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Brief report

Are we barking up the right tree? Evaluating a comparative approach to personality

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Abstract

Animal studies can enrich the field of human personality psychology by addressing questions that are difficult or impossible to address with human studies alone. However, the benefits of a comparative approach to personality cannot be reaped until the tenability of the personality construct has been established in animals. Using criteria established in the wake of the person–situation debate (Kenrick & Funder, 1988), the authors evaluate the status of personality traits in animals. The animal literature provides strong evidence that personality does exist in animals. That is, personality ratings of animals: (a) show strong levels of interobserver agreement, (b) show evidence of validity in terms of predicting behaviors and real-world outcomes, and (c) do not merely reflect the implicit theories of observers projected onto animals. Although much work remains to be done, the preliminary groundwork has been laid for a comparative approach to personality.

Introduction

Personality characteristics have been examined in a broad range of nonhuman species including chimpanzees, rhesus monkeys, ferrets, hyenas, rats,

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sheep, rhinoceros, hedgehogs, zebra finches, garter snakes, guppies, and octopuses (for a full review, see Gosling, 2001). Such research is important because animal studies can be used to tackle questions that are difficult or impossible to address with human studies alone. By reaping the benefits of animal research, a comparative approach to personality can enrich the field of human personality psychology, providing unique opportunities to examine the biological, genetic, and environmental bases of personality, and to study personality development, personality-health links, and personality perception. However, all of these benefits hinge on the tenability of the personality construct in non-human animals. Thus, the purpose of the present paper is to address a key question in the animal domain: is personality real? That is, do personality traits reflect real properties of individuals or are they fictions in the minds of perceivers?

Thirty years ago, the question of the reality of personality occupied the attention of human-personality researchers, so our evaluation of the comparative approach to personality draws on the lessons learned in the human domain. Mischel's (1968) influential critique of research on human personality was the first of a series of direct challenges to the assumptions that personality exists and predicts meaningful real-world behaviors. Based on a review of the personality literature, Mischel (1968) pointed to the lack of evidence that individuals' behaviors are consistent across situations (Mischel & Peake, 1982). Over the next two decades, personality researchers garnered substantial empirical evidence to counter the critiques of personality. In an important article, Kenrick and Funder (1988) carefully analyzed the various arguments that had been leveled against personality and summarized the theoretical and empirical work refuting these arguments.

The recent appearance of studies of animal personality has elicited renewed debate about the status of personality traits. Gosling, Lilienfeld, and Marino (in press) proposed that the conditions put forward by Kenrick and Funder (1988) to evaluate the idea of human personality can be mobilized in the service of evaluating the idea of animal personality. Gosling et al. (in press) used these criteria to evaluate research on personality in nonhuman primates. In the present paper, we extend their analysis to the broader field of comparative psychology, considering research on nonhuman animals from several species and taxa. Kenrick and Funder's paper delineates three major criteria that must be met to establish the existence of personality traits: (1) assessments by independent observers must agree with one another; (2) these assessments must predict behaviors and real-world outcomes; and (3) observer ratings must be shown to reflect genuine attributes of the individuals rated, not merely the observers' implicit theories about how personality traits covary. Drawing on evidence from the animal-behavior literature, we evaluate whether these three criteria have been met with respect to animal personality.

Criterion 1: Independent assessments must agree

If individual differences in personality exist and can be detected, then independent observers should agree about the relative standing of individuals on personality traits. The preponderance of evidence supports the conclusion that humans agree strongly in their ratings of other humans; studies typically elicit interobserver agreement correlations in the region of .50 (e.g., Funder, Kolar, & Blackman, 1995; McCrae, 1982), and provide a benchmark by which judgments of animals can be evaluated.

There is now a substantial corpus of research showing that observers agree strongly in their ratings of animals. Gosling (2001) summarized the findings from 21 rating studies of animal personality; the mean interobserver agreement correlation was .52, matching the magnitude of consensus correlations from human research. However, the generally strong agreement correlations obscured a more complex picture in which agreement coefficients varied considerably across traits and species. For example, in one study of cheetahs (Wielebnowski, 1999), the mean interobserver correlation was .67, but ranged across traits from .48 (“playful”) to .82 (“active”). In a study of chimpanzees (King & Figueredo, 1997), the mean interobserver correlation was .33, but ranged from .10 (“erratic”) to .61 (“dominant”).

