„Personality“ differences but no sex differences in the individual behaviour of four monkey species from three different continents

In their appearance, the sexes differ from one another in many animal species. Males are often bigger and physically stronger than females. But sex differences in body morphology need not go along with sex differences in behaviour as a recent study on monkeys showed. In each of four species, stable individual behavioural differences—thus, “personality” differences—occurred but sex differences were largely absent. These findings shed new light on many evolutionary psychologists’ assumption that sex differences in human behaviour inevitably result from the bodily differences between men and women and thus constitute an evolutionary heritage of humans.

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„Men are from Mars and women from Venus”—our everyday life is full of stories about sex and gender differences. It is also a hot topic in scientific psychology. Over the last decades, psychologists tried to explain behavioural differences between men and women not only with biological differences between the sexes but also increasingly using evolutionary theories.

The central problem of evolutionary psychology, however, is the fact that our human ancestors no longer exist. Scientists can rely only on archaeological findings and the behaviour of modern humans to make conclusions on our ancestors’ behaviour. But these conclusions are often very speculative—and ultimately cannot be tested.

In evolutionary psychology, the assumption is widespread that pronounced behavioural sex differences have already occurred among our ancestors: The physically stronger men went on hunting, whereas the physically weaker women gathered fruits and roots and focused on child rearing and the social community. For this reason—so the assumption—men are more bold and aggressive, whereas women are more socially oriented and anxious.

Because fossil bones do not reveal much about the social behaviour of their former carriers, scientists often seek to find evidence for their evolutionary theories from research on modern humans. Most findings on gender differences in “personality” derive from research using questionnaires. Questionnaires can capture what humans think of themselves and of others, but they cannot capture the peculiarities and differences that can actually be observed in individuals’ behaviours. Therefore, questionnaire answers cannot be used to unravel whether gender differences in human individual behaviour are culturally influenced or whether they are, in fact, biologically determined or even evolutionarily derived as often assumed. Ultimately, making conclusions from modern humans’ behaviour to that of their evolutionary ancestors and using these conclusions, in turn, to explain modern humans’ behaviour remains circular. Possible mistakes cannot be detected.

Comparative psychologists therefore use a different approach and study today’s living species, in particular, human’s closest living relatives—the nonhuman primates. Today’s species’ behaviours, social systems and ecological adaptations can be directly explored and their degree of evolutionary relatedness can be genetically analysed. The knowledge and data base on their communalities and differences that can thus be secured can be used to make conclusions about possible behaviours of their ancestral species. Such comparative research opens up new avenues also for testing evolutionary theories on humans.

In a recent study in the Berlin Zoo and the Animal Shelter of Berlin, Germany, Jana Uher and her research team have studied individual behaviours in four monkey species. These species are endemic to three different continents: Weeper capuchins originate from South America, Mandrills from Africa, and toque macaques and rhesus macaques from Asia. The study is based on a novel research paradigm that the personality expert has developed to explore "personality" differences independently from everyday language and thus also in nonhuman species (see the Science Blog "A new scientific paradigm for research on individuals").

In this new research, Jana Uher adapted and further developed approaches from cross-*cultural* "personality" psychology for the purposes of systematic cross-*species* comparisons of "personality" differences. To test these novel methodologies, her team observed individual monkeys of each of the four species over 4-5 weeks, each individual for in total 60-80 hours. The researchers recorded grooming, body contact and proximity to conspecifics as well as aggressive and dominant behaviours. In all these behaviours, pronounced and temporally stable individual differences occurred that are commonly called "personality" differences (see the Science Blog "„Personality" differences compared between four monkey species: A novel methodology to unravel communalities and differences").

Surprisingly, sex differences were largely absent. No sex differences occurred in aggressive and dominant behaviour—in none of the four species. In the social contact behaviours, only two sex differences emerged: In the toque macaques, females spent their time with greater numbers of conspecifics than did the males and, in the rhesus macaques, females groomed others more often than males. But these differences occurred neither in the weeper capuchins nor in the mandrills.

