

CONTENTS

EAORC NOTICES	2
PUBLICATION ALERTS.....	2
EAORC NEWS – Biennial Membership Check – Please Respond.....	2
NEWS	2
SCIENCE NEWS – ‘Playful teasing’ in apes could provide clues to the evolutionary roots of early humor.....	2
SOCIETY FOR SCIENCE – Neandertal genes in people today may raise risk of severe COVID-19.....	2
SOCIETY FOR SCIENCE – Neandertal babies had stocky chests like their parents.....	3
BREAKING SCIENCE – Researchers Sequence Y Chromosomes of Bonobos and Orangutans.....	3
BREAKING SCIENCE – BREAKING SCIENCE – Black Imported Fire Ants Adapt Tool Use to Avoid Drowning.....	3
BREAKING SCIENCE – Neanderthals’ Deep and Short Ribcage was Already Present at Birth.....	3
SCIENCE DAILY – How the brain helps us navigate social differences.....	3
SCIENCE DAILY – Evolution of the Y chromosome in great apes deciphered.....	3
SCIENCE DAILY – Battling with neighbors could make animals smarter.....	3
SCIENCE DAILY – Past tropical forest changes drove megafauna and hominin extinctions.....	3
SCIENCE DAILY – Zoologists uncover new example of rapid evolution -- meet the Sulawesi Babblers.....	3
SCIENCE DAILY – Ants adapt tool use to avoid drowning.....	4
NATURE BRIEFING – Neandertal genes raise risk of serious COVID.....	4
THE CONVERSATION – How does being bilingual affect your brain? It depends on how you use language.....	4
PUBLICATIONS	4
American Journal of Physical Anthropology.....	4
PAPERS	4
MARKUS PORT et al – The evolution of social philopatry in female primates.....	4
NICOLE TORRES-TAMAYO et al – Assessing thoraco-pelvic covariation in <i>Homo sapiens</i> and <i>Pan troglodytes</i> : A 3D geometric morphometric approach.....	4
ANA BUCCHI et al – Insertion sites in manual proximal phalanges of African apes and modern humans.....	4
Animal Behaviour.....	5
PAPERS	5
TALIA BOROFKY et al – Hive minded: like neurons, honey bees collectively integrate negative feedback to regulate decisions.....	5
ILAPREET TOORA et al – Aggression and motivation to disperse in eusocial naked mole-rats, <i>Heterocephalus glaber</i>	5
CÉDRIC GIRARD-BUTTOZ et al with CHRISTOPHE BOESCH & CATHERINE CROCKFORD – Variable use of polyadic grooming and its effect on access to social partners in wild chimpanzees and bonobos.....	5
Current Biology.....	6
ARTICLES	6
TOBIAS KALENSCHER – Social Neuroscience: How the Brain Attends to the Joys and Pains of Others.....	6
Evolutionary Anthropology.....	6
PAPERS	6
MICHAEL J. O'BRIEN & R. ALEXANDER BENTLEY – Genes, culture, and the human niche: An overview.....	6
Language.....	6
PAPERS	6
JOE BLYTHE et al – Acquiring the lexicon and grammar of universal kinship.....	6
Nature Communications.....	6
PAPERS	6
MAXIME GARCIA et al – Evolution of communication signals and information during species radiation.....	6
EMILY L. MACKEVICIUS, MICHAEL T. L. HAPP & MICHAEL S. FEE – An avian cortical circuit for chunking tutor song syllables into simple vocal-motor units.....	7
Nature Scientific Reports.....	7
PAPERS	7
AVIAD AGAM et al – Estimating temperatures of heated Lower Palaeolithic flint artefacts.....	7
BENJAMIN J. ASHTON, PATRICK KENNEDY & ANDREW N. RADFORD – Interactions with conspecific outsiders as drivers of cognitive evolution.....	7
New Scientist.....	7
NEWS	7
Cockroach species found to live like ants with workers and a queen.....	7

