Survival of the friendliest? Why Homo sapiens outlived other humans

We once shared the planet with at least seven other types of human. Ironically, our success may have been due to our deepest vulnerability: being dependent on others

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HUMANS today are uniquely alone. For the majority of the existence of *Homo sapiens*, we shared the planet with many other types of human. At the time when our lineage first evolved in Africa some 300,000 years ago, there were at least five others. And if you were going to place a bet on which of those would outlast all the rest, you might not have put your money on us.

The odds would have seemed more favourable for the Neanderthals, who had already

adapted to live in colder conditions and expanded to inhabit much of Eurasia. Or Homo erectus, who had made a success of living in south-east Asia. By contrast, our direct *Homo sapiens* ancestors were the new kids on the block, and wouldn't successfully settle outside of Africa until more than 200,000 years later. Yet, by 40,000 years ago, or possibly a bit more recently, we were the only humans left standing. Why?

Many explanations have been put forward: brainpower, language or just luck. Now, a new idea is building momentum to explain our dominance. Ironically, it may be some of our seemingly deepest vulnerabilities – being dependent on others, feeling compassion and experiencing empathy – that could have given us the edge.

Today, surrounded by computers, phones and all the other clever things we have invented, it is easy to pin our success on our cognitive abilities. But the more we learn about other types of human, the more they seem similar to us in this regard. In the case of Neanderthals, and possibly the mysterious Denisovans, this includes the ability to make sophisticated tools, such as projectile spears that enabled them to hunt large game. Similarly, we are discovering that artistic flair – a marker for the ability to think symbolically, and thought to be another vital ingredient for our dominance – wasn't just the preserve of our species. *Homo erectus* etched patterns onto shells some 500,000 years ago and Neanderthals drew on cave walls.

More recently, the focus has shifted from intelligence to our ability to network with strangers: the survival of the friendliest. Archaeological evidence shows, for example, that *Homo sapiens* not only lived in larger groups than all other humans, but had an unparalleled ability to form alliances beyond their immediate group. It might be that these social abilities helped to make us the most adaptable humans, the only ones capable of occupying every single biome on the planet.

Other humans certainly became adept at living in particular environments. *Homo heidelbergensis* and the Neanderthals, for example, had the cultural and technological skills – the ability to make clothing, fire and shelter – needed to branch out into colder climes. The diminutive newly discovered Homo luzonensis, along with Homo floresiensis (aka the hobbit), thrived in woodland environments. "But it is doubtful that these humans would have been successful if they were magically plopped down in the other's habitat, whereas *sapiens* likely could have," says Brian Stewart, an archaeologist at the

University of Michigan.

Stewart, together with Patrick Roberts, an archaeologist at the Max Planck Institute for the Science of Human History in Jena, Germany, argues that our *Homo sapiens* ancestors set themselves apart by developing a new ecological niche, which they call the generalist specialist. "Not only could *Homo sapiens* generalise and expand across the world, but specific populations could also specialise in certain environments," says Roberts. "Together, this allowed our ancestors to thrive in the face of climatic and environmental variability."

However, it still isn't clear how we became the masters of adaptability. Now, Penny Spikins, an archaeologist at the University of York, UK, has a new explanation. She thinks that our emotional nature and frailties gave us the edge. "Our emotional neediness gave us the drive to connect with others," she says. And expanding our network made us more resilient, allowing us to flourish in many different environments.

To understand why, we have to turn the clock back around 2 million years to when these complex emotions appear to have emerged, and travel to southern Africa to meet our ape-like ancestor *Australopithecus*. Here, we find the earliest known examples of the possible care for sick or injured hominins, with evidence from the skeletons of individuals who lived with bone problems that would have caused pain and disability, such as a teenage boy with a spinal tumour. "They almost certainly received some level of help, being given food and protection, to survive with these conditions," says Spikins, whose book exploring these ideas, Hidden Depths: The origins of human connection, will be published next year.

Care in the community

Examples in the archaeological record of caring for fellow hominins increase over time and are commonplace by the time Neanderthal communities emerge. One Neanderthal skeleton found in Shanidar cave in Iraq and dated to about 50,000 years ago shows signs of multiple severe injuries, including the loss of the right forearm and hand. But remarkably, this individual survived for 10 to 15 years after his accident, and was carefully buried when he died aged between 40 and 50. "His care must have been extensive," says Spikins.

