

SHORT COMMUNICATION

Reliability of the Emotions Profile Index, Primate Form, with *Papio hamadryas*, *Macaca fuscata*, and Two *Saimiri* SpeciesPATRICE A. MARTAU, NANCY G. CAINE, and DOUGLAS K. CANDLAND
Bucknell University

ABSTRACT. An evaluation of the reliability of the Emotions Profile Index (EPI), primate form, was carried out using two captive species of Old World monkeys (*Papio hamadryas* and *Macaca fuscata*) and two species (?) of New World monkeys (*Saimiri sciureus* and *S. boliviensis*). Observers, some familiar with the animals and some unfamiliar, rated members of the four groups at different times. Inter-rater reliability was high for most members of all species, but only when the observers were familiar with the animals. Assessments remained stable over at least one year.

Key Words: Personality; Emotions; Emotions Profile Index; *Papio*; *Macaca*; *Saimiri*.

INTRODUCTION

Most observers of nonhuman primate behavior would agree that individual animals differ in temperament, or personality, but if personality is to be measured so individual differences can be identified, it is necessary to develop a psychometric procedure whose reliability and validity are known.

At least two approaches to developing nonhuman primate personality assessment instruments can be identified. In the first, one begins with the traits used to describe human personality and determines which traits are also suitable as descriptors of primate behaviors. An example of this approach is the method developed by STEVENSON-HINDE and ZUNZ (1978) in which adjectives commonly used to describe human personality are applied (using a rating scale) to rhesus monkeys (*Macaca mulatta*).

A second approach that has received empirical attention is derived from PLUTCHIK's (1962, 1980) theory of emotions. Based upon the notion that personality is a mixture of eight "prototypic emotions," PLUTCHIK developed the Emotions Profile Index (EPI) as a tool to assess human personality. As adapted by PLUTCHIK for nonhuman subjects, the EPI is a forced-choice test consisting of ten adjectives that form paired items. The rater selects the adjective of the pair that is the more descriptive of the animal. For example, the rater decides whether the primate is more "belligerent" than "depressed" or more "inquisitive" than "submissive." Each choice is then scored in terms of the prototypic emotions implied by the trait word, thereby producing eight separate scores (representing the relative strength of each of the basic emotions) for each animal.

The EPI has been used to describe *Papio anubis* by BUIRSKI et al. (1973) and *Pan troglodytes schweinfurthi* by BUIRSKI et al. (1978). When the EPI was applied to *Papio*, the interrater reliability among three raters on each of the eight prototypic emotions was over +.74 in most cases. The raters were students who were individuals with animals' behavior. The observa-

tions of *Pan* included the rating of 23 animals living at Gombe Stream. Most of the interjudge reliabilities were greater than +.70 (BUIRSKI et al., 1978). Again, all judges were very familiar with the animals.

The reliability of the EPI when applied (1) to New World species, (2) to species maintained in captivity, and (3) by observers who are relatively unfamiliar with the animals, has not yet been determined. The primary purpose of the current study was to assess the reliability of the EPI when applied to captive nonhuman primate populations, including two species of Old World monkeys and two species (?) (see HERSHKOVITZ, 1984) of New World monkeys. To evaluate the role of observer familiarity in the reliable use of the EPI, one species was rated not only by observers who had prior experience with the monkeys, but also by observers who were relatively unfamiliar with the animals (i.e., less than 5-hr contact).

METHOD

SUBJECTS

Four groups of primates were rated. The *Papio hamadryas* and *Macaca fuscata* groups included adults (over 5 years), subadults (4–5 years), and juveniles (1–3 years). The two *Saimiri* groups were composed of adults. Four infants (less than 1 year) were not included in the rating procedure. These were two *M. fuscata* and two *S. boliviensis*. Information on age, sex, and group composition is provided in Table 1.

The baboons and the macaques occupied two outdoor enclosures, 12 × 12 × 5.2 m (at the apex), each of which was equipped with a feeding station, a water spigot, a climbing apparatus, and a shelter. The squirrel monkeys were housed indoors in wood and screen enclosures, 3.5 × 3.5 × 3.5 m, equipped with ropes and branches to encourage activity. Water and monkey chow were provided *ad lib.* for all colonies.