Given the variability in interobserver agreement, one important task for animal researchers is to identify the parameters that affect whether observers agree in their ratings. Gosling (2001) identified several potential parameters, including the level of acquaintance between the observers and the animals, the developmental stage of the animals (e.g., infants vs. adults), characteristics of the species, traits, and situations being rated, and interactions among these variables. Unfortunately, few studies have directly tested the effects of these parameters and this remains an important area for future research.

Overall, however, the accumulated evidence suggests that observers tend to agree strongly in their judgments of animals’ personalities. Using the correlations obtained from studies of humans as a benchmark, Criterion 1 has been met.

Criterion 2: Assessments must predict behaviors and real-world outcomes

Ultimately, for personality traits to have value, they must predict behaviors and real-world outcomes. Thus, one of Mischel’s (1968) most pointed criticisms of personality was to argue that personality traits rarely predict behaviors or real-world outcomes at meaningful levels, with trait-behavior correlations rarely exceeding .30.

Mischel’s critique prompted two major responses. First, researchers argued that trait–behavior correlations should be measured using aggregates of behavior codings rather than single instances, which tend to be relatively

unreliable (Epstein, 1979, 1983). Second, researchers argued that an effect size of .30 is not as weak as it may appear (Funder & Ozer, 1983).

In the few animal studies in which personality measures have been tested (Gosling, 2001), the evidence for concurrent and predictive validity is strong; even when using single specific acts as criteria, the personality–criterion correlations often exceed the .30 level. The validity of observer ratings of animal personality has been supported by two forms of evidence: studies showing that observer ratings of animal personality correlate with conceptually related behaviors, and with real-world outcomes.

The first form of evidence is provided by studies showing that observers' trait ratings (e.g., "aggressive") are correlated with independently coded behaviors (e.g., frequency of bites). For example, Carlstead, Mellen, and Kleiman (1999) found that rhinoceros rated by zookeepers as more fearful showed a longer latency to approach a novel object than did individuals rated as less fearful. In a study of rhesus macaques (Capitanio, 1999), ratings of sociability were correlated with affiliative behaviors, and ratings of confidence were correlated with aggressive behaviors. These and other studies (e.g., Feaver, Mendl, & Bateson, 1986; Wielebnowski, 1999) suggest that observer ratings reflect genuine attributes of individuals, not merely anthropomorphic projections.

The second form of evidence is provided by studies showing that observers' trait ratings are correlated with real-world outcomes. For example, consistent with the matriarchal dominance hierarchy that characterizes hyena clans, Gosling (1998) found that observer ratings of assertiveness in spotted hyenas were related to dominance status and sex—dominant hyenas were rated as more assertive than non-dominant hyenas, and females were rated as more assertive than males. No other traits were significantly correlated with dominance status or sex, lending support to the discriminant validity of the observer ratings.

Chronic states of anxiety can have a negative impact on the reproductive success of animals (e.g., Boissy, 1995; Gray, 1971), so reproductive success should be related to an individual's tenseness and fearfulness, but not necessarily to other traits. In her research on cheetahs, Wielebnowski (1999) found that observer ratings of tenseness and fearfulness predicted the breeding patterns of the animals, such that non-breeding cheetahs were rated as more tense and fearful than breeding cheetahs, but did not differ on other traits.

Personality traits have also been shown to predict important biological outcomes in rhesus macaques. Capitanio, Mendoza, and Baroncelli (1999) found that sociable individuals showed a stronger immune response to experimental inoculation with the simian immunodeficiency virus than did less sociable individuals. These findings are important because they demonstrate that behaviorally based personality dimensions can predict criterion measures that are not based on behavior. As a consequence, it cannot be argued that the relations between personality traits and outcome variables are

merely a tautological consequence of content overlap (Nicholls, Licht, & Pearl, 1982).

