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Regional behaviour among late Neanderthal groups in Western Europe: A comparative assessment of late Middle Palaeolithic bifacial tool variability

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ABSTRACT

Population dynamics between and within Pleistocene groups are vital to understanding wider behavioural processes like social transmission and cultural variation. The late Middle Palaeolithic (MIS 5d-3, ca. 115,000–35,000 BP [years before present]) permits a novel, data-driven assessment of these concepts through a unique record: bifacial tools made by classic Neanderthals. Previously, studies of late Middle Palaeolithic bifacial tools were hampered by a convoluted plethora of competing terms, types and regional entities. This paper presents a large-scale intercomparison of this tool type, and bridges typo-technological and spatio-temporal data from across Western Europe (Britain, Belgium, the Netherlands, France and Germany).

Results indicate a high level of variation among individual bifacial tools and assemblages. Each bifacial tool concept is correlated with various methods of production, resulting in large degrees of morphological variation. Despite such variation, a distinct three-fold, macro-regional pattern was identified: the Mousterian of Acheulean Tradition (MTA) in the southwest dominated by handaxes, the Keilmessergruppen (KMG) in the northeast typified by backed and leaf-shaped bifacial tools, and, finally a new unit, the Mousterian with Bifacial Tools (MBT), geographically situated between these two major entities, and characterised by a wider variety of bifacial tools.

Differing local conditions, such as raw material or function, are not sufficient to explain this observed macro-regional tripartite. Instead, the MTA and KMG can be viewed as two distinct cultural traditions, where the production of a specific bifacial tool concept was passed on over generations. Conversely, the MBT is interpreted as a border zone where highly mobile groups of Neanderthals from both the east (KMG) and west (MTA) interacted.

Principally, this study presents an archaeological contribution to behavioural concepts such as regionality, culture, social transmission and population dynamics. It illustrates the interpretive potential of large-scale lithic studies, and more specifically the presence of regionalised cultural behaviour amongst late Neanderthal groups in Western Europe.

Introduction

Regional behaviour, cultural diversity, social transmission and elements of population dynamics such as size, stability, density, migrations and interactions are behavioural concepts crucial for understanding many aspects of human evolution. These concepts are often difficult to identify directly in the Palaeolithic archaeological record but have recently been approached, and proved of great relevance, through other disciplines such as genetics, primatology, palaeoanthropology, biology and computational modelling (Boesch, 2003; Caramelli et al., 2006; Rosas et al., 2006; Fabre et al., 2009; Premo and Hublin, 2009; Lycett, 2010; Premo and Kuhn, 2010; Kamilar and Marshack, 2011; Dalen et al., 2012; Hawks, 2012; Luncz et al., 2012; Kobayashi and Aoki, 2012; Kuhn, 2012). Within Palaeolithic archaeology, stone tools provide the most direct, durable and largest source of behavioural information. However, the capacities to identify patterns of behavioural significance among the Lower and Middle Palaeolithic stone tool record have rightly been questioned (Davidson and Noble, 1993; Davidson, 2002; Clark, 2005; Clark and Riel-Salvatore, 2006; Dibble et al., 2006; Richter et al., 2013). The main argument relates to the

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recovered stone tool form not resulting from the intention of the knapper and hence not reflecting an intended end-product; the so-called finished artefact fallacy (Frison, 1968; Dibble, 1987, 1995; Davidson and Noble, 1993; Davidson, 2002). Conversely, many studies stress the unique interpretive potential of bifacially worked tools, such as handaxes and leaf points, describing them as exhibiting more effort than functionally necessary and reflecting intended concepts; the so-called biface enigma (Mellars, 1996; Wynn, 1996; Richter, 2000; Wenban-Smith, 2004; Clark and Riel-Salvatore, 2006; White and Pettitt, 2011). To test both viewpoints, data has been collected and analysed from the late Middle Palaeolithic, representing one of the largest and best contextualised samples of bifacial tools. The wider interpretive potential of this lithic record has not been explored in detail due to various epistemological issues and past research foci.

The presence of bifacial tools was already extensively acknowledged in early classificatory frameworks of Middle Palaeolithic entities (Bordes, 1961; Bosinski, 1967). Subsequent debates on the Middle Palaeolithic have long been dominated by competing explanations for the micro-scale variation present among the recovered and classified stone tools and lithic assemblages (Bordes, 1961, 1973; Mellars, 1965, 1986; Binford, 1973; Dibble, 1987, 1991, 1995; Dibble and Rolland, 1992; Kuhn, 1995). However, these discussions frequently focussed on the varying proportions of different types of unifacial tools, e.g., scrapers, notches and denticulates, with only a secondary role for the bifacially worked pieces. Also, these studies predominantly concentrated on the rich Middle Palaeolithic record from southwest France and rarely involved wider comparative studies, incorporating data from different regions. Despite intensive research since the 1960s, it remains largely unclear what exact effect causal factors such as raw material, site function, tool function, resharpening and the knapper's skills and knowledge have in Middle Palaeolithic lithic variability (Richter et al., 2013).

