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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 – Artifact densities and assemblage formation: Evidence from Tabun Cave

*In Journal of Anthropological Archaeology 38, 8-16 (2015).*

#### **STEVEN L. KUHN & AMY E. CLARK – Artifact densities and assemblage formation: Evidence from Tabun Cave**

Archaeological assemblages are fundamentally records of discard behavior. Lewis Binford’s pioneering ethnoarchaeological research focused attention on the differing pathways that lead to artifacts being abandoned in different locations on the landscape. Recurring relationships between artifact density and assemblage content at Middle and Upper Paleolithic sites reflect simple behavioral dynamics pertaining to artifact production and discard. In the very long archaeological sequence from A. Jelinek’s excavations at Tabun Cave, Mousterian assemblages show the expected pattern, but earlier Acheulean, Amudian and Yabrudian assemblages do not. In combination with evidence that different classes of artifacts were discarded at different rates, these results suggest that land use and raw material provisioning in the later Middle Pleistocene were organized differently than they were among later populations of Neanderthals and modern humans.

[https://www.academia.edu/15402567/Artifact\\_densities\\_and\\_assemblage\\_formation\\_evidence\\_from\\_Tabun\\_Cave](https://www.academia.edu/15402567/Artifact_densities_and_assemblage_formation_evidence_from_Tabun_Cave)

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### ACADEMIA.EDU – The Khormusan: Evidence for an MSA East African industry in Nubia

*In Journal of Anthropological Archaeology 38, 8-16 (2015).*

#### **MAE GODER-GOLDBERGER – The Khormusan: Evidence for an MSA East African Industry In Nubia**

There is clear evidence of lithic technological variability in Middle Paleolithic (MP) assemblages along the Nile valley and in adjacent desert areas. One of the identified variants is the Khormusan, the type-site of which, Site 1017, is located north of the Nile’s Second Cataract. The industry has two distinctive characteristics that set it apart from other MP industries within its vicinity. One is the use of a wide variety of raw materials; the second is an apparent correlation between raw material and technology used, suggesting a cultural aspect to raw material management. Stratigraphically, site 1017 is

situated within the Dibeira-Jer formation which represents an aggradation stage of the Nile and contains sediments originating from the Ethiopian Highlands. While it has previously been suggested that the site dates to sometime before 42.5 ka, the Dibeira-Jer formation can plausibly be correlated with Nile alluvial sediments in northern Sudan recently dated to 83 24 ka (MIS 5a). This stage coincides with the 81 ka age of sapropel S3, indicating higher Nile flow and stronger monsoon rainfall at these times. Other sites which reflect similar raw material variability and technological traditions are the BNS and KHS sites in the Omo Kibish Formation (Ethiopia) dated to w100 ka and w190 ka respectively. Based on a lithic comparative study conducted, it is suggested that site 1017 can be seen as representing behavioral patterns which are indicative of East African Middle Stone Age (MSA) technology, adding support to the hypothesis that the Nile Valley was an important dispersal route used by modern humans prior to the long cooling and dry trend beginning with the onset of MIS 4. Techno-typological comparison of the assemblages from the Khormusan sites with other Middle Paleolithic sites from Nubia and East Africa is used to assess the possibility of tracing the dispersal of technological traits across the landscape and through time.  
[https://www.academia.edu/4334900/The\\_Khormusan\\_Evidence\\_for\\_an\\_MSA\\_East\\_African\\_industry\\_in\\_Nubia](https://www.academia.edu/4334900/The_Khormusan_Evidence_for_an_MSA_East_African_industry_in_Nubia)

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## NEWS

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### BREAKING SCIENCE – Pocket Gophers are First Non-Human Mammals Known to Farm for Living

According to new research from the University of Florida, roots grow into the humid tunnels of southeastern pocket gophers (*Geomys pinetis*) where they benefit from nutrients from gopher wastes; cropping these roots supplies the animals with an average of 21% but up to 62% of their daily metabolic needs. Southeastern pocket gophers are solitary, root-eating fossorial rodents native to North and Central American grasslands.

<http://www.sci-news.com/biology/farming-pocket-gophers-10985.html>

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### BREAKING SCIENCE – Scientists Sequence Genome of Red Deer Cave Human

Researchers have sequenced and analyzed the genome of a Late Pleistocene hominin from Red Deer Cave located in Southwest China, which was previously reported possessing mosaic features of modern and archaic hominins. Their results indicate that the individual from Red Deer Cave is an anatomically modern human who exhibits genetic continuity to present day populations and is linked deeply to the East Asian ancestry that contributed to First Americans.

<http://www.sci-news.com/genetics/red-deer-cave-human-genome-11002.html>

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### NATURE BRIEFING – Gophers are ‘farmers’ too, say scientists

Gophers graze on roots that grow into their large network of tunnels, which some researchers say could be the first evidence of a non-human mammal engaging in farming. Scientists installed cameras in trenches that they dug around tunnels used by southeastern pocket gophers (*Geomys pinetis*) in Florida. The roots of above-ground grasses and nettles quickly filled the tunnels that the gophers couldn't access, but remained short in those they could. The animals nibbled on the roots to nourish themselves and stimulate root regrowth, and dropped waste throughout the network to fertilize the soil — effectively cultivating the crop. Other researchers say the practice can't be described as farming because the gophers don't plant or distribute their crops as do humans and other creatures, such as fungus-growing ants.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=d92310949b&e=1db4b9a19b>

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### NATURE BRIEFING – DeepMind AI learns physics like a baby

Researchers at Google-owned company DeepMind have created an artificial intelligence (AI) that knows about as much physics as a 3-month-old baby. The team trained the system on simple videos until it could predict patterns such as solidity (two objects do not pass through one another) and continuity (objects do not blink in and out of existence). The research makes an interesting contribution to the nature–nurture debate about how infants learn to see the world, say psychologists Susan Hespous and Apoorva Shivaram in the accompanying News & Views article. The results suggest that experience “is an important contribution to the learning process, but it is not the whole story. The complete story requires some built-in knowledge.”

