

EVOLUTION OF THE HOMINOID ORBITOFRONTAL CORTEX

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Social and foraging decisions require the prediction and comparison of changing risk and reward values. The evolution of tolerant behavior requires detecting complex social risks, such as being cheated, and the inhibition of reward-focused aggressive and appetitive behaviors. In primates risk and reward values are represented affectively in the orbitofrontal cortex or OFC (Kringelbach and Rolls 2004.) Since apes show both sex and species differences in social tolerance and aggressive behaviors we should expect them to exhibit sex and species dimorphism in the ratio of their antero-lateral OFC (where complex risks are evaluated) to medial OFC (where rewards are evaluated.) Particularly, between species we should expect more socially tolerant apes to have higher antero-lateral/medial OFC ratios than less social species, and within species we should expect females to have higher OFC ratios than males due to their greater risk-sensitivity. Region-of-Interest techniques were used to measure the antero-lateral and medial OFC in previously obtained magnetic resonance images (MRIs) from 60 chimpanzees (30 males and 30 females) and 6 members (3 males and 3 females) from each of the following species: bonobos, gorillas, and orangutans. Bonobos and chimpanzees have higher antero-lateral/medial OFC ratios than do gorillas or orangutans, and female chimpanzees have higher ratios than do chimpanzee males, in accord with behavioral differences.

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