AN INTEGRATIVE APPROACH TO PERSONALITY RESEARCH IN ANTHROZOOLOGY: RATINGS OF SIX SPECIES OF PETS AND THEIR OWNERS

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ABSTRACT

In this paper, we identify two obstacles that have hindered the integration of personality research in anthrozoology. The first of these interrelated obstacles is the difficulty of obtaining large samples in anthrozoological research. Without large samples investigators must rely on replication studies to establish the generalizability of their findings. However, the second obstacle—the lack of a standard taxonomy of personality descriptors—makes it difficult to see whether findings replicate across studies. To address these issues and to stimulate a more integrative approach to personality studies, we: (a) provide normative data for personality ratings of dogs, cats, ferrets, horses, rabbits, and hedgehogs on 50 traits; (b) provide personality profiles of the owners of these six species; (c) provide the instrument on which the pet and human data were collected; and (d) demonstrate the viability of the internet as a tool for collecting large samples of personality data on pets. We show how the normative data can be used to convert findings from other studies into a standard-score metric that facilitates cross-study comparisons. Finally, we consider some limitations of this study and make a number of recommendations aimed to promote a more programmatic science of anthrozoology.

INTRODUCTION

One only has to peruse the pages of *Anthrozoös* to be struck by the variety of interesting research in the field of anthrozoology. Questions about animals, humans, and the interactions between them are tackled from a variety of angles; many animal species are studied, a broad range of humans provide data, and numerous methodologies are used. Unfortunately, this diversity can make it difficult to quantitatively compare findings of one study with those of another. Such cross-study comparisons are essential if anthrozoological research is to be cumulative.

Two interrelated obstacles have hindered the development of a cumulative approach in anthrozoology and threaten to fragment the field. The first obstacle stems from the substantial difficulties associated with obtaining large sample sizes in animal research (Gosling 1998c). It is expensive and time consuming to collect data on pets, although the extent and nature of the difficulties will vary according to the species under scrutiny. When investigators are limited to collecting data from small samples, they must rely on replication studies to establish the generalizability of their findings. However, replication studies are impeded by the second obstacle to anthrozoology's ability to function as a cumulative endeavor—the lack of a standard set of personality descriptors. Unlike human personality research, the much younger field of animal personality has yet to develop a common currency for the exchange of scientific findings. Instead, investigators frequently employ idiosyncratic constructs with minimal regard for how their findings may cohere with previous studies. The disparate methodologies used by investigators obscure the degree to which findings replicate across studies.

To illustrate these two obstacles, imagine a study in which 20 nursing-home residents provide ratings of their pet cats on a number of personality traits, such as "timid" and "calm." Suppose that one of the participants rates the timidity of her cat, "Henry" as a 7 on a 9-point scale. As anthrozoologists, we have the task of interpreting this score. The scale-anchors may provide some clues to what a "7" means, but it would be more informative to know how Henry's timidity compares with the timidity of other cats. One solution would be to compare Henry's timidity rating with the ratings of the

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other 19 cats in the nursing-home study. Unfortunately, even a comparison sample of 20 may not be a reliable indicator of cat ratings more generally. In such cases, where ratings of small samples or even individual case studies are obtained, a normative sample based on a larger data set would be an indispensable aid for interpreting these ratings. A normative sample would enable investigators to (a) compare Henry's level of timidity with cats in general and (b) compare the average level of timidity of cats in the nursing home with cats in general. However, when investigators attempt to use the normative sample, they may run into the second obstacle to an integration of anthrozoological research—the lack of a standardized set of items. Without a set of standard descriptors used across studies, comparisons among studies are problematic (Gosling 1998b, 1998c). For example, we cannot directly compare the findings of the present study which used the traits "shy" and "relaxed" with the findings of the nursing-home study which used "timid" and "calm."

