Article Title: *Colony-specific caste allometry in a top Neotropical predator*

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Supplementary Information

SI. 1. Error Analysis

Pairwise comparisons of differences in centroid size reveals that the scale of measurement error on individuals (N = 91, μ = 6.29e-03, σ = 9.9e-03) is close to two orders of magnitude smaller than the scale of variation among individuals (N = 4095, μ = 0.49, σ = 0.38) (**Fig. S1**). For the evaluation of differences in shape due to error, the distribution of the partial Procrustes distance among two images of each of 91 specimens was compared to the distribution of the same sum for all pairwise comparisons of shape among those 91 individuals. Results for shape differences mirror the results for size differences (**Fig. S1**), with the scale of measurement error (N = 91, μ = 6.16e-04, σ = 5.53e-04) almost two orders of magnitude less than the scale of variation among individuals (N = 4095, μ = 1.57e-02, σ = 1.27e-02).

SI. 2. Measurement Conversion

A previous study found discrete gaps in the distribution of head width (HW) values among workers that were then used to define worker subcastes (Franks, 1985). In our study, the landmark configuration for the head was chosen so that the traditional linear measurements of head length (HL) and head width (HW) are easily calculated from the shape data (Table 1). Centroid size is strongly correlated with HW (Adjusted R^2: 0.9974) (**Fig. S4**) which, combined with a low residual standard error of 0.01546, describes a highly significant and predictive relationship ($p < 2e\text{-}16$; INT = -0.051; SLP = 0.644).We therefore converted the midpoints of the previously identified gaps in HW values (Franks, 1985) into corresponding values of CS (**Minors**: *CS < 2.05*; **Media**: *2.05 < CS < 2.82*; **Submajors**: *2.82 < CS < 3.51*; **Majors**: *CS > 3.51*), and searched for among-subcaste differences in size and allometry using our GM data.

SI. 3. Dynamic Comparisons

Dynamic comparisons of partial warp scores test whether two sample sets share the same pattern of allometric shape change relative to a reference form. Allometric trajectories are considered parallel in morphospace when shapes differ significantly at any given size, yet share the same pattern of allometric shape change as measured by dynamic comparisons. Dynamic comparisons between each subcaste and colony were performed using VecCompareMac7 (Sheets, 2000). For all comparisons landmark configurations were put into Procrustes superimposition with CoordGen7a, and then converted to sets of partial warp scores using PCAGenMac7a and a common reference form produced from the smallest individuals from Colony 1 (Sheets, 2000). For results see **Table 2**.

SI. 4. Static Comparisons

Static comparisons of shape differences test whether two groups of samples are significantly different in shape space. Static comparisons of caste and colony groups needed to be size-standardized due to the demonstrated allometry in the exploratory analyses. Standardized samples were then analyzed and compared using TwoGroup7, where all intercolonial differences were significant (Table 2). Static comparisons standardized to the same allometric curve showed

significant intercolonial shape differences for both the media subcaste (*Hotelling's* T^2: F = 2.29, dist = 0.0207, p = 0.0017; *Goodall's F-test*: F = 5.15, dist = 0.0112, p = 5.21e-15; *Bootstrapped F-test*: 900 bs, F = 5.15, dist = 0.0112, p = 0.0011) and the submajor subcaste (*Hotelling's* T^2: F = 3.32, dist = 0.0274, p = 0.00041; *Goodall's F-test*: F = 3.94, dist = 0.0127, p = 5.82e-10; *Bootstrapped F-test*: 900 bs, F = 3.94, dist = 0.0127, p = 0.0011). Size-standardized comparisons between subcastes from each colony were also performed, demonstrating much larger and statistically significant differences between subcastes in the same colony compared to the same subcaste across colonies (see Table 2).