This investment in caring brought benefits for the group as well as the individual. "It allowed humans to hunt dangerous animals whilst living with the consequences in terms of injury risks. And it also allowed longer lifespans, enabling grandparents to be

involved in infant care, as well as passing on knowledge and skills," she says.

Explore key Neanderthal sites with archaeologist Rebecca Wragg-Sykes: On a Discovery Tour of France

Archaeological evidence of those benefits becomes increasingly apparent as we get closer to the present day, showing humans hunting animals larger than themselves and working together to tackle particularly dangerous beasts, such as woolly rhinoceros, mammoths and giant Cape buffalo.

But when *Homo sapiens* emerged, they took these collaborative skills one step further and began to extensively interact with others outside their own immediate group – something not seen before. Exactly what drove this is unclear, but large swings in climate in Africa would have made life difficult, and those who collaborated may have been more likely to survive. Around 320,000 years ago, in the Olorgesailie basin in what is now southern Kenya, people began to transfer obsidian – a highly valued volcanic glass used for spear points – over longer distances, up to 90 kilometres in some cases. This suggests that interactions were occurring with neighbouring groups. Over time, these long-distance networks expanded. By 30,000 years ago, Stewart and his colleagues have shown that *Homo sapiens* in southern Africa were exchanging ostrich eggshell beads over distances of more than 300 kilometres.

This expansion of our social networks was a significant part of our success, says Chris Stringer at the Natural History Museum, London. "Interacting with more people allowed us to acquire behaviours and inventions from neighbouring groups, which may have aided survival." By contrast, the Neanderthal's apparently insular way of life may have cost them dear. Ten wooden throwing spears, excavated from a mine in Schöningen, near Hannover in Germany, and dated to around 300,000 years ago, would have enabled those who used them – perhaps early Neanderthals – to hunt big game from a distance. "You would assume that such a good invention could never be lost, but maybe within 10,000 years of the Schöningen people living there, the entire area was covered by an ice sheet and all these humans were gone," says Stringer. "If these people weren't part of a much wider social network then the technology that was special to their group would have died with them."

"If things had turned out differently, would it be Neanderthals' ancestors here today?"

Not only did such networks allow *Homo sapiens* to pass knowledge on, but they were an insurance policy for when times are bad. "If a drastic climate change occurred, then some populations might struggle, but others living in a different region might thrive, and may have been able to help out their neighbours. This would have allowed us to become incredibly resilient," says Roberts.

He and his colleagues have found evidence for this kind of supporting collaboration in the dense jungle environments of south Asia, some 50,000 years ago, when *Homo sapiens* first settled this region. These pioneers spread across this challenging environment with unprecedented speed. The isotope chemistry of bones found deep within the jungles of Sri Lanka reveal that *Homo sapiens* inhabited the rainforest all year round. "They became rainforest specialists, using bow and arrow to hunt monkeys and giant squirrels," says Roberts. But artefacts found alongside their bones, such as marine shell beads and sharks' teeth, indicate that they also had contact with populations from coastal regions. "What you end up with is a beautiful picture of two different populations – one in the forest and one on the coast – and they are communicating," says Roberts.

