

# EAORC BULLETIN 971 – 23 January 2022

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## NOTICES

### PUBLICATION ALERTS

If you have had a paper or book published, or you see something which would be of interest to the group, please send me a publication alert so that I can include it in the newsletter. Many thanks to those who have already sent in alerts.

If there is a journal you feel I should be tracking on a regular basis, let me know.

And if you have any other ideas for extending the “EAORC experience”, please contact me.

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### ACADEMIA.EDU – On the working memory of humans and great apes

*Neuroscience and Biobehavioral Reviews* 134:104496 (2022).

#### **DWIGHT W. READ, HÉCTOR M. MANRIQUE & MICHAEL J. WALKER – On the working memory of humans and great apes: Strikingly similar or remarkably different?**

In this article we review publications relevant to addressing widely reported claims in both the academic and popular press that chimpanzees working memory (WM) is comparable to, if not exceeding, that of humans. WM is a complex multidimensional construct with strong parallels in humans to prefrontal cortex and cognitive development. These parallels occur in chimpanzees, but to a lesser degree. We review empirical evidence and conclude that the size of WM in chimpanzees is  $2 \pm 1$  versus Miller’s famous  $7 \pm 2$  in humans. Comparable differences occur in experiments on chimpanzees relating to strategic and attentional WM subsystems. Regardless of the domain, chimpanzee WM performance is comparable to that of humans around the age of 4 or 5. Next, we review evidence showing parallels among the evolution of WM capacity in hominins ancestral to Homo sapiens, the phylogenetic evolution of hominins leading to Homo sapiens, and evolution in the complexity of stone tool technology over this time period.

## ACADEMIA.EDU – Interpopulational variation in human brain size: implications for hominin cognition

*Anthropological Review* 84:4, 405-429 (2021).

### **GARY CLARK & MACIEJ HENNEBERG – Interpopulational variation in human brain size: implications for hominin cognitive phylogeny**

Throughout the hominin lineage brain size is believed to have increased threefold – increase which, it is argued by some researchers, results in the enhanced brain power that distinguishes humans from any other living being. However, as we demonstrate in this article this supposed increase is the result of comparing the species mean of contemporary humans with other great apes and fossil hominins. This method obscures both interpopulational variation among modern humans, and the fact that the putative increases in the mean are the result of an increase in the upper limit in some populations, which has the result of obscuring the relative stasis in the lower limit over the last 600k years. For example, populations such as Aboriginal Australians have a range that is more different from Danes than it is from that of Asian *H. erectus* over the last 600ka. Yet Aboriginal Australians, whose unique anatomy seems to be related to the climatic conditions of Australia, possess all of the socio-cognitive traits characteristic of all other modern-day populations – yet they seemed not to have undergone increase in brain size to the degree that many other populations have. In this instance brain size seems to be unrelated to cognition. In this article we present a statistical analysis of interpopulational variation in contemporary humans and why such an analysis is crucial for our understanding of hominin cognitive, social and technological evolution. We also suggest how such variation may add to our understanding of hominin ontogeny or life history. Additionally, we develop a model based on humanity's unique form of embodied social cognition that results from our upright bipedal posture and hand morphology. This model is then used to explain the results of our statistical analysis and the possible factors underpinning the human emergence.

[https://www.academia.edu/67845986/Interpopulational variation in human brain size implications for hominin cognitive phylogeny](https://www.academia.edu/67845986/Interpopulational_variation_in_human_brain_size_implications_for_hominin_cognitive_phylogeny)

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## ACADEMIA.EDU – Cognitive and behavioral modernity in *Homo erectus* & hominin brain evolution

*Anthropological Review* 84:4, 467-485 (2021).

### **GARY CLARK & MACIEJ HENNEBERG – Cognitive and behavioral modernity in *Homo erectus*: skull globularity and hominin brain evolution**

In this article we provide evidence that evolutionary pressures altered the cranial base and the mastoid region of the temporal bone more than the calvaria in the transition from *H. erectus* to *H. sapiens*. This process seems to have resulted in the evolution of more globular skull shape – but not as a result of expansion of the brain in the parietal regions but of reduction of the cranial base and the mastoid region relative to the parietals. Consequently, we argue that expansion of the parietals seems to be unrelated to brain evolution, but is more a by-product of reduction in other regions of the skull, reduction that may be related to dietary factors. Additionally, these findings suggest that cognitive and behavioural modernity may not necessarily be dependent on brain shape. Also, it cannot be attributed to the change in brain size because *H. erectus* and modern human cranial capacities overlap substantially. Consequently, we suggest *H. erectus* possessed the full suite of cognitive adaptations characteristic of modern humans without possessing a globular skull with flared parietals. Our results also support the theory that paedomorphic morpho-genesis of the skull was important in the transition from *H. erectus* to *H. sapiens* and that such changes may be related to both dietary factors and social evolution.