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=6701319c1f&e=1db4b9a19b>

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### SAPIENS – A land of ancient fairies?

Archaeologists in China have unearthed a site in Sichuan province filled with objects that reveal the various ways ancient people sought to commune with spirits like fairies and the central place such beings held in their beliefs.

<https://sapiens.us11.list-manage.com/track/click?u=80f6cf678900daf984bf763b7&id=3bc8625a0d&e=dc0eff6180>

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### SAPIENS – Grief Can Make Us Wise

Grief makes sense of loss and opens us to rebuilding all that is meaningful in life. Society would benefit if public grief were acknowledged more.

<https://www.sapiens.org/culture/public-grief-parkland/>

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## SAPIENS – Animal Grief Shows We Aren't Meant to Die Alone

The coronavirus pandemic is robbing some people of a chance to come together to mourn: a practice deeply embedded in many animal species.

<https://www.sapiens.org/biology/animal-grief/>

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## SCIENCE DAILY – Brain ripples may help bind information across the human cortex

Researchers provide some of the first empirical evidence that brain ripples exist. These electrical waves have long been hypothesized as a way for the brain to integrate and encode memories.

<https://www.sciencedaily.com/releases/2022/07/220708123623.htm>

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## SCIENCE DAILY – DNA from ancient population in S. China suggests Native Americans' E. Asian roots

For the first time, researchers successfully sequenced the genome of ancient human fossils from the Late Pleistocene in southern China. The data suggests that the mysterious hominin belonged to an extinct maternal branch of modern humans that might have contributed to the origin of Native Americans.

<https://www.sciencedaily.com/releases/2022/07/220714145052.htm>

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## SCIENCE NEWS – Does this gopher 'farm' the roots it eats?

Root-cropping behaviour may represent a kind of husbandry.

<https://www.science.org/content/article/does-gopher-farm-roots-it-eats>

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## OTHER NEWS – GUARDIAN – A long childhood is what makes us Earth's most complex animal

Children spend the same amount of time growing up as bowhead whales – yet they live for hundreds of years.

<https://www.theguardian.com/commentisfree/2022/jul/10/long-childhood-humans-earths-most-complex-animal>

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## OTHER NEWS – Eons PBS

When We First Talked.

[https://www.facebook.com/watch/?v=430642245592192&\\_cft=%5b0%5d=AZW\\_23RX07A2NvWVmaHsKSc9Mc7d6P6p1DPHdVORQhstmNISXlaivZQgHdt-HD6RzjyZmVtNKaAePo8DIor-nmpj1VzyFjwso-lyBmjs3SqG27aMq3AHi2hDZ0MCXV325huQpNjeyyzCEHYiMwbCvkw-r-i-w4e19f0RmgKWVJZ5rb0ROrXh3xoTDwT-iH0c0iw](https://www.facebook.com/watch/?v=430642245592192&_cft=%5b0%5d=AZW_23RX07A2NvWVmaHsKSc9Mc7d6P6p1DPHdVORQhstmNISXlaivZQgHdt-HD6RzjyZmVtNKaAePo8DIor-nmpj1VzyFjwso-lyBmjs3SqG27aMq3AHi2hDZ0MCXV325huQpNjeyyzCEHYiMwbCvkw-r-i-w4e19f0RmgKWVJZ5rb0ROrXh3xoTDwT-iH0c0iw)

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## OTHER NEWS – EDLING – Michigan prisons ban Spanish & Swahili dictionaries to prevent disruptions

Officials in prison systems across the United States have banned certain books as a way to prevent the flow of material that they say might incite violence...

"If certain prisoners all decided to learn a very obscure language, they would be able to then speak freely in front of staff and others about introducing contraband or assaulting staff or assaulting another prisoner," said Chris Gautz, the spokesperson for the Michigan Department of Corrections.

*{First, what happened to good, old fashioned Thieves Cant? Second, why is it that der Gumment are naïve when it comes to understanding that humans communicate, that's what we do; and, apart from 100% solitary, there is no way to stop us? Third, "a very obscure language"? More than 200 million Swahili speakers Worldwide, and 30% of the Michigan prison population is Hispanic or Latino. Perhaps the Spanish dictionary ban is already too late. Maybe employ more Hispanic and Latino Guards?}*

<https://www.npr.org/2022/06/02/1102164439/michigan-prisons-ban-spanish-and-swahili-dictionaries-to-prevent-inmate-disrupti>

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## PUBLICATIONS

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### Current Biology

#### ARTICLES

#### LEHTI SAAG & ROBERT STANIUK – Historical human migrations: From the steppe to the basin

Many migrations during human history have made the Carpathian Basin the melting pot of Europe. New ancient genomes confirm the Asian origin of European Huns, Avars and Magyars and huge within-group variability that is linked with social structure.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)00902-2](https://www.cell.com/current-biology/fulltext/S0960-9822(22)00902-2)

