Robert C. Dunnell’s Systematics in Prehistory at 50

Felix Riede1,✉, and Yourfirstname Yourlastname2

26 June, 2021

2021 marks the fiftieth anniversary of the publication of Robert C. Dunnell’s (1971) diminutive yet dense Systematics in Prehistory. At the height of the debate between Culture History and New Archaeology, Dunnell’s work sought to address a more fundamental issue that was and still is relevant to all branches of prehistoric archaeology, and especially to the study of the Paleolithic: systematics. Dunnell himself was notorious and controversial, however, but the importance of his work remains underappreciated. Like other precocious works of that tumultuous time Systematics in Prehistory today remains absent from most course reading lists and gathers dust on library shelves. In this contribution we argue for a greater appreciation of its as yet unfulfilled conceptual and analytical promise. In particular, we briefly chart its somewhat delayed impact via evolutionary archaeology, including how it has also influenced non-Anglophone traditions, especially in South America. The obstinate persistence of classification issues in paleoanthropology and Paleolithic archaeology, we argue, warrants a second look at Dunnell’s Systematics.

1 Department of Archaeology and Heritage Studies, Aarhus University, Moesgård Allé 20, 8270 Højbjerg, Denmark  
2 University of Another Place

✉ Correspondence: [Felix Riede <[f.riede@cas.au.dk](mailto:f.riede@cas.au.dk)>](mailto:f.riede@cas.au.dk)

Keywords: Systematics; Evolutionary archaeology; Cultural phylogenetics; Robert C. Dunnell

Highlights: These are the highlights.

## 1 INTRODUCTION

The notion of major paradigm shifts in the history of archaeology is characterized by a great deal of hyperbole and rhetorical maneuvering. That said, the late 1960s and 1970s really do stand out as rather revolutionary. In the US, the Binfordian steamroller increasingly hammered away at its culture-historical nemesis, while in the UK, David Clarke’s formidable *Analytical Archaeology* was shaking up the establishment with novel concepts, novel methods and an incisive rhetoric (Clarke, 1968). The reception and impact of these works has seen a great deal of attention in later years, especially as many researchers are rediscovering the merits of Clarke’s approach in particular (Lycett and Shennan, 2018; Nicholas, 2012). The year 2021 marks the fiftieth anniversary of the publication of Robert C. Dunnell’s (1971) diminutive yet dense *Systematics in Prehistory*, a volume that is concerned with nothing but classification in archaeology. Published at the height of the debate between Culture History and New Archaeology, Dunnell’s work was no less iconoclastic than that of Binford or Clarke, but it was considerably narrower in its endeavor to address a more fundamental issue that was and still is relevant to all branches of prehistoric archaeology, and especially to the study of the Paleolithic: systematics.

Dunnell himself was notorious and controversial, and his *Systematics* was received with mixed reactions by his contemporaries who commented - mostly negatively - both on his style of writing and the book’s content (Bayard, 1973; Shenkel, 1973; Spaulding, 1974; Tuggle, 1974). Like other precocious works of that tumultuous time *Systematics in Prehistory* today remains absent from most course reading lists and gathers dust on library shelves. As Lyman has recently shown, systematics takes up little space in contemporary archaeological research or teaching (Lyman, 2021). If at least some of the success of Clarke and Binford can be attributed to them boldly tackling exciting and large-scale topics such as migration and adaptation using then avant-garde terminology, then the corresponding obscurity [figure of citation frequency here?] of Dunnell’s *Systematics* can perhaps be attributed to him focusing on an issue that simply seemed too uninteresting. Yet, Dunnell was correct in his axiomatic insistence that rigorous classification comes before any other analysis or interpretation. Without consistent and explicit classification, any scientific discipline will inevitably fail to produce cumulative insights.

