

The Expressive Apes and the Emotional Apes: Current Fair Trends in Primatology

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Once, not so long ago - let's go back two decades - Primatology was a much more rigid discipline, in which the studies of nonhuman primate facial expression and emotion were bound to connect both topics in the form of (stereotyped displays) which researchers actively sought in their behavior sampling schemes. There was little room for interindividual variation, cultural variation and complex emotions, which were «naturally» in the realm of humans. In recent years not only has there been an upsurge of interest in nonhuman primate expressive behavior, including facial and gestural expression, but also an increased interest in the detailed inspection of complex emotional experiences, such as empathy and social emotions, and a widespread acknowledgment of personality, which can affect all of the above. How did Primatology depart from dogma and arrived at current fairness to the emotional and expressive lives of primates and where is this trend going to take us?

Another century and a half backwards, in the late XIXth century, Charles Darwin, who was not prone to dogma and was an accurate observer of both human and animal behavior, had marveled at the expressiveness of primates at the London Zoo: In (The expression of Emotions in Man and Animals) [1] he launched the view that expressive movements had undergone evolutionary processes, drawing many human-nonhuman primate comparisons. Picking up where Darwin left it, the subject was resumed in the 1960's-80's. Psychology researchers who were pushing forward the study of human facial expression were stating that humans could produce thousands of expressions [2,3] which contrasted with the 6-15 reported by primatologists in chimpanzees [4-6] bonobos [7] gorillas [8,9] and orangutans [10]. A big jump in expressiveness seemed to have taken place since the split of the human and Pan lineages.

A key to change had been of course Jane Goodall, who paved the way by naming every chimpanzee at Gombe National Park based on their individual traits, often mentioning their distinct personalities (1986). The other long term field workers felt the same way and mentioned ape personality constantly [11] and that was also evident when a revolutionary report from captive chimpanzees was published - *Chimpanzee politics* - by De Waal [12], with a truly powerful account of Arnhem zoo chimpanzee behavior, with its males ever so distinct from each other in their thirst for power, in their strategies to achieve it and to maintain peace.

In the early 1990's, enter James King, professor of Psychology at the University of Arizona, consultant with the Chimpanzee program of the Jane Goodall Institute and naturally an attentive ape observer, pursuing since the early 1990s a valid measure of ape personality: with Aurelio Figueiredo [13], he published what became the first study of the structure of personality in an ape species that could be compared to the structure of human personality. Other studies by King and collaborators and other teams followed, not only on apes and other primates but also on personality in a range of other vertebrates [14,15] and it became clear that everyone needed to include personality in their equation to understand adaptation and predict behavior in their species of study.

In the early 2000's personality was being reported as affecting many classes of ape behavior, including facial expression, which varied extensively, not only according to group/population, but also across individuals of the same age-class and sex [16-18]. Overall, the facial behavior of great apes has revealed to be prolific, and emotionwise chimpanzees display a collection of facial expressions that is by no means shorter than that of humans, including varieties in the types of smile across apparent subtleties in emotion context [16-18]. Gestures, too, vary among individuals [19]. Furthermore, like humans, chimpanzees and gorillas show evidence of control over their expression [7,12,17,20,21]. These later reports bring us to mind-reading - great apes, influence their interactors' behavior sometimes purposefully, applying Theory of Mind to communication and leaking signs of self-consciousness.

The mystery of human emotional empathy - an affective state that reflects the emotion of others and which underlies many of human altruistic acts [22] is being tackled with new comparative approaches to chimpanzee and bonobo empathic and altruistic behavior [23] and it turns out that we share with other primates neural networks that fire and mirror the brain activity of others, perceived as experiencing emotions such as distress or disgust [24,25].

Now that personality, expressive behavior and complex emotions are all in the Primatology agenda, what lies ahead? The study of the neural underpinnings of so-called social emotions, such as jealousy, pride, and embarrassment are still much in their early days, but near future holds promise as neuroscientists are already making some breakthroughs [24].

As regards expression, we haven't stitched a few loose ends yet: current and future research should reveal how facial expression, combined with vocalization and gait express personality and gender in nonhuman primates, a line of research that has already revealed interesting correlates in the human primate [26].

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