PROCEDURE

During January 1982, five students spent at least 2 hr each day observing the macaques and the squirrel monkeys. During January 1983, a different set of five students observed the macaques. In early February of those years, the observers independently rated each animal using the EPI. Three observers rated *S. boliviensis*, while each of the other two groups was rated by five observers.

The baboons rarely leave their shelter during the winter, so the rating was postponed until March 1982. The raters were four students who had observed the animals for other projects for at least six months.

The macaques were also rated by unfamiliar observers, these being five students who observed the animals for 1 hr each day for no more than five days before completing the EPI in November 1982.

RESULTS

Excluded from analysis were data from two macaques born in the spring of 1982 and two infant *S. boliviensis*. All observers had expressed discomfort with rating the infants because there was so little behavior to judge. Those observers who were willing to try to rate the infants scored both members of each pair identically.

Table 1. Subject information and inter-rater reliability associated with the EPI.

Subject	Age/Sex			Inter-rater reliability (mean correlation coefficients and standard deviations)		
<i>P. hamadryas</i>	1	adult	F	.71 (.22)		
	2	adult	F	.20 (.46)		
	3	adult	M	.89 (.04)		
	4	subadult	F	.90 (.06)		
	5	subadult	M	.36 (.44)		
	6	juvenile	M	.76 (.10)		
<i>S. boliviensis</i>	1	adult	M	.97 (.02)		
	2	adult	F	.92 (.02)		
	3	adult	F	.92 (.04)		
	4	adult	F	.90 (.06)		
	5	adult	M	.76 (.07)		
	6	adult	F	.62 (.16)		
	7	adult	M	.56 (.08)		
	8	adult	F	.15 (.51)		
<i>S. sciureus</i>	1	adult	F	.85 (.09)		
	2	adult	F	.83 (.12)		
	3	adult	F	.81 (.14)		
	4	adult	M	.69 (.21)		
	5	adult	M	.67 (.21)		
<i>M. fuscata</i>				Feb. 1982	Feb. 1983	Nov. 1982 ¹⁾
	1	adult	F	.83 (.07)	.48 (.31)	.50 (.32)
	2	adult	F	.71 (.15)	.30 (.37)	.08 (.62)
	3	adult	F	.63 (.23)	.43 (.36)	.23 (.43)
	4	adult	M	.82 (.08)	.93 (.03)	.80 (.18)
	5	subadult	F	.07 (.39)	—	—
	6	subadult	M	.77 (.14)	.85 (.11)	.71 (.22)
	7	subadult	M	.39 (.29)	—	—
	8	subadult	M	.49 (.20)	.76 (.16)	-.14 (.62)
	9	juvenile	M	.89 (.08)	.71 (.21)	.18 (.42)
	10	juvenile	F	.79 (.12)	.82 (.12)	.74 (.18)
	11	juvenile	M	.78 (.13)	.77 (.24)	.81 (.11)
	12	juvenile	M	.95 (.02)	.80 (.18)	.26 (.56)
	13	juvenile	M	.89 (.09)	.74 (.19)	.65 (.23)
14	juvenile	F	.83 (.13)	.57 (.35)	.67 (.27)	

1) Unfamiliar observers.

For each animal, the scores on each of the eight dimensions of the EPI were determined for each rater and correlated (Pearson product-moment) with the corresponding eight scores of each of the other observers. Mean correlations are shown in Table 2. In Table 3 the mean correlations are separated by personality dimension. In the language of the EPI, the term "personality dimensions" refers to the eight primary traits that are used to describe an individual. While it is not critical to the larger issue of reliability that these eight dimensions be defined and described here, the reader may want to consult PLUTCHIK (1962, 1980) for details relating to this and other theoretical aspects of the EPI. Of concern to the current paper is the fact that the various traits measured by the EPI were not rated with equal reliability.

When rated by observers familiar with the monkeys, the EPI produced correlations of over +.70 for 70% of the animals. Most of the animals for whom the mean correlation among raters was low were those whose status within the troop appeared to be changing at the time of the assessment (e.g., *fuscata* 1, 2, and 3, who were undergoing dominance struggles in the winter of 1983). It is interesting to note that, among the February 1982 rating of the macaques, the lowest reliabilities were recorded for the two monkeys who died later that year (*fuscata* 5 and 7).

