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Session ID	18
Session Title	Minds in situ: Material Approaches to Cognition in the Past
Start Time	Wed Dec 18 09:30:00
Room	739

Cognitive archaeology's aim - to study the minds of people in the past - has prompted scepticism since its beginnings. Nevertheless, the last few decades have seen a surge of interest in the archaeology of the mind. As a broad, interdisciplinary research area, a plethora of approaches have been used, leading to creative and varied research. Yet, cognitive archaeology as a whole lacks cohesion. Focusing on the fundamental role of material culture may offer a particularly useful approach for archaeologists wishing to tackle this area. Theoretical approaches like the 'extended mind' and Material Engagement Theory have advocated a certain materialist approach, where the mind does not consist solely of the brain. As a result, there is increasing recognition of the significant roles that our bodies and the environment, including material culture, play in our cognition.

This session will consider how archaeologists can study cognition through material culture. It encompasses a broad range of topics, including cultural transmission, craft, art, technology and evolution. While cognitive archaeology is traditionally seen as a prehistoric endeavour, it has great potential for use in any period, as seen by the papers in this session. Cognitive archaeology has been successful in helping to consider not only pathways of thought and learning in the past, but also understanding the mind in the context of behaviour, social relationships and material culture. The papers in this session reflect the potential of this area of study and demonstrate how a traditionally prehistoric endeavour can be of use more widely in archaeology.

9:30	Dr Cory Stade, University of Southampton; Taryn Bell, University of York	Introduction	
9:40	Mike Groves, University of York, UK	Carving out an existence: understanding the chaîne opératoire from the inside out and making a name in woodcraft	How is cognition experienced in contemporary material culture? And how might artisanal skill be employed in order to maximise production from an inherently unpredictable material? This talk aims to cast light on how an internalised, bodily understanding of negotiation and material engagement can offer insights into archaeological processes as they unfold in the present. This discussion falls within a recent turn in material culture – the resurgence of heritage craft and a re-evaluation of the handmade. People relate to one another through different kinds of things produced, exchanged and consumed today as they were in the past. The key difference here, and the value of understanding this social process from within, is that archaeologists can study this phenomenon contemporaneously. Spoken from the mind of the maker, I will discuss and share my experiences of crafting wooden table wares, by commission, and hence what kinds of dialogues arise amid the locus between mind, tools and material. Having to stick to a design and mass-produce it, by hand, inspires challenges and situations of problem solving, cooperation and compromise in order to get the most out of raw materials. These situations respond to real, lived economic pressure. My own handicraft is supplemented with ethnographic fieldwork of my fellow woodworkers. As an active member of a resurrected community of practitioners, my work explains this change in material culture; critiquing the changing relationship between master and apprentice, identifying the role of social media in cultural transmission and ultimately creating new uses for the chaîne opératoire.

9:55	Paul March, University of Oxford, UK	Do extended minds have material dreams?: a Materially Enacted Phenomenological response	Materially Enacted Phenomenology (MEP) is a methodology that uses Material Engagement Theory (MET) to inform and interrogate the process of modelling with clay. The aim of the approach is to reveal and describe the activities of an extended mind. Here I present a MEP case-study to show that sculptures come into existence through a series of step-wise articulations that have little to do with creative insight. Sculpting is determined instead by the morphogenic possibilities and constraints of matter and the historical patterning of repetitive gestures and sculptural habits. I show how the MET concepts of Creative Thinging and Enactive Signification share ontological ground with Latour's analysis of science. Latour demonstrates that science is not about uncovering objective facts but proceeds instead through a series of laboratory-based material transformations that create a material-linguistic hybrid where before existed only anonymous and undifferentiated matter. The case begins with the birth of a novel, anonymous and undifferentiated material - a mixture of clay, hemp and paper. I describe how this composite material facilitates, defines and limits the development of a range of gestural possibilities which in turn extend and limit the range of behavioural possibilities of the clay-composite. I conclude that creative intention develops directly out of this iterative relationship rather than from free-floating artistic reverie or blue-sky thinking.
