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The cultural dimension of cognition

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ABSTRACT

Around the transition from the Pleistocene to the Holocene in southwest Asia, human skills in cultural niche construction were qualitatively upgraded in order to support the formation of large, permanently co-resident communities and regional interaction networks with new and sophisticated forms of symbolic action and representation. The transition from small, mobile forager bands to networks of large permanent communities that occurred between 22,000 and 8500 years ago was enabled by the significant development of what Merlin Donald has called 'theoretic culture', communicated and stored in systems of 'external symbolic storage'. The over-arching role of symbolic culture became the highly developed core of what we may call the cognitive-cultural niche, within which and by means of which children learned and adults understood and expressed their identity and their place in the world. The extraordinary plasticity of the modern human brain and its developmental responsiveness to context meant that individuals formed their identity through a long process of enculturation within a cognitively powerful cultural niche. While we are accustomed to literacy and dependence on written sources, they were more adept with other media, particularly ceremonies and rituals, and the making of memory in monuments, artistic representations, signs and systems of symbols.

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1. Introduction

In this paper I argue that 'the material dimension of cognition' is essentially a cultural dimension, which we can see changing its nature in a significant way around the Pleistocene–Holocene transition in southwest Asia. We cannot think of 'the material dimension of cognition' in any absolute sense, without concern for its cultural context in time and space. The material dimension of cognition among *Homo erectus*, for example, was qualitatively different from that among archaic *Homo sapiens*, which in turn was different from that among recent *H. sapiens*; and, because of the diversity of cultural variation, it will present differently in different contemporary cultural contexts. As a prehistoric archaeologist interested in the transformation that brought about the first large, permanently co-resident communities and established farming economies in southwest Asia, I am exploring the way that those communities developed new systems of symbolic representation in material form. I want to understand the role of what appears to be the significantly enhanced symbolic material dimension within those new communities. For more than one hundred thousand years, modern humans have learned to make and share meaning out of material in ways that are without precedent in human evolution; from that early start, the cultural facility with material signs and symbols grew (and continues to grow) at an exponential rate. The transformation that we can observe around the Pleistocene–Holocene transition in southwest Asia, however, represents a remarkable expansion of these cognitive-cultural abilities. Moreover, it was accompanied by the emergence of a way of life in networks of large, sedentary communities that was fundamental for all of later prehistory and the historical periods that have followed. I seek to argue that these two processes – the emergence of large-scale, permanently co-resident communities, and the development of monumental architecture and complex sculptural representations - are reciprocally interrelated, and can be understood in the context of an extension of cultural niche construction theory.

The conventional wisdom among archaeologists for a long time has been that the key element in the process of 'neolithisation', or the 'Neolithic revolution' in southwest Asia was the domestication of plants and animals and the development of farming economies; accounts of the process typically reach back beyond the beginning of the Neolithic period into the last two or three millennia of the preceding Epi-palaeolithic period. I see the process as taking place over a much longer time-scale, beginning at least as early as the inception of the Levantine Upper Palaeolithic almost 50,000 years ago; in that long-term perspective, the terms 'neolithisation' and

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'Neolithic revolution' become misnomers. I believe that we can better understand the nature of the process if we see it in evolutionary terms within the context of a profound re-shaping of the cultural niche.

First, I will sketch an outline of the multi-factorial components of the process. Then, I will introduce niche construction theory, more particularly cultural niche construction theory. Niche construction theory provides a conceptual framework for modelling the evolutionary process (Odling-Smee et al., 2003), is applicable to many (most?) species, and is particularly useful for understanding the way of life of social animals. Cultural niche construction theory recognizes the important role that human culture plays in the human situation (Kendal, 2011; Kendal et al., 2011; Laland and O'Brien, 2011). The arguments in this paper are underpinned by the evolutionary dynamic of the 'social brain hypothesis' (Dunbar, 1998, Dunbar et al., 2014; Gamble et al., 2014); this proposes that the expensive, long-term increase in size of the human brain, particularly the pre-frontal cortex, was necessary to support the exponential growth in the cognitive load of living in larger and more cohesive social groups. In that story of increasing social group size, culture has played an important role, and not just in terms of technology and material culture. In the latter part of this paper, I will discuss how the Pleistocene–Holocene transformation illustrates a major change in the functioning of the *H. sapiens* cultural niche, which I call the cognitive-cultural niche. My thesis is that the increasing population density and co-resident group size through the Epi-palaeolithic and Neolithic of southwest Asia is an acceleration of a long-term trend that is not accompanied by, and is indeed too rapid for, the biological evolution of the human brain. As *H. sapiens* social group size in southwest Asia (and no doubt in other regions of the world) was at the physical limit of the 'social brain' (Dunbar, 1998), human cultural ingenuity provided a means of growing community size beyond that physical limitation. I will argue that the material symbolising capacities of the cognitive-cultural niche were evolved to sustain the coherence of human communities of several hundred, and later several thousand permanently co-resident individuals. This transformation of the human cultural niche opened the way for the relatively rapid development of the very large-scale human communities in which we have grown up and with which we are instinctively familiar.

