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What is Still Bay? Human biogeography and bifacial point variability

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ABSTRACT

'Still Bay' is the name given to a cultural phase within the southern African Middle Stone Age, which remains critical to our understanding of modern human behavioural evolution. Although represented in only a handful of sites, the Still Bay is widespread geographically and, at certain localities, persisted over a substantial period of time. Many studies have focused on tracing the temporal range and geographic reach of the Still Bay, as well as inferring degrees of early modern human demographic connectedness from these parameters. Variation within the Still Bay, relative to the accuracy with which it can be identified, has received considerably less attention. However, demographic models based on the spread of the Still Bay in space and time hinge on the reliability with which it can be recognized in the archaeological record. Here we document patterns of bifacial point shape and size variation in some key Still Bay assemblages, and analyse these patterns using the statistical shape analysis tools of geometric morphometrics. Morphological variation appears to be geographically structured and is driven by the spatial separation between north-eastern and south-western clusters of sites. We argue that allometric variation is labile and reflects environmentally driven differences in point reduction, whereas shape differences unrelated to size more closely reflect technological and cultural fragmentation. Our results suggest that the biogeographic structure of Middle Stone Age populations was complex during the period associated with the Still Bay, and provide little support for heightened levels of cultural interconnectedness between distantly separated groups at this time. We briefly discuss the implications of our findings for tracing classic techno-traditions in the Middle Stone Age record of southern Africa, and for inferring underpinning population dynamics from these patterns.

1. Introduction

The dispersal of behaviourally modern humans within Africa and their subsequent spread throughout the world 80–50 ka has been suggested widely to be a process linked in its origins with two phases of the southern African Middle Stone Age (MSA) (Mellars, 2005, 2006; Mellars et al., 2006, 2013; Jacobs et al., 2008; Jacobs and Roberts, 2009; Henshilwood, 2012), the Still Bay and the Howiesons Poort. These industries span large territories and are considered to be short-lived technological phases (less than or around five thousand years), if one excludes sites with unresolved dating controversies (Jacobs et al., 2008; Guérin et al., 2013; Tribolo et al., 2013; Feathers, 2015; Jacobs and Roberts, 2015). They are also associated with the geographic spread of early behaviourally modern humans, since they both document a unique co-occurrence of evidence for intensive innovation, including relatively advanced lithic technologies amongst other material indicators of abstract thought (Henshilwood and Sealy, 1997; Henshilwood et al., 2001a, 2001b, 2002, 2004; D'Errico et al., 2005; Parkington et al., 2005; Rigaud et al., 2006; D'Errico and Henshilwood, 2007; Backwell et al., 2008; Brown et al., 2009; Texier et al., 2010; Marean, 2010; Porraz et al., 2013a, 2013b; Wadley and Prinsloo, 2014). The complex technological repertoires of the Still Bay and Howiesons Poort, in combination with elevated levels of trade and exchange, probably stimulated dissemination of knowledge and facilitated access to materials and food further afield (Ambrose, 1998, 2002; Deacon and Deacon, 1999; Mellars, 2006). This may have increased productivity levels with regards to access and defence of resources, which contingently transformed intra-group co-operation (Marean, 2014) and in turn increased effective environmental carrying capacity. Together, these advances are seen as having caused or enabled populations to grow and spread geographically (Deacon and Deacon, 1999). There is also growing support for the notion that behavioural complexity in the MSA arose as a function of oscillating population interactions, with the caveat that inferences regarding specific causes and effects are difficult to draw (Jacobs et al., 2008;

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Jacobs and Roberts, 2009; Powell et al., 2009). Moreover it is argued that similarity between technological elements in contemporaneous but spatially distant sites provides evidence for such interaction, which occurred across substantial distances in the Still Bay and Howiesons Poort (Wadley, 2007; Lombard et al., 2010; Henshilwood and Dubreuil, 2011; Henshilwood, 2012; Mackay et al., 2014; Soriano et al., 2015). In short, these phases of the MSA play a central role in our understanding of both human behavioural evolution and of early modern human demography.

Models based on the temporal and spatial dispersion of MSA techno-traditions hinge entirely on the reliability of assemblage attributions (Conard et al., 2014). This is problematic because: (a) the prevailing tendency to focus on technological similarity obscures important inter-assemblage variation; (b) the specific geographic, technological and morphological parameters used to evaluate these similarities are seldom justified; and (c) the reliability of tracing technological indicators of population interaction across time and space is often not tested rigorously (however see Wadley and Mohapi, 2008; Porraz et al., 2013a; Archer et al., 2015; Conard and Will, 2015; Soriano et al., 2015). Although strong counterarguments against assemblage pigeonholing were previously proposed (Parkington et al., 1980; Mazel, 1984; Parkington, 1993; among others), recently Lombard et al. (2012) suggested that variation in the southern African Stone Age cultural-historic sequence is most accurately interpreted as reflecting similarities and differences in artefact making 'traditions'. As discussed in the following section, this interpretation has not changed substantially since the 1920s (Goodwin and van Riet Lowe, 1929; Lombard et al., 2012), and the Still Bay complex, in particular, characterises this viewpoint. An MSA cultural phase characterized by specifically shaped bifacial points, the 'Still Bay' is a label used to classify broadly contemporaneous assemblages containing these technological elements. Bifacial points from spatially separated MSA sites are usually seen as products of a single demographic phenomenon, which is further inferred by some to represent a shared social network (Mellars, 1996; Jacobs and Roberts, 2009; Henshilwood and Dubreuil, 2011; Mackay et al., 2014).