10:10	Emanuele Prezioso, University of Oxford, UK	Style as memory: bridging past and present in the context of Minoan archaeology	The notion of style has been used in archaeology for typological and chronological sequences, pictorial attribution, as an indicator of economic movements, and as a tool to establish identities between groups. Also, a good deal of literature presented style as a choice to explain the relations among materials and people. New emerging approaches to material culture, above all Material Engagement Theory (MET), are casting a new light on the mutual interactions between people, things, and their environments. Rooted in MET and A. Gell's anthropology of art and time, this paper presents style as a memory process able to guide a potter's stylistic choices. Using Middle Minoan decorative polychrome pottery, style is explored as a process where each creation in the present (intentions) results from accumulated sequences of memories of past actions (retentions) that project actions in the future (protentions). Decorative styles result as memories of actions distributed in space and time in the material culture. Looking at the constant engagement between people and things allow seeing how memories pass through generations guiding actions and intentions. Style helps to bridge past and present and to understand how it acts in the social, cultural, and material worlds. This approach, although still under investigation, aims to question the transmission of stylistic traditions over long periods.
10:25	Alexander Aston, School of Archaeology, University of Oxford	Metaplasticity and the boundaries of social cognition: exploring scalar transformations in social interaction and intersubjectivity	This presentation applies the principles of Material Engagement Theory (MET) to the study of social cognition. Specifically, the paper examines how material culture shapes the development of intersubjectivity and generates social interactions at emergent scales. The most influential models in the study of social cognition, the Social Intelligence Hypothesis and Theory of Mind promote a view of intersubjectivity that is rooted in methodological individualism and primarily understood as a capacity for observation and prediction. This approach leads to significant issues when confronted with the diversity and plasticity of human social organisation, particularly in regards to the computational burdens and information processing bottlenecks implied by scalar transformations in social organisation. However, if material culture is understood to be an intrinsic feature of human cognitive processes, then it is possible to examine the archaeological record as a form of niche construction that has reshaped the evolution of the mind. Specifically, evidence from early childhood development and the cognitive science of body perception suggest an evolutionary feedback loop generated between hands, eyes and the bodies of others. In this light, social cognition is understood to develop from perception-action systems that evolved through pragmatic and cooperative social interactions with the material environment. To illustrate how material culture has transformed human intersubjectivity, the presentation offers a brief archaeology of how stone tools and figurines coordinate and mediate social interaction. Ultimately, a MET approach to social cognition provides insight to the developmentally plastic and emergent properties of hominin sociality.

10:40	Laura Ahlqvist, Aarhus Universitet, Denmark; Christian Hoggard, University of Southampton, UK; Rune Iversen, University of Copenhagen, Denmark; Ditte Kofod, Bornholms Museum, Denmark; Poul Otto Nielsen, The National Museum of Denmark, Denmark; Finn Ole S. Nielsen, Bornholms Museum, Denmark; Niels N. Johannsen, Aarhus Universitet, Denmark	Mass consuming miniature meanings: analysing the carved stones of Neolithic Bornholm	A unique artefact assemblage recovered at the causewayed enclosure of Vasagård on the Baltic island of Bornholm may provide insights into ritual life and underlying patterns of cognition and transmission among the Neolithic population that used this site. Here, more than 400 so-called 'sun stones' have emerged – small tablets of shale, sandstone and water-rolled pebbles that have been engraved with a range of motifs. One prevalent motif consists of a circle with radiating lines very similar to what present-day humans would produce if asked to draw a sun, hence the archaeological name; however, a range of other motifs also appear on the stones. All of the engravings are based on a relatively small repertoire and yet, no two stones are identical as the repeated elements are combined in different constellations, creating substantial variability within the material. An explanation for the seeming dichotomy between the normativity that directs the choice of motif, on the one hand, and the relative freedom in its execution, on the other, may potentially be found in the ways that cultural transmission and cognitive processes structured the manufacturing and use of the stones. Drawing on a range of interdisciplinary approaches, we explore the roles of imitation, emulation and active teaching, and how these connect to reproducibility and memorability, in an attempt to understand the apparent combination of structuring and idiosyncrasy. This leads to a number of observations as well as suggestions for further research on these enigmatic stones.