## 2 SYSTEMATICS IN PREHISTORY AND THE EMERGENCE OF EVOLUTIONARY ARCHAEOLOGY

For Dunnell himself, the soul-searching that began with writing *Systematics in Prehistory* led him to discover evolutionary theory. In a series of follow-up papers, he forcefully argued for the benefits of a scientific and Darwinian archaeology (Dunnell, 1982, 1980). While not making him many friends, these writings have since become foundational for the development of evolutionary archaeology, especially in the Americas (O’Brien, 1996). Initially, following the direct lead of Dunnell, this approach was rather narrowly selectionist - treating artefacts as the hard parts of the human phenotype and selection acting on these as the main driver of change (O’Brien and Holland, 1990) - but which since has become more fully aligned with cultural evolutionary thinking in the form of dual-inheritance and niche construction theory (Marwick, 2006; Riede, 2019). Vitally, cultural evolutionary theory and its focus on the transmission of cultural knowledge via various modes of learning has provided the generative mechanism for material culture systematics. In its contemporary form, selection, but also drift and a range of transmission biases, play important roles in explaining culture change.

While Dunnell worked exclusively on the Holocene prehistory of the Americas, the idiosyncrasies of archaeological classification are nowhere more apparent and acute than in the archaeology of human evolutionary history. Rooted in French antiquarianism, the development of Paleolithic systematics has been likened to ‘accidents of history’ (Clark, 2009), and there are few periods or regions of the Paleolithic that have not seen debate about the validity or otherwise of their analytical units (Reynolds and Riede, 2019). The use of, more often than not, older typological classifications remains prevalent, despite clear and repeated critiques (e.g. Bisson, 2000). More recently, the analysis of technological traits has supplemented or even eclipsed purely typological approaches. However, theoretical explications of the generative mechanisms, and rigorous comparative systematics backed by transparent and replicable analytics as demanded by Dunnell, remain exceptions rather than the rule (Tostevin, 2013). Today, a great deal attention is being paid to systematics in prehistory, and as Barton and Clark (2021) have pointed out, the continuing adherence to outmoded classifications is preventing the exploration of more relevant and pressing research questions . Several researchers are tackling classificatory issues with novel and mostly quantitative means (Grove and Blinkhorn, 2021; Ivanovaitė et al., 2020; Leplongeon et al., 2020). At the same time, however, it appears that the topic remains poorly heeded in archaeological teaching (Lyman, 2021). Given that cultural evolutionary theory itself teaches us that aspects of culture most easily and rapidly change when scaffolded through active teaching (Riede et al., 2021), we suggest that, after half a century, Dunnell’s *Systematics in Prehistory* - and with it rigorous and replicable ways of classifying material culture - are placed more abundantly on our curricula, in addition to continuing the ongoing critique and transformation of existing classifications through novel research. Only when the construction and meaning of our analytical units and their relationships among one another are transparent, and robust cultural taxonomies are in place can we seriously hope to understand the patterns and processes that have shaped cultural evolution in deep history.