However, relatively little consideration has been paid to the possibility of independent invention, or to the spatial or temporal distance beyond which technological convergence becomes a strong likelihood. For example, the presence of bifacial points in spatially separated Late Pleistocene localities may not necessarily indicate demographic links in the form of contemporaneous interacting populations. Bifacial points were widespread across most of Africa at various stages in the Middle and Late Pleistocene. At some geographic scale, it becomes unlikely that bifacial points in themselves reflect synchronic demographic connections as opposed to technological convergence or, less easy to test, divergence from an ancient common ancestor. However the scale at which convergence or drift become likely explanations for assemblage similarities or differences is seldom investigated or even discussed. Indeed, the amount of space and time separating technologically similar artefacts/assemblages is correlated with the probability of convergence (Kleindienst, 1968; Wang et al., 2012; Adler et al., 2014; Will et al., 2015). For instance, it is unlikely that the presence of bifacial foliates in the Aterian of north-west Africa or in the Somalian MSA necessarily means there is a connection to the Still Bay. The broader issue concerns at what spatial and temporal scales specific technologies can be assumed to relate to certain demographic groups. Here we question whether this assumption is warranted at the geographic scale of the Still Bay, as it is currently defined and accepted.

Identification of regionally specific variants at the spatial limits of the Still Bay may indicate that too much variability in MSA point morphologies is already being lumped together. Atypical Still Bay bifacial points from Apollo 11 in Namibia, and serrated bifacial points within the ~71 ka Still Bay point-bearing layers at Umhlatuzana may be examples of this (Lombard et al., 2010; Vogelsang et al., 2010). Still Bay sites of the southern and western Cape coasts are well over 1000 km from the cluster of sites further to the north-east (NE). However, bifacial point industries in ~70–77 ka levels found across the southern African sub-continent tend to be associated with the Still Bay techno-tradition, although this attribution has been carefully qualified in some cases (Lombard et al., 2010; Conard et al., 2013). In the context of continental scale variability, it is of critical importance where the lines are drawn for particular assemblage types and requires rigorous testing before inferences can be drawn about cultural transmission and biogeography.

Here we aim to assess the homogenous nature of the Still Bay, as well as the broader implications for our interpretations of human adaptation within the MSA. We contribute an interpretation of this phase by deconstructing variability in bifacial points – the fossile directeur of Still Bay material culture – drawn from some classic Still Bay sites, including Blombos, Diepkloof, Sibudu, Hollow Rock Shelter, Dale Rose Parlour, Umhlatuzana and Clanwilliam Dam East (Goodwin and van Riet Lowe, 1929; Henshilwood et al., 2001b; Wadley, 2007; Villa et al., 2009; Lombard et al., 2010; Högberg and Larsson, 2011). The high resolution statistical shape analysis tools of three dimensional geometric morphometrics are used to document and analyse variation in bifacial point shapes (Slice, 2007; Mitteroecker and Gunz, 2009). In addition, both experimental data and conventional measures of bifacial point shape variation are drawn on to interpret the identified geometric morphometric patterns in a behavioural context.

We stress that the broader issues described above are neither new nor restricted to the southern African MSA, and that the novel quantitative approach presented may be fruitfully applied to many other contexts of relevance to early modern human biogeography and behavioural evolution. Importantly, our approach enables investigation of how shape and size vary and, contingently, whether different design imperatives may be guiding point manufacture in different regions. We are also able to isolate components of shape variation associated with specific behaviours, remove this variation from the dataset, and look at the residual shape variability. Our hypothesis is that if the Still Bay is a coherent entity reflecting synchronic cultural contacts and transmission, then shape and size should vary similarly throughout the Still Bay region. Our prediction is that although Still Bay groups in different regions appear to have been making much the same types of artefacts, closer inspection of the actual products may show that they are systematically quite different.

2. Background

2.1. Still Bay definition, historical context and ages

Questions and ambiguities regarding the definition, origin and demographic implications of the Still Bay were raised from the very inception of the term. It was proposed initially to describe South African bifacial points with 'Solutric retouch' reportedly similar in form to Upper Palaeolithic points from Crôt du Charnier in eastern France (Arcelin, 1890; Malan and Goodwin, 1938; Henshilwood, 2012). The notion that complex technologies like Still Bay points necessarily had a single European origin were widely promoted by European researchers working in Africa (Van Hoepen, 1926; Heese, 1933; Breuil, 1948; see citations in Henshilwood, 2012), although South African and South Africa-based researchers avidly maintained that the origins of the southern African Stone Age were still open to question (Goodwin and Van Riet Lowe, 1929; Goodwin, 1953, 1958).