Beyond the binary: Inferential challenges and solutions in cognitive archaeology

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Abstract

We welcome Stibbard-Hawkes's empirical contributions and discussion of interpretive challenges for archaeology, but question some of his characterizations and conclusions. Moving beyond critique, it is time to develop new research methods that eschew simplistic modern/premodern binaries. We advocate an inductive, probabilistic approach using multiple lines of evidence to infer the causes and consequences of behavioral variability across time and space.

> "*'Modern' is thus doubly asymmetrical: it designates a break in the regular passage of time, and it designates a combat in which there are victors and vanquished. If so many of our contemporaries are reluctant to use this adjective today, if we qualify it with prepositions, it is because we feel less confident in our ability to maintain that double asymmetry: we can no longer point to time's irreversible arrow, nor can we award a prize to the winners*" (Latour, 1993: 10)

We applaud Stibbard-Hawkes's cutting-edge analysis of data from three African foraging communities and his consideration of its implications for archaeology. Nonetheless, we are concerned that his broader critique employs straw-man arguments that misrepresent the state of the field. In particular, Stibbard-Hawkes's analysis of logical errors in cognitive archaeology (Section 4) and subsequent discussion downplays widespread critiques of the "behavioral modernity" construct over the past two decades, including McBrearty and Brook (2000) and many others (Kissel & Fuentes, 2021; Kuhn, 2021; Meneganzin & Currie, 2022; Shea, 2011), some of which he cites in Section 3. This amplifies unilinear and teleological views of cognitive evolution and erroneously presents them as consensus. We suggest it is time to move from critique to the

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development of new approaches not organized around sterile simple/complex or modern/pre-modern binaries.

We advocate (e.g., Stout & Hecht, 2023) a more particularist approach to studying the cognitive processes behind the production, reproduction, perception, and variation of specific material cultural evidence (e.g., geometric engravings, cave painting, pigment, compound tools, etc.) by integrating experimental, ethnographic, comparative, and archaeological evidence. We agree with Stibbard-Hawkes that such investigations should not be framed around an assumed "null hypothesis" of cognitive primitiveness. We instead suggest (e.g., Stout et al., 2019) an inductive and probabilistic approach (c.f. consilience, Inference to Best Explanation (Killin & Pain, 2021; Stock et al., 2023)). Our own work focuses on stone toolmaking, but Tylén et al. (2020) provide a relevant example. Using Blombos and Diepkloof engravings as stimuli, they found that design changes over 30,000 years made these signs more salient, memorable, and easier to reproduce. This provides positive evidence for the use of these signs in an evolving communicative system but does not warrant conclusions about the presence/absence of symbolic cognition. Ethnographic studies can help us understand possible social contexts for such sign systems, as briefly considered in Section 10 of the target article.

Stibbard-Hawkes argues that cognitive archaeologists routinely treat absence of evidence as evidence of absence. We agree this can be a problem, but not that archaeologists are generally so simplistic. As recently reviewed by Wallach (2019), archaeologists often use the absence of evidence in a *probabilistic* way. This is logically valid and consistent with the move away from a "null hypothesis" approach. Kelly, Mackie, and Kandel (2023) demonstrate the utility of such *argumentum ad ignorantiam* to identify behavioral patterns in need of explanation. Stibbard-Hawkes criticizes their "provisional assumption" that symbolic expression in a population would have left some material trace, but we see this as a disagreement about probabilities rather than a logical fallacy. Importantly, Kelly et al. (2023) provide a balanced discussion of possible factors other than cognition that might contribute to the observed pattern. This is productive and can lead to further research.

This also applies to experimental evidence. Stout and Hecht (2023: 6) review the epistemology of experimental cognitive archaeology, emphasizing that it is not possible to use modern data "to demonstrate the presence/absence of particular neuroanatomical structures [or] functions" at particular points in the past. Rather, the objective is to characterize patterns in the expres-

sion of particular capacities in order to identify the somatic, social, and ecological factors that favor their expression (i.e. evolutionary causation broadly construed). For example, Stout and Chaminade (2012) wrote that Lower Paleolithic toolmaking studies to date had not found "significant activation of 'ventral stream' semantic representations" suggesting that this behavior is not particularly demanding of such representations. They note that this pattern could simply reflect experimental design, but that "if this trend continues" it might suggest that such semantic representation "evolved later and/or in a different context." This is a probabilistic argument about likely selective contexts rather than an attempt to date the emergence of a particular semantic capacity (as is unfortunately suggested by the highly selective quote in the target article). Rather than attacking straw men, we propose that cognitive archaeology should focus its energy on identifying potential causal pathways leading to, and likely evolutionary consequences arising from, the expression of behaviors across time and space, rather than attempting to date the "appearance" of particular capacities along a unilinear sequence leading to modern humans. Evidence presented by Stibbard-Hawkes can contribute to this project.

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