

EAORC BULLETIN 868 – 2 February 2020

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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, do 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, do let me know.

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

SCIENCE NEWS – Africans carry surprising amount of Neanderthal DNA

For 10 years, geneticists have told the story of how Neanderthals—or at least their DNA sequences—live on in today’s Europeans, Asians, and their descendants. Not so in Africans, the story goes, because modern humans and our extinct cousins interbred only outside of Africa. A new study overturns that notion, revealing an unexpectedly large amount of Neanderthal ancestry in modern populations across Africa. It suggests much of that DNA came from Europeans migrating back into Africa over the past 20,000 years.

https://www.sciencemag.org/news/2020/01/africans-carry-surprising-amount-neanderthal-dna?utm_campaign=news_daily_2020-01-30

SOCIETY FOR SCIENCE – A Siberian cave contains clues about two epic Neandertal treks

Stone tools and DNA illuminate an earlier and a later journey eastward across Asia.

[http://click.societyforscience-](http://click.societyforscience-email.com/?qs=7b599abbd9b371b529be724e064cb9658d96583ef9c5fddbded01c20bb66aa80f0d90c4236cc4caa52d086a1219972799c47ed0e55f0ba04)

[email.com/?qs=7b599abbd9b371b529be724e064cb9658d96583ef9c5fddbded01c20bb66aa80f0d90c4236cc4caa52d086a1219972799c47ed0e55f0ba04](http://click.societyforscience-email.com/?qs=7b599abbd9b371b529be724e064cb9658d96583ef9c5fddbded01c20bb66aa80f0d90c4236cc4caa52d086a1219972799c47ed0e55f0ba04)

BREAKING SCIENCE – African Individuals Carry More Neanderthal DNA than Previously Thought

Using a novel method for detecting Neanderthal ancestry in modern humans, a team of U.S. researchers has demonstrated that remnants of Neanderthal genomes survive in every modern human population studied to date. They have found that modern African individuals have more Neanderthal DNA than previously thought; this can be explained by genuine Neanderthal ancestry due [...]

http://feedproxy.google.com/~r/BreakingScienceNews/~3/B26ui3gFEY/african-neanderthal-dna-08071.html?utm_source=feedburner&utm_medium=email

SCIENCE DAILY – Assessing geographic origins of ancient humans

Working with lead isotopes taken from tooth enamel of prehistoric animals, researchers have developed a new method for assessing the geographic origins of ancient humans.

<https://www.sciencedaily.com/releases/2020/01/200128142749.htm>

SCIENCE DAILY – Early North Americans may have been more diverse than previously suspected

Ancient skulls from the cave systems at Tulum, Mexico, suggest that the earliest populations of North America may have already had a high level of morphological diversity, according to a new study.

<https://www.sciencedaily.com/releases/2020/01/200129143344.htm>

SCIENCE DAILY – Neanderthal ancestry also in African populations

After sequencing the Neanderthal genome, scientists discovered all present day non-African individuals carry some Neanderthal ancestry in their DNA. Now, researchers present evidence of Neanderthal ancestry in African populations too, and its origin provides new insights into human history.

<https://www.sciencedaily.com/releases/2020/01/200130112000.htm>

SCIENCE DAILY – How the human brain solves complex decision-making problems

A new study on meta reinforcement learning algorithms helps us understand how the human brain learns to adapt to complexity and uncertainty when learning and making decisions. A research team succeeded in discovering both a computational and neural mechanism for human meta reinforcement learning, opening up the possibility of porting key elements of human intelligence into artificial intelligence algorithms. This study provides a glimpse into how it might ultimately use computational models to reverse engineer human reinforcement learning.

<https://www.sciencedaily.com/releases/2020/01/200130104921.htm>

SCIENCE DAILY – People may lie to appear honest

People may lie to appear honest if events that turned out in their favor seem too good to be true, according to new research.

