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Abstract

Applying numbers to the three Fs: form, function, and phylogeny

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Blue monkey © Amanda Korstjens

Throughout the history of evolutionary thought, there has been an uncomfortable tension in morphology between those intent on exploring function and those with an interest in phylogeny. To many, the relationship between form and function is self-evident, and the relationship between form and phylogeny is obvious and tractable, but that between function and phylogeny is a philosophical nightmare. While some maintain that phylogeneticists should concentrate only on non-functional traits (however they may be defined), others argue that phylogeny can only be inferred from functional characteristics, as they are under the strictest control of natural selection. Even less straightforward is how quantitative traits should be treated, as most phylogeny reconstruction computer programs require that data be coded into discrete states for input, and the translation of quantitative data into codes is tantamount to violence in the eyes of many.

To explore these issues, a large dataset of cercopithecine primate postcranial measurements was analysed using a number of techniques, reflecting a wide range of approaches to the problem of function and phylogeny. The data demonstrate a number of issues, including sensitivity to dominant locomotor pattern, the effect of allometry on attempts to scale data to body size, and the relationship of functional features to phylogenetic relationships, which highlight the opportunities and difficulties in inferring function and phylogeny from form. While it may not be possible to 'solve' the function/phylogeny conundrum, this example demonstrates the utility of some approaches to the problem, and the failure of others.