These findings are remarkable because, in all four species, males are larger than females. This difference is particularly pronounced in mandrills: Males weigh twice as much as females—this is one of the largest sex differences of all primate species. Mandrills are also the worlds' largest monkey species—and the most striking one: The males show exotic looking blue, white and red colouration of their faces and hind quarters.

„The main aim of the study was to present the new methodologies for cross-species comparisons of 'personality' differences—among them sex differences—and to demonstrate their application in the four monkey species. Therefore, we have studied only one social group per species. But statistical estimations showed that the results will be similar in studies on larger samples of individuals", says Jana Uher.

In a previous study conducted with her research collaborators in Rome, Italy, the personality expert has investigated four groups of tufted capuchins over longer periods of time. These South-American monkeys also showed pronounced "personality" differences in their behaviours but hardly any sex differences. "Meanwhile, we have data from eight social groups of monkeys from five different species in which we found stable individual differences but hardly any sex differences in behaviour", she says (see the Science Blog "Sex differences, not as universal as previously thought").

Sex differences did however occur in crab-eating macaques, a monkey species originating from South-East Asia. Together with her Dutch colleagues from Utrecht University, Jana Uher explored over three years not only the behaviour of 104 monkeys, but also how 99 human observers assessed these monkey individuals on "personality" questionnaires after having conducted systematic observations of the monkeys' behaviours in their social groups.

In agreement with the behavioural data, the observers judged males and females as equally sociable and males as more curious, more playful and less aggressive than females. The observers also judged males as less anxious than females, although they had recorded more anxiety behaviours for males than for females. Did widespread stereotypes about the bravery of male individuals and the anxiousness of females ones bias these ratings?

Male crab-eating macaques also showed more impulsive behaviours than females but, surprisingly, this sex difference was not reflected in the “personality” assessments. “It may be possible that the raters have already considered that the males behaved generally more impulsively than females. When generating their assessments, the observers may therefore have compared the males not with all individuals but instead only with other males”, Jana Uher assumes (see the Science Blog “Human's ‘personality glasses’ - Why we form impressions of individuals. New insights into a uniquely human ability”).

“There is no doubt that questionnaire assessments are biased by stereotypical beliefs. But in which kinds of judgements these biases occur and in what ways they influence the assessment outcomes, seems to be quite different. This complicates the current picture of findings. We urgently have to explore, how people generate their answers to standardised questionnaires. Otherwise, all questionnaire data are meaningless”, Jana Uher warns.

In humans, explorations of behavioural gender differences are particularly complicated because pertinent cultural beliefs influence not only the interpretation and assessment of observable behaviours—these beliefs can also change individuals’ behaviour in and of itself. Many studies have shown that it is only during childhood that individuals acquire gender-related beliefs and also learn to behave accordingly. But sometimes, beliefs about gender-differences are maintained although such differences cannot be observed in individual behaviour. Anthropological studies from Great Britain could show, for example, that - contrary to widespread beliefs – adult men gossip as much as women. Thus obviously, gender differences in behaviour are much less biologically influenced than often thought.

The new findings from the four monkey species support this idea. Jana Uher emphasises, however: “These findings from other primate species do not mean that gender differences in individual behaviour were largely absent also in our human ancestors. But these new results show that differences in body morphology do not necessarily go along with differences in behaviour, as often assumed in evolutionary psychology.”

This research is part of a project funded by the German Research Foundation (DFG, UH249/1-1).

Scientific publication:

Uher, J. (2015e). Comparing individuals within and across situations, groups and species: Metatheoretical and methodological foundations demonstrated in primate behaviour. In D. Emmans & A. Laihinen (Eds.). *Comparative Neuropsychology and Brain Imaging (Vol. 2), Series Neuropsychology: An Interdisciplinary Approach.* (chapter 14, pp. 223-284). Berlin: Lit. [Download] ISBN 978-3-643-90653-3 DOI: 10.13140/RG.2.1.3848.8169

Last update: 14.09.2015

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