SELECTIVE ECOLOGY FOR ELABORATE VOCAL DISPLAYS IN PRIMATES [1]

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Abstract: This dissertation explores the social, behavioral, and habitat based influences on the evolution of elaborate vocalizations in primates. The goals of this project were to merge and test hypotheses derived from both the primate morphological origins literature and the musical behavior origins literature. Theoretical elements from the leaping and arboreal hypotheses from the primate origins literature were brought to bear on vocal display data from extant primates and on theories on the function of song in animals and music in humans. Specifically, I used computational statistical techniques to test the dual hypotheses that precision limb landing, as required in navigating complex arboreal topologies, could have not only shaped primate morphology, but also evolutionarily shaped their vocal signaling behaviors. I also tested other theories from the literature on both animal communication (e.g. the acoustic adaptation hypothesis) and human music (e.g. coalition signaling as well as group and pair bonding). I collected behavioral data, for as many species (n) as possible, from the primary primate behavioral literature, including vocalization (n=68), locomotion (n=99), and socio-ecological regression control variables. Data were then analyzed in three separate substantive chapters. First, in chapter 2, spectrographic vocalizations were scored manually along ethnomusicologically universal acoustic parameters and subsequently reduced into a univariate acoustic reappearance diversity index [ARDI], reflecting call elaborateness. Second, in chapter 3, quantitative locomotion activity data (e.g. leaping and swinging percentages) were harvested from the positional behavior primary literature in order to both estimate its ancestral influence on morphology as well as to create better (non-binary) predictor variables for testing vocal display origin theories. Third, in chapter 4, I tested for my hypothesized co-evolutionary relationship while controlling for phylogeny. ARDI was highest in smaller, socially monogamous, and forest living groups, as well as positively associated with swinging and leaping. These results are consistent with the dual hypothesis that both elaborate vocal displays and vision changes in primates could have evolved as a result of increased demand for precision limb landing locomotion. In chapter 5, I discuss the limitations and drawbacks as well as the theoretical significance, scientific relevance, broader implications, and ideas for future research.

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