Ancient humans harnessed fire to make stone tools 300,000 years ago	7
PLoS One.....	8
PAPERS	8
MARCEL WEISS – The Lichtenberg Keilmesser - it’s all about the angle	8
ESZTER SOMOGYI et al – The effect of language on prosocial behaviors in preschool children	8
PNAS.....	8
PAPERS	8
AINARA SISTIAGA et al with AUDAX MABULLA – Microbial biomarkers reveal a hydrothermally active landscape at Olduvai Gorge at the dawn of the Acheulean, 1.7 Ma	8
XIAOMIN FANG et al – The 3.6-Ma aridity and westerlies history over midlatitude Asia linked with global climatic cooling	9
CHELSEA J. WEIBEL et al – Accelerated reproduction is not an adaptive response to early-life adversity in wild baboons	9
MONIKA CECHOVA et al – Dynamic evolution of great ape Y chromosomes	9
Science Advances.....	9
PAPERS	9
DANIEL GARCÍA-MARTÍNEZ et al – Early development of the Neanderthal ribcage reveals a different body shape at birth compared to modern humans	9
Trends in Cognitive Sciences	10
PAPERS	10
THOMAS L. GRIFFITHS – Understanding Human Intelligence through Human Limitations.....	10
MURRAY SHANAHAN et al – Artificial Intelligence and the Common Sense of Animals	10
Subscribe to the EAORC Bulletin	10
Unsubscribe from the EAORC Bulletin	10
Produced by and for the EAORC email group	10

EAORC 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.

EAORC NEWS – Biennial Membership Check – Please Respond

2020 is a membership checking year, when I ask for confirmation that you wish to continue receiving the bulletins. So please let me know that you wish to continue by emailing me with Bulletin Yes, or something similar. If you do not wish to continue receiving the bulletin then you need do nothing. Anyone who has not indicated they wish to continue will be taken off the list at the end of October. This biennial membership check has been in operation since 2008, and GDPR has made it even more important that it is carried out regularly.

Many thanks to everyone who has responded so far. I already have enough to ensure the continued existence of the list.

When I am about to purge the list, you will receive a separate email, either confirmation of your continued membership, or notification of your final issue.

NEWS

SCIENCE NEWS – ‘Playful teasing’ in apes could provide clues to the evolutionary roots of early humor

Even before they learn to talk, human infants and toddlers know how to joke: They play games such as peek-a-boo and take whatever unexpected actions get a rise from adults. Now, it appears that nonhuman apes—like gorillas and orangutans—engage in similar behaviors, according to a paper published last week in *Biology Letters*.

Science chatted with co-author Erica Cartmill, an anthropologist at the University of California, Los Angeles, about what these “playful teasing” behaviors look like in our evolutionary cousins.

https://www.sciencemag.org/news/2020/10/playful-teasing-apes-could-provide-clues-evolutionary-roots-early-humor?utm_campaign=news_daily_2020-10-05&et rid=17774313&et cid=3509080

SOCIETY FOR SCIENCE – Neandertal genes in people today may raise risk of severe COVID-19

People in South Asia and Europe are more likely to carry a genetic heirloom from Neandertals linked to susceptibility to the coronavirus.

<http://click.societyforscience-email.com/?qs=422aafe881ab771849f208fac75e9ca52cdded3f7923a7a3700f986e3fdeb8cf5ba26a5000829372772c141fef48f79b0a2f0dac3e436402>

SOCIETY FOR SCIENCE – Neandertal babies had stocky chests like their parents

Our evolutionary relatives may have inherited short, deep rib cages from their ancient ancestors.