2. Three strands in a long-term process of transformation

There are three aspects to this transformation: as they are intertwined, we can think of them as strands. Most research has been concentrated on the domestication of plants and animals and the development of farming economies, which we may take as the first of those three strands, but only because of the primacy that the 'origins of agriculture' has been given by researchers. The development of effective farming economies came at the end of a sequence of important changes in subsistence and settlement strategy, for which the best evidence has been built up over many years from sites in the southern Levant. We know that people were harvesting, storing and processing wild grasses, cereals and pulses for many thousands of years before pre-domestication cultivation began around the Epi-palaeolithic–Neolithic transition (Kislev et al., 1992; Weiss et al., 2004). We have the heavy ground-stone implements for pounding and grinding from at least the beginning of the Upper Palaeolithic period (Wright, 1994); and, from the Upper Palaeolithic–Epipalaeolithic transition at least 22,000 years ago, we have direct evidence of the carbonised seeds of grasses, cereals and legumes, and identifiable starch residues on the surfaces of grinding slabs (Piperno et al., 2004). While the focus has been on defining the moment of domestication, it still took a thousand years or more before people established crop management on which they could rely. With animal domestication, there was a series of changes in hunting, trapping and fishing strategies before herding began and domesticated species appeared (Stiner et al., 2000; Zeder, 2012). Reliance on their animal herds came a thousand or more years after domestication (Conolly et al., 2011).

The second strand is demographic. Based on the evidence of the reducing availability of prime hunting prey, the increasing pressure on hunted gazelle, and increasing time and effort invested in obtaining small, fast-moving animals and birds, growth in population density in the Levant began from at least the Last Glacial Maximum and continued through the Epipalaeolithic period (Davis, 1991; Stiner et al., 2000; Munro, 2004; Davis, 2005). Israeli colleagues have estimated the number of settlement sites per thousand years through the Epipalaeolithic and Neolithic for different parts of southwest Asia (Goring-Morris and Belfer-Cohen, 2011: Fig. 2). Their best quantitative data comes from the southern Levant. In the north Levant, we lack data on the Epipalaeolithic, but the rise through the Neolithic is a similar gradient to that in the south. In the early Neolithic in the southern Levant (9600–7000 BC) the average size of settlements increased by a factor of 10, and the density of buildings also grew dramatically by a factor of at least four times (Kuijt, 2000). Putting together those trends in size, density of occupation, and numbers of settlements, it is clear that there was a massive rise in overall population, as well as an equivalent rise in the size of co-resident communities (that is, the population units that are represented in the archaeological record by the settlements that they built and in which they lived). By the latter part of the early Neolithic period, there were settlements with populations estimated at 5000 to 10,000 (for instance, Çatalhöyük in central Turkey, see Cessford, 2005). Where there were typically Palaeolithic, small-scale, repeated occupations of cave-mouths, rock-shelters, and open locations, in the Epipalaeolithic period cave and rock-shelter occupations sometimes expanded to cover extensive open areas, and open sites grew in size and began to accumulate indications of long-term occupation. From quite early in the Epipalaeolithic period, there were settlements that had accumulated clear stratigraphies of repeated re-buildings (e.g. Neve David in northern Israel: Kaufman, 1989; Uyun al-Hammam in Jordan: Maher, 2007; Kharaneh IV, also in Jordan: Maher, 2010; Maher et al., 2012; Richter et al., 2013); but in the early Neolithic, settlements grew to become the typical mounded landscape form that Arabic speakers recognised as a 'tell' (or 'tepe' or 'höyük' in other languages).

The third strand is the rise in the quantity, scale and complexity of symbolic representation in material form. Skipping over the symbolic aspects of domestic architecture (though not failing to mention my own contribution: Watkins, 1990), I must point to a series of large, circular, subterranean communal buildings at the centre of early Neolithic settlements from southeast Turkey, through north Syria and Cyprus, as far as southern Jordan. These earliest Neolithic examples are prefigured by similar, large, circular, (semi-)subterranean buildings that do not appear to be domestic in purpose from late Epi-palaeolithic sites such as Eynan in the north of Israel (Valla, 1988), and Wadi Hammeh 27 in Jordan (Hardy-Smith and Edwards, 2004; Edwards, 2009), and another such building at Tell Mureybet in north Syria, which dates to the very end of the Epi-palaeolithic; this last structure is very similar in internal structural detail to two of those at early Neolithic Jerf el Ahmar (Stordeur et al., 2000). The first to become widely known was found at Jerf el Ahmar, in the Euphrates valley in north Syria (Stordeur et al., 2000). It is the scale of the communal effort and organization that was required to create the cavity (7 m in diameter and about 3 m deep) in which it was constructed that is so impressive. These structures are clearly different from the general

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