Neanderthal brawn lost out to social human brain

March 13 2013, by Mariette Le Roux

This file photo shows visitors of the Museum for Prehistory in Eyzies-de-Tayac looking at a Neanderthal man ancestors' reconstructed images, on July 19, 2004. Neanderthals' bigger eyes and bodies meant they had less brain space to dedicate to social networking, which may explain why they died out and Homo sapiens conquered the planet, according to a new study.

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An enigmatic branch of the human family tree, Neanderthals lived in parts of Europe, Central Asia and Middle East for up to 300,000 years but vanished from the fossil record about 30-40,000 years ago.

Why they disappeared is one of the hottest topics in anthropology. Theories say they may have been victims of climate change or were massacred by their H. sapiens cousins.

Now experts from the University of Oxford and the Natural History Museum in London suggest the answer could lie in available brainpower.

Neanderthals were stockier than anatomically modern humans who shared the planet with them at the time of their demise, but their brains were the same size, the team write in the journal Proceedings of the Royal Society B.

As a result, Neanderthals "would have required proportionately more neural matter" to maintain and control their larger bodies, they say.

Comparing the skulls of 32 H. sapiens and 13 Neanderthals, the researchers also established the hominids had bigger eye sockets, indicating bigger eyes and visual cortices—those areas of the brain that regulate vision.

"More of the Neanderthal brain would have been dedicated to vision and body control, leaving less brain to deal with other functions like social networking," explained Oxford anthropologist and lead author Eiluned Pearce.

Among living primates and humans, the size of an individual's social network is constrained by the size of specific brain areas, she said.

The larger these areas are, the more connections an individual can maintain.

The archaeological record seems to support the theory that Neanderthals were cognitively limited to smaller groups—they transported raw materials over shorter distances and rare finds of symbolic artefacts suggest a limited ability to trade.

A visitor looks at an exhibit comparing Neanderthals to Homo sapiens, at the Field Museum in Chicago, Illinois, on March 7, 2006. Neanderthals' bigger eyes and bodies meant they had less brain space to dedicate to social networking, which may explain why they died out and Homo sapiens conquered the planet, according to a new study.

The ability to organise a collective response would have been a key to

survival when times turned harsh, like during the Ice Age, Pearce told AFP.

"If Neanderthals knew fewer people in fewer neighbouring groups, this would have meant fewer sources of help in the event of, for example, local resource failure," she said.

"Smaller groups are also more liable to demographic fluctuations, meaning a greater chance of a particular group dying out. Smaller groups are less able to maintain cultural knowledge, so innovations may be more likely to be lost."

She added: "Overall, if Neanderthals had smaller groups/social networks, this could have led to their extinction along a variety of pathways."

Neanderthals probably had larger eyes in the first place because they hailed from higher latitudes and had to deal with lower light than H. sapiens, who evolved in lower-latitude Africa.

"While the physical response to high latitude conditions adopted by Neanderthals may have been very effective at first, the social response developed by anatomically modern humans seems to have eventually won out in the face of the climate instability that characterised high latitude Eurasia at this time," the study concludes.

The relationship between absolute brain size and higher cognitive abilities has long been controversial, the authors admit.

Their finding, that similar-sized brains had been differently organised, "could explain why Neanderthal culture appears less developed than that of early humans, for example in relation to symbolism, ornamentation and art."

More information: Paper: rspb.royalsocietypublishing.or … .1098/rspb.2013.0168