Promoting Integration in Anthrozoology

In this paper we offer four contributions that we hope will begin to promote a more integrative approach to personality research in anthrozoology. First, we provide normative samples ($n>100$) for personality ratings of three animal species (dogs, cats, and ferrets), as well as three smaller samples (rabbits, horses, and hedgehogs), that we hope will be supplemented by other investigators. We hope that this data set will serve as an initial empirical benchmark with which investigators can compare their own findings. Second, we provide personality scores derived from self-reports of the human owners who completed the questionnaires. These data, categorized in terms of the species rated by the owners, give investigators some basic personality information about pet owners, another frequent target of anthrozoological research. Third, to enable investigators to make full use of our normative samples we also provide the rating instrument used to collect the personality ratings of pets and humans. Although the traits used in this instrument were selected carefully, we acknowledge that they are not a definitive pool of constructs and we encourage investigators to supplement this list with additional constructs when needed. Fourth, we hope that this study will demonstrate the viability of the internet as a means for gathering data on pets and their owners. The internet provides an inexpensive means for reaching a large number of pet owners.

Moreover, the number of internet users is growing every day and the population using the internet is becoming more diverse; As it grows, the internet will become increasingly useful for overcoming issues of generalizability associated with conventional data collection techniques.

METHOD

The present data are based on personality ratings of a large sample of pets ($n=1,640$) and their owners ($n=1,563$). Ratings of pets and humans were made using the same instrument consisting of 50 personality traits. To obtain norms for a variety of pets and to collect ratings from a substantial and relatively diverse sample, we used the internet to collect the personality descriptions. Each participant was given the opportunity to receive feedback based on his or her ratings. The feedback was given in terms of broad personality dimensions, along with explanations of how to interpret the scores. The questionnaire was located on the world wide web site of the Berkeley Animal Personality Project (http://socrates.berkeley.edu/bapp). The ratings were collected between June 1996 and December 1997.

Development of the rating instrument

We chose to use the internet to collect our data to allow us to reach a broad range of pet owners. We were therefore faced with the challenge of creating an instrument that could be applied to a wide range of animals and could be understood by a wide range of participants, some of whom may not use English as their first language.

In every study of personality, investigators must decide which traits to include. Of the thousands of ways to describe how individuals differ (Allport and Odbert 1936), which traits should be measured? The situation facing anthrozoologists today somewhat resembles that faced by human-personality researchers about 30 years ago. For many years, human-personality research was plagued by widespread disagreement concerning which personality terms should be used. Recently, however, consensus has grown in the field and a unifying framework has emerged: the Five Factor Model (FFM) of personality (McCrae and Costa in press). The FFM suggests that most individual differences in human personality can be classified into five broad, empirically-derived domains (see John 1990, for review). The five independent dimensions, shown in Table 1 (p. 150) along with descriptions of their content, have been named

Table 1.

The Dimensions of the Five-Factor Model: Acronym Labels and Trait Adjective Examples

Acronym Labels	Trait Adjective Examples
<u>Extraversion</u>, Energy, Enthusiasm	Talkative, Verbal, Bold, Quiet (R), Shy (R), Bashful (R)
<u>Agreeableness</u>, Altruism, Affection	Sympathetic, Kind, Warm, Considerate, Cold (R), Harsh (R)
<u>Conscientiousness</u>, Control, Constraint	Organized, Systematic, Efficient, Prompt, Disorganized (R), Sloppy (R)
<u>Neuroticism</u>, Negative affectivity, Nervousness	Moody, Jealous, Envious, Fretful, Touchy, Anxious
<u>Intellect/Openness</u>, Originality, Open-mindedness	Imaginative, Artistic, Philosophical, Complex, Uncreative (R), Unintelligent (R)

Note. Underlined labels indicate the commonly used labels for the dimensions. (R) denotes reverse-scored items. Acronym labels suggested by John (1990). Trait adjectives are selected from the 40 marker traits developed by Goldberg (1992) and Saucier (1994).

Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Intellect/Openness to experience (Goldberg 1993). The FFM has provided a common language for human-personality research, unifying a field that was in danger of fragmenting as each investigator invented his or her own system for classifying personality.