#### PAPERS

#### ZOLTÁN MARÓTI et al – The genetic origin of Huns, Avars, and conquering Hungarians

Huns, Avars, and conquering Hungarians were migration-period nomadic tribal confederations that arrived in three successive waves in the Carpathian Basin between the 5th and 9th centuries. Based on the historical data, each of these groups are thought to have arrived from Asia, although their exact origin and relation to other ancient and modern

populations have been debated. Recently, hundreds of ancient genomes were analyzed from Central Asia, Mongolia, and China, from which we aimed to identify putative source populations for the above-mentioned groups. In this study, we have sequenced 9 Hun, 143 Avar, and 113 Hungarian conquest period samples and identified three core populations, representing immigrants from each period with no recent European ancestry. Our results reveal that this “immigrant core” of both Huns and Avars likely originated in present day Mongolia, and their origin can be traced back to Xiongnu (Asian Huns), as suggested by several historians. On the other hand, the “immigrant core” of the conquering Hungarians derived from an earlier admixture of Mansis, early Sarmatians, and descendants of late Xiongnu. We have also shown that a common “proto-Ugric” gene pool appeared in the Bronze Age from the admixture of Mezhovskaya and Nganasan people, supporting genetic and linguistic data. In addition, we detected shared Hun-related ancestry in numerous Avar and Hungarian conquest period genetic outliers, indicating a genetic link between these successive nomadic groups. Aside from the immigrant core groups, we identified that the majority of the individuals from each period were local residents harboring “native European” ancestry.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)00732-1](https://www.cell.com/current-biology/fulltext/S0960-9822(22)00732-1)

### **JONATHAN ROMIGUIER et al – Ant phylogenomics reveals a natural selection hotspot preceding the origin of complex eusociality**

The evolution of eusociality has allowed ants to become one of the most conspicuous and ecologically dominant groups of organisms in the world. A large majority of the current ~14,000 ant species belong to the formicoids, 1 a clade of nine subfamilies that exhibit the most extreme forms of reproductive division of labor, large colony size, 2 worker polymorphism, 3 and extended queen longevity. 4 The eight remaining non-formicoid subfamilies are less well studied, with few genomes having been sequenced so far and unclear phylogenetic relationships. 5 By sequencing 65 genomes, we provide a robust phylogeny of the 17 ant subfamilies, retrieving high support to the controversial leptanillomorph clade (Leptanillinae and Martialinae) as the sister group to all other extant ants. Moreover, our genomic analyses revealed that the emergence of the formicoids was accompanied by an elevated number of positive selection events. Importantly, the top three gene functions under selection are linked to key features of complex eusociality, with histone acetylation being implicated in caste differentiation, gene silencing by RNA in worker sterility, and autophagy in longevity. These results show that the key pathways associated with eusociality have been under strong selection during the Cretaceous, suggesting that the molecular foundations of complex eusociality may have evolved rapidly in less than 20 Ma.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)00760-6](https://www.cell.com/current-biology/fulltext/S0960-9822(22)00760-6)

### **XIAOMING ZHANG et al – A Late Pleistocene human genome from Southwest China**

Southern East Asia is the dispersal center regarding the prehistoric settlement and migrations of modern humans in Asia-Pacific regions. However, the settlement pattern and population structure of paleolithic humans in this region remain elusive, and ancient DNA can provide direct information. Here, we sequenced the genome of a Late Pleistocene hominin (MZR), dated ~14.0 thousand years ago from Red Deer Cave located in Southwest China, which was previously reported possessing mosaic features of modern and archaic hominins. MZR is the first Late Pleistocene genome from southern East Asia. Our results indicate that MZR is a modern human who represents an early diversified lineage in East Asia. The mtDNA of MZR belongs to an extinct basal lineage of the M9 haplogroup, reflecting a rich matrilineal diversity in southern East Asia during the Late Pleistocene. Combined with the published data, we detected clear genetic stratification in ancient southern populations of East/Southeast Asia and some degree of south-versus-north divergency during the Late Pleistocene, and MZR was identified as a southern East Asian who exhibits genetic continuity to present day populations. Markedly, MZR is linked deeply to the East Asian ancestry that contributed to First Americans.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)00928-9](https://www.cell.com/current-biology/fulltext/S0960-9822(22)00928-9)

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## eLife

### PAPERS

### **STÉPHANE PEYRÉGNE, JANET KELSO, BENJAMIN M PETER & SVANTE PÄÄBO – The evolutionary history of human spindle genes includes back-and-forth gene flow with Neandertals**

Proteins associated with the spindle apparatus, a cytoskeletal structure that ensures the proper segregation of chromosomes during cell division, experienced an unusual number of amino acid substitutions in modern humans after the split from the ancestors of Neandertals and Denisovans. Here, we analyze the history of these substitutions and show that some of the genes in which they occur may have been targets of positive selection. We also find that the two changes in the kinetochore scaffold 1 (KNL1) protein, previously believed to be specific to modern humans, were present in some Neandertals. We show that the KNL1 gene of these Neandertals shared a common ancestor with present-day Africans about 200,000 years ago due to gene flow from the ancestors (or relatives) of modern humans into Neandertals. Subsequently, some non-Africans inherited this modern human-like gene variant from Neandertals, but none inherited the ancestral gene variants. These results add to the growing evidence of early contacts between modern humans and archaic groups in Eurasia and illustrate the intricate relationships among these groups.

