

# We all Appreciate the Same Animals: Cross-Cultural Comparison of Human Aesthetic Preferences for Snake Species in Papua New Guinea and Europe

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## Abstract

We examined the aesthetic perception of animal species in two culturally contrasting societies. Students from the Czech Republic and villagers from Papua New Guinea were asked to rank photographs of the python and boa species according to the perceived beauty of the depicted snake. The ranking of the species in Europe and Papua tightly correlated in spite of ethnic differences that were significant in the case of six species. This result suggesting basic similarity in animal beauty perception between two distant ethnic groups is not only a partial argument for perceptual unity of humankind. This cross-cultural congruence may be important for conservation policies as humans may be predetermined to appreciate and thus support some species more than others.

## Introduction

Animals have been an integral component of the human environment and culture from the very beginning of our species. Thus, our mind should be evolutionarily prepared to respond specifically to animal stimuli. Manifestation of this may be innate tendency of humans to affiliate with other species that was recognised by Wilson (1986) and named as 'biophilia'. Nevertheless, we share not only interest in animal species, but also ability to categorize them in a similar way. Even illiterate hunter-gatherers are able to name and categorize animal species in a very similar way as contemporary scientists (Berlin 1992 and references herein). We addressed the question whether cross-cultural congruence also applies to the aesthetic perception of animal species. For this purpose we compared aesthetic preferences towards snake species in European students and Papuan villagers. As a model group we chose snakes that represent biologically valid stimuli and are known to selectively capture human attention even in complex visual displays (Öhman & Mineka 2003).

Papuans have entirely different cultural background than Europeans, and moreover, live in much closer contact with wild animals including snakes. In Papua New Guinea, as everywhere in Australian zoogeographic area, most snake species belong to the family Elapidae and are highly poisonous (O'Shea 1996). Therefore, we expected that aesthetic apprehension of tested species recovered by our research would significantly differ between people from Europe and Papua.

## Methods

We collected 32 photographs of boas and pythons, each depicting a typical individual of its species. We set each of the snake bodies on a black background regardless of real size of the animal and printed in format 10 × 15 cm. Our respondents were undergraduate students of the Charles University in Prague (63 men and 20 women born in the Czech Republic) and villagers from Papua New Guinea (63 men and 20 women from Madang and Chimbu provinces) who voluntarily agreed to participate in

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the project. Each study subject was shown the set of photographs in a random assemblage and asked to rank the species according to the perceived beauty.

The congruence among the respondents was evaluated by non-parametric Kendall's test of concordance that is appropriate for rank-order data (Sheskin 2004). This procedure was computed in SPSS version 16.0 (SPSS Inc. 2007). The ranks of particular species provided by individual respondents were divided by 32 and square root arcsine transformed prior to multivariate analyses and ANOVA. To assess multivariate structure of the data we performed principal component analysis (PCA) in which transformed species rankings were treated as variables. We used discriminant function analysis (DFA) to reveal possible variance between sexes and ethnic groups. Combination of sex and ethnic group Species displaying the highest variance within ethnic groups (*Corallus caninus*) was excluded from multivariate analyses to avoid the problem of predetermination of the last rank. Most computations were made in STATISTICA 6.0. (StatSoft 2001).