Table 2. Mean product-moment correlations among raters for each species.

Species	Mean correlation coefficient (S.D.)
Hamadryas baboons (<i>Papio hamadryas</i>)	0.64 (.39)
Japanese monkeys (<i>Macaca fuscata</i>)	
Feb. 1982	0.70 (.29)
Feb. 1983	0.68 (.30)
Nov. 1982 (unfamiliar observers)	0.46 (.50)
Roman-arch squirrel monkeys (<i>Saimiri boliviensis</i>)	0.72 (.32)
Gothic-arch squirrel monkeys (<i>Saimiri sciureus</i>)	0.76 (.18)

Table 3. Mean product-moment correlations among raters for each of the eight personality dimensions of the EPI.

Personality dimension ¹⁾	<i>Papio hamadryas</i>	<i>Macaca fuscata</i> (1982) ²⁾	<i>Macaca fuscata</i> (1983)	<i>Saimiri boliviensis</i>	<i>Saimiri sciureus</i>
Incorporation ("Trustful")	0.679	0.456	0.625	0.820	0.869
Orientation ("Dyscontrolled")	0.846	0.751	0.819	0.346	0.231
Protection ("Timid")	0.826	0.647	0.709	0.855	0.921
Deprivation ("Depressed")	0.541	0.483	0.456	0.723	0.006
Rejection ("Distrustful")	0.758	0.240	0.620	0.853	0.906
Exploration ("Controlled")	0.629	0.681	0.811	0.643	0.415
Destruction ("Aggressive")	0.802	0.822	0.863	0.857	0.848
Reproduction ("Gregarious")	-0.005	0.554	0.381	0.707	0.595

1) Given, as per PLUTCHIK (1962, 1980), in functional terms and trait terms; 2) unfamiliar observers.

The November 1982 ratings of the macaques demonstrate that familiarity with the animals enhances the reliability of the EPI. For 9 of the 12 animals which were rated three times, the lowest correlations were produced by unfamiliar observers. As Table 2 shows, however, no species was rated much more reliably than any other when raters were familiar with the animals.

The issue of whether the EPI yields an assessment of personality that is stable over time was addressed by correlating the assessments of two different sets of five student observers which were taken one year apart (macaques only). As shown in Table 4, the ratings remained quite stable for all animals except *M. fuscata* 14.

Table 4. Product-moment correlations between two years' ratings for the mean scores (summed over raters) of *M. fuscata*.

Name	Correlation coefficient
<i>fuscata</i> 1	0.91
<i>fuscata</i> 2	0.73
<i>fuscata</i> 3	0.89
<i>fuscata</i> 4	0.91
<i>fuscata</i> 6	0.97
<i>fuscata</i> 8	0.86
<i>fuscata</i> 9	0.92
<i>fuscata</i> 10	0.98
<i>fuscata</i> 11	0.90
<i>fuscata</i> 12	0.98
<i>fuscata</i> 13	0.98
<i>fuscata</i> 14	0.17

DISCUSSION

According to the data presented above, the EPI, primate form, can reliably assess most non-infant members of captive primate groups. The results support those of BUIRSKI et al. (1973, 1978) who concluded that the EPI was highly reliable. However, in both BUIRSKI studies the ratings were made by observers who were very familiar with the animals, and at least one of the troops that was observed (1973) contained no subadult monkeys. Both observer familiarity and age of subjects (infants and subadults presented particular problems) affected the reliability of ratings in the current study.

The EPI is less reliable when observers are unfamiliar with the animals. But familiarity itself is often confounded with collaboration among observers. That is, since observers familiar with the same group have had opportunity to discuss their observations, it may be that the high reliability comes not from the measure, but from the raters' having formed common opinions while carrying out observations. The degree of familiarity should be separated from degree of collaboration among raters in order to determine the influence and interaction of these variables.

Test situations may yield more precise measures of temperament than observation, but often such manipulation is neither possible nor desirable. A method by which impressions of personality can be recorded with reliability is of value. The EPI, despite the limitations presented above, appears to hold promise as such a tool.

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Authors' Names and Address: PATRICE A. MARTAU, NANCY G. CAINE, and DOUGLAS K. CANDLAND, *Program in Animal Behavior, Bucknell University, Lewisburg, Pennsylvania 17837, U.S.A.*