Although the content validity of the FFM personality structure has been well-established in research on humans (Goldberg 1993), it is not clear that all important domains of pet personality would be captured by the FFM. It is quite possible, for example, that there are important aspects of dog personality (e.g., "obedient") that are not captured by the traits included in a human-oriented instrument. In addition, some of the more human-oriented terms (e.g., "philosophical") require metaphorical thinking to apply them to dogs, cats, and other animals. We therefore considered a number of potential sources of items. One possibility was to derive items from free descriptions of a species we hoped to study. For example, we could have selected traits such as "obedient," "slobbery," and "cuddly," that had been generated to describe dogs (Gosling 1998a). However, many of the problems encountered with human traits would again arise—it may be no easier to apply dog-oriented traits to cats and hedgehogs than it is to apply human-oriented traits to cats and hedgehogs. Therefore, we decided to use human traits as these have already been subjected to substantial psychometric scrutiny (e.g., Goldberg 1992). Additionally, choosing a set of established human traits has the advantage of facilitating direct comparisons between human research and animal research (e.g., Burson et al. 1996; Gosling et al. 1996; Gosling and John in prep.).

The next issue was to decide whether to use adjectives (e.g., "energetic") or longer descriptive items (e.g., "is full of energy") in our questionnaire. There were three reasons for choosing adjectives. First, given that different species may manifest the same trait very differently, we were concerned that longer items would be less applicable to a wide variety of animals than adjectives. Second, longer items are more likely than adjectives to contain culturally biased wording that may compromise the degree to which their meaning translates across cultures and they may be more difficult for non-English speakers to understand. Third, our sample was entirely comprised of volunteers who had minimal obligation to complete our survey; thus shorter items were generally preferable to longer, more time consuming items. We were confident that the adjectival format would be sufficient as it has been used successfully for many years in human research (e.g., Norman 1967; Gough and Heilbrun 1983).

Given our aim to collect a large volunteer sample, it was necessary to keep the instrument reasonably short. We, therefore, selected a subset of 50 of Goldberg's (1992) 100 standard FFM adjective marker traits, including Saucier's (1994) set of 40 adjectives. The final list of 50 traits is given in Appendix A.

RESULTS

The Normative Samples

Pet Ratings

A total of 1,640 participants rated their pets on the 50 trait adjectives. Ratings were made on a 9-point scale ranging from "extremely inaccurate description of the pet" (1) to "extremely accurate description of the pet" (9). We divided