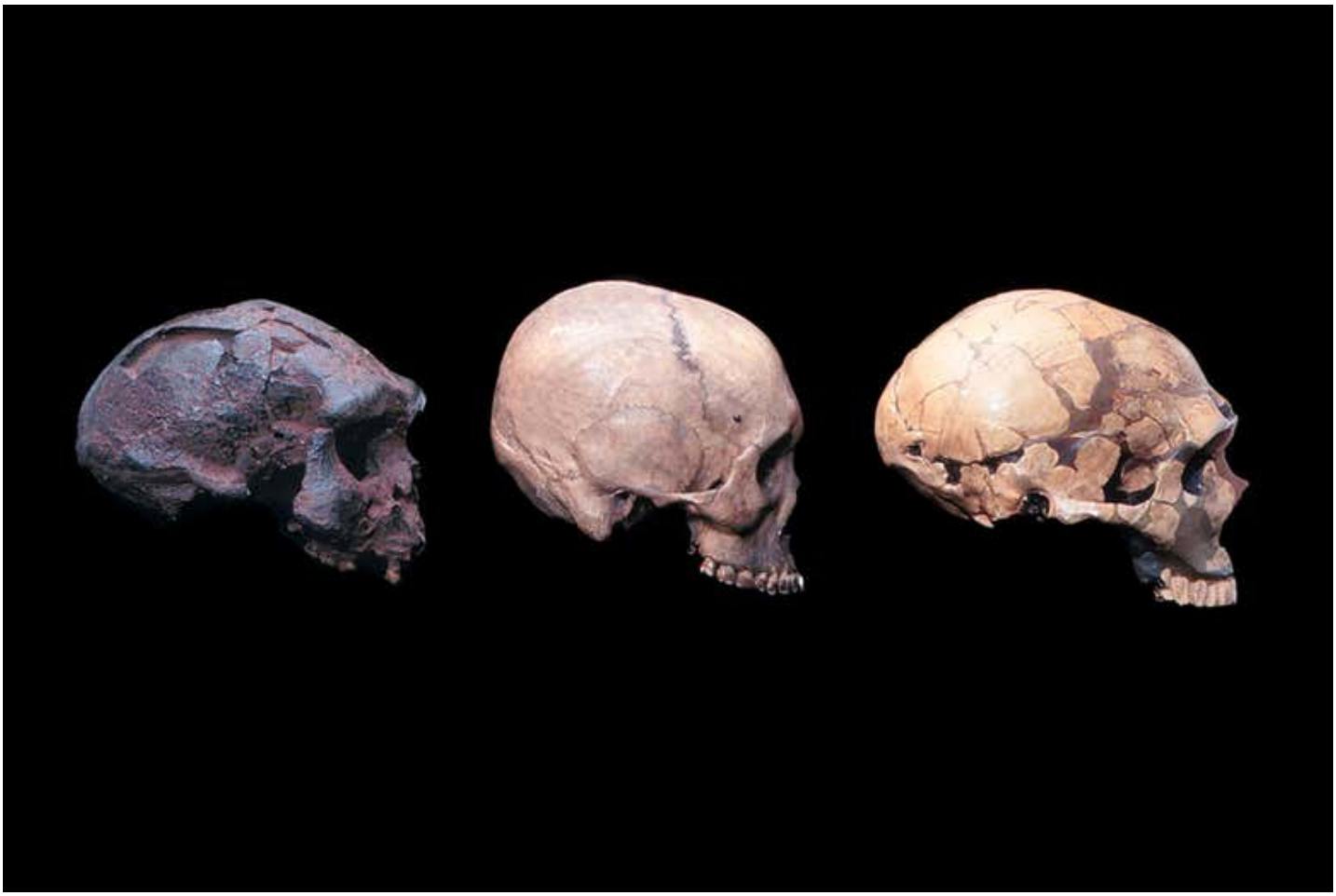
The more we look, the more we see evidence for increased social interaction and wider networks when *Homo sapiens* first emerge. But what gave us the courage to interact with our neighbours in a way not seen in other human lineages? Genomic analysis of a rare genetic condition known as Williams syndrome has recently shed light on this question.

People with Williams syndrome are often hyper-social – trusting and happy to hug strangers. The condition is also associated with a range of health risks, including heart issues, and a distinct physical appearance, including delicate facial features such as smaller teeth.

The syndrome is caused by small deletions of genetic material, of which one gene – *BAZ1B* – has been the subject of much research during the past decade. This gene is associated with the control of neural crest cells, which form the basis for many tissues during embryonic development and create the adrenal glands that influence our hormonal response to stressful events. The absence of this gene results in reduced migration of the cells, providing an explanation for the delicate facial features and health issues associated with Williams syndrome, as well as the reduced levels of fear, leading to hyper-social behaviour.

The genetic changes associated with Williams syndrome caught the attention of Cedric Boeckx at the Catalan Institution for Research and Advanced Studies in Barcelona,

Spain. He wondered if they could help explain why our *Homo sapiens* ancestors started to expand their social networks in the past. Working with Giuseppe Testa at the University of Milan, Italy, the researchers compared the modern human genome with that of our closest relatives, the Neanderthals and Denisovans, and found that *BAZ1B* had undergone many more mutations in *Homo sapiens*, suggesting strong evolutionary selection pressure for traits associated with this gene. "It gives us a handle on the direction of genetic change that may have made us more tolerant of strangers," says Boeckx.



Compared with Homo erectus (left) and Homo Neanderthalensis (right), Homo sapiens (centre) has more delicate facial features
Natural History Museum, London/Science Photo Library

What's more, the same mutations may explain why Neanderthals are sometimes described as looking brutish, with their heavy brow ridges and robust jawline. "As well as making us less aggressive, these genetic changes seem to result in physical features that make us appear less threatening," says Spikins.