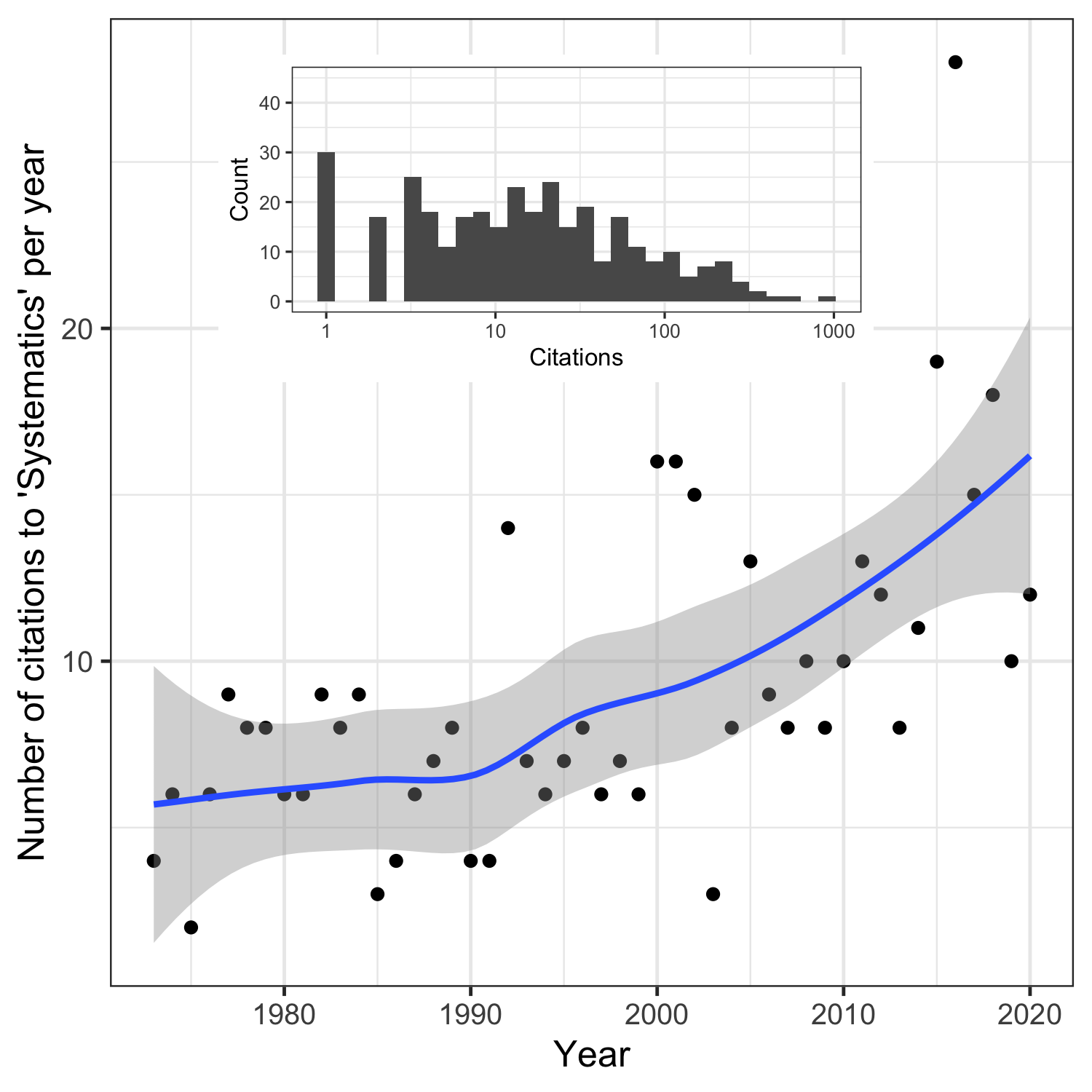


Figure 1: Citations to ‘Systematics’ over time. Inset shows distributions of citations to works citing ‘Systematics.’ Data collected from Google Scholar on October 2020