Further evidence for the reality of personality in animals comes from studies showing that at least some animal-personality traits are heritable. For example, Hansen's (1996) research on selection of traits in more than 3000 mink demonstrated that it was possible to select for the trait "fearfulness," characterized by a fearful or aggressive reaction to human contact. After 5–6 generations, 90% of the mink in the line selected for fearfulness responded fearfully, compared with less than 30% before selection. Sinn, Perrin, Mather, and Anderson's (2001) research on octopuses also found evidence for the heritability of traits, showing greater similarity within than across broods of octopuses. Similar findings have been obtained in other animals including snakes, (Herzog & Burghardt, 1988), goats, (Lyons, Price, & Moberg, 1988), fishes, (Iguchi, Matsubara, & Hakoyama, 2001), and chimpanzees (Weiss, King, & Figueredo, 2000).

Although the evidence is far from complete, the findings to date suggest that personality traits predict theoretically relevant behaviors and real-world outcomes. We therefore conclude that the second criterion has provisionally been met, although additional research is warranted to strengthen this conclusion.

Criterion 3: Ratings must reflect attributes of targets, not observer's implicit personality theories

In recent years, several studies of personality structure in animals have been published (see Gosling & John, 1999 for a review); each of these studies has identified a number of broad dimensions, which often resemble the dimensions found in studies of humans. These findings could be taken as evidence that animals have personality. However, it is possible that observers are not detecting the true structure of personality traits in animals, but are instead simply "filling in the blanks" using their knowledge of human personality structure. Although most animal studies of personality structure are based on personality ratings (e.g., "curiosity"), a small number of studies are based on behavioral tests (e.g., response to novel object) and carefully recorded ethological observations (e.g., time spent exploring environment). For example, van Hooff (1973) meticulously observed the naturally occurring expressive behavior of chimpanzees. A Social Play factor was marked by such behavior patterns as "grasp and poke" (boisterous but relaxed contact), "pull limb" (playful social contact), and "gymnastics" (exuberant locomotory play, such as swinging, dangling, rolling over, turning somersaults), and an Affinity factor was marked by behavior patterns indicating social closeness, such as "touching" (gentle contact, such as stroking another over the head), "grooming," and "embrace."

Another example of behavior-based research on personality structure is provided by Sinn et al.'s (2001) study of 73 baby octopuses. They identified four factors, which they labeled Active Engagement (marked by such behaviors as "touch stimulus," "crawl," "color change," and "jet or swim"), Arousal/Readiness (marked by "head move," "respiratory change," and "papillary change"), Aggression (marked by "grab brush," "pull brush," and "posture change"), and Avoidance/Disinterest (marked by "papillae change" and "shrink"). With the exception of the Arousal/Readiness factor, these findings parallel earlier research on octopus behavior (Mather & Anderson, 1993), underlining the robustness of these patterns. Other behavior-based studies of personality structure have been conducted on dogs (Goddard & Beilharz, 1985), pigs (Forkman, Furuhaug, & Jensen, 1995), and Bushbabies (Watson & Ward, 1996).

Unlike the ratings-based factors, such behavior-based factors cannot be explained solely in terms of observers "filling in the blanks" on the basis of the semantic similarity of the traits. Moreover, in cases where cross-study comparisons can be made, the factors obtained from behavioral codings resemble factors obtained from observer ratings, suggesting that both methods assess the same underlying constructs (Gosling & John, 1999). Furthermore, the finding that different constructs emerge in the personality structures of different species suggests that human observers are not solely relying on their implicit trait theories—instead, they are making judgments that are specific to the animals being observed.

The evidence suggests that mere similarity in the meaning of the terms cannot explain the empirical relations among the traits. Instead, the findings suggest that the structure of personality ratings is based, at least in part, on real attributes of the individuals being rated. Based on this evidence, we provisionally conclude that Criterion 3 has been met.

Summary

Personality research in animals fares relatively well when held to the standards expected of human personality research—there is strong evidence that personality does exist in animals. That is, personality ratings of animals show strong levels of interobserver agreement, and these assessments show evidence of validity in terms of predicting behaviors and real-world outcomes, such as susceptibility to disease progression. Finally, these assessments do not merely reflect the implicit theories of observers, projected onto animals (i.e., anthropomorphism). Although much work remains to be done to fortify the foundations of this emerging area of research, the preliminary groundwork has been laid for a comparative approach to personality. We anticipate that the comparative approach will continue to flourish and provide new insights into personality in both human and nonhuman animals.

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