<https://elifesciences.org/articles/75464>

## **LANA HANTZSCH, BENJAMIN PARRELL & CAROLINE A NIZIOLEK – A single exposure to altered auditory feedback causes observable sensorimotor adaptation in speech**

Sensory errors induce two types of behavioral changes: rapid compensation within a movement and longer-term adaptation of subsequent movements. Although adaptation is hypothesized to occur whenever a sensory error is perceived (including after a single exposure to altered feedback), adaptation of articulatory movements in speech has only been observed after repeated exposure to auditory perturbations, questioning both current theories of speech sensorimotor adaptation as well as the universality of more general theories of adaptation. We measured single-exposure or 'one-shot' learning in a large dataset in which participants were exposed to intermittent, unpredictable perturbations of their speech acoustics. On unperturbed trials immediately following these perturbed trials, participants adjusted their speech to oppose the preceding shift, demonstrating that learning occurs even after a single exposure to auditory error. These results provide critical support for current theories of sensorimotor adaptation in speech and align speech more closely with learning in other motor domains.

<https://elifesciences.org/articles/73694>

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## **Frontiers in Ecology and Evolution**

### **PAPERS**

#### **TIMOTHY B. ROWE et al – Human Occupation of the North American Colorado Plateau ~37,000 Years Ago**

Calibrating human population dispersals across Earth's surface is fundamental to assessing rates and timing of anthropogenic impacts and distinguishing ecological phenomena influenced by humans from those that were not. Here, we describe the Hartley mammoth locality, which dates to 38,900–36,250 cal BP by AMS 14C analysis of hydroxyproline from bone collagen. We accept the standard view that elaborate stone technology of the Eurasian Upper Paleolithic was introduced into the Americas by arrival of the Native American clade ~16,000 cal BP. It follows that if older cultural sites exist in the Americas, they might only be diagnosed using nuanced taphonomic approaches. We employed computed tomography (CT and  $\mu$ CT) and other state-of-the-art methods that had not previously been applied to investigating ancient American sites. This revealed multiple lines of taphonomic evidence suggesting that two mammoths were butchered using expedient lithic and bone technology, along with evidence diagnostic of controlled (domestic) fire. That this may be an ancient cultural site is corroborated by independent genetic evidence of two founding populations for humans in the Americas, which has already raised the possibility of a dispersal into the Americas by people of East Asian ancestry that preceded the Native American clade by millennia. The Hartley mammoth locality thus provides a new deep point of chronologic reference for occupation of the Americas and the attainment by humans of a near-global distribution.

*{A significant paper on a novel view of how humans populated the globe, a side-story about a colonisation event that failed, or an over-interpretation of the evidence? You pays your money and you takes your choice.}*

<https://www.frontiersin.org/articles/10.3389/fevo.2022.903795/full>

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## **Nature Communications**

### **PAPERS**

#### **HEATHER WILLIAMS et al – Cumulative cultural evolution and mechanisms for cultural selection in wild bird songs**

Cumulative cultural evolution, the accumulation of sequential changes within a single socially learned behaviour that results in improved function, is prominent in humans and has been documented in experimental studies of captive animals and managed wild populations. Here, we provide evidence that cumulative cultural evolution has occurred in the learned songs of Savannah sparrows. In a first step, "click trains" replaced "high note clusters" over a period of three decades. We use mathematical modelling to show that this replacement is consistent with the action of selection, rather than drift or frequency-dependent bias. Generations later, young birds elaborated the "click train" song form by adding more clicks. We show that the new songs with more clicks elicit stronger behavioural responses from both males and females. Therefore, we suggest that a combination of social learning, innovation, and sexual selection favoring a specific discrete trait was followed by directional sexual selection that resulted in naturally occurring cumulative cultural evolution in the songs of this wild animal population.

<https://www.nature.com/articles/s41467-022-31621-9>

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## **Nature Reviews Neuroscience**

### **PAPERS**

#### **NANCY PADILLA-COREANO, KAY M. TYE & MORIEL ZELIKOWSKY – Dynamic influences on the neural encoding of social valence**

Social signals can serve as potent emotional triggers with powerful impacts on processes from cognition to valence processing. How are social signals dynamically and flexibly associated with positive or negative valence? How do our past social experiences and present social standing shape our motivation to seek or avoid social contact? We discuss a model in which social attributes, social history, social memory, social rank and social isolation can flexibly influence valence assignment to social stimuli, termed here as 'social valence'. We emphasize how the brain encodes each of these four factors and highlight the neural circuits and mechanisms that play a part in the perception of social attributes, social memory and social rank, as well as how these factors affect valence systems associated with social stimuli. We highlight the impact of

social isolation, dissecting the neural and behavioural mechanisms that mediate the effects of acute versus prolonged periods of social isolation. Importantly, we discuss conceptual models that may account for the potential shift in valence of social stimuli from positive to negative as the period of isolation extends in time. Collectively, this Review identifies factors that control the formation and attribution of social valence — integrating diverse areas of research and emphasizing their unique contributions to the categorization of social stimuli as positive or negative.