[https://www.academia.edu/67846116/Cognitive and behavioral modernity in \*Homo erectus\* skull globularity and hominin brain evolution](https://www.academia.edu/67846116/Cognitive_and_behavioral_modernity_in_Homo_erectus_skull_globularity_and_hominin_brain_evolution)

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## NEWS

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### **BREAKING SCIENCE – Africa's Oldest Known Modern Human Fossils are 233,000 Years Old**

In the 1960s, paleoanthropologists uncovered the remains of anatomically modern *Homo sapiens* — known as Omo I — in the lower Omo valley of southern Ethiopia. Earlier attempts to date the Omo I fossils suggested they were 197,000 years old, but the new research shows they must be older than a major explosive eruption of Shala volcano in the Main Ethiopian Rift that took place 230,000 years ago and represent the earliest evidence of our species, *Homo sapiens*.

[http://www.sci-news.com/othersciences/anthropology/omo-i-fossils-10474.html?utm\\_source=feedburner&utm\\_medium=email](http://www.sci-news.com/othersciences/anthropology/omo-i-fossils-10474.html?utm_source=feedburner&utm_medium=email)

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### **SCIAM NEWS – Rockshelter Discoveries Show Neandertals Were a Lot like Us**

Our much maligned cousins made sophisticated ornaments and probably had language.

<https://www.scientificamerican.com/article/rockshelter-discoveries-show-neandertals-were-a-lot-like-us/>

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## SCIENCE DAILY – Reinterpreting our brain's body maps

Our brain maps out our body to facilitate accurate motor control. For a century, the body map has been thought to have applied to all types of motor actions. Now, a research group has revealed that the body relies on multiple maps based on the choice of motor system.

<https://www.sciencedaily.com/releases/2022/01/220121124858.htm>

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## SOCIETY FOR SCIENCE – Homo sapiens bones in East Africa are at least 36,000 years older

Analyses of remnants of a volcanic blast push the age of East Africa's oldest known H. sapiens fossils at Ethiopia's Omo site to 233,000 years or more.

<http://click.societyforscience-email.com/?qs=e5915167ee97ffc2670248031fec003b01d402c1f088a47e290b207dd3df344c4755f5a08f8b3168089d3df4b8b8a7db4f3ff68e91ff6ceb7abb43cc5bdfaf4c>

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## PUBLICATIONS

### Nature

#### OBITUARIES

##### **BERT HÖLLDOBLER – Edward O. Wilson (1929–2021)**

Naturalist, conservationist and synthesizer who founded sociobiology.

<https://www.nature.com/articles/d41586-022-00078-7>

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### Nature Ecology & Evolution

#### PAPERS

##### **SAMANTHA BROWN et al with JANET KELSO & SVANTE PÄÄBO – The earliest Denisovans and their cultural adaptation**

Since the initial identification of the Denisovans a decade ago, only a handful of their physical remains have been discovered. Here we analysed ~3,800 non-diagnostic bone fragments using collagen peptide mass fingerprinting to locate new hominin remains from Denisova Cave (Siberia, Russia). We identified five new hominin bones, four of which contained sufficient DNA for mitochondrial analysis. Three carry mitochondrial DNA of the Denisovan type and one was found to carry mtDNA of the Neanderthal type. The former come from the same archaeological layer near the base of the cave's sequence and are the oldest securely dated evidence of Denisovans at 200 ka (thousand years ago) (205–192 ka at 68.2% or 217–187 ka at 95% probability). The stratigraphic context in which they were located contains a wealth of archaeological material in the form of lithics and faunal remains, allowing us to determine the material culture associated with these early hominins and explore their behavioural and environmental adaptations. The combination of bone collagen fingerprinting and genetic analyses has so far more-than-doubled the number of hominin bones at Denisova Cave and has expanded our understanding of Denisovan and Neanderthal interactions, as well as their archaeological signatures.

<https://www.nature.com/articles/s41559-021-01581-2>

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### Nature Scientific Reports

#### PAPERS

##### **KOSUKE ITOH et al – Cerebral cortical processing time is elongated in human brain evolution**

An increase in number of neurons is presumed to underlie the enhancement of cognitive abilities in brain evolution. The evolution of human cognition is then expected to have accompanied a prolongation of net neural-processing time due to the accumulation of processing time of individual neurons over an expanded number of neurons. Here, we confirmed this prediction and quantified the amount of prolongation in vivo, using noninvasive measurements of brain responses to sounds in unanesthetized human and nonhuman primates. Latencies of the N1 component of auditory-evoked potentials recorded from the scalp were approximately 40, 50, 60, and 100 ms for the common marmoset, rhesus monkey, chimpanzee, and human, respectively. Importantly, the prominent increase in human N1 latency could not be explained by the physical lengthening of the auditory pathway, and therefore reflected an extended dwell time for auditory cortical processing. A longer time window for auditory cortical processing is advantageous for analyzing time-varying acoustic stimuli, such as those important for speech perception. A novel hypothesis concerning human brain evolution then emerges: the increase in cortical neuronal number widened the timescale of sensory cortical processing, the benefits of which outweighed the disadvantage of slow cognition and reaction.

<https://www.nature.com/articles/s41598-022-05053-w>

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### New Scientist

#### NEWS

##### **A West African writing system shows how letters evolve to get simpler**

The characters used to write the Vai script, which was invented in Liberia in 1833, have become visually simpler over time, reflecting the evolutionary pressures acting on writing.

<https://www.newscientist.com/article/2303865-a-west-african-writing-system-shows-how-letters-evolve-to-get-simpler/#ixzz7IY6D0bdj>

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