Seattle, August 4, 2022

Dear MorphMetters,

At the beginning of April I wrote you to announce that a new manuscript of mine, "Dimensions of Morphological Integration," was under review at the journal Evolutionary Biology and also was posted for your perusal on Research Square, the free preprint service associated with Springer journals. The gently revised version of this article accepted six weeks ago appeared just today on the journal's website as an Open Access offering. I commend it to your attention for several reasons, including the two new diagrams it demonstrates: the "spiderweb diagram," a version of the thin-plate spline grid using polar coordinates instead of Cartesian coordinates, and the "pseudoprocrustes plot," a novel application of the Procrustes algebra for comparing the Boas mean form to the Boas first principal component.

The paper's discussion of morphological integration is set as a major modification of the celebrated Olson and Miller (1958) approach in order to accommodate today's image-based computational GMM workflows. I'd be particularly interested in any thoughts you may have about two of the paper's core arguments: the demonstration that an excess of semilandmark count over landmark count seriously interferes with efforts to understand integration by any of the standard GMM tools, and the suggestion that evolutionary scientists avoid computing the statistic called V_rel (a formula based in the variance of the eigenvalues of a morphometric correlation matrix) whenever the data come in the form of 2D or 3D coordinates -- V_rel discards far too much potentially important information. I'm also suggesting that reports of GMM integration studies change their language, eschewing questions like "Is this data set integrated?" or "How integrated is this data set?" in favor of the much more subtle query "How is this data set integrated?" Finally, the paper reveals a hitherto-unnoticed failure of the thin-plate spline to correctly represent deformations incorporating directional substructures like sheets or arches for which thickness is a more salient quantification than position.

I'd welcome any comments you feel like posting (or sending to me privately) about these or any other aspects of my suggested reformulation of Olson and Miller for today's GMM integration studies. Whether you agree or disagree, either way, I hope you enjoy the paper.

Fred Bookstein

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