<https://www.sciencedaily.com/releases/2020/01/200130081618.htm>

NATURE BRIEFING – Survival of the friendliest

Theories of how life survived and thrived are more complex and collaborative than a simple interpretation of Darwinian 'survival of the fittest', writes anthropologist John Favini. The lesson for some of us, argues Favini, is to stop imposing a cultural preference for competition on our models of nature — and start finding ways to live more collaboratively.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=98d028c36e&e=1db4b9a19b>

ACADEMIA.EDU – Evolution, revolution or saltation scenario for the emergence of modern cultures

2014. *Journal of Archaeological Research* 22:2, 141-175.

SILJE EVJENTH BENTSEN – Using Pyrotechnology: Fire-related Features and Activities with a Focus on the African Middle Stone Age

Pyrotechnology was important in prehistory and has been a research topic for decades, in particular, the origins of controlled and habitual use of fire. The earliest putative evidence of fire use is from the African sites of Swartkrans (1,500,000–1,000,000 years ago) and Koobi Fora (1,500,000 years ago). In contrast, researchers working with European sites debate whether habitual use of fire occurred before 400,000 years ago. This paper provides a brief introduction to early fire use and then focuses on the African Middle Stone Age. Published evidence on fire use is available for 34 sites in southern Africa. Combustion features yield much evidence about human behavior, not only in regard to technical skills but also concerning social activities. Several activities using fire, symbolic behavior, spatial structuring, and group size in the Middle Stone Age are inferred from bone and lithic data, ash discard, site maintenance, and hearth size. The current status of knowledge on Middle Stone Age pyrotechnology demonstrates the benefits of applying new methodological approaches, facilitates comparisons with earlier and later archaeological periods, and is an important reminder of the benefits of a multidisciplinary approach.

https://www.academia.edu/5055163/Using_Pyrotechnology_Fire-related_Features_and_Activities_with_a_Focus_on_the_African_Middle_Stone_Age?auto=download

SAPIENS – Were Neanderthals More Than Cousins to Homo Sapiens?

These members of the genus *Homo* have long occupied two different branches on the family tree. But now that researchers think these groups interbred, scholars are giving serious consideration to whether we are the same species after all.

<https://sapiens.us11.list-manage.com/track/click?u=80f6cf678900daf984bf763b7&id=c7b0a3b0f1&e=dc0eff6180>

GUARDIAN SCIENCE – Neanderthal genes found for first time in African populations

Findings suggest human and Neanderthal lineages more closely intertwined than once thought

<https://www.theguardian.com/science/2020/jan/30/neanderthal-genes-found-for-first-time-in-african-populations>

PUBLICATIONS

Frontiers for Young Minds

PAPERS

BECCA PEIXOTTO & MARINA C. ELLIOTT – Meet Neo: Your Distant Cousin?

Have you ever wondered about your extended family? Paleoanthropologists—scientists who study the history of the human family—discovered bones in South Africa belonging to a species of human relative they call *Homo naledi*. The bones were located deep underground in the Rising Star Cave, in a chamber that is difficult to access. Scientists gave the nickname Neo to one of the most complete skeletons they found. The bones of Neo and other *Homo naledi* individuals are helping us understand more about the family history of our own species, *Homo sapiens*. This article describes how Neo was found and what we have learned about him and his species, *Homo naledi*. It will also tell you what research scientists do to solve mysteries like how old Neo was when he died and how his bones got into the cave.

<https://kids.frontiersin.org/article/10.3389/frym.2019.00155>

Interface: Journal of the Royal Society

PAPERS

ALASTAIR KEY, TOMOS PROFFITT & IGNACIO DE LA TORRE – Raw material optimization and stone tool engineering in the Early Stone Age of Olduvai Gorge (Tanzania)

For more than 1.8 million years hominins at Olduvai Gorge were faced with a choice: whether to use lavas, quartzite or chert to produce stone tools. All are available locally and all are suitable for stone tool production. Using controlled cutting tests and fracture mechanics theory we examine raw material selection decisions throughout Olduvai's Early Stone Age. We quantify the force, work and material deformation required by each stone type when cutting, before using these data to compare edge sharpness and durability. Significant differences are identified, confirming performance to depend on raw material choice. When combined with artefact data, we demonstrate that Early Stone Age hominins optimized raw material choices based on functional performance characteristics. Doing so flexibly: choosing raw materials dependent on their sharpness and durability, alongside a tool's loading potential and anticipated use-life. In this way, we demonstrate that early lithic artefacts at Olduvai Gorge were engineered to be functionally optimized cutting tools.

