

Did Neandertals Think Like Us?

João Zilhão defends his controversial view that our oft-maligned relatives shared our cognitive abilities

KEY CONCEPTS

- Scientists have traditionally considered *Homo sapiens* the only species to invent and use symbols.
- But over the past few decades archaeologists have discovered a handful of enigmatic artifacts hinting that our cousins the Neandertals—long dismissed as intellectually inferior—might have engaged in symbolic activities, too. Experts dismissed the finds, however, attributing them to modern humans instead.
- The recent discovery of Neandertal jewelry and body paint from two sites in Spain provides unequivocal evidence of Neandertal symbolism and suggests that modern human behavior has ancient roots.

—The Editors

For the past two decades archaeologist João Zilhão of the University of Bristol in England has been studying our closest cousins, the Neandertals, who occupied Eurasia for more than 200,000 years before mysteriously disappearing some 28,000 years ago. Experts in this field have long debated just how similar Neandertal cognition was to our own. Occupying center stage in this controversy are a handful of Neandertal sites that contain cultural remains indicative of symbol use—including jewelry—a defining element of modern human behavior. Zilhão and others argue that Neandertals invented these symbolic traditions on their own, before anatomically modern humans arrived in Europe around 40,000 years ago. Critics, however, believe the items originated with moderns.

But this past January, in a paper published in the *Proceedings of the National Academy of Sciences USA*, Zilhão and his colleagues reported on finds that could settle the dispute: pigment-stained seashells from two sites in Spain dated to nearly 50,000 years ago—10,000 years before anatomically modern humans made their way to Europe. Zilhão recently discussed the implications of his team's new discoveries with *Scientific American* staff editor Kate Wong. An edited version of their conversation follows.

SCIENTIFIC AMERICAN: Paleoanthropologists have been arguing about Neandertal behavior for decades. Why all the fuss?

JOÃO ZILHÃO: The debate of the past 25 years stems from the theory that anatomically modern humans originated in Africa as a new species and then spread out from there, replacing archaic humans such as the Neandertals. Added to this notion was the tenet that species are defined as much by anatomy as by behavior. Thus, Neandertals, not being modern in anatomy, could not by definition be modern in behavior.

But there were problems with this model. In 1979 archaeologists working at the site of St. Césaire in France found a Neandertal skeleton in a layer containing cultural remains made in the so-called Châtelperronian tradition. At the time, experts believed that the Châtelperronian artifacts—body ornaments and sophisticated bone tools, among other elements—were manufactured by modern humans. But the St. Césaire find established its association with the Neandertals instead. Then, in 1995, researchers determined that the human remains found in the Châtelperronian levels of another French site, the Grotte du Renne at Arcy-sur-Cure, were also those of Neandertals.

To reconcile these discoveries with the idea



VIKTOR DEAK

that modern humans alone were capable of such advanced practices, some researchers proposed that the artifacts somehow got mixed into the Neanderthal deposits from overlying early-modern human deposits. Others argued that the Neandertals simply copied their modern human contemporaries or obtained the items from them through scavenging or trade but did not really understand them and never integrated them into their culture in the same way moderns did. This controversy has never really been settled to the satisfaction of all those involved, which is where our new finds from Spain come in.

SA: What exactly did you find and how did you find it?

JZ: The material comes from two sites. One is a cave in southeast Spain called Cueva de los Aviones, which was excavated in 1985 by Ricardo Montes-Bernárdez of the Fundación de Estudios Murcianos Marqués de Corvera. In his reports Montes-Bernárdez mentioned having found three perforated cockle shells in the deposits, but no one paid attention at the time. After reading about the shells in his papers a few years ago, I went to the museum housing the materials he

▲ **NEANDERTAL ADORNMENTS** appear to have included face paint and pendants, according to recent discoveries made at two sites in Spain. Such items indicate that Neandertals were capable of symbolic thought—a crucial element of modern human behavior.

collected and asked to see them. They immediately struck me as being of major importance because such shells are typically considered pendants when discovered in archaeological deposits. But we didn't know the age of the material, so the first thing was to select samples for radiocarbon dating. The dates came out at 48,000 to 50,000 years ago.

Because most of the shells in the collection had never been washed, I checked to see if there were other specimens of note. One of the shells turned out to be a Mediterranean oyster shell, the cleaning of which revealed a stain that I thought could be pigment residue. Analysis of the substance identified it as a mix of red pigment, called lepidocrocite, and finely ground up bits of dark red and black hematite and pyrite, which would have added sparkle. My colleagues and I also came across a naturally pointed horse bone bearing some reddish pigment on the tip. And we found lumps of yellow and red pigment, including a very large deposit of a mineral called natrojarosite, the quantity and purity of which indicated that it had been stored in a purse that eventually perished, leaving only the mineral behind.

▼ **SCALLOP SHELL PENDANT** was painted with an orange pigment, perhaps so that the exterior of the shell (*right half*) matched the naturally colorful interior (*left half*). Pigment found on the tip of a naturally pointed horse foot bone (*above shell*) suggests that the Neandertals used the bone to mix or apply their paints.



SA: What did you unearth at the second site?