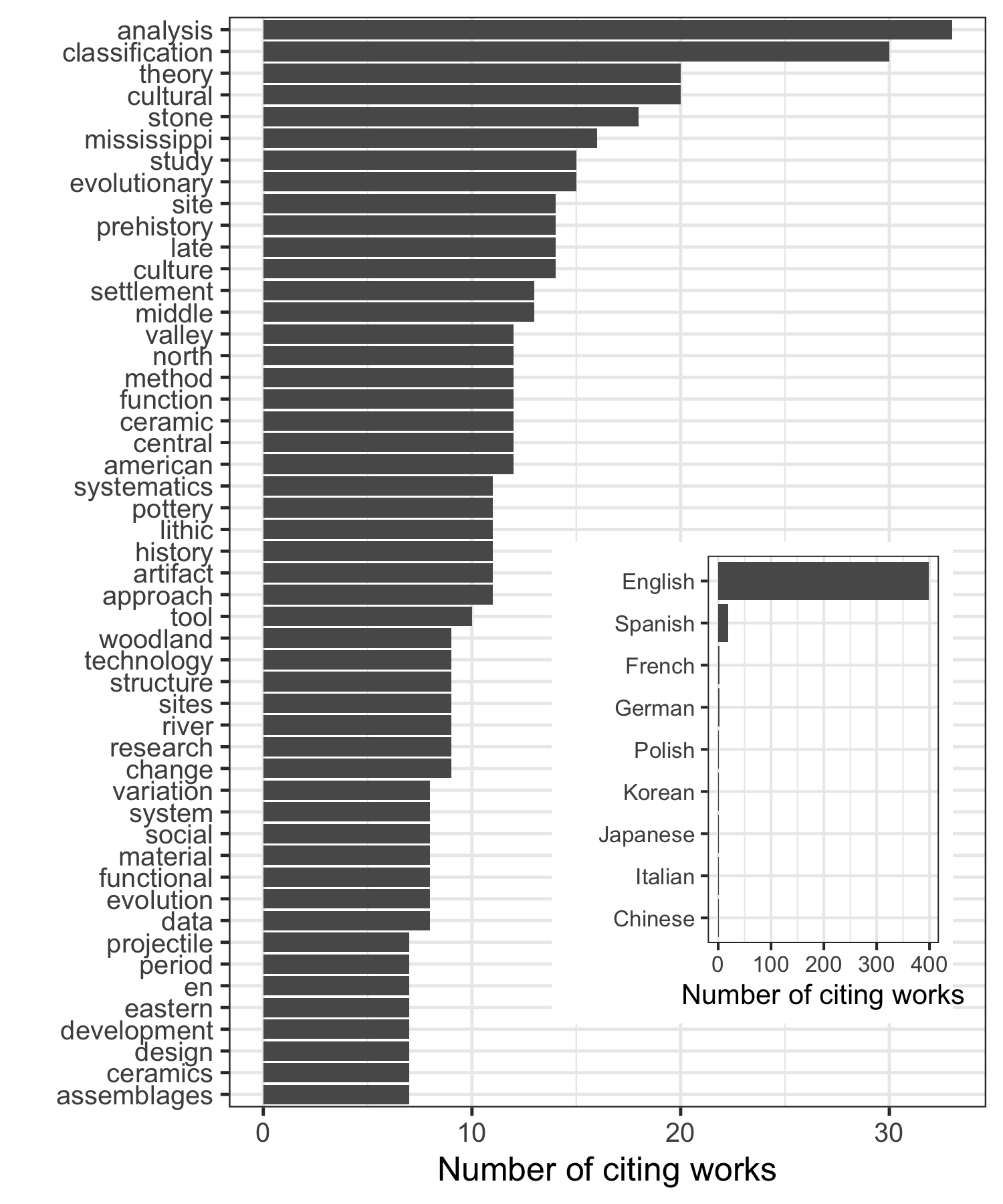


Figure 2: Keywords in titles of works citing ‘Systematics.’ Inset shows languages of works citing ‘Systematics.’ Data collected from Google Scholar on October 2020

# Acknowledgements

# References

Barton, C.M., Clark, G.A., 2021. From artifacts to cultures: Technology, society, and knowledge in the upper paleolithic. Journal of Paleolithic Archaeology 4, 16. <https://doi.org/10.1007/s41982-021-00091-8>

Bayard, D.T., 1973. ’Prehistory: A systematic science?’: A review of robert c. Dunnell’s "systematics in prehistory" (book review). Mankind 9, 39.

Bisson, M.S., 2000. Nineteenth century tools for twenty-first century archaeology? Why the middle paleolithic typology of françois bordes must be replaced. Journal of Archaeological Method and Theory 7, 1–48. https://doi.org/<http://dx.doi.org/10.1023/A:1009578011590>

Clark, G.A., 2009. Accidents of history: Conceptual frameworks in paleoarchaeology, in: Camps, M., Chauhan, P. (Eds.),. Springer New York, New York, NY, pp. 19–41.

Clarke, D.L., 1968. Analytical archaeology. Methuen & Co., London.

Dunnell, R.C., 1982. Science, social science, and common sense: The agonizing dilemma of modern archaeology. Journal of Anthropological Research 38, 1–25.

Dunnell, R.C., 1980. Evolutionary theory in archaeology. Advances in Archaeological Method and Theory 3, 35–99.

Dunnell, R.C., 1971. Systematics in prehistory. The Free Press, New York.

Grove, M., Blinkhorn, J., 2021. Testing the integrity of the middle and later stone age cultural taxonomic division in eastern africa. Journal of Paleolithic Archaeology 4, 14. <https://doi.org/10.1007/s41982-021-00087-4>

Ivanovaitė, L., Serwatka, K., Hoggard, C.S., Sauer, F., Riede, F., 2020. All these fantastic cultures? Research history and regionalization in the late palaeolithic tanged point cultures of eastern europe. European Journal of Archaeology 23, 162–185. <https://doi.org/10.1017/eaa.2019.59>

Leplongeon, A., Ménard, C., Bonhomme, V., Bortolini, E., 2020. Backed pieces and their variability in the later stone age of the horn of africa. African Archaeological Review 37, 437–468. <https://doi.org/10.1007/s10437-020-09401-x>