<https://www.nature.com/articles/s41583-022-00609-1>

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## Nature Scientific Reports

### PAPERS

#### **MARKUS BASTIR et al – Variation in human 3D trunk shape and its functional implications in hominin evolution**

This study investigates the contribution of external trunk morphology and posture to running performance in an evolutionary framework. It has been proposed that the evolution from primitive to derived features of torso shape involved changes from a mediolaterally wider into a narrower, and antero-posteriorly deeper into a shallower, more lightly built external trunk configuration, possibly in relation to habitat-related changes in locomotor and running behaviour. In this context we produced experimental data to address the hypothesis that medio-laterally narrow and antero-posteriorly shallow torso morphologies favour endurance running capacities. We used 3D geometric morphometrics to relate external 3D trunk shape of trained, young male volunteers (N = 27) to variation in running velocities during different workloads determined at 45–50%, 70% and 85% of heart rate reserve (HRR) and maximum velocity. Below 85% HRR no relationship existed between torso shape and running velocity. However, at 85% HRR and, more clearly, at maximum velocity, we found highly statistically significant relations between external torso shape and running performance. Among all trained subjects those with a relatively narrow, flat torso, a small thoracic kyphosis and a more pronounced lumbar lordosis achieved significantly higher running velocities. These results support the hypothesis that external trunk morphology relates to running performance. Low thoracic kyphosis with a flatter ribcage may affect positively respiratory biomechanics, while increased lordosis affects trunk posture and may be beneficial for lower limb biomechanics related to leg return. Assuming that running workload at 45–50% HRR occurs within aerobic metabolism, our results may imply that external torso shape is unrelated to the evolution of endurance running performance.

<https://www.nature.com/articles/s41598-022-15344-x>

#### **MICHELE MIOZZO & FRANCESCA PERESSOTTI – How the hand has shaped sign languages**

In natural languages, biological constraints push toward cross-linguistic homogeneity while linguistic, cultural, and historical processes promote language diversification. Here, we investigated the effects of these opposing forces on the fingers and thumb configurations (handshapes) used in natural sign languages. We analyzed over 38,000 handshapes from 33 languages. In all languages, the handshape exhibited the same form of adaptation to biological constraints found in tasks for which the hand has naturally evolved (e.g., grasping). These results were not replicated in fingerspelling—another task where the handshape is used—thus revealing a signing-specific adaptation. We also showed that the handshape varies cross-linguistically under the effects of linguistic, cultural, and historical processes. Their effects could thus emerge even without departing from the demands of biological constraints. Handshape's cross-linguistic variability consists in changes in the frequencies with which the most faithful handshapes to biological constraints appear in individual sign languages.

<https://www.nature.com/articles/s41598-022-15699-1>

#### **ELSPETH H. HAYES et al – 65,000-years of continuous grinding stone use at Madjedbebe, Northern Australia**

Grinding stones and ground stone implements are important technological innovations in later human evolution, allowing the exploitation and use of new plant foods, novel tools (e.g., bone points and edge ground axes) and ground pigments. Excavations at the site of Madjedbebe recovered Australia's (if not one of the world's) largest and longest records of Pleistocene grinding stones, which span the past 65 thousand years (ka). Microscopic and chemical analyses show that the Madjedbebe grinding stone assemblage displays the earliest known evidence for seed grinding and intensive plant use, the earliest known production and use of edge-ground stone hatchets (aka axes), and the earliest intensive use of ground ochre pigments in Sahul (the Pleistocene landmass of Australia and New Guinea). The Madjedbebe grinding stone assemblage reveals economic, technological and symbolic innovations exemplary of the phenotypic plasticity of Homo sapiens dispersing out of Africa and into Sahul.

<https://www.nature.com/articles/s41598-022-15174-x>

#### **SHELLY MASI et al – Free hand hitting of stone-like objects in wild gorillas**

The earliest stone tool types, sharp flakes knapped from stone cores, are assumed to have played a crucial role in human cognitive evolution. Flaked stone tools have been observed to be accidentally produced when wild monkeys use handheld stones as tools. Holding a stone core in hand and hitting it with another in the absence of flaking, free hand hitting, has been considered a requirement for producing sharp stone flakes by hitting stone on stone, free hand percussion. We report on five observations of free hand hitting behavior in two wild western gorillas, using stone-like objects (pieces of termite mound). Gorillas are therefore the second non-human lineage primate showing free-hand hitting behavior in the wild, and ours is the first report for free hand hitting behavior in wild apes. This study helps to shed light on the morphofunctional and cognitive requirements for the emergence of stone tool production as it shows that a prerequisite for free hand percussion (namely,

free hand hitting) is part of the spontaneous behavioral repertoire of one of humans' closest relatives (gorillas). However, the ability to combine free hand hitting with the force, precision, and accuracy needed to facilitate conchoidal fracture in free hand percussion may still have been a critical watershed for hominin evolution.

<https://www.nature.com/articles/s41598-022-15542-7>

### **SARAH B. CARP et al – Monkey visual attention does not fall into the uncanny valley**

Very humanlike artificial agents can induce feelings of uneasiness in human perceivers. Stimuli that generate this response are said to occupy “the uncanny valley”. Given inconsistent findings in the literature, whether or not nonhuman animals experience the uncanny valley is unclear. Here, we recorded the visual attention of eleven male rhesus monkeys as they viewed faces varying in realism across five levels, with visual attention measured by both number and duration of visual fixations on faces as a whole and on areas of interest within the faces (e.g., eyes, mouth). Face stimuli varied in terms of the realism of the image and behavior depicted by the face (lipsmack, threat, bared teeth, and neutral). We largely found no support that rhesus monkeys perceive an uncanny valley when viewing our stimuli; however, monkeys did generally pay more attention to eyes and less attention to mouths in real images compared to less realistic images. Across all stimuli, monkeys' visual attention was drawn to the mouths of images when teeth were visible. These findings suggest that rhesus monkeys in our study did not display an uncanny valley effect when viewing realistic stimuli but did perceive affective information depicted by faces regardless of how real those faces appear.