JZ: At around the same time that I was inspecting the Aviones collection, I was also going through the finds of the September 2008 field season at a large rock shelter some 60 kilometers inland from Aviones called Cueva Antón, where I have been excavating Neandertal deposits since 2006. One of the items was a perforated scallop shell that one of my undergraduate students had collected on the second day of excavation. I had originally thought it was a fossil shell unrelated to human activities. But when I started to clean it, I found it was very fresh and full of color. On closer inspection, it seemed that the whitish exterior of the shell had been painted with an orange pigment, which turned out to be a mix of hematite and another mineral called goethite.

SA: What do you think the Neandertals were doing with these items?

JZ: The interesting thing about natrojarosite is that it has only one known use, and that's as a cosmetic. So we infer that that's how it was used at Aviones as well. The horse bone with the reddish tip may have been used to mix or apply pigment or to pierce through hide that had been colored with pigment. And the unperforated Mediterranean oyster shell bearing the traces of a glittery red mixture was probably a paint cup.

The simplest explanation for the natrojarosite and sparkly red pigment and the context in which they were found is some kind of body painting, specifically facial painting. But whether the Neandertals applied them on a daily basis after waking up or whether it was something that they did for ritual reasons on special occasions—for celebrations or perhaps for mourning—we don't know.

In addition, one of the perforated cockle shells from Aviones had bits of red ochre adhering to its inner side near the hole. In this case, the most likely scenario is that the shell had been painted, because you cannot use a shell with holes in it as a container. Thus, in addition to painting their bodies, the Neandertals at both sites painted perforated shells, which they presumably used as pendants.

COURTESY OF FRANCESCO DERRICO University of Bordeaux (for bone); COURTESY OF JOAO ZILHAO University of Bristol (shell fragments)

SA: Your analyses did not yield evidence that the holes in the cockle and scallop shells at these sites were man-made, nor were you able to find traces of use on the edges of the holes themselves, so how do you know they were used decoratively?

JZ: These species are found only in deep water, so by the time they wash ashore they no longer contain any flesh, which means they were not collected for food. And they have pigments associated with them. What is the alternative? If you open any book of ethnographic shell ornaments from Africa or Oceania, you'll see examples of shells of these or related species with natural perforations used as ornaments.

SA: What are the implications of these discoveries in terms of understanding the origin of behavioral modernity in humans?

JZ: The one thing these finds make clear is that Neandertals were behaviorally modern. They were not like early modern humans anatomically, but they were cognitively as advanced or more so. There are several possible conclusions one could draw from this observation. Either modern cognition and modern behavior emerged independently in two different lineages, or they existed in the common ancestor of Neandertals and anatomically modern humans; or the groups we call Neandertals and modern humans were not different species and therefore we should not be surprised that despite the anatomical differences there are no cognitive differences, which is the conclusion I favor.

In my view, the emergence of modern human behavior is the slow, perhaps intermittent accumulation of knowledge that, as population densities increase, gives rise to social identification systems, which appear in the archaeological record in the form of personal ornaments, body painting, etcetera. That such early examples of behavioral modernity are rare is what we should expect. That's what the beginning of an exponential process like this one should look like.

SA: So modern behavior—as represented by body decoration, artwork, and so on—is the product of needing to communicate with or identify members of a growing population?

JZ: Yes, in a world where the frequency of encounters with strangers would be such that you need to have ways to know whether a stranger is



friend or foe, whether it's someone to whom your kin owes favors or is owed favors.

SA: But do you think something had to change in the hardware, the brain, at some point in the human lineage before modern human behavior could arise?

JZ: Yes, I think that happened 1.5 million to two million years ago—or somewhere between 500,000 and a million years ago at the latest—when average brain size reached the modern range. If we could clone a human who lived 500,000 years ago, put him in a surrogate womb, and then after birth nurture him as a human of today, would he be able to fly an airplane? Maybe some of my colleagues would say no, but my answer is he would.

SA: If Neandertals in Spain were making ornaments 10,000 years before moderns arrived in Europe, do you think that, rather than Neandertals copying moderns, the reverse might have occurred?

JZ: Prior to entering Europe, modern humans did not have pierced or grooved mammal teeth like the ones found in the Châtelperronian, nor did they have perforated bivalve shells like the ones we found in Spain. But once they enter Europe, they have them. Where did the moderns get these ornaments? If we were talking about people in the Copper Age, we would conclude that the incomers got them from the locals. Why should we have a different logic for Neandertal things? ■

▲ **JOÃO ZILHÃO** has long argued that Neandertals invented symbolic practices independently of anatomically modern humans. Here he sifts through sediments at a site located in the same region as the sites that yielded the Neandertal finds.

➔ MORE TO EXPLORE

The Morning of the Modern Mind. Kate Wong in *Scientific American*, Vol. 292, No. 6, pages 86–95; June 2005.

Twilight of the Neandertals. Kate Wong in *Scientific American*, Vol. 301, No. 2; pages 32–37; August 2009.

Symbolic Use of Marine Shells and Mineral Pigments by Iberian Neandertals. João Zilhão et al. in *Proceedings of the National Academy of Sciences USA*, Vol. 107, No. 3, pages 1023–1028; January 19, 2010.