CHRISTOPHER K. TOKITA & CORINA E. TARNITA – Social influence and interaction bias can drive emergent behavioural specialization and modular social networks across systems

In social systems ranging from ant colonies to human society, behavioural specialization—consistent individual differences in behaviour—is commonplace: individuals can specialize in the tasks they perform (division of labour (DOL)), the political behaviour they exhibit (political polarization) or the non-task behaviours they exhibit (personalities). Across these contexts, behavioural specialization often co-occurs with modular and assortative social networks, such that individuals tend to associate with others that have the same behavioural specialization. This raises the question of whether a common mechanism could drive co-emergent behavioural specialization and social network structure across contexts. To investigate this question, here we extend a model of self-organized DOL to account for social influence and interaction bias among individuals—social dynamics that have been shown to drive political polarization. We find that these same social dynamics can also drive emergent DOL by forming a feedback loop that reinforces behavioural differences between individuals, a feedback loop that is impacted by group size. Moreover, this feedback loop also results in modular and assortative social network structure, whereby individuals associate strongly with those performing the same task. Our findings suggest that DOL and political polarization—two social phenomena not typically considered together—may actually share a common social mechanism. This mechanism may result in social organization in many contexts beyond task performance and political behaviour.

<https://royalsocietypublishing.org/doi/full/10.1098/rsif.2019.0564>

Nature

PAPERS

MARK LIPSON et al with DAVID REICH – Ancient West African foragers in the context of African population history

Our knowledge of ancient human population structure in sub-Saharan Africa, particularly prior to the advent of food production, remains limited. Here we report genome-wide DNA data from four children—two of whom were buried approximately 8,000 years ago and two 3,000 years ago—from Shum Laka (Cameroon), one of the earliest known archaeological sites within the probable homeland of the Bantu language group. One individual carried the deeply divergent Y chromosome haplogroup A00, which today is found almost exclusively in the same region. However, the genome-wide ancestry profiles of all four individuals are most similar to those of present-day hunter-gatherers from western Central Africa, which implies that populations in western Cameroon today—as well as speakers of Bantu languages from across the continent—are not descended substantially from the population represented by these four people. We infer an Africa-wide phylogeny that features widespread admixture and three prominent radiations, including one that gave rise to at least four major lineages deep in the history of modern humans.

https://www.nature.com/articles/s41586-020-1929-1?WT.ec_id=NATURE-20200130&utm_source=nature_etoc&utm_medium=email&utm_campaign=20200130&sap-outbound-id=93345BA7B2D58C72754360F1D3F3ED0537756798&mkt-key=005056A5C6311ED999A8FA728E53655A

Nature Scientific Reports

PAPERS

TIBOR TAUZIN et al with JOSEP CALL – Context-sensitive adjustment of pointing in great apes

Great apes are able to request objects from humans by pointing. It is unclear, however, whether this is an associated response to a certain set of cues (e.g. the presence and attention of a human addressee) or a communicative signal which can be adjusted to relevant aspects of the spatial and social context. In three experiments, we tested captive great apes' flexible use of pointing gestures. We manipulated the communicative context so that the default pointing response of apes would have indicated an undesired object, either due to 1) the spatial arrangements of the target objects, 2) the perspective of the addressee or 3) the knowledge of the addressee about the target objects' location. The results of the three experiments indicate that great apes can successfully adjust their pointing to the spatial configuration of the referent environment such as distance and location of food. However, we found no evidence that they take the perspective or the knowledge of the addressee into account when doing so. This implies that pointing in great apes is a context-sensitive, but maybe less versatile, communicative signal compared to human pointing.

