

Neanderthals and their contemporaries engineered stone tools

January 24 2012



Replica Levallois core (left) and flake (right) knapped by Dr Metin Eren

(PhysOrg.com) -- New published research from anthropologists at the University of Kent has scientifically supported for the first time the long held theory that early human ancestors across Africa, Western Asia and Europe engineered their stone tools.

For over a century, [anthropologists](#) have debated the significance of a

group of stone age artifacts manufactured by at least three prehistoric hominin species, including the Neanderthals (*Homo neanderthalensis*). These artifacts, collectively known as ‘Levallois’, were manufactured across Europe, [Western Asia](#) and [Africa](#) as early as 300,000 years ago.

Levallois artifacts are flaked [stone tools](#) described by archaeologists as ‘prepared cores’ i.e. the stone core is shaped in a deliberate manner such that only after such specialised preparation could a prehistoric flintknapper remove a distinctive ‘Levallois flake’. Levallois flakes have long been suspected by researchers to be intentionally sought by prehistoric hominins for supposedly unique, standardised size and shape properties. However, such propositions were regarded as controversial by some, and in recent decades some researchers questioned whether Levallois tool production involved conscious, structured planning that resulted in predetermined, engineered products.

Now, an experimental study – in which a modern-day flintknapper replicated hundreds of Levallois artifacts – supports the notion that Levallois flakes were indeed engineered by prehistoric hominins. By combining experimental archaeology with morphometrics (the study of form) and multivariate statistical analysis, the Kent researchers have proved for the first time that Levallois flakes removed from these types of prepared cores are significantly more standardised than the flakes produced incidentally during Levallois core shaping (called ‘debitage flakes’). Importantly, they also identified the specific properties of Levallois flakes that would have made them preferable to past mobile hunter-gathering peoples.

Dr Metin Eren, Leverhulme Early Career Fellow at the University’s School of Anthropology and Conservation and the flintknapper who crafted the tools, said: ‘The more we learn about the stone tool-making of the Neanderthals and their contemporaries, the more elegant it becomes. The sophistication evident in their tool-making suggests

cognitive abilities more similar to our own than not.’

Dr Stephen Lycett, Senior Lecturer in Human Evolution and the researcher who conducted the laboratory analysis of the tools, commented: ‘Mobility is a factor in the lives of all hunter-gatherer populations, including Late Pleistocene hominins. Since mobile hunter-gatherers can only carry a fixed number of tools, it is paramount that the potential usefulness of their tools is optimised relative to their weight. The new analyses indicated that Levallois flakes appear to optimise their utility in a variety of ways relative to other flakes. These flakes are on average thicker across their surface area than debitage flakes, and more uniformly thick. These properties would have optimised durability. However, relative to size, the maximum thickness of Levallois flakes is actually less than debitage flakes. This would have provided greater potential for use, resharpening, and re-use, time and again. The symmetry and evenly distributed thickness of Levallois flakes would also align the tool’s centre of mass with the tool’s motion during use, making them ergonomically desirable.’

Dr Lycett also explained that ‘amongst a variety of choices these tools are ‘superflakes’. They are not so thin that they are ineffective but they are not so thick that they could not be re-sharpened effectively or be unduly heavy to carry, which would have been important to hominins such as the Neanderthals’.

More information: 'Why Levallois? A morphometric comparison of experimental 'preferential' Levallois flakes versus debitage flakes' (Metin I. Eren and Stephen J. Lycett, University of Kent) is published in the journal *PLoS ONE*. [dx.plos.org/10.1371/journal.pone.0029273](https://doi.org/10.1371/journal.pone.0029273)

Provided by University of Kent

Citation: Neanderthals and their contemporaries engineered stone tools (2012, January 24)
retrieved 20 September 2024 from

<https://phys.org/news/2012-01-neanderthals-contemporaries-stone-tools.html>

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