<http://click.societyforscience-email.com/?qs=7e89c5f0fb2cdd5dfca5e66a655c0b4b1a417ac623b254bd79b6b408f979e53331542c51922bfe6279c43a357b5673da5a790f660b586459>

BREAKING SCIENCE – Researchers Sequence Y Chromosomes of Bonobos and Orangutans

The male-specific Y chromosome plays a critical role in sex determination and male fertility. However, because of its repetitive nature, it is frequently absent from genome assemblies and remains enigmatic. In new research, a team of scientists at Penn State University has sequenced and assembled the Y chromosome of the bonobo (*Pan paniscus*) and the Sumatran orangutan (*Pongo abelii*). They've also reconstructed the ancestral Y chromosome of great apes by comparing three existing (gorilla, human, and chimpanzee) and two new Y chromosome assemblies, and found that many of their repetitive sequences and multicopy genes were likely already present in their common ancestor.

http://feedproxy.google.com/~r/BreakingScienceNews/~3/j5E0p6EgAU/bonobo-orangutan-y-chromosomes-08927.html?utm_source=feedburner&utm_medium=email

BREAKING SCIENCE – BREAKING SCIENCE – Black Imported Fire Ants Adapt Tool Use to Avoid Drowning

Black imported fire ants (*Solenopsis richteri*) have the remarkable ability to adapt its tool use: when provided with small containers of sugar water, they were able to float and feed on the surface, but when researchers reduced the surface tension, the ants started depositing sand grains on the inside of the container leading out of it.

http://feedproxy.google.com/~r/BreakingScienceNews/~3/OnyJASgkePI/black-imported-fire-ants-tool-use-08933.html?utm_source=feedburner&utm_medium=email

BREAKING SCIENCE – Neanderthals' Deep and Short Ribcage was Already Present at Birth

An international team of researchers has virtually reconstructed the ribcages of four Neanderthal individuals from birth to around 3 years old and found that most of the skeletal differences between the Neanderthal and modern human ribcage are already largely established at birth, the Neanderthal ribcage being deeper and shorter than that of modern humans.

http://feedproxy.google.com/~r/BreakingScienceNews/~3/ovDVn0PUN6M/neanderthals-deep-short-ribcage-present-at-birth-08932.html?utm_source=feedburner&utm_medium=email

SCIENCE DAILY – How the brain helps us navigate social differences

Researchers found that, among pairs of people who had very different socioeconomic backgrounds - calculated according to education level and family income - there was a higher level of activity in an area of the frontal lobe called the left dorsolateral prefrontal cortex. The area is associated with speech production and rule-based language as well as cognitive and attentional control.

<https://www.sciencedaily.com/releases/2020/10/201005080906.htm>

SCIENCE DAILY – Evolution of the Y chromosome in great apes deciphered

New analysis of the DNA sequence of the male-specific Y chromosomes from all living species of the great ape family helps to clarify our understanding of how this enigmatic chromosome evolved.

<https://www.sciencedaily.com/releases/2020/10/201006153503.htm>

SCIENCE DAILY – Battling with neighbors could make animals smarter

From ants to primates, 'Napoleonic' intelligence has evolved to help animals contend with the myriad cognitive challenges arising from interactions with rival outsiders, suggest researchers.

<https://www.sciencedaily.com/releases/2020/10/201006091231.htm>

SCIENCE DAILY – Past tropical forest changes drove megafauna and hominin extinctions

Researchers have discovered that Southeast Asia, today renowned for its lush rainforests, was at various points in the past covered by sweeping grasslands. The expansion and reduction of these grasslands had drastic effects on local megafauna, variously supporting success and inducing extinction.

<https://www.sciencedaily.com/releases/2020/10/201007123125.htm>

SCIENCE DAILY – Zoologists uncover new example of rapid evolution -- meet the Sulawesi Babblers

Zoologists have discovered that male and female Sulawesi Babblers (*Pellorneum celebense*, a species of bird) have evolved to attain different sizes on small islands, and in quick-fire time. They believe this is most likely due to evolutionary pressure favoring such 'dimorphism' because the birds are able to reduce competition with each other by feeding on different, scarce resources.

