



# Failure of optimal foraging theory to appeal to researchers working on the origins of agriculture worldwide

Even though the last 30 y has witnessed a remarkable increase in worldwide efforts to understand agricultural origins (OA), Gremillion et al. (1) find fault with the vast majority of this work, which they label as “particularism” and argue that it lacks sufficient inclusion of theory in the initial formulation of OA explanations. This label of particularism is applied to a remarkably broad spectrum of researchers, from Franz Boas to Ian Hodder, including all of the other participants in the special OA issue of PNAS, as well as all of the participants, excepting Piperno, in the recent Wenner Gren OA conference (2), along with a vast number of other researchers worldwide. The only individuals that appear to avoid the particularism label are the very few using optimal foraging theory (OFT) and diet breadth models (DBMs) in their formulation of explanations of OA. Why is it, one might ask, that after several decades of availability, the OFT/DBM approach to explaining OA is practiced by so few and has attracted so few converts from the vast population of particularists? A fairly obvious primary reason is that OFT/DBM-based efforts have failed to produce any compelling regional-scale explanations of OA, as amply demonstrated by the three OFT/DBM case studies showcased by Gremillion et al. (1). Gremillion’s eastern North American efforts, for example, are acknowledged as failing to explain OA in the region, whereas

Piperno’s application of OFT/DBM to South America results in only a vague, after the fact, perceived correlation between available data and OFT/DBM expectations. Their final OFT/DBM case study example, Southwest Asia, has been the subject of a recent devastating deconstruction (3), which Gremillion et al. (1) brush aside without addressing in any detail. Although the rejection of OFT/DBM to date is largely due to the absence of any successful OFT/DBM explanations of OA data sets, increasing interest in niche construction theory (NCT) as a framework for OA explanation substantially undercuts the future of OFT/DBM as a conceptual approach. Recently developed in evolutionary biology and falling comfortably within human behavioral ecology, NCT is explicitly antithetical to OFT/DBM. Contrary to the characterization of NCT presented by Gremillion et al. (1), NCT explanations of OA are based on a solid general theory for human behavior: that human societies actively modify their surrounding environment to increase the relative abundance and reliability of preferred wild species of plants and animals and that such efforts have the potential to provide individuals and populations with an evolutionary advantage (4, 5). Gremillion et al. (1) also fail to mention that when test implications for OFT/DBM and NCT-based theories of OA are formulated and the two general explanatory

frameworks are directly compared in different world regions, NCT provides a much better match to available empirical data sets (3–5). Although I generally agree with Gremillion et al. (1) that combining NCT with other evolutionary approaches to OA will provide for a better future understanding of OA, I doubt very much that OFT/DBM will be included in that mix.

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