Religious Sacrifice in the Ice Age? On Ritual Finger Amputation as a Potential Explanation for the Gravettian Hand Images with Incomplete Fingers

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Over 200 hand images with incomplete fingers (HIIFs) have been found among Europe's Ice Age cave paintings. Currently, the significance of these images, which are associated with the Gravettian (27,000–22,000 BP), is unclear. Some authors have argued the individuals who produced the images had all their fingers and simply manipulated their hands so that certain finger segments were invisible. Others have argued the images were produced by individuals who had undergone finger amputation. In 2018 we reported a study designed to shed light on the possibility that the Gravettian HIIFs reflect amputation (McCauley et al. 2018). We identified 121 recent societies that practiced finger amputation and distinguished ten motivations for engaging in it, nine of which did not involve a medical goal. We concluded that the hypothesis that best fits the Gravettian HIIFs is that they were produced by individuals who underwent amputation in religious rituals. Here, we do three things. First, we demonstrate that the main criticisms of our 2018 paper do not hold water. Next, we summarize the results of work we have carried out on this topic in the last few years. Most importantly, this work shows that amputation of fingers from living people for cultural reasons was even more common in the recent past than our 2018 survey indicated. It also shows that there is other evidence of finger amputation associated with the Gravettian. The third thing we do in this paper is discuss some implications of the Ritual Amputation Hypothesis. For example, we suggest it is worth considering whether finger amputation and other 'dysphoric rituals' might help explain not only the ability of Upper Paleolithic groups to outcompete non-modern hominins like the Neanderthals but also the emergence of the ethnolinguistic groups that appear to be reflected in the personal ornaments of the European Upper Paleolithic.

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Form or Shape? How Data Standardization Affects Results of Quantitative Genetic Analyses of the Primate Appendicular Skeleton

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3D landmarking is increasingly used to collect morphometric data for use in studies of human and non-human primate evolution. Such data are typically size standardized via Generalized Procrustes Analysis (GPA) to isolate shape for analysis; however, many anthropological studies incorporating evolutionary quantitative genetic methods instead use logarithmic transformation. This does not isometrically scale data, resulting in variables describing form (shape plus size). As shape and size vary even in closely related primate groups, analyses of form alone may confound our understanding of how shape alone evolves, and how shape and size covary. This is particularly pertinent to studies of hominins, a taxonomic group with apparent mosaic evolution and variable body size. Here, we compare the results of quantitative genetic analyses assessing evolutionary patterns affecting shape, size, and form by applying different methods of data standardization to the same dataset. Three datasets of 40 interlandmark distances on eight elements from the appendicular skeleton of six catarrhine genera were generated using different methods of standardization: log-transformation (form data), isometric scaling (shape data), and isometric scaling with element centroid sizes included as separate variables (shape and size data). Results of all analyses indicated the branch leading to *Homo* evolved under directional selection. Analyses of both form data and shape and size data indicated the branch to *Hylobates* was evolving under directional selection, while that of shape and size data indicated that the branch to *Pan* was evolving under directional selection. These results indicate that size may be a confounding factor in the evolution of shape. When using such methods to analyze evolutionary patterns in primates, analyses of shape and size as well as form may provide a more nuanced understanding of how shape has evolved over time while still allowing the constraining effects of evolutionary changes in size to be accounted for.

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