<https://www.nature.com/articles/s41598-019-56183-7>

ANNA CIGARINI, JULIÁN VICENS & JOSEP PERELLÓ – Gender-based pairings influence cooperative expectations and behaviours

The study explores the expectations and cooperative behaviours of men and women in a lab-in-the-field experiment by means of citizen science practices in the public space. It specifically examines the influence of gender-based pairings on the decisions to cooperate or defect in a framed and discrete Prisoner's Dilemma game after visual contact. Overall, we found that when gender is considered behavioural differences emerge in expectations of cooperation, cooperative behaviours, and their decision time depending on whom the partner is. Men pairs are the ones with the lowest expectations and cooperation rates. After visual contact women infer men's behaviour with the highest accuracy. Also, women take significantly more time

to defect than to cooperate, compared to men. Finally, when the interacting partners have the opposite gender they expect significantly more cooperation and they achieve the best collective outcome. Together, the findings suggest that non verbal signals may influence men and women differently, offering novel interpretations to the context-dependence of gender differences in social decision tasks.

<https://www.nature.com/articles/s41598-020-57749-6>

PLoS Biology

PAPERS

FANG WANG, GEOFFREY SCHOENBAUM & THORSTEN KAHNT – Interactions between human orbitofrontal cortex and hippocampus support model-based inference

Internal representations of relationships between events in the external world can be utilized to infer outcomes when direct experience is lacking. This process is thought to involve the orbitofrontal cortex (OFC) and hippocampus (HPC), but there is little evidence regarding the relative role of these areas and their interactions in inference. Here, we used a sensory preconditioning task and pattern-based neuroimaging to study this question. We found that associations among value-neutral cues were acquired in both regions during preconditioning but that value-related information was only represented in the OFC at the time of the probe test. Importantly, inference was accompanied by representations of associated cues and inferred outcomes in the OFC, as well as by increased HPC–OFC connectivity. These findings suggest that the OFC and HPC represent only partially overlapping information and that interactions between the two regions support model-based inference.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000578>

PLoS One

PAPERS

STEFANIA TITTON et al – Subspheroids in the lithic assemblage of Barranco León (Spain): Recognizing the late Oldowan in Europe

The lithic assemblage of Barranco León (BL), attributed to the Oldowan techno-complex, contributes valuable information to reconstruct behavioral patterning of the first hominins to disperse into Western Europe. This archaic stone tool assemblage comprises two, very different groups of tools, made from distinct raw materials. On the one hand, a small-sized toolkit knapped from Jurassic flint, comprising intensively exploited cores and small-sized flakes and fragments and, on the other hand, a large-sized limestone toolkit that is mainly linked to percussive activities. In recent years, the limestone macro-tools have been the center of particular attention, leading to a re-evaluation of their role in the assemblage. Main results bring to light strict hominin selective processes, mainly concerning the quality of the limestone and the morphology of the cobbles, in relation to their use-patterning. In addition to the variety of traces of percussion identified on the limestone tools, recurrences have recently been documented in their positioning and in the morphology of the active surfaces. Coupled with experimental work, this data has contributed to formulating hypothesis about the range of uses for these tools, beyond stone knapping and butchery, for activities such as: wood-working or tendon and meat tenderizing. The abundance of hammerstones, as well as the presence of heavy-duty scrapers, are special features recognized for the limestone component of the Barranco León assemblage. This paper presents, for the first time, another characteristic of the assemblage: the presence of polyhedral and, especially, subspheroid morphologies, virtually unknown in the European context for this timeframe. We present an analysis of these tools, combining qualitative evaluation of the raw materials, diacritical study, 3D geometric morphometric analysis of facet angles and an evaluation of the type and position of percussive traces; opening up the discussion of the late Oldowan beyond the African context.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0228290>

XIAOFENG WANG, XIAOJIE CHEN & LONG WANG – Evolution of egalitarian social norm by resource management