Table 2

Ratings of Six Species of Pet on 50 Personality Traits

Variable	Dog (n=1022) Mean	SD	Cat (n=440) Mean	SD	Ferret (n=126) Mean	SD	Rabbit (n=29) Mean	SD	Horse (n=10) Mean	SD	Hedgehog (n=13) Mean	SD
Anxious	4.93	2.50	4.60	2.56	4.06	2.70	4.10	2.38	5.00	2.83	4.23	2.20
Artistic	4.50	2.08	4.58	1.94	4.52	2.18	4.54	2.06	4.40	2.12	3.31	1.89
Bashful	3.25	2.41	4.05	2.66	2.62	2.22	3.69	2.12	4.40	1.96	4.46	2.33
Bold	6.26	2.14	5.88	2.38	7.77	1.44	6.38	2.26	6.00	1.83	5.54	1.66
Careless	4.24	2.27	4.16	2.29	5.63	2.33	3.90	1.97	3.90	1.45	5.00	1.41
Cold	2.09	1.72	2.77	2.16	2.16	1.69	1.93	1.58	4.30	2.54	3.69	1.55
Complex	6.22	2.25	6.34	2.08	6.17	2.37	7.00	1.89	5.10	2.56	6.23	2.20
Considerate	6.13	2.17	5.62	2.26	5.60	2.32	6.10	2.04	5.70	2.31	3.62	2.18
Cooperative	6.49	1.94	5.54	2.23	5.02	2.29	5.48	2.21	7.10	1.45	5.00	2.45
Creative	6.33	2.00	5.93	1.92	7.17	1.94	6.11	2.17	4.90	1.20	4.38	1.71
Deep	5.75	2.18	5.67	2.05	5.55	2.36	5.59	2.26	5.80	1.81	4.62	2.29
Disorganized	4.17	2.05	3.98	1.88	4.34	2.58	3.69	2.14	3.00	1.76	5.15	1.86
Efficient	5.96	1.84	5.71	1.68	6.09	2.06	5.93	2.03	5.60	2.12	5.00	2.12
Energetic	7.50	1.76	6.45	2.17	8.03	1.59	6.93	1.60	7.40	1.07	7.85	1.07
Envious	5.47	2.54	5.14	2.57	3.98	2.69	4.32	2.72	7.00	2.11	3.77	2.31
Extraverted	6.53	2.32	5.79	2.53	6.69	2.39	5.59	2.11	5.20	1.81	5.08	2.02
Fretful	4.44	2.47	4.24	2.37	3.26	2.26	3.83	2.33	4.80	2.04	4.62	1.61
Harsh	2.72	2.07	3.24	2.28	2.46	1.97	2.59	2.44	4.10	2.23	3.69	1.97
Imaginative	6.32	1.98	6.07	1.91	7.27	1.68	5.86	2.08	6.00	1.41	4.46	1.81
Inefficient	3.61	1.89	3.74	1.70	3.41	2.03	3.00	1.94	3.40	1.78	4.77	1.69
Intellectual	6.37	2.14	5.87	2.13	6.59	2.00	5.86	2.45	4.90	1.73	4.38	1.94
Jealous	6.05	2.46	5.68	2.57	4.29	2.69	4.83	2.55	6.60	1.96	4.31	2.90
Kind	7.24	1.71	6.63	1.92	6.93	1.86	6.90	1.84	7.20	1.69	5.08	2.10
Moody	3.97	2.55	5.08	2.74	3.74	2.50	4.83	2.80	5.60	2.12	6.77	2.42
Nervous	4.31	2.55	4.59	2.63	2.95	2.12	4.55	2.20	4.60	2.55	5.46	1.76
Organized	5.17	1.85	5.15	1.62	5.33	2.55	5.39	1.79	5.60	1.84	4.31	1.89
Philosophical	4.68	2.05	4.89	1.91	3.94	2.14	4.79	2.27	4.80	0.42	3.23	2.28
Practical	5.59	1.95	5.37	1.87	5.66	2.29	5.86	2.40	6.50	1.65	5.08	1.71
Prompt	5.83	2.11	6.00	2.05	5.06	2.41	6.18	2.16	6.00	1.33	3.62	2.36
Quiet	4.71	2.55	4.64	2.60	5.57	2.76	7.17	1.93	4.40	2.41	7.85	1.21
Relaxed	5.49	2.32	6.18	2.19	5.76	2.46	6.76	1.86	6.10	2.33	5.00	2.20
Rude	3.69	2.30	4.12	2.46	3.26	2.28	2.86	2.30	4.80	2.04	4.54	2.40
Shy	3.31	2.39	4.29	2.67	2.43	2.17	4.72	2.39	4.10	2.33	6.15	1.86
Sloppy	4.17	2.33	3.98	2.38	4.22	2.56	4.21	2.24	5.10	2.33	5.69	1.80
Sympathetic	6.79	1.90	6.29	1.92	5.75	2.11	5.86	2.23	6.50	1.78	4.38	2.63
Systematic	5.89	1.97	5.67	1.78	6.58	1.94	5.93	1.98	6.20	1.69	6.38	1.76
Talkative	5.96	2.44	6.23	2.45	4.13	2.56	4.43	2.49	6.40	1.07	2.00	1.47
Temperamental	4.20	2.56	5.28	2.68	4.16	2.60	4.10	2.85	6.70	2.36	6.38	2.29
Touchy	4.35	2.65	5.35	2.55	3.89	2.44	4.14	2.82	5.50	2.42	6.23	2.05
Uncreative	3.28	1.99	3.74	1.88	2.41	1.89	2.79	1.73	3.60	2.07	4.69	1.89
Unenvious	3.99	2.39	4.24	2.32	4.55	2.61	4.04	2.69	3.50	2.22	5.77	2.74
Unintellectual	3.11	2.13	3.52	2.16	2.83	1.99	2.89	2.36	3.70	2.21	5.08	2.47
Unintelligent	2.02	1.62	2.45	1.72	1.73	1.31	1.83	1.67	2.40	1.35	3.69	2.06
Unkind	2.34	1.74	2.73	1.95	2.31	1.81	1.79	1.42	2.30	1.57	2.77	1.74
Unsympathetic	2.53	1.82	3.12	2.02	3.09	2.07	2.52	1.92	2.60	1.71	4.46	2.30
Unsystematic	3.40	2.06	3.71	1.83	3.02	2.10	3.18	2.21	2.80	1.75	3.85	2.19
Untalkative	3.31	2.31	3.23	2.34	4.64	2.79	4.64	2.95	2.90	1.52	7.46	1.56
Verbal	5.94	2.45	6.26	2.52	4.58	2.55	4.32	2.84	6.20	1.40	2.62	2.10
Warm	7.70	1.52	7.34	1.76	7.57	1.51	7.86	1.16	7.40	1.51	5.92	1.71
Withdrawn	2.38	1.92	3.22	2.33	2.23	1.77	3.03	2.16	3.00	2.11	3.69	2.43