<https://www.sciencedaily.com/releases/2020/10/201008104229.htm>

SCIENCE DAILY – Ants adapt tool use to avoid drowning

Researchers have observed black imported fire ants using sand to draw liquid food out of containers, when faced with the risk of drowning. This is the first time this sophisticated tool use has been reported in animals.

<https://www.sciencedaily.com/releases/2020/10/201008083807.htm>

NATURE BRIEFING – Neanderthal genes raise risk of serious COVID

A gene segment that raises the risk of severe COVID-19 was inherited from Neanderthals. In the present, the segment is carried by around 50% of people of South Asian ancestry and 16% of people with European backgrounds. “The genes in this region may well have protected the Neanderthals against some other infectious diseases that are not around today,” says geneticist Svante Pääbo. “And now, when we are faced with the novel coronavirus these Neanderthal genes have these tragic consequences.”

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=5dbf959082&e=1db4b9a19b>

THE CONVERSATION – How does being bilingual affect your brain? It depends on how you use language

Why the benefits of bilingualism aren't consistent.

<https://theconversationuk.cmail20.com/t/r-l-juvhrk-khhilalh-k/>

PUBLICATIONS

American Journal of Physical Anthropology

PAPERS

MARKUS PORT et al – The evolution of social philopatry in female primates

The transition from solitary life to sociality is considered one of the major transitions in evolution. In primates, this transition is currently not well understood. Traditional verbal models appear insufficient to unravel the complex interplay of environmental and demographic factors involved in the evolution of primate sociality, and recent phylogenetic reconstructions have produced conflicting results. We therefore analyze a theoretical model for the evolution of female social philopatry that sheds new light on the question why most primates live in groups. In individual-based simulations, we study the evolution of dispersal strategies of both resident females and their offspring. The model reveals that social philopatry can evolve through kin selection, even if retention of offspring is costly in terms of within-group resource competition and provides no direct benefits. Our model supports the role of predator avoidance as a selective pressure for group-living in primates, but it also suggests that a second benefit of group-living, communal resource defense, might be required to trigger the evolution of sizable groups. Lastly, our model reveals that seemingly small differences in demographic parameters can have profound effects on primate social evolution.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24123?campaign=wolletoc>

NICOLE TORRES-TAMAYO et al – Assessing thoraco-pelvic covariation in Homo sapiens and Pan troglodytes: A 3D geometric morphometric approach

Understanding thoraco-pelvic integration in Homo sapiens and their closest living relatives (genus Pan) is of great importance within the context of human body shape evolution. However, studies assessing thoraco-pelvic covariation across Hominoidea species are scarce, although recent research would suggest shared covariation patterns in humans and chimpanzees but also species-specific features, with sexual dimorphism and allometry influencing thoraco-pelvic covariation in these taxa differently.

N = 30 adult H. sapiens and N = 10 adult Pan troglodytes torso 3D models were analyzed using 3D geometric morphometrics and linear measurements. Effects of sexual dimorphism and allometry on thoraco-pelvic covariation were assessed via regression analyses, and patterns of thoraco-pelvic covariation in humans and chimpanzees were computed via Two-Block Partial Least Squares analyses.

Results confirm the existence of common aspects of thoraco-pelvic covariation in humans and chimpanzees, and also species-specific covariation in H. sapiens that is strongly influenced by sexual dimorphism and allometry. Species-specific covariation patterns in chimpanzees could not be confirmed because of the small sample size, but metrics point to a correspondence between the most caudal ribs and iliac crest morphology that would be irrespective of sex.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24103?campaign=wolletoc>

ANA BUCCHI et al – Insertion sites in manual proximal phalanges of African apes and modern humans

The primary aim of this study was to describe the insertion sites of the ligaments holding the flexor digitorum profundus and superficialis muscles (flexor ridges) in proximal phalanges 2–5 of African apes and modern humans. To interpret differences in flexor ridge size based on general behavioral differences among taxa.