Supplementary Figure and Figure Legends

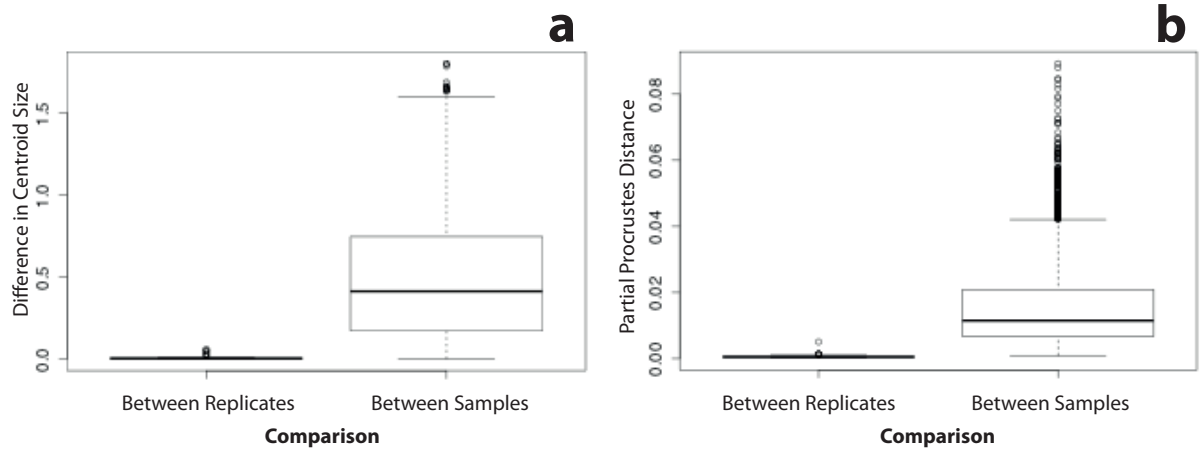

Fig. S1. The magnitude of measurement error relative to among-individual variation in head size (A) and head shape (B). In A, the left boxplot shows the difference in centroid size between landmark configurations digitized from two photographs of each of 91 specimens (μ = 6.29e-03, σ = 9.9e-03), while the right boxplot shows the difference in centroid size between specimens for the 4,095 pairwise comparisons of the same 91 specimens (μ = 0.49, σ = 0.38). In B, the left boxplot shows the difference in shape (measured as partial Procrustes distance) between landmark configurations digitized from two photographs of each of 91 specimens (N = 91, μ = 6.16e-04, σ = 5.53e-04), while the right boxplot shows the difference in shape between specimens for the 4,095 pairwise comparisons of the same 91 specimens (μ = 1.57e-02, σ = 1.27e-02).

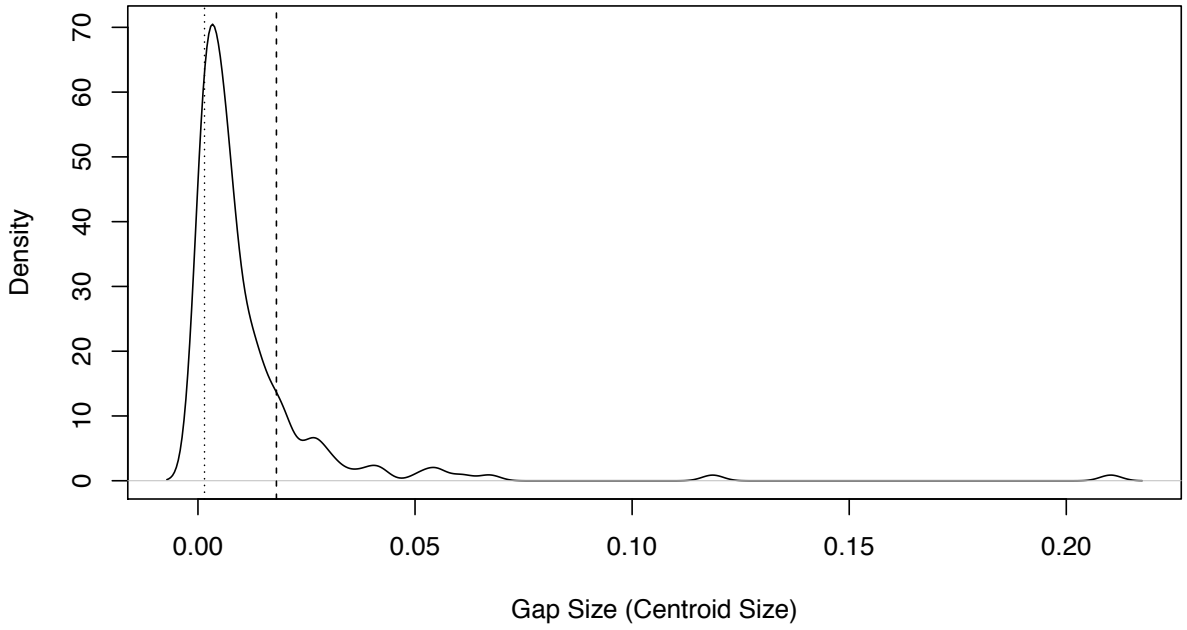

Fig. S2. Density distribution of the gaps between all rank-ordered centroid sizes. The dotted line indicates the gap size of the putative discontinuity between the minor and media subcastes (centroid size = 2.05), and the dashed line indicates the gap size of the putative discontinuity between the media and submajor subcastes (centroid size = 2.82), based on data by Franks (1985). Note that the gap is not significantly different from the other gaps in the dataset, and that 0.17 of the probability density is greater than the media-submajor putative discontinuity, and that 0.83 of the probability density is greater than the minor-media discontinuity, indicating that there are no marked breaks in size between the minor, media, and submajor subcastes.