<https://www.nature.com/articles/s41598-022-14615-x>

### **S. G. HABINGER et al – Evolutionary ecology of Miocene hominoid primates in Southeast Asia**

The evolutionary history and palaeoecology of orangutans remains poorly understood until today. The restricted geographic distribution of extant *Pongo* indicates specific ecological needs. However, it is not clear whether these needs were shared by the great diversity of fossil pongines known from the Miocene to the Pleistocene. Here we show how niche modelling of stable carbon and oxygen isotope data of the carbonate fraction of dental enamel can be used to reconstruct the paleoecology of fossil and modern pongines and associated mammal communities. We focus on *Khoratpithecus ayeyarwadyensis*, a Late Miocene pongine from Myanmar and the sister clade to extant orangutans, and compare it to its associated mammal fauna and other fossil and extant pongines. The results are consistent with a vertical position high up in the canopy of a forested habitat with purely C3 vegetation for *K. ayeyarwadyensis* as well as the contemporaneous *Sivapithecus*. Although their positions in the modelled isotopic niche space look similar to the ecological niche occupied by modern *Pongo*, a comparison of the modelled niches within the pongine clade revealed possible differences in the use of microhabitats by the Miocene apes.

<https://www.nature.com/articles/s41598-022-15574-z>

### **GIOVANNI FEDERICO et al – The cortical thickness of the area PF of the left inferior parietal cortex mediates technical-reasoning skills**

Most recent research highlights how a specific form of causal understanding, namely technical reasoning, may support the increasing complexity of tools and techniques developed by humans over generations, i.e., the cumulative technological culture (CTC). Thus, investigating the neurocognitive foundations of technical reasoning is essential to comprehend the emergence of CTC in our lineage. Whereas functional neuroimaging evidence started to highlight the critical role of the area PF of the left inferior parietal cortex (IPC) in technical reasoning, no studies explored the links between the structural characteristics of such a brain region and technical reasoning skills. Therefore, in this study, we assessed participants' technical-reasoning performance by using two ad-hoc psycho-technical tests; then, we extracted from participants' 3 T T1-weighted magnetic-resonance brain images the cortical thickness (i.e., a volume-related measure which is associated with cognitive performance as reflecting the size, density, and arrangement of cells in a brain region) of all the IPC regions for both hemispheres. We found that the cortical thickness of the left area PF predicts participants' technical-reasoning performance. Crucially, we reported no correlations between technical reasoning and the other IPC regions, possibly suggesting the specificity of the left area PF in generating technical knowledge. We discuss these findings from an evolutionary perspective, by speculating about how the evolution of parietal lobes may have supported the emergence of technical reasoning in our lineage.

<https://www.nature.com/articles/s41598-022-15587-8>

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## **PLoS One**

### **PAPERS**

#### **MICHELE CORAZZA et al – Unsupervised deep learning supports reclassification of Bronze age cyriot writing system**

Ancient undeciphered scripts present problems of different nature, not just tied to linguistic identification. The undeciphered Cypro-Minoan script from second millennium BCE Cyprus, for instance, currently does not have a standardized, definitive inventory of signs, and, in addition, stands divided into three separate subgroups (CM1, CM2, CM3), which have also been alleged to record different languages. However, this state of the art is not consensually accepted by the experts. In this article, we aim to apply a method that can aid to shed light on the tripartite division, to assess if it holds up against a multi-pronged, multi-disciplinary approach. This involves considerations linked to paleography (shapes of individual signs) and epigraphy (writing style tied to the support used), and crucially, deep learning-based strategies. These automatic methods,

which are widely adopted in many fields such as computer vision and computational linguistics, allow us to look from an innovative perspective at the specific issues presented by ancient, poorly understood scripts in general, and Cypro-Minoan in particular. The usage of a state-of-the-art convolutional neural model that is unsupervised, and therefore does not use any prior knowledge of the script, is still underrepresented in the study of undeciphered writing systems, and helps to investigate the tripartite division from a fresh standpoint. The conclusions we reached show that: 1. the use of different media skews to a large extent the uniformity of the sign shapes; 2. the application of several neural techniques confirm this, since they highlight graphic proximity among signs inscribed on similar supports; 3. multi-stranded approaches prove to be a successful tool to investigate ancient scripts whose language is still unidentified. More crucially, these aspects, together, point in the same direction, namely the validation of a unitary, single Cypro-Minoan script, rather than the current division into three subgroups.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0269544>

#### **LAURE TOSATTO et al – Detecting non-adjacent dependencies is the exception rather than the rule**

Statistical learning refers to our sensitivity to the distributional properties of our environment. Humans have been shown to readily detect the dependency relationship of events that occur adjacently in a stream of stimuli but processing non-adjacent dependencies (NADs) appears more challenging. In the present study, we tested the ability of human participants to detect NADs in a new Hebb-naming task that has been proposed recently to study regularity detection in a noisy environment. In three experiments, we found that most participants did not manage to extract NADs. These results suggest that the ability to learn NADs in noise is the exception rather than the rule. They provide new information about the limits of statistical learning mechanisms.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0270580>