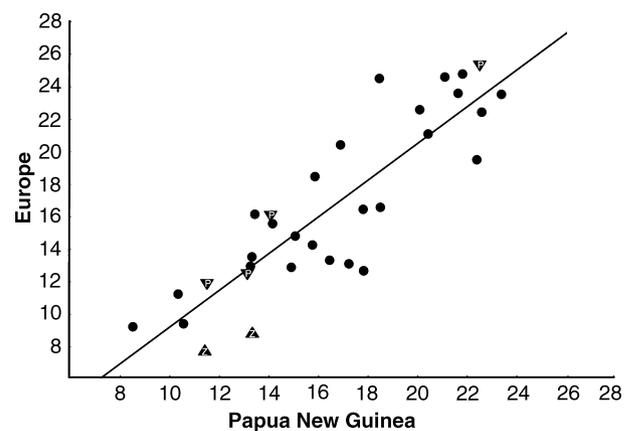
We were conscious of possible hidden effects of the position of snakes on the pictures (rolling the body), within-species variation and many different characteristics of the pictures on respondents' apprehension and resulting ranks. The assessments could be also influenced just on the part of respondents' state of mind. We carried out additional testing in Czech respondents to exclude these influences. To check consistency of results, we asked 25 respondents to rank two different sets of pictures ( $n = 30$ ) according to perceived beauty of depicted animals. The sets consisted of the same 30 bovid species but differed in the depicted individuals (exhibiting an apparently different position). The picture background was black in both sets and each respondent had 24–48 h break between testing and retesting. Different individuals of the same species obtained nearly the same ranks (Spearman  $r = 0.97$ ;  $p < 0.0001$ ). Thus we concluded that the position of the snake body and qualities of the photograph do not significantly affect resulting ranks (Marešová & Frynta 2008) and if there is any influence of respondents' mood or immediate state, it is trivial.

## Results

There was a good agreement among the respondents in ranking the snake species. Non-parametric Kendall's test of concordance was highly significant (Kendall's  $w = 0.345$ ,  $0.360$  and  $0.325$  for Czech men, women and pooled sexes, respectively;

$w = 0.204$ ,  $0.228$  and  $0.193$  for Papuan men, women and pooled sexes, respectively; all  $p < 0.001$ ). To further explore the data we performed PCA; the first principal component (PC1) accounted for 39.0%, 26.0% and 30.9% in the Czech Republic, Papua New Guinea and pooled data, respectively. The loadings of most respondents (i.e. 166 individuals except for six Papuans and five Czechs) contributed to PC1s in one direction. Moreover, there were tight correlations between PC1s and mean ranks of particular species obtained in Europe, Papua and pooled samples (Spearman  $r = 0.97$ ;  $0.99$  and  $0.99$ , respectively; all  $p < 0.0001$ ). Thus PC1s may be interpreted as perceived beauty and for further analyses we used mean ranks that we find more intuitive than PCs.

We computed mean species ranks for Czech and Papuan respondents separately and then correlated with each other. This correlation explained 76% of variation ( $r = 0.87$ ;  $n = 32$ ;  $p < 0.0001$ ; Fig. 1). The congruence between Czech and Papuan respondents is reflected also by non-parametric Kendall's coefficient of concordance in a pooled sample ( $w = 0.239$ ;  $p < 0.001$ ). Nevertheless, DFA in which combinations of sex and ethnic group were used as a grouping variable (Wilks'  $\lambda = 0.3178$ ;  $F_{(93,395)} = 1.99$ ;  $p < 0.0001$ ) revealed small but significant sex differences within the European sample ( $F_{(31,132)} = 1.92$ ;  $p < 0.0059$ ). It also uncovered slight differences between ethnic groups [ $F_{(31,132)} = 2.28$ ;  $p < 0.0007$  for men and  $F_{(31,132)} = 2.36$ ;  $p < 0.0004$  for women]; however, these groups overlapped considerably. A total of 16.9% of Czech respondents and 22.9% of Papuan respondents were misclassified



**Fig. 1.** Relationship between the mean ranks (human preference) of snake species ( $n = 32$ ) obtained in Europe (Czech Republic) and Papua New Guinea. ▼ = species living in Papua, ▲ = species most represented in zoos.

into the other ethnic group. Separate ANOVAs for each particular species (Bonferroni adjusted) were then performed to test the effects of ethnic group, sex and its interaction on ranking. Significant effect of sex was found in two species: *Corallus annulatus* (more preferred by women) and *Epicrates angulifer* (more preferred by men). Ethnic differences were significant in the case of six species: the Papuans prefer more *C. annulatus*, *Eryx johni* and *Python timorensis*, whereas the Czech respondents prefer more *Python sebae*, *Liasis childreni* and *Eryx conicus*.