In contrast to this observed variability stands the notion that the Middle Palaeolithic is a period of stasis. Especially from a broad temporal perspective, the Middle Palaeolithic has been described as a period with few technological and behavioural changes for over 250,000 years (Mithen, 1996; Kuhn and Stiner, 1998; Gamble, 1999; Klein, 1999). However, pioneering studies (Bordes, 1961; Bosinski, 1967) and especially more recent research suggest that specific spatial and chronological tendencies exist amongst Neanderthal stone tool assemblages, predominantly, but not exclusively, among the bifacial tools (Soressi, 2002, 2005; Jöris, 2004; Hovers and Kuhn, 2006; Locht et al., 2010; Koehler, 2011). Within the late Middle Palaeolithic (MIS 5d-3, ca. 115,000–35,000 BP [years before present]) several of these spatio-temporal entities can be identified, such as the specific occurrence of blade technologies in northern France during MIS-5 (Depaepe, 2007; Goval, 2008), bout coupé handaxes in MIS-3 Britain (White and Jacobi, 2002; White and Pettitt, 2011) and cleavers in the Vasconian entity of the western Pyrenees and Cantabria (Deschamps, 2010; Deschamps and Mourre, 2012; Thiébaut et al., 2012). These entities are regionally restricted and contain a specific set of shared features, making them unique within different regions. This phenomenon occurs from MIS-5 onwards and has been linked to the first appearance in the archaeological record of regionality (Richter, 2000; Jöris, 2004). The exact mechanisms behind these broader scale regionalised patterns and their behavioural significance are still in an early stage of development, and again, wider-scale studies are rare.

The research presented here integrates data from late Middle Palaeolithic bifacial tools and from various regions of Western Europe (Belgium, Britain, the Netherlands, Germany and France) providing a reassessment and detailed characterisation of patterns of typo-technological, spatial and temporal variation. The results allow for a new discussion on the factors that cause lithic variability, both at a micro- and macro-scale. Moreover, the observed variation can be linked to wider patterns of Neanderthal behaviour, including concepts of regionality, cultural variation and population dynamics, making a comprehensive archaeological contribution to these crucial behavioural concepts.

Late Middle Palaeolithic bifacial tool variability

Handaxes and bifacial technologies are the defining hallmark of the Lower Palaeolithic Acheulean (Table 1; Clark, 1994; Santonja and Villa, 2006) but decline strongly during the early Middle Palaeolithic (MIS 9-5e), coinciding with the emergence of the Levallois technique (Monnier, 2006; Scott, 2011). Throughout this time period, bifacial tools occur only in very low numbers across Western Europe (Brenet et al., 2008). However, from MIS 5d onwards bifacial tools form a regular component of the Neanderthal toolkit (Soressi, 2002; Jöris, 2004). These late Middle Palaeolithic bifacial tools comprise a large number of types including handaxes and backed bifacial knives. Subsequently, the use of bifacial technologies again decreases from mid MIS-3 onwards. In several 'transitional' technocomplexes such as the Szeletian and Lincombian–Ranisian–Jerzmanowician, they still occur as bifacial leaf points (Flas, 2008, 2011) to then become even rarer in the various Upper Palaeolithic industries, with exception of the Solutrean (Table 1). Hence, late Middle Palaeolithic bifacial tools are distinct from their Lower Palaeolithic counterparts, occur in association with classic Neanderthals and include claims of technological, functional, morphological, spatial and temporal variation (Soressi, 2002; Jöris, 2004; Ruebens, 2007a, b; Iovita and McPherron, 2011).

This variation and the restricted regional research focus of many previous studies have resulted in the emergence of a plethora of competing late Middle Palaeolithic bifacial tool terms, types and

Table 1
A diachronic overview of the occurrence of bifacial tools within Palaeolithic industries.

Time frame	Years BP (approx.)		Industries	Associated hominin	Amount of bifacial tools	Bifacial tool types
	Start	End				
Lower Palaeolithic	2.7 mya	600 kya	Oldowan	Australopithecines, early *Homo*	Low	Rare bifacial choppers
	1.7 mya	200 kya	Acheulean	*H. erectus*, *H. heidelbergensis*	High	Defined by handaxes, cleavers
Early Middle Palaeolithic	300 kya	115 kya	Mousterian	Early Neanderthals	Low	Rare handaxes
Late Middle Palaeolithic	**115 kya**	**35 kya**	**Mousterian, KMG**	**Classic Neanderthals**	**High**	**Handaxes, backed knives**
Final Middle Palaeolithic	45 kya	35 kya	'Transitional' industries	Classic Neanderthals	Medium	Leaf points
Early Upper Palaeolithic	45 kya	30 kya	Aurignacian	Early modern humans	Low	Very rare bifacial foliates
Later Upper Palaeolithic	32 kya	22 kya	Gravettian	Early modern humans	Low	Rare bifacial points
	22 kya	17 kya	Solutrean	Early modern humans	Medium	Bifacial points common
	18 kya	10 kya	Magdalenian	Early modern humans	Low	Bifacial tools very rare

Period studied in this paper in bold. mya = millions of years ago; kya = thousands of years ago.