#### **ISABELL K. ADLER, DANIELA FIEDLER & UTE HARMS – Darwin's tales—A content analysis of how evolution is presented in children's books**

In science, certain theories led to a paradigm shift in human being's approach to explain nature, such as the theory of relativity, the quantum theory, and the theory of evolution. The latter explains the emergence of biodiversity on Earth and all living beings' relatedness, including humans. Accordingly, evolutionary theory is a central part of scientific literacy. However, scholars have demonstrated that misconceptions emerging in childhood hinder learners from grasping evolutionary processes. Implementing evolution in early science education could enhance scientific ideas as a basis for subsequent learning at school. Currently, children's literature that deals with evolution is increasing and may enable more children to encounter evolutionary theory before entering school. This explorative study aimed to analyze how children's books about evolution approach explaining this complex topic to young children in terms of covered contents, underlying concepts and use of language. We conducted (1) a text-based qualitative content analysis of 31 children's books in the categories of organismal context, evolutionary principles, and misconceptions, and (2) a computer-supported content analysis of 33 word labels concerning (a) scientific terms and (b) verbs expressing evolutionary change. Although evolution is a universal concept, children's books seem to promote specific contexts such as animal and human evolution. Even though the principle of selection requires an understanding of complex interactions between individuals and environmental factors, this principle was more frequent than the principles variation and inheritance. Phylogenetic history was covered more often than basic evolutionary processes, and evolutionary change was mainly mentioned at the species level over long periods. Besides, most books conveyed misconceptions such as transformationist, teleological or anthropomorphic reasoning. Consequently, books covering evolution may bias children's first ideas concerning this topic or introduce unscientific ideas. Based on our results, we propose implications for early evolution educators and education researchers.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0269197>

#### **MARK W. MOORE et al – Bronze age stone flaking at Saruq al-Hadid, Dubai, southeastern Arabia**

Excavations at Saruq al-Hadid, Dubai, UAE, discovered a stone tool technology with backed microliths dating to the Wadi Suq period and Late Bronze Age (ca. 1750–1300 BCE). The stone technology is a contemporary with metal production in the region, and the assemblage was recovered from a thick bone midden deposit at this multi-period site on the edge of the Rub' al-Khali Desert. Small cobbles of chert were imported to the site and were reduced into flakes by hard-hammer percussion. Cores were frequently rotated during knapping and the reduction strategy was ad hoc, lacking hierarchical reduction stages. Flake tools were used as-is or modified by retouching. Some flakes were selected for backing into geometric microliths, and backing techniques often reflected high levels of stoneworking skill to produce stylised scalene shapes. A review of contemporary archaeological evidence, and the context of the Saruq al-Hadid assemblage, suggest that microliths may have been made as stone armatures for arrows despite the contemporary use of copper-based arrowheads.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0270513>

#### **JONAS GREGORIO DE SOUZA et al – Environmental effects on the spread of the Neolithic crop package to South Asia**

The emergence of Neolithic economies and their spread through Eurasia was one of the most crucial transitions of the Holocene, with different mechanisms of diffusion—demic, cultural—being proposed. While this phenomenon has been exhaustively studied in Europe, with repeated attempts to model the speed of Neolithic diffusion based on radiocarbon dates, much less attention has been devoted to the dispersal towards the East, and in particular to South Asia. The Neolithic

in the latter region at least partly derived from southwest Asia, given the presence of “founder crops” such as wheat and barley. The process of their eastward diffusion, however, may have been significantly different to the westward dispersal, which was mainly due to demic diffusion, as local domesticates were already available and farming was already practiced in parts of South Asia. Here, we use radiocarbon dates specifically related to the spread of the southwest Asian Neolithic crops to model the speed of dispersal of this agricultural package towards South Asia. To assess potential geographical and environmental effects on the dispersal, we simulate different speeds depending on the biomes being crossed, employing a genetic algorithm to search for the values that most closely approach the radiocarbon dates. We find that the most important barrier to be crossed were the Zagros mountains, where the speed was lowest, possibly due to topography and climate. A large portion of the study area is dominated by deserts and shrublands, where the speed of advance, albeit closer to the range expected for demic diffusion, was lower than observed in Europe, which can also potentially be attributed to environmental constraints in the adaptation of the crops. Finally, a notable acceleration begins in the Indus valley, exceeding the range of demic diffusion in the tropical and subtropical environments east of the Indus. We propose that the latter is due to the rapid diffusion among populations already familiar with plant cultivation.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0268482>

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## Proceedings of the Royal Society B

### PAPERS

#### **AMOR ALINE SALDAÑA-SÁNCHEZ et al – Not just females: the socio-ecology of social interactions between spider monkey males**

Male–male relationships are mostly characterized by competition. However, males also cooperate with one another if socio-ecological conditions are suitable. Due to their male philopatry, the need for cooperation in home range defence and high degree of fission–fusion dynamics, spider monkeys provide an opportunity to investigate how male–male interactions are associated with socio-ecological factors, such as the presence of potentially receptive females, the degree of food availability and the likelihood of home range defence. We tested predictions about changes in social interactions between wild spider monkey males in relation to these factors. First, males did not change their interaction patterns when potentially receptive females were in the subgroup compared to when they were absent. Second, males tended to be less tolerant of one another when feeding, but spent more time grooming, in contact and proximity with one another when food availability was lower than when it was higher. Third, males exchanged fewer embraces, spent less time grooming, in proximity and in contact with one another, and spent more time vigilant at the home range boundary area than at other locations. Our findings contribute to the understanding of social flexibility and the importance of considering males in socio-ecological models of any group-living species.