## Discussion

It is almost self-evident that two human populations possessing completely different cultures and distant gene pools (Cavalli-Sforza et al. 1994) should at least slightly differ in aesthetic preferences. We confirmed this hypothesis, however, the rankings of the snakes provided by European and Papuan respondents' exhibit surprising similarity (Fig. 1). Moreover, the slight disparity in ranking the species is not explicable by personal experience and/or the role of the particular species in the local culture, as four of the tested species are distributed in New Guinea and none of them played a significant role in ethnic differences. Thus, not only classification of the animal kingdom but also considerable component of aesthetic preferences for animal species may be universal across humankind. This conforms with the view of evolutionary psychology (Barkow et al. 1992) claiming that the human mind evolved prior to geographic and cultural diversification of our species.

The above-discussed findings suggest that both studied ethnic groups share nearly the same perception of animal beauty. Nevertheless, shared preferences may result from more general perceptual processes that are not specific for animals and/or snakes. There is a question whether respondents really evaluated the animals rather than just the colourful pictures. We have noticed that in particular the Papuan respondents saw the depicted animals as living creatures and discussed a lot about them. Nevertheless, even the congruence in colour preferences would be of relevance as colour perception is known to differ considerably between Papua and Europe (Kay & Regier 2007). If we look at the colouration of the species that were significantly more preferred by one ethnic group, we are not able to trace up the characters responsible for the difference. The appearance of three species that are preferred more by Papuans is quite similar and comparable with the look of those three preferred more by Europeans. The

situation is similar with respect to observed sex differences in two species. There are known sex differences in colour preferences (Hemphill 1996) that are, however, not applicable to our results.

Of course, we are aware of the fact that snakes have special meanings for humans. Easy elicitation and learning of snake fear evolved in humans and many other primates (Öhman & Mineka 2002; Ramakrishnan et al. 2005; Coss et al. 2007) as snakes may have signified deadly threats for our primate ancestors. Fear may increase human attention but on the other hand it may interfere with beauty perception.

Even if we are not able to determine causes of detected congruence in animal beauty perception, this phenomenon deserves further research. It seems reasonable to perform similar comparison concerning perception of other animal groups as well as abstract pictures. Moreover, native ethnic groups from other continents should be also included. This may allow us to verify the generality of our results.

In present situation, endangered species of many taxa compete with one another for financial and political support provided within conservation projects. The winners of the competition for human support tend to be the species that are attractive to humans (Gunnthorsdottir 2001), larger in size (Metrick & Weitzman 1998), considered as 'a higher form of life' (Metrick & Weitzman 1996) and those that resemble humans (Samples et al. 1986). As far as tested group of boid snakes is concerned, the number of individuals of particular species kept in zoos worldwide is highly correlated with human preferences, but not with species rarity or conservation status (Marešová & Frynta 2008).

Another approach is to estimate the effort that humans would devote to save a given species. It is possible to quantify economic value of the species by means of willingness to pay (WTP). In a hypothetical market, people expressed in questionnaires their maximum WTP for protection of the species/biodiversity (e.g. Thayer 1981; Randall et al. 1983). Results of this method are generally in conformity with studies mentioned above. Martín-López et al. (2008) in their meta-analysis of 60 recent papers on economic valuation of biodiversity proved that WTP increases in favour of conservation species with anthropomorphic and anthropocentric (e.g. larger eye-size) characteristics instead of scientific factors; e.g. listing in International Union for the Conservation of Nature categories did not have any influence on WTP.

1 If further testing proves the phenomenon of wildly  
 2 shared preference for certain animal types within a  
 3 group of related species, it is imaginable that in glo-  
 4 bal conservation network this might lead to selective  
 5 protection/neglecting of some species and thus con-  
 6 tribute to the species composition of future biota.

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