

The role of trophic security and arboreal descent in the evolution of complex acoustic display

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ABSTRACT*

Animals create salient acoustic displays as a conflict avoidant way to secure mates or territory. Non-scentmarking anthropoids, for example, can use spectrally-rich signals to efficiently relay location, identity, condition, emotion, and intentions across distances separating callers. Arboreal primates, who are not usually the largest animals in a given geographic area, will signal from protected vantage points so as to not also attract terrestrial predators. Such a trophic security strategy can also involve natively protected increases in size or inter-substrate locomotion as added means of predator deterrence and avoidance. Recent work highlights acoustical associations with certain discontinuous forms of locomotion (e.g. leaping) in arboreal strategies that successfully avoid scent-stalking. I investigated sensory, habitat, morphological, ecological, and locomotor factors of primate life as driving complex acoustic display. While melodic display did associate with arboreal acrobatics, complex rhythmic display surprisingly appears more often in bipedally-capable terrestrial lineages (e.g. gorilla and some lemurs). This suggests that rhythmic complexity may emerge in exceptionally trophic-secure species with semi-vestigial limbs formerly used in more routine rhythmic locomotion. Thus, hindlimb-decoupled forelimb displays such as chest-beating in gorillas or dancing in humans could derive from a freeing-up of these accessory appendages, which support only occasional climbing, carrying, or tool use. In humans, the threat of weaponized forelimb tools may have further allowed for canine atrophy and extended terrestriality. Such stable grounding undoubtedly emboldened more aggressive hunting and audacious dancing practices in tandem with an evolution towards acoustic displays in larger groups with specialized singers and instrumental musicians.

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