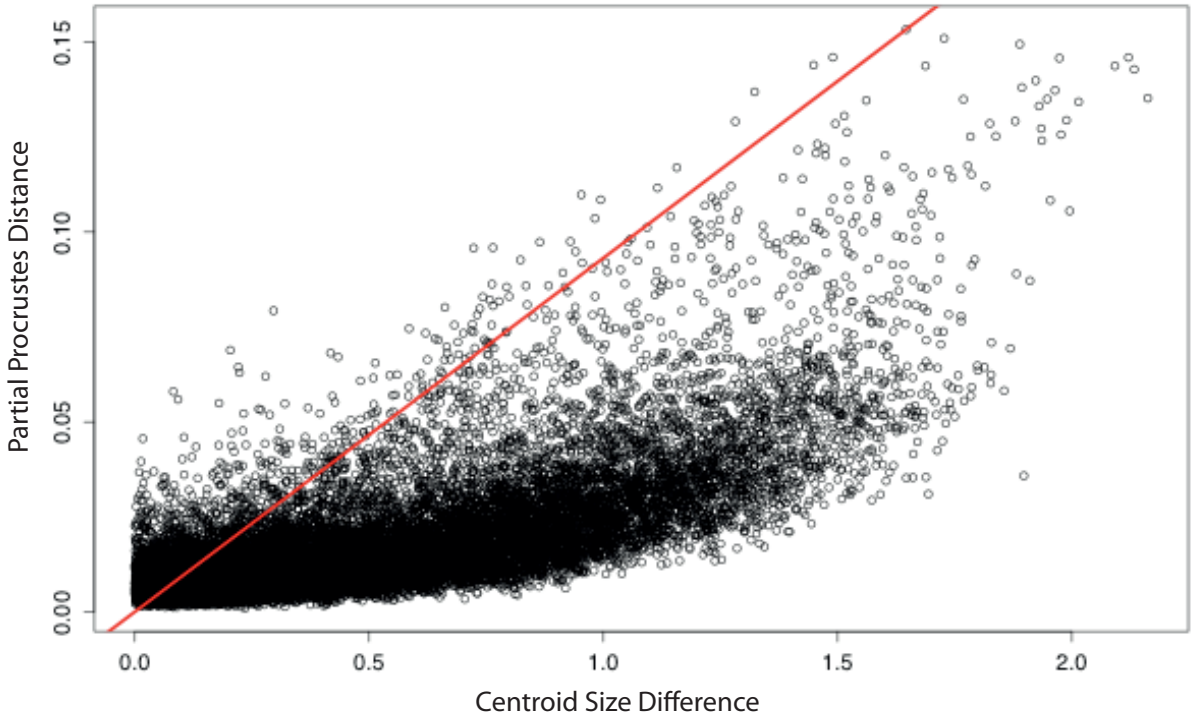

Fig. S3. Pairwise comparisons of shape and centroid size differences. Note that the upper left corner of the graph is empty, indicating that there are no large differences in shape between similarly-sized individuals (N = 17,776). Shape difference between specimens is measured as partial Procrustes distance (see text); size difference between specimens is the difference in their centroid size.

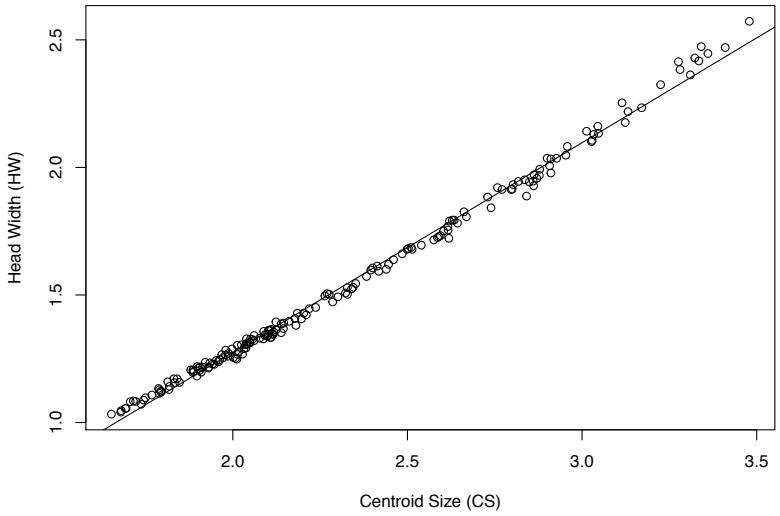

Fig. S4. Relationship between head width and centroid size. The two measures were highly correlated (Adjusted R^2: 0.9974) with a low residual standard error of 0.01546, although the relationship is slightly non-linear. All specimens used for shape analysis are included here, demonstrating the robustness of this relationship.