ORIGINAL RESEARCH ARTICLE

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

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ABSTRACT
Abstract here.

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1. Introduction

The majority of dart point types recovered from archaeological sites in the American Southeast—to include Gary dart points—have been identified on the basis of shape attributes (Suhm, Krieger, and Jelks 1954; Suhm 1962); the defining characteristic of a morphological type (O'Brien and Lyman 1999).

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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.

O'Brien, Michael J., and R. Lee Lyman. 1999. *Seriation, Stratigraphy, and Index Fossils: The Backbone of Archaeological Dating*. New York: Kluwer Academic/Plenum Publishers.

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.

Suhm, Dee Ann. 1962. "Handbook of Texas Archeology: Type Descriptions. A Cumulative Compendium of Type Descriptions." *The Texas Memorial Museum Bulletin* 4: 1–297.

Suhm, Dee Ann, Alex D. Krieger, and Edward B. Jelks. 1954. "An Introductory Handbook of Texas Archeology." *Bulletin of the Texas Archeological Society* 25: 1–562.