Lycett, S.J., Shennan, S.J., 2018. David clarke’s analytical archaeology at 50. World Archaeology 50, 210–220. <https://doi.org/10.1080/00438243.2018.1470561>

Lyman, R.L., 2021. On the importance of systematics to archaeological research: The covariation of typological diversity and morphological disparity. Journal of Paleolithic Archaeology 4, 3. <https://doi.org/10.1007/s41982-021-00077-6>

Marwick, B., 2006. What can archaeology do with boyd and richerson’s cultural evolutionary program? The Review of Archaeology 26, 30–40.

Nicholas, G.P., 2012. “Making us uneasy”: Clarke, wobst, and their critique of archaeology put into practice. Archaeologies 8, 209–224. <https://doi.org/10.1007/s11759-012-9204-1>

O’Brien, M.J., 1996. The historical development of an evolutionary archaeology, in: Maschner, H.D.G. (Ed.),. Springer US, Boston, MA, pp. 17–32. <https://doi.org/10.1007/978-1-4757-9945-3_2>

O’Brien, M.J., Holland, T.D., 1990. Variation, selection, and the archaeological record, in: Schiffer, M.B. (Ed.),. University of Arizona Press, Tucson, AZ, pp. 31–79.

Reynolds, N., Riede, F., 2019. House of cards: cultural taxonomy and the study of the European Upper Palaeolithic. Antiquity 93, 1350–1358. <https://doi.org/10.15184/aqy.2019.49>

Riede, F., 2019. Niche construction theory and human biocultural evolution, in: Prentiss, A.M. (Ed.),. Springer International Publishing, Cham, pp. 337–358. <https://doi.org/10.1007/978-3-030-11117-5_17>

Riede, F., Walsh, M.J., Nowell, A., Langley, M.C., Johannsen, N.N., 2021. Children and innovation: Play, play objects and object play in cultural evolution. Evolutionary Human Sciences 3. <https://doi.org/10.1017/ehs.2021.7>

Shenkel, J.R., 1973. Archeology: Systematics in prehistory. ROBERT c. DUNNELL. American Anthropologist 75, 505–506. https://doi.org/<https://doi.org/10.1525/aa.1973.75.2.02a01030>

Spaulding, A.C., 1974. Review: Systematics in prehistory by robert c. dunnell. American Antiquity 39, 513516.

Tostevin, G.B., 2013. Seeing lithics: a middle-range theory for testing for cultural transmission in the Pleistocene, American school of prehistoric research monograph series. Oxbow Books, Oxford.

Tuggle, H.D., 1974. Plains Anthropologist 19, 7678.

### Colophon

This report was generated on 2021-06-26 10:19:33 using the following computational environment and dependencies:

