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Comment on Sterelny and Watkins

Melinda A. Zeder

Niche-construction theory and Neolithic emergence in the Near East

Explanatory models of Neolithic emergence in the Near East traditionally spotlight domestication and follow-on agricultural emergence as defining characteristics of the Neolithic, with most characterizing these developments as responses to resource depression induced either by adverse climatic conditions (Bar Yosef 2011) or by unchecked demographic expansion accompanying climate amelioration over the course of the Late Pleistocene/Early Holocene (Stutz *et al*. 2009). Changes in social organization, ritual, and symbolic inventories are, if mentioned at all, portrayed as knock-on, tangential and largely ancillary side-effects of the transition from foraging to farming. Trevor Watkins is one of a vocal minority who argue that the Neolithic represents fundamental and revolutionary reorientation in human social organization in which changes in subsistence economies play more of a supporting than catalytic role (Watkins 2010). He has, in particular, advocated that symbolic systems and their material expression play primary shaping roles in Neolithic emergence. And while the mechanics of the shifts in symbolic repertoires and the cognitive changes that drove them remain largely undefined in other similar approaches (Cauvin 2000; Hodder 2001), Watkins' work is anchored in an evolutionary framework that portrays Neolithic emergence as a later phase of the development of cognitive skills that distinguished anatomically modern humans from earlier hominin relatives (Watkins 2005).

In teaming up with Kim Sterelny, a philosopher of science who has written widely about the evolution of human cognition, Watkins is able to tie this view of Neolithic emergence even more closely, and convincingly, to an evolutionary framework as a manifestation of cultural niche construction—the unique human ability to construct bodies of cultural knowledge and transmit them through social learning that is held to be a major driver of human evolution (Sterelny 2007). This new angle brings Watkins' theories into the mainstream of an emerging paradigm, niche construction theory (NCT), which is finding a broad and receptive audience in evolutionary biology, ecology and the social sciences. By embedding this thesis within NCT, Sterelny and Watkins make a compelling case for the catalytic role of symbolic systems and their manifestation in material and expressive culture in Neolithic emergence.

This breakthrough article, however, falls short of realizing the full potential of NCT as a comprehensive explanatory framework for Neolithic emergence in the Near East by 1) retaining Watkins' original emphasis on population growth as the primary driver of these developments; 2) relegating subsistence economy to a relatively minor role in the process; and 3) omitting any mention of the dramatic climate and environmental changes that provided the context for these developments. Both here and in Watkins' earlier contributions, inevitable, unstoppable demographic expansion is a central driver of Near Eastern neolithization. According to this view, population expansion resulted, in a largely unspecified way, in the formation of large permanent communities that provided the context for the development of new forms of cognitive cultural niche construction needed to mitigate the stresses that arose from the aggregation of larger and less closely related groups of people living together on a permanent basis. And yet, many of the developments held here to be central to this process—the explosive increase in the size and density of communities, privatization of access to resources, specialization of economic and social roles—are all much

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later developments that coincide with the appearance of agricultural economies based primarily on the production and consumption of domesticates—more than a millennium after the process of neolithization is said to have begun.

While the first phase of this process in the Late Epipaleolithic/early Neolithic does indeed see the establishment of more sedentary, territorially conscripted settlement patterns—first in the Early Natufian of the southern Levant and later across the entire Fertile Crescent in the PPNA—even the largest of these communities in both the northern and southern Levant barely reached the 150–200 person threshold set here as the upper limit of group size that can be maintained without requiring the development of more complex mechanisms for promoting social cohesion. Even in the Levant, and especially in the central and eastern Fertile Crescent, overall population size and density during this period remains quite low (Goring-Morris & Belfer-Cohen 2011, fig. 2). Moreover, there is reason to question the permanence and degree of sedentism in these early sites (Asouti & Fuller 2013).

Instead of unbridled demographic expansion and population packing, a better case can be made for the importance of steadily improving climate and the associated development of a mosaic of resource rich environments across the Fertile Crescent as providing the context for settlement shifts during this period (Zeder 2012). Even during the height of the Late Glacial Maximum, foragers targeted environments with diverse, densely distributed resources for the establishment of base camps, like Ohalo II for repeated and extended occupation (Nadel 2004). Over the course of the Late Epipaleolithic into the early Neolithic, we see a steady decrease in catchment size and residential mobility as foragers target environments with abundant, diverse resources predictably found within well-defined resource catchment areas (Zeder 2009). Foragers in the Near East had likely been engaging in eco-system engineering activities aimed at enhancing biotic productivity and security since the arrival of modern humans in the region, if not before. But the development of increasingly stable resource-rich environments in the Late Pleistocene and, especially, in the early Holocene, provided foragers with new opportunities for experimentation with different productivity enhancing techniques. The long-term investment in these more territorially conscripted catchment areas served as an additional incentive to engage in further, perhaps more intensive, niche-constructing activities. It also put a premium on enhancing and preserving the growing store of ecological knowledge that allowed these communities to continue to reap the rewards of previous generations' investment in modifying and shaping these environments (Smith 2012).

Building and passing on this store of traditional ecological knowledge was a core element of the cultural inheritance that Sterelny and Watkins argue made the Neolithic transition possible. Thus, in addition to the mechanisms used to relieve the social stress incurred by reduced mobility and larger group size, maintaining and transferring this ecological knowledge base should be seen as a major contributor to the symbolic and ritual repertoire that becomes increasingly elaborate over the course of Neolithic emergence in the Near East. There is, in fact, ample evidence for a close association between the megalithic structures, communal buildings and ritual practices found at many Late Epipaleolithic/Early Neolithic sites and the production, preparation and consumption of both plant and animal foods—associations that can convincingly be argued to be vehicles for the transmission of knowledge about the core subsistence activities needed to sustain these communities (Asouti & Fuller 2013).

I would then argue for a more comprehensive application of NCT to understanding Neolithic emergence in the Near East that brings together both the social, economic and ecological aspects of the process to show how, in the context of stable, resource-rich environments, goals of preserving community cohesion and longevity combine with complementary goals of creating a secure and predictable resource base, resulting in a revolutionary transformation in all aspects of human social organization, economic activity, ideology and cognitive capacity. The strength of a NCT explanatory framework for understanding major transitions like the Neolithic is that it offers an opportunity to explore the interface between humans and the natural world that demonstrates how processes that shape human cultural evolution interact with those governing biological evolution (Zeder 2015). And while the emphasis on social aspects of the Neolithic evident here and in Watkins' earlier work is understandable, given the economic and environmental bias of traditional approaches, a more robust understanding of neolithization will only be gained by broadening the lens of inquiry to the full complement of environmental, economic and social factors involved in the process.

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Response

Kim Sterelny & Trevor Watkins

We would like to begin by thanking the commentators for their thoughtful, informed and, for the most part, generous responses. Even Ofer Bar-Yosef, while clearly disagreeing deeply with our whole approach, has invested precious resources of time and thought in our paper. We shall respond commentary by commentary, but there are some common themes in the responses, and we will note those as we go through.

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