survey can be developed using owner perceptions of dog personality (Ley et al., 2008), and that, with refinement (Ley et al., 2009a), this can become a reasonably valid and reliable instrument, at least as assessed using inter-rater and test-retest measures (Ley et al., 2009b). Nonetheless, conceptualisations of dog personality remain controversial and there are no firm conclusions about how many personality dimensions exist or how they might best be described.

Two recent surveys have resulted in publication of three-factor (Dominance, Impulsiveness and Neuroticism) (Gartner et al., 2014), and five-factor (Openness, Quietness, Affiliation, Activity and Anthroaffiliation) (Kaleta et al., 2016) models of cat personality. In the first of these studies, Gartner et al. (2014) compared the personality structure of several feline species, using ratings provided by either shelter workers or zoo staff. In the second, Kaleta et al. (2016) used a sample of 161 Polish domestic cat owners and a survey comprised of statements about the cat's behavior in specific situations.

Relatively common in studies of non-human animal personality are methodologies adapted from those used to develop the Five Factor Model (FFM) of human personality (McCrae and John, 1992). This method involves generation of a comprehensive list of potential personality trait adjectives (e.g. 'energetic'), which is then refined and administered to a large sample as a survey, before a principal components analysis is conducted that, together with theory, organises the traits into personality dimensions. Although the expression of finer points of personality may be limited by using adjectives, and although the results necessarily reflect somewhat anthropomorphic interpretations of behavior on the part of the human raters, trait-based surveys are easy to understand, have a hypothesized link with behavior and offer an economical way of measuring personality constructs (Briggs, 1992). These meth-

ods have been particularly useful in the mapping of personality in domestic dogs (Ley et al., 2008), who, like domestic cats, have shared a close, companionship-based relationship with humans for thousands of years (Faure and Kitchener, 2009). Importantly, trait-based measures provide a means of allowing personality dimensions to emerge from adjectives already commonly used to describe animals, rather than forcing data to conform to pre-existing scientific models.

A small number of domestic cat personality studies have previously employed methodologies similar to the FFM approach, including a behavioral observation study by Feaver et al. (1986), which measured cat personality on three dimensions: alert, sociable and equable. However, these results were limited in that the sample consisted of just 14 female laboratory cats. Another study, by Gosling and Bonnenburg (1998), used adjectives obtained from human personality research to explore domestic cat personality via a survey of cat owners, but these authors did not attempt to group adjective ratings into dimensions specific to feline personality. Lee and Ryan (2007) performed a factor analysis on owner's ratings of their cat's behavior, revealing four unlabelled personality factors. However, cat behavior was measured using a 12-item canine personality scale (Whalgren and Lester, 2003), which may lack validity in cats. Another study employing the FFM methodology, by Gartner et al. (2014), did perform factor analysis on personality trait adjectives. This revealed three factors: dominance, impulsiveness and neuroticism. However, the sample in this study consisted exclusively of shelter cats, which may provide an unrepresentative sample since behavioral problems may have caused their admission into shelters in the first instance. Furthermore, cat personality was rated by shelter staff, who are likely less familiar with shelter cats' personality than are domestic cat owners with their own cat's personality. Shelter workers may also use 'industry jargon', including a limited list of adjectives, to describe individual cats. In Gartner et al.'s (2014) study, 85 of the 100 cats were rated by just six raters, meaning that the assumption of independence of data required by most statistical tests was compromised.

Gartner and Weiss (2013) concluded in their comprehensive review that more research is required before any definitive conclusions regarding domestic cat personality can be drawn. This was also concluded by Vitale Shreve and Udell (2015). Prior to publication of the two most recent studies we conducted a study in which a trait-based survey was administered to a relatively large sample of domestic cat owners. We report the results of this study here to contribute to the growing literature concerning individual personality differences in cats. It is acknowledged that the current lack of consensus identified by Gartner and Weiss (2013), along with a clear lack of theoretical coherence, remains of concern. However, it is hoped that the gradual accumulation of empirical data will help to address these issues.

2. Study 1 method and results

2.1. Participants

Focus group participants were purposefully selected based on their academic, vocational and personal experience with cats. The first group included six 'specialist' participants: a veterinary behaviorist, a psychologist specializing in human-animal interactions, and four advanced postgraduate psychology students working in the field of anthrozoology, including two working in the area of human-cat relationships and one working in the area of dog personality. The second group consisted of five participants. These were chosen to represent people familiar with cats, but not highly educated in a formal sense, so that interpretability and applicability of the words generated by the first group could be assessed. They

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