#> ─ Session info ───────────────────────────────────────────────────────────────  
#> setting value   
#> version R version 4.0.5 (2021-03-31)  
#> os macOS Catalina 10.15.7   
#> system x86\_64, darwin17.0   
#> ui X11   
#> language (EN)   
#> collate en\_US.UTF-8   
#> ctype en\_US.UTF-8   
#> tz America/Los\_Angeles   
#> date 2021-06-26   
#>   
#> ─ Packages ───────────────────────────────────────────────────────────────────  
#> ! package \* version date lib source   
#> P assertthat 0.2.1 2019-03-21 [?] CRAN (R 4.0.0)  
#> P backports 1.2.1 2020-12-09 [?] CRAN (R 4.0.2)  
#> P bookdown 0.22 2021-04-22 [?] CRAN (R 4.0.2)  
#> P broom 0.7.6 2021-04-05 [?] CRAN (R 4.0.2)  
#> P cachem 1.0.5 2021-05-15 [?] CRAN (R 4.0.2)  
#> P callr 3.7.0 2021-04-20 [?] CRAN (R 4.0.2)  
#> P cellranger 1.1.0 2016-07-27 [?] CRAN (R 4.0.0)  
#> P cld2 \* 1.2.1 2020-12-15 [?] CRAN (R 4.0.2)  
#> P cli 2.5.0 2021-04-26 [?] CRAN (R 4.0.2)  
#> P colorspace 2.0-1 2021-05-04 [?] CRAN (R 4.0.2)  
#> P cowplot \* 1.1.1 2020-12-30 [?] CRAN (R 4.0.2)  
#> P crayon 1.4.1 2021-02-08 [?] CRAN (R 4.0.2)  
#> P DBI 1.1.1 2021-01-15 [?] CRAN (R 4.0.2)  
#> P dbplyr 2.1.1 2021-04-06 [?] CRAN (R 4.0.2)  
#> P desc 1.3.0 2021-03-05 [?] CRAN (R 4.0.2)  
#> P devtools 2.4.1 2021-05-05 [?] CRAN (R 4.0.4)  
#> P digest 0.6.27 2020-10-24 [?] CRAN (R 4.0.2)  
#> P dplyr \* 1.0.6 2021-05-05 [?] CRAN (R 4.0.4)  
#> P ellipsis 0.3.2 2021-04-29 [?] CRAN (R 4.0.2)  
#> P evaluate 0.14 2019-05-28 [?] CRAN (R 4.0.0)  
#> P fansi 0.5.0 2021-05-25 [?] CRAN (R 4.0.2)  
#> P farver 2.1.0 2021-02-28 [?] CRAN (R 4.0.2)  
#> P fastmap 1.1.0 2021-01-25 [?] CRAN (R 4.0.2)  
#> P forcats \* 0.5.1 2021-01-27 [?] CRAN (R 4.0.2)  
#> P fs 1.5.0 2020-07-31 [?] CRAN (R 4.0.2)  
#> P generics 0.1.0 2020-10-31 [?] CRAN (R 4.0.2)  
#> P ggplot2 \* 3.3.3 2020-12-30 [?] CRAN (R 4.0.2)  
#> P ggpmisc \* 0.3.9 2021-04-04 [?] CRAN (R 4.0.2)  
#> P glue 1.4.2 2020-08-27 [?] CRAN (R 4.0.2)  
#> P gtable 0.3.0 2019-03-25 [?] CRAN (R 4.0.0)  
#> P haven 2.4.1 2021-04-23 [?] CRAN (R 4.0.2)  
#> P here 1.0.1 2020-12-13 [?] CRAN (R 4.0.2)  
#> P highr 0.9 2021-04-16 [?] CRAN (R 4.0.2)  
#> P hms 1.1.0 2021-05-17 [?] CRAN (R 4.0.2)  
#> P htmltools 0.5.1.1 2021-01-22 [?] CRAN (R 4.0.2)  
#> P httr 1.4.2 2020-07-20 [?] CRAN (R 4.0.2)  
#> P janeaustenr 0.1.5 2017-06-10 [?] CRAN (R 4.0.0)  
#> P jsonlite 1.7.2 2020-12-09 [?] CRAN (R 4.0.2)  
#> P knitr 1.33 2021-04-24 [?] CRAN (R 4.0.2)  
#> P labeling 0.4.2 2020-10-20 [?] CRAN (R 4.0.2)  
#> P lattice 0.20-44 2021-05-02 [?] CRAN (R 4.0.2)  
#> P lifecycle 1.0.0 2021-02-15 [?] CRAN (R 4.0.2)  
#> P lubridate 1.7.10 2021-02-26 [?] CRAN (R 4.0.2)  
#> P magrittr 2.0.1 2020-11-17 [?] CRAN (R 4.0.2)  
#> P Matrix 1.3-3 2021-05-04 [?] CRAN (R 4.0.2)  