note. Ratings made on 1 (extremely inaccurate description) to 9 (extremely accurate description) scale. Sample sizes (n) indicate maximum number of participants in each category as some traits were not rated by every participant.

Table 3.

Big Five Personality Scores of Pet Owners of Six Pet Species

| | OWNERS OF... | | | | | | | | | | |
| | Dogs (n=983) | | Cats (n=421) | | Ferrets (n=113) | | Rabbits (n=27) | | Horses (n=7) | | Hedgehogs (n=12) | |
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Extraversion	5.72	1.63	5.78	1.59	5.75	1.41	4.96	1.95	5.13	1.40	5.30	2.14
Agreeableness	7.46	1.12	7.34	1.11	7.36	1.23	7.47	1.12	7.70	0.60	7.40	0.78
Conscientiousness	6.46	1.54	6.36	1.59	6.49	1.57	6.25	1.52	6.86	1.43	6.42	1.04
Neuroticism	4.62	1.47	4.90	1.61	4.36	1.53	5.16	1.67	3.88	1.80	4.51	1.16
Intellect/Openness	7.06	1.23	7.22	1.22	7.15	1.19	7.32	1.09	7.55	1.02	7.27	1.03

Note. Each scale is computed as average rating of eight component traits (Saucier 1994). Ratings made on 1 (extremely inaccurate description) to 9 (extremely accurate description) scale. Sample sizes (n) indicate maximum number of participants in each category as some traits were not rated by every participant.

the ratings by species and computed the means and standard deviations for each of the 50 traits. These means and standard deviations, categorized by species and listed in alphabetical order, are shown in Table 2 (p. 151).

Owners' Self-ratings

Of those participating, 1,563 (95.3%) provided self-descriptions using the same set of adjectives as those used to rate the pets. We used 40 of these traits to compute scale scores for each participant in terms of the FFM dimensions (Saucier 1994).[1] The mean scale scores and standard deviations for owners of each species of pet are shown for each of the FFM dimensions in Table 3. To provide readers with a more configural representation of the six pet-owner personality profiles, the data in Table 3 are plotted in bar graph form in Figure 1.

Using the Normative Data to Compute Standard Scores

When comparing findings within and across studies, it is prudent to calculate standard scores or "z-scores" (Cohen and Cohen 1983). This common metric facilitates comparisons across studies by providing an index of an individual's score in standard deviation units relative to a population. Along with other methods for computing standard scores (e.g., t-scores), z-scores are an invaluable aid to comparisons of findings across studies and measures. These scores are derived by converting raw scores into comparable measurement units. It is

important that sets of scores converted to such units have equivalent means and control for differences in variability across sets of raw scores. Accordingly, z-scores are computed by subtracting the mean of the sample from an individual's raw score and then dividing this difference by the standard deviation of the sample:
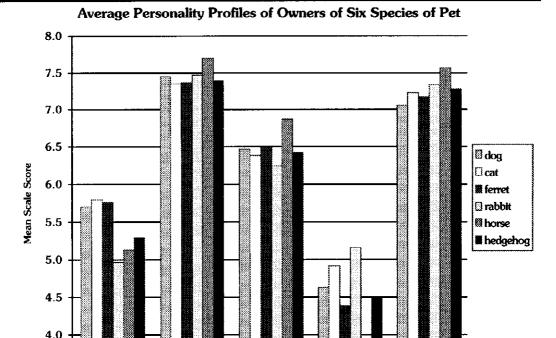
$$\text{Individual's z-score} = \frac{(\text{individual's raw score - sample mean})}{\text{sample standard deviation}}$$

Unfortunately, however, means of small samples provide less reliable estimates of the general population mean than do means of large samples. In such cases, means from larger normative samples can be used. The normative data presented in Table 2 are provided to enable other investigators to compute standardized scores for individuals in their own data sets. Z-scores can be computed for pets that were rated on any of the traits in Table 2 using the same 9-point scale.[2] (As we shall discuss later, the means and standard deviations for rabbits, horses, and hedgehogs are based on relatively small sample sizes and should be interpreted cautiously.)