Essentially, it seems that our Homo sapiens ancestors "domesticated" themselves. Archaeological finds confirm that the softening of our facial features, with the development of smaller skulls, flatter faces and tinier teeth, starts to occur in our lineage

around 300,000 years ago.

The question then becomes what effect these changes had. To find out, scientists have looked at other species that have also undergone similar genetic changes and evolved in the "friendly" direction, such as bonobos – a highly social ape – and animals that have been deliberately domesticated, including dogs, sheep and cows.

Compared with chimpanzees, which haven't undergone self-domestication, bonobos are less scared of strangers and more willing to share and interact in a positive way with others at the borders of their territory. Similarly, dogs are more tolerant than wolves of living in a group with unrelated animals, and dogs have evolved flatter faces that are capable of more expression. "Being expressive enables greater communication and makes you less threatening," says Spikins.

"Our emotional neediness may have been our trump card during climate changes"

In the case of *Homo sapiens*, it appears that we took expressiveness to another level, with the development of language. "It seems likely that language helped us to maintain our social networks and was one of the skills that enabled us to adapt to lots of different environments," says Boeckx.

There are, however, downsides to the social traits acquired during our long-running process of self-domestication. "Becoming more connected and tolerant towards other people gave us greater strength as a community, but our underlying drive to please others and belong to a group also makes individuals vulnerable to being lonely, depressed and anxious," says Spikins.

By 50,000 years ago, *Homo sapiens* had become well established across Eurasia, having finally burst successfully out of Africa. Then, between 50,000 and 40,000 years ago, there seems to have been a crunch, from which the Neanderthals and Denisovans were never able to recover. There was an intense cooling of the climate and a major volcanic eruption in Italy around 39,000 years ago, and a reversal of Earth's magnetic field around 42,000 years ago, which together are thought to have caused major climate changes around the world.

It is possible that our emotional neediness was our trump card during this difficult period. "Our drive to connect with others may have helped us to network more widely and cope better with the immense environmental changes at that time," says Spikins. Luck certainly played a part too. Perhaps our emotional skills just happened to be the

best tool to navigate this particular challenge. Had the environment been different, it might have been other types of human that were better equipped to cope. “If things had turned out differently, for example with a more stable climate, would it be Neanderthals’ ancestors here today?” says Spikins.

As Boeckx says: “The history of humans is full of fits and starts, and we are just looking at a snapshot of the last time we got lucky.”

The others

New Scientist audio Many other types of human existed at the same time as us. The best known are outlined below, but there are likely to be more, as yet undiscovered.

Homo erectus

The first of our ancestors to develop shorter arms and longer legs, and to expand beyond Africa ~1.8 million years ago (ya)

When: 1.89 million to 110,000 ya

Where: Africa, western and eastern Asia, perhaps Europe

Homo heidelbergensis

The first humans to live in colder climates and routinely hunt large animals. Thought to have eventually evolved into *Homo neanderthalensis* in Europe and *Homo sapiens* in Africa

When: 700,000 to 200,000 ya

Where: Eastern and southern Africa, Europe and possibly Asia

Homo neanderthalensis (Neanderthal)

Shorter and stockier than us, with a protruding brow ridge and brains as large as ours, if not larger

When: 400,000 to 40,000 ya

Where: Europe, south-western to central Asia

Denisovan (no formal species name due to lack of fossil material)

Identified in 2010 from DNA in a finger bone found in Siberia. Denisovan populations overlapped and interbred with Neanderthals and *Homo sapiens*

When: Highly uncertain – at least 300,000 ya to as recent as 15,000 ya

Where: East Asia

Where: East Asia

Homo naledi

Discovered in 2013. Displays a mix of ancient and modern human features (small brain, very long fingers but modern human-like hands and feet). Its anatomy suggests it walked on two legs, but could climb and hang from trees.

When: 335,000 to 235,000 ya

Where: South Africa

Homo luzonensis

First identified in 2019 from a few bones, this diminutive human has a blend of ancient and modern features, hinting that it might have been a descendant of an early pre-*Homo erectus* dispersal out of Africa.

When: ? to 50,000 ya

Where: The island of Luzon in the Philippines

Homo floresiensis (nickname: the hobbit people)

Discovered in 2003, these small yet capable people, with tiny brains, large teeth, no chin and a receding forehead, used stone tools, hunted small elephants and may have used fire. Their diminutive stature might have been a form of island dwarfism, or it could reflect a shared ancestry with **Homo luzonensis**, from an early wave of small humans that ventured into Asia.

When: 190,000 to 50,000 ya

Where: Flores island, Indonesia

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