#> P memoise 2.0.0 2021-01-26 [?] CRAN (R 4.0.2)  
#> P mgcv 1.8-35 2021-04-18 [?] CRAN (R 4.0.2)  
#> P modelr 0.1.8 2020-05-19 [?] CRAN (R 4.0.0)  
#> P munsell 0.5.0 2018-06-12 [?] CRAN (R 4.0.0)  
#> P nlme 3.1-152 2021-02-04 [?] CRAN (R 4.0.5)  
#> P pillar 1.6.1 2021-05-16 [?] CRAN (R 4.0.2)  
#> P pkgbuild 1.2.0 2020-12-15 [?] CRAN (R 4.0.2)  
#> P pkgconfig 2.0.3 2019-09-22 [?] CRAN (R 4.0.0)  
#> P pkgload 1.2.1 2021-04-06 [?] CRAN (R 4.0.2)  
#> P prettyunits 1.1.1 2020-01-24 [?] CRAN (R 4.0.0)  
#> P processx 3.5.2 2021-04-30 [?] CRAN (R 4.0.2)  
#> P ps 1.6.0 2021-02-28 [?] CRAN (R 4.0.2)  
#> P purrr \* 0.3.4 2020-04-17 [?] CRAN (R 4.0.0)  
#> P R6 2.5.0 2020-10-28 [?] CRAN (R 4.0.2)  
#> P Rcpp 1.0.6 2021-01-15 [?] CRAN (R 4.0.2)  
#> P readr \* 1.4.0 2020-10-05 [?] CRAN (R 4.0.2)  
#> P readxl 1.3.1 2019-03-13 [?] CRAN (R 4.0.0)  
#> remotes 2.4.0 2021-06-02 [1] CRAN (R 4.0.2)  
#> P reprex 2.0.0 2021-04-02 [?] CRAN (R 4.0.2)  
#> P rlang 0.4.11 2021-04-30 [?] CRAN (R 4.0.2)  
#> P rmarkdown 2.8 2021-05-07 [?] CRAN (R 4.0.4)  
#> P rprojroot 2.0.2 2020-11-15 [?] CRAN (R 4.0.2)  
#> P rstudioapi 0.13 2020-11-12 [?] CRAN (R 4.0.2)  
#> P rvest \* 1.0.0 2021-03-09 [?] CRAN (R 4.0.2)  
#> P scales 1.1.1 2020-05-11 [?] CRAN (R 4.0.0)  
#> P selectr 0.4-2 2019-11-20 [?] CRAN (R 4.0.0)  
#> P sessioninfo 1.1.1 2018-11-05 [?] CRAN (R 4.0.0)  
#> P SnowballC 0.7.0 2020-04-01 [?] CRAN (R 4.0.0)  
#> P stringi 1.6.2 2021-05-17 [?] CRAN (R 4.0.2)  
#> P stringr \* 1.4.0 2019-02-10 [?] CRAN (R 4.0.0)  
#> P testthat 3.0.2 2021-02-14 [?] CRAN (R 4.0.2)  
#> P tibble \* 3.1.2 2021-05-16 [?] CRAN (R 4.0.2)  
#> P tidyr \* 1.1.3 2021-03-03 [?] CRAN (R 4.0.2)  
#> P tidyselect 1.1.1 2021-04-30 [?] CRAN (R 4.0.2)  
#> P tidytext \* 0.3.1 2021-04-10 [?] CRAN (R 4.0.2)  
#> P tidyverse \* 1.3.1 2021-04-15 [?] CRAN (R 4.0.2)  
#> P tokenizers 0.2.1 2018-03-29 [?] CRAN (R 4.0.0)  
#> P usethis 2.0.1 2021-02-10 [?] CRAN (R 4.0.2)  
#> P utf8 1.2.1 2021-03-12 [?] CRAN (R 4.0.2)  
#> P vctrs 0.3.8 2021-04-29 [?] CRAN (R 4.0.2)  
#> P withr 2.4.2 2021-04-18 [?] CRAN (R 4.0.2)  
#> P xfun 0.23 2021-05-15 [?] CRAN (R 4.0.2)  
#> P xml2 1.3.2 2020-04-23 [?] CRAN (R 4.0.0)  
#> P yaml 2.2.1 2020-02-01 [?] CRAN (R 4.0.0)  
#>   
#> [1] /Users/bmarwick/Desktop/systematicsinprehistory/renv/library/R-4.0/x86\_64-apple-darwin17.0  
#> [2] /private/var/folders/mz/6nn330m17\_37ck5hhz2p24100000gn/T/RtmpVf7BwC/renv-system-library  
#> [3] /Library/Frameworks/R.framework/Versions/4.0/Resources/library  
#>   
#> P ── Loaded and on-disk path mismatch.

The current Git commit details are:

#> Local: master /Users/bmarwick/Desktop/systematicsinprehistory  
#> Remote: master @ origin (git@github.com:benmarwick/systematicsinprehistory.git)  
#> Head: [cbcaf2a] 2021-06-07: Damn, just spotted a typo