10:55	Joana Valdez-Tullett, Historic Environment Scotland	Teaching and learning Atlantic rock art: exploring cultural transmission in the Neolithic	Cup-and-rings, cupmarks, penannulars and wavy grooves are some of the most iconic motifs, part of the prehistoric carving tradition known as Atlantic Rock Art (ARA). These are widespread across western Europe, created on open-air boulders and outcrops. Because of similar iconography, landscape location and other characteristics, researchers have long questioned the similarities between the rock art of these regions, and suggested a common origin for the symbols. Many proposed theories attempted to explain function and meaning, but were often extrapolated acritically to the different regions. Effectively, at a large-scale ARA is very similar. However, a detailed study of the tradition enabled a deep understanding of the rock art, its making process and role within Neolithic society, also identifying important local preferences. This was carried out across 5 study areas, based on empirical data assessed with a multiscalar, interdisciplinary methodology. Considering the widespread adoption of ARA and the level of repetition of the motifs, it seems undeniable that this tradition held great importance. The emergence of very small details, some repeated across all study areas, suggested a strong network of connections between the regions. This paper will explore the cultural transmission of Atlantic Rock Art and the possibility that it may have been intentionally taught, inspired by Stade's (2017) conclusions with experimental work with Palaeolithic handaxes. The degree of similarity and the replication of small details between widely separated regions, certainly suggests intentional teaching and learning of the craft, as otherwise the motifs' morphology would probably not be so uniform.
<b>11:10 BREAK</b>			<b>BREAK</b>
11:40	Izzy Wisher, Durham University	Creating art, shaping the mind: a psychological approach to Upper Palaeolithic cave art in northern Spain	<p>Upper Palaeolithic cave art is enthralling and, unsurprisingly, has been subject to extensive research since its discovery. Recently, inspired by cognitive archaeological approaches, research has taken a turn towards conceptually proposing psychological foundations behind the production of cave art. In particular, Hodgson (2006; 2008; 2012; Hodgson and Pettitt 2018), has proposed that specific psychological phenomena were triggered in the highly sensory environments of caves. It is suggested this dictated the form of the art and was intimately linked to the psychological state of Palaeolithic hunter-gatherers. This reconceives Palaeolithic cave art as the direct product of specific psychological processes experienced by hunter-gatherers, that were influenced by their entangled, dependent relationship with the animals depicted. However, this has yet to be explored in a grounded, falsifiable way. Consequently, there is an overwhelming need to test conceptual ideas of the psychological foundations of Upper Palaeolithic cave art against the archaeological record itself. This talk will present a novel chaîne opératoire approach, that attempts to integrate the psychological phenomena triggered in caves into a cohesive framework for understanding the processes involved in cave art production. This takes an interdisciplinary approach between psychology and archaeology, through creating 3D models of cave art from northern Spain and creating virtual reality versions of the art to use in psychology experiments. Further, this talk will emphasise the importance of adopting fully-grounded, interdisciplinary approaches in cognitive archaeology, through demonstrating that this enables a shift towards fine-scale, nuanced understandings of the cognitive processes embedded in Upper Palaeolithic artistic behaviours.</p> <p>Hodgson, D. (2006) 'Altered States of Consciousness and Palaeoart: an Alternative Neurovisual Explanation.' Cambridge Archaeological Journal 16 (1): 27 – 37.</p> <p>Hodgson, D. (2008) 'The Visual Dynamics of Upper Palaeolithic Cave Art.' Cambridge Archaeological Journal 18 (3): 341 – 353.</p> <p>Hodgson, D. (2012) 'Emanations of the Mind: Upper Paleolithic Art as a Visual Phenomenon.' Time and Mind 5 (2): 185 – 193.</p> <p>Hodgson, D. and Pettitt, P. (2018) 'The Origins of Iconic Depictions: A Falsifiable Model Derived from the Visual Science of Palaeolithic Cave Art and World Rock Art.' Cambridge Archaeological Journal 28 (4): 591 – 612.</p>

11:55	Xuanqi Zhu, University of York, UK	Tool-making and mind-making? Acheulean handaxes and the emergence of aesthetic sensibilities	In the pursuit of answering the classic question of how and why human aesthetic preferences change over time, it is important to ask why human beings have such preferences in the first place, i.e. what is the origin of our aesthetic sensibilities? Here I focus on one remarkable practice of our extinct hominin relatives, the practice of stone tool production, to suggest that it was the long-lasting history of the reliance on tools that gave birth to the earliest form of what we call aesthetic appreciations. Specifically, such aesthetic concerns could have emerged during the Acheulean when more advanced tool making techniques became widespread and delicately made handaxes were produced during the more than 1-million-year time span. By drawing on the theory of niche construction, this paper claims that the handaxe industry of Acheulean was a major practice which intensely constructed the hominins' niches and therefore led to changes to the selective environments. These changes could have exerted non-random selective pressures on individuals' cognitive capacities that facilitated the practice of handaxe knapping. Finally, as such practice persisted for more than 1,000,000 years, these pressures seemed to have resulted in the presence of some proto-aesthetic sensibilities in hominins.