To illustrate how these data might be used, let us return to the personality ratings of Henry, the cat in the nursing-home study. Imagine that Henry was rated by his owner as a "7" on "Nervousness." We could use the normative data provided in Table 2, to compute Henry's z-score as follows:

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[1] We computed the FFM scores using the subset of 40 traits rather than the full set of 50 traits because the published instrument and norms were also based on these 40 traits (Saucier 1994).

[2] The z-score metric is useful even if investigators did not collect ratings that used the same 9-point scale. This is because investigators can compute z-scores within their data set. They can then directly compare their standard-scored pets with pets in any other data set using this z-score metric.

Figure 1.

Average Personality Profiles of Owners of Six Species of Pet

Henry's raw score
on Nervous = 7 (from owner's rating)

Mean Nervousness
rating for cats = 4.59 (from Table 2)

Standard deviation
of Nervousness ratings
for cats = 2.63 (from Table 2)

∴ Henry's Nervousness

$$\text{z-score} = \frac{(\text{raw score} - \text{mean score})}{\text{standard deviation}}$$

$$= \frac{(7 - 4.59)}{2.63}$$

$$= 0.92$$

This z-score indicates that this cat was about 0.9 standard deviations above the mean compared to other cats.[3]

Using the Internet to Collect Data on Pets and their Owners

Even the most ambitious studies of pets

and their owners have usually been limited by geographical or cultural boundaries. In the present study, we attempted to cut across these boundaries by collecting data on the internet. While this methodology clearly limits our sample to individuals with internet access, our demographic data suggest that we are reaching a diverse sample. For example, there was considerable variation in terms of nationality, race, religion, and occupation. As the internet continues to spread into more homes across the globe, the prospects for reaching an even greater diversity of participants are improving every day.

Data collected on the internet has the added benefit of arriving in electronic format, thereby reducing the time and errors associated with data entry in large samples. In addition, as technology improves, we can expect yet more efficient means for transferring data from participants to investigators. Moreover, the internet will provide an efficient means for disseminating findings from anthrozoological studies to persons from all walks of life across the world.

Although, this research demonstrates the viability of the internet as a data-collecting tool for anthrozoological investigators, technology is improving daily and our study should be seen as a conservative estimate of who can be

[3]The same procedure can be carried out for the human personality data shown in Table 3. However, the human data are presented at the scale level and will, therefore, be more reliable than the pet data which are presented at the item level.

reached by the internet and of how much information can be exchanged among investigators, participants, and the wider population.

LIMITATIONS AND RECOMMENDATIONS

In this final section, we would like to consider a number of limitations that we hope will be addressed in future research. We shall then turn to the wider implications of this study and make four recommendations for future research on animal personality.

Limitations

Sample size

Ideally, the data for all six species would be based on sample sizes comparable to the ones we obtained for dogs, cats, and ferrets. The sample sizes for rabbits, hedgehogs, and horses are clearly less than optimal and we urge investigators to interpret the means and standard deviations for these species cautiously. Despite our reservations, we elected to provide data for these species because personality ratings of rabbits, hedgehogs, and horses are rather uncommon so even these small samples may provide initial insights into these unusual populations. Moreover, we encourage investigators to augment these samples with data from their own studies.[4]

Selection of Traits

The choice of traits to be included in an instrument influences the comparability and comprehensiveness of findings based on that instrument. Cross-species comparability is limited by the degree to which traits translate from one species to another (Podberscek and Gosling in prep.). For example, a trait like "talkative" may be difficult to interpret in animals. At this stage of research, when most animal studies are largely exploratory, there is no easy answer to the question of what traits to include in multi-species or single-species inventories. Our set of traits is clearly not definitive, but we do offer it as a starting point for the development of a more comprehensive lexicon of terms. Eventually, when many species have been studied using a number of trait terms, we may discover a set of widely applicable personality traits that do not sacrifice specificity. As investigators develop a cross-species lexicon, they will inevitably need to supplement our set of traits with additional constructs. We encourage such additions, but at the same time we urge caution; cross-study comparability will be possible only to the extent that investigators refrain from using different terms to apply to the same underlying construct and refrain from using the same term to refer to different underlying constructs (Gosling 1998b).

