

ORIGINAL RESEARCH ARTICLE

A potential biological correlate of *design intent* for Gary dart points from the American Southeast?

Robert Z. Selden, Jr.^a, John E. Dockall^b

^aHeritage Research Center, Stephen F. Austin State University; Department of Biology, Stephen F. Austin State University; Cultural Heritage Department, Jean Monnet University;

^bCox|McClain Environmental Consultants, Inc.

ARTICLE HISTORY

Compiled October 25, 2021

ABSTRACT

Abstract here.

KEYWORDS

archaeoinformatics; geometric morphometrics; museum studies; digital humanities; mental model

1. Introduction

Introduction here.

Acknowledgments

We extend our gratitude to the Caddo Nation of Oklahoma, the Williamson Museum at Northwestern State University, the Louisiana State Exhibit Museum, the Texas Archeological Research Laboratory at The University of Texas at Austin, the Brazos Valley Museum of Natural History, the Texas Parks and Wildlife Department, and the Sam Noble Oklahoma Museum of Natural Science for the requisite permissions and access needed to generate 3D scans of the Gahagan bifaces. Thanks to Harry J. Shafer, Hiram F. (Pete) Gregory, Christian S. Hoggard, and David K. Thulman for their comments on the analyses of Gahagan biface shape.

RZS extends his gratitude to Christian S. Hoggard and David K. Thulman for their thoughtful comments and constructive criticisms of the landmarking protocol used in this study (LM3d1), as well as the landmarking protocol for Gahagan bifaces that will be used in the next iteration of these analytical efforts (LM3d2); to Martin Hinz for fielding questions related to the `oxcAAR` package and Derek Hamilton for his guidance with the chronological models; and to Dean C. Adams, Michael L. Collyer, Emma Sherratt, Lauren Butaric, and Kersten Bergstrom for their constructive criticisms, general comments, and suggestions throughout the development of this research program.

CONTACT Robert Z. Selden, Jr.. Email: zselden@sfasu.edu, John E. Dockall. Email: johnd@coxmcclain.com

Funding

Components of this analytical work flow were developed and funded by a Preservation Technology and Training grant (P14AP00138) to RZS from the National Center for Preservation Technology and Training (NCPTT), and additional grants to RZS from the Caddo Tribe of Oklahoma, National Forests and Grasslands in Texas (15-PA-11081300-033) and the United States Forest Service (20-PA-11081300-074). Funding to scan the Gahagan bifaces at the Williamson Museum at Northwestern State University, Louisiana State Exhibit Museum, Texas Archeological Research Laboratory at The University of Texas at Austin, and Sam Noble Oklahoma Museum of Natural Science was provided to the RZS by the Heritage Research Center at Stephen F. Austin State University.

Data management

The analysis code associated with this project can be accessed through this document or the GitHub repository, which is digitally curated on the Open Science Framework DOI: 10.17605/OSF.IO/Y7B39. The reproducible nature of this undertaking provides a means for others to critically assess and evaluate the various analytical components (Gray and Marwick 2019; Peng 2011; Gandrud 2014), which is a necessary requirement for the production of reliable knowledge.

Reproducibility projects in psychology and cancer biology are impacting current research practices across all domains. Examples of reproducible research are becoming more abundant in archaeology (Marwick 2016; Ivanovaite et al. 2019; Selden Jr., Dockall, and Shafer 2018; Selden Jr., Dockall, and Dubied 2020; Selden Jr et al. 2021), and the next generation of archaeologists are learning those tools and methods needed to reproduce and/or replicate research results (Marwick et al. 2019). Reproducible and replicable research work flows are often employed at the highest levels of humanities-based inquiries to mitigate concern or doubt regarding proper execution, and is of particular import should the results have—explicitly or implicitly—a major impact on scientific progress (Peels and Bouter 2018).

References

- Gandrud, Christopher. 2014. *Reproducible Research with R and RStudio*. The R Series. London: CRC Press.
- Gray, Charles T., and Ben Marwick. 2019. *Truth, Proof, and Reproducibility: There's No Counter-Attack for the Codeless*, book section Chapter 8, 111–129. Communications in Computer and Information Science.
- Ivanovaite, Livija, Kamil Serwatka, Christian Steven Hoggard, Florian Sauer, and Felix Riede. 2019. "All these Fantastic Cultures? Research History and Regionalization in the Late Palaeolithic Tanged Point Cultures of Eastern Europe." *European Journal of Archaeology* 23 (2): 162–185.
- Marwick, Ben. 2016. "Computational Reproducibility in Archaeological Research: Basic Principles and a Case Study of Their Implementation." *Journal of Archaeological Method and Theory* 24 (2): 424–450.
- Marwick, Ben, Li-Ying Wang, Ryan Robinson, and Hope Loiselle. 2019. "How to Use Replication Assignments for Teaching Integrity in Empirical Archaeology." *Advances in Archaeological Practice* 8 (1): 78–86.

- Peels, R., and L. Bouter. 2018. "Humanities need a replication drive too." *Nature* 558 (7710): 372. <https://www.ncbi.nlm.nih.gov/pubmed/29921855>.
- Peng, Roger D. 2011. "Reproducible Research in Computational Science." *Science* 334 (6060): 1226–7. <https://www.ncbi.nlm.nih.gov/pubmed/22144613>.
- Selden Jr, Robert Z., John E. Dockall, C. Britt Bousman, and Timothy K. Perttula. 2021. "Shape as a function of time + raw material + burial context? An exploratory analysis of Perdiz arrow points from the ancestral Caddo area of the American Southeast." *Journal of Archaeological Science: Reports* 37: 102916. <https://www.sciencedirect.com/science/article/pii/S2352409X21001280>.
- Selden Jr., Robert Z., John E. Dockall, and Morgane Dubied. 2020. "A quantitative assessment of intraspecific morphological variation in Gahagan bifaces from the southern Caddo area and central Texas." *Southeastern Archaeology* 39 (2): 125–145. <https://www.tandfonline.com/doi/full/10.1080/0734578X.2020.1744416>.
- Selden Jr., Robert Z., John E. Dockall, and Harry J. Shafer. 2018. "Lithic Morphological Organisation: Gahagan Bifaces from the Southern Caddo Area." *Digital Applications in Archaeology and Cultural Heritage* 10: e00080. <https://www.sciencedirect.com/science/article/abs/pii/S2212054818300183>.