Social organizations, especially human society, rely on egalitarian social norm, which can be characterized by high levels of fairness, empathy and collective conformity. Nevertheless, the evolution of egalitarian social norm remains a conundrum, as it suffers the persistent challenge from individual self-interest. To address this issue, we construct an evolutionary game theoretical model by employing the Ultimatum Game, in which rational individuals are able to perform resource management. We show that resource management drives a population evolving into an oscillatory state with high equilibrium degrees of fairness, empathy and collective conformity and thus constitutes a key mechanism for the evolution of egalitarian social norm in social dilemma situations. Specifically, it results in (1) the formation of egalitarian social norm from diverse individual norms, (2) the emergence of egalitarian social norm in a selfish and unfair world, and (3) the maintenance of egalitarian social norm despite the presence of norm violators. The constructive role of resource management is explained by a mean-field analysis revealing that resource management can effectively enlarge the attraction basin of egalitarian norms or even change the dynamical property of the mini Ultimatum Game from bistability between egalitarian norms and less egalitarian norms to complete-dominance of egalitarian norms over less egalitarian norms. Furthermore, we find that the capacity of resource management can be evolutionarily selected by a coevolution between egalitarian social norm and resource management. Our study suggests that efficiency and equity are linked to each other.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0227902>

PNAS

PAPERS

KATHRIN MÜSCH et al – Transformation of speech sequences in human sensorimotor circuits

After we listen to a series of words, we can silently replay them in our mind. Does this mental replay involve a reactivation of our original perceptual dynamics? We recorded electrocorticographic (ECoG) activity across the lateral cerebral cortex as people heard and then mentally rehearsed spoken sentences. For each region, we tested whether silent rehearsal of sentences involved reactivation of sentence-specific representations established during perception or transformation to a distinct representation. In sensorimotor and premotor cortex, we observed reliable and temporally precise responses to speech; these patterns transformed to distinct sentence-specific representations during mental rehearsal. In contrast, we observed less reliable and less temporally precise responses in prefrontal and temporoparietal cortex; these higher-order representations, which were sensitive to sentence semantics, were shared across perception and rehearsal of the same sentence. The mental rehearsal of natural speech involves the transformation of stimulus-locked speech representations in sensorimotor and premotor cortex, combined with diffuse reactivation of higher-order semantic representations.

<https://www.pnas.org/content/early/2020/01/28/1910939117.abstract?etoc>

Science

ARTICLES

MICHAEL PRICE – Africans, too, carry Neanderthal genetic legacy

For the first time, significant and widespread sequences of Neanderthal ancestry have been detected in modern African populations. It was widely assumed that Africans possessed little Neanderthal DNA because modern humans only interbred with them once migrating out of Africa. Yet by using a new statistical model that estimates whether stretches of modern DNA are inherited from an ancient reference population—in this case, Neanderthals—the researchers behind a new study learned that five widespread African subpopulations each contained about 17 megabases of DNA inherited from Neanderthals, making up about 0.3% of their genomes. Africans owe this shared Neanderthal ancestry to a relatively recent back-migration of Europeans, as well a much earlier, failed out-of-Africa migration more than 100,000 years ago that introduced human DNA into Neanderthals.

<https://science.sciencemag.org/content/367/6477/497>

ANDREW CURRY – Europe's lost frontier

Most days, Willy van Wingerden spends a few free hours walking by the sea not far from the Dutch town of Monster. Here, the cheerful nurse has plucked more than 500 ancient artifacts from the broad, windswept beach known as the Zandmotor, or "sand engine." She has found Neanderthal tools made of river cobbles, bone fishhooks, and human remains thousands of years old. Her favorite beach—made of material dredged from the sea bottom offshore—preserves traces of a lost world, when sea levels were lower, and what is now the North Sea was a rich lowland, home to modern humans and Neanderthals. While she and other dedicated amateurs amass artifacts, scientists are applying new methods to date the finds and sequence any genetic traces, as well as to map the sea floor and analyze sediment cores. Together, researchers and collectors are bringing to light a vanished homeland of ancient Europeans.

<https://science.sciencemag.org/content/367/6477/499>

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