Use of an adjectival measure

The choice between short adjectival measures and longer items represents an inevitable trade-off in cross-species research—by keeping the items flexible enough to be applicable to multiple species, investigators may not be able to detect important distinctions within a species (Gosling 1998c). Unqualified traits such as "jealous" may be widely applicable but may fail to discriminate between potentially important concepts (e.g., jealousy of other pets versus jealousy of other humans). Such problems entail balancing flexibility with specificity—a tradeoff with no ideal solution. Investigators must find a balance between these conflicting pressures that is consistent with their research goals. Our goal was to conduct an exploratory analysis of multiple species. Accordingly, we chose an adjectival measure which, we believe, represents the best compromise between the costs and benefits of the various rating alternatives.

Generalizability of Sample

Another potential limitation of this study is its generalizability. It is possible that our sample, collected entirely from persons who have access to the internet, would systematically differ from non-internet users. However, in a separate study comparing internet, college, and community samples (Bonnenburg and Gosling 1998), we found that the overall personality profiles did not differ across samples, with internet users being only slightly higher on Conscientiousness, Intellect/Openness, Extraversion, and Agreeableness than individuals from more conventional populations.

Implications and Recommendations

Many anthrozoological studies collect personality ratings of pets and/or their owners. Many fascinating findings emerge from such research but, unlike research on humans, a common language with which to compare these studies has yet to be developed. Moreover, given the considerable difficulties associated with obtaining large data sets for anthrozoological research, many studies are performed using sample sizes that are less than optimal (Gosling 1998c). Together, these problems interfere with interpretations of

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[4] Investigators interested in contributing to this data set should send their findings to the first author from whom updated normative samples can also be obtained.

anthrozoological findings in a wider context and they impede investigators' efforts to build on one another's research.

It is not realistic to expect animal-personality research to have reached the same stage as the much older field of human-personality research. However, anthrozoologists can benefit from a number of lessons learned during the development of human research. First, investigators using large samples should publish the means and standard deviations of their variables to enable colleagues interested in quantitatively comparing results to compute standard scores. Second, when samples are small or when case studies are reported, samples such as ours can be used to compute standard scores to determine the generalizability of findings. Third, we encourage investigators to develop and use a more standardized set of descriptors. Fourth, we propose the internet as source of research participants. We hope that our normative sample and rating instrument will facilitate the adoption of these steps in animal research and will serve as an impetus for the development of a science of anthrozoology that is cumulative and programmatic.

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APPENDIX A

HOW ACCURATELY DO THESE TRAITS DESCRIBE YOUR PET?

Take a moment to think about the personality of your pet. A number of personality traits are listed below. Indicate how accurately each trait describes the pet's character using the following scale

——— INACCURATE ———				?	——— ACCURATE ———			
Extremely	Very	Moderately	Slightly		Slightly	Moderately	Very	Extremely
1	2	3	4	5	6	7	8	9

___ Kind	___ Harsh	___ Moody	___ Sloppy	___ Rude
___ Creative	___ Inefficient	___ Cooperative	___ Temperamental	___ Practical
___ Extraverted	___ Careless	___ Cold	___ Prompt	___ Unintelligent
___ Fretful	___ Imaginative	___ Jealous	___ Unkind	___ Uncreative
___ Envious	___ Nervous	___ Efficient	___ Unintellectual	___ Withdrawn
___ Deep	___ Considerate	___ Unenvious	___ Touchy	___ Sympathetic
___ Anxious	___ Artistic	___ Talkative	___ Systematic	___ Philosophical
___ Bashful	___ Bold	___ Organized	___ Relaxed	___ Verbal
___ Complex	___ Disorganized	___ Quiet	___ Warm	___ Unsystematic
___ Energetic	___ Intellectual	___ Unsympathetic	___ Untalkative	___ Shy