We analyzed 3D models of manual proximal phalanges 2–5 from 29 gorillas (*Gorilla beringei* and *Gorilla gorilla*), 30 chimpanzees (*Pan troglodytes*) and 36 recent modern humans. Flexor ridges (mm²) were compared within and across genera.

Gorillas and chimpanzees had larger flexor ridges for phalanges 2–4 than humans and this difference subsists when controlling for body size. Each genus had a unique insertion size pattern across the digits, with the most heterogeneous pattern found in chimpanzees, followed by humans, and lastly gorillas. These patterns corresponded strongly to the differences in the size of the phalanges within each genus, except for phalanx 5 in humans, which had a larger flexor ridge than expected.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24127?campaign=woletoc>

Animal Behaviour

PAPERS

TALIA BOROFSKY et al – Hive minded: like neurons, honey bees collectively integrate negative feedback to regulate decisions

Collective decision making is essential for multicellular and self-organized society coordination, but how this occurs when most of the individuals have limited knowledge of the external environment remains elusive. Using empirical data to inform a neuroscience-based firing-rate model, we found that integration of negative feedback and network dynamics in a honeybee, *Apis mellifera*, hive demonstrates strong similarities to the neuronal interactions of the human brain, where very brief perturbations of feedback in the system result in more rapid and accurate decisions. We show that honey bees used an inhibitory ‘stop’ signal towards dancing honey bees that reduced both waggle dancing and waggle dance pheromone production. Stop signals were probably elicited by individuals with no individual knowledge of food quality change in the external environment. Therefore, we demonstrate that collective behaviour across different biological levels of organization exhibits a dynamic complex system that is self-organized, but is governed by simple feedback mechanisms, facilitating efficient group decision making by optimally aggregating individuals that have relatively limited cognitive capabilities within a society or cell in a multicellular organism. We discuss how despite being on two different levels of biological organization, both neurons in the brain and honeybee individuals, within the hive, can operate collectively, which is probably a result of convergent evolution.

https://www.sciencedirect.com/science/article/abs/pii/S000334722030227X?dgcid=raven_sd_via_email

ILAPREET TOORA et al – Aggression and motivation to disperse in eusocial naked mole-rats, *Heterocephalus glaber*

Naked mole-rats are eusocial mammals that live in hierarchies consisting of one breeding female, one to three male consorts and their reproductively suppressed offspring. A ‘disperser morph’ subcaste has been suggested with a subset of nonbreeders exhibiting motivation to leave their natal colony and mate with unfamiliar conspecifics. To test the hypotheses that intrinsic colony variables (e.g. population density, sex ratio, queen temperament) influence the dispersal phenotype, and that males and females differ in responsiveness to these variables, we evaluated dispersal behaviour in 17 laboratory colonies. Queen aggression was associated with the number of female, but not male, dispersers, although dispersers were not themselves targets of queen aggression. Female dispersers were more aggressive than their nondispersing sisters, although still less aggressive than queens overall. Following outpairing with an unfamiliar opposite-sex animal, dispersers and nondispersers produced litters at similar rates, demonstrating that motivation to leave the colony, and not anticipatory reproductive maturation, is the key to successful dispersal. Collectively, these data suggest that aggressive naked mole-rat queens motivate dispersal in their daughters and that female dispersers show traits consistent with successful queens (e.g. aggression).

https://www.sciencedirect.com/science/article/abs/pii/S0003347220302268?dgcid=raven_sd_via_email

CÉDRIC GIRARD-BUTTOZ et al with CHRISTOPHE BOESCH & CATHERINE CROCKFORD – Variable use of polyadic grooming and its effect on access to social partners in wild chimpanzees and bonobos

In mammals, allogrooming is prominent in forming and maintaining social and cooperative relationships. Yet an animal's social time is constrained, which may limit its access to a large number of partners. Dunbar (1993, *Behavioral and Brain Sciences*, 16 (4), 681–694) proposed that human polyadic conversations, which allow access to several social partners