<https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2021.2808>

#### **PAWEŁ REK & ROBERT D. MAGRATH – Reality and illusion: the assessment of angular separation of multi-modal signallers in a duetting bird**

The spatial distribution of cooperating individuals plays a strategic role in territorial interactions of many group-living animals, and can indicate group cohesion. Vocalizations are commonly used to judge the distribution of signallers, but the spatial resolution of sounds is poor. Many species therefore accompany calls with movement; however, little is known about the role of audio-visual perception in natural interactions. We studied the effect of angular separation on the efficacy of multimodal duets in the Australian magpie-lark, *Grallina cyanoleuca*. We tested specifically whether conspicuous wing movements, which typically accompany duets, affect responses to auditory angular separation. Multimodal playbacks of duets using robotic models and speakers showed that birds relied primarily on acoustic cues when visual and auditory angular separations were congruent, but used both modalities to judge separation between the signallers when modalities were spatially incongruent. The visual component modified the effect of acoustic separation: robotic models that were apart weakened the response when speakers were together, while models that were together strengthened responses when speakers were apart. Our results show that responses are stronger when signallers are together, and suggest that males were able to bind information cross-modally on the senders' spatial location, which is consistent with a multisensory illusion.

<https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2022.0680>

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## Science

### REVIEWS

#### **RICHARD G. ROBERTS & THOMAS SUTIKNA – Discovering the “Hobbit”**

Review of ‘Little Species, Big Mystery: The Story of *Homo Floresiensis*’ by Debbie Argue, Melbourne University Press, 2022.

<https://www.science.org/doi/10.1126/science.abq8248>

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## Trends in Cognitive Sciences

### PAPERS

#### **SEBASTIAN P.H. SPEER, ALE SMIDTS & MAARTEN A.S. BOKSEM – Cognitive control and dishonesty**

Dishonesty is ubiquitous and imposes substantial financial and social burdens on society. Intuitively, dishonesty results from a failure of willpower to control selfish behavior. However, recent research suggests that the role of cognitive control in

dishonesty is more complex. We review evidence that cognitive control is not needed to be honest or dishonest per se, but that it depends on individual differences in what we call one's 'moral default': for those who are prone to dishonesty, cognitive control indeed aids in being honest, but for those who are already generally honest, cognitive control may help them cheat to occasionally profit from small acts of dishonesty. Thus, the role of cognitive control in (dis)honesty is to override the moral default.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00136-X](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00136-X)

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## Trends in Ecology and Evolution

### ARTICLES

#### **MICHAEL D. PURUGGANAN – What is domestication?**

The nature of domestication is often misunderstood. Most definitions of the process are anthropocentric and center on human intentionality, which minimizes the role of unconscious selection and also excludes non-human domesticators. An overarching, biologically grounded definition of domestication is discussed, which emphasizes its core nature as a coevolutionary process that arises from a specialized mutualism, in which one species controls the fitness of another in order to gain resources and/or services. This inclusive definition encompasses both human-associated domestication of crop plants and livestock as well as other non-human domesticators, such as insects. It also calls into question the idea that humans are themselves domesticated, given that evolution of human traits did not arise through the control of fitness by another species.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(22\)00089-1](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(22)00089-1)

### PAPERS

#### **JAVIER FERNÁNDEZ-LÓPEZ DE PABLO et al with FELIX RIEDE – Understanding hunter-gatherer cultural evolution needs network thinking**

Hunter-gatherers past and present live in complex societies, and the structure of these can be assessed using social networks. We outline how the integration of new evidence from cultural evolution experiments, computer simulations, ethnography, and archaeology open new research horizons to understand the role of social networks in cultural evolution.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(22\)00090-8](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(22)00090-8)

#### **GRACE H. DAVIS, MARGARET C. CROFOOT & DAMIEN R. FARINE – Using optimal foraging theory to infer how groups make collective decisions**

Studying animal behavior as collective phenomena is a powerful tool for understanding social processes, including group coordination and decision-making. However, linking individual behavior during group decision-making to the preferences underlying those actions poses a considerable challenge. Optimal foraging theory, and specifically the marginal value theorem (MVT), can provide predictions about individual preferences, against which the behavior of groups can be compared under different models of influence. A major strength of formally linking optimal foraging theory to collective behavior is that it generates predictions that can easily be tested under field conditions. This opens the door to studying group decision-making in a range of species; a necessary step for revealing the ecological drivers and evolutionary consequences of collective decision-making.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(22\)00143-4](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(22)00143-4)

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## Trends in Neurosciences

### PAPERS

#### **YE EMILY WU & WEIZHE HONG – Neural basis of prosocial behavior**

Application of systems-neuroscience approaches in genetically tractable rodent models enables interrogation at high spatiotemporal precision of the neural coding and control of prosocial behavior. This provides new insights into specific neuronal populations and neural circuits causally regulating comforting and helping behaviors.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(22\)00126-6](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(22)00126-6)

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