12:10	Lana Ruck, Indiana University, US and Stone Age Institute, US; Shelby S J Putt, Illinois State University, US; Zara Anwarzai, Indiana University, US and Stone Age Institute, US; P. Thomas Schoenemann, Indiana University, US and Stone Age Institute, US; Kathy Schick, Indiana University, US and Stone Age Institute, US;; Nicholas Toth, Stone Age Institute	Evolutionary perspectives on human handedness and hemispheric specialization in the brain	Neuro-archaeological investigations into stone toolmaking have found multiple parallels between toolmaking, language, and other uniquely-expanded domains in the human brain. These studies fit into a wider discussion on the drivers of hominin cognitive evolution, but one largely unaddressed theme in these studies is the effects of handedness on toolmaking, language, and other lateralized brain activities. Population-level right handedness is also unique to humans, and its manifestation in modern populations suggests that tracking the evolution of right-hand preference may help us understand population-level changes in hemispheric specialization and the origins of language. The goal of this research is to investigate the effects of handedness on brain networks which underlie language and toolmaking. Pilot neuroimaging data were collected from 10 human participants (5 left-handed) who completed stone toolmaking, language, and visuospatial tasks while undergoing fMRI scanning. Initial results confirm significant areas of overlap for these tasks in the following brain regions: premotor cortex (BA 8), the inferior frontal gyrus (BA 44/45); superior and inferior parietal areas (BA 7); primary and premotor cortex (PMC, BA 4, 6); the posterior middle temporal gyrus; and visual cortex (BA 17, 18, and 19). Co-activation of functional networks for tool and language tasks is likely due to co-evolutionary histories, and co-lateralization of these tasks in left-handed and right-handed participants provides additional evidence of their evolutionary ties. Furthermore, it suggests that handedness is an important topic of study within the context of stone toolmaking, and potentially language evolution, throughout hominin evolution.
12:25	Michal Paradysz, University of Liverpool, UK; Natalie Uomini, University of Liverpool, UK and Max Planck Institute for the Science of Human History, Germany; Larry Barham, University of Liverpool, UK; Ryan Horsfall, University of Liverpool, UK; Georg Meyer, University of Liverpool, UK	Tracing three million years of human cognitive evolution: a neuroarchaeology study	Lithic materials have been used by people for more than 3 million years, and they offer currently the oldest and lengthiest source of information about past minds. In particular, the potential co-evolution of brain areas involved in language and prehistoric stone knapping has been the focus of intense debate in recent years. We present a cognitive archaeology study that used neuroscience methods to explore the brain networks involved in learning to knap. With fMRI we scanned naive participants observing stone knapping hand actions, and spoken syllables, before and after flint knapping training. Through individual analyses, for the first time we found that participants show true overlap in their brain networks for speech and flint knapping observation. Using connectivity analyses we also found corresponding structural changes associated with the knapping training. We could not find separable activation patterns in individual brains for the two tasks, leading us to conclude that speech functions co-evolved with tool-making networks. The structural changes due to knapping training could explain why the earliest traces of brain reorganization in our ancestors began 3 million years ago.
12:40	Dr Cory Stade, University of Southampton; Taryn Bell, University of York	Discussion	
<b>13:00</b>	<b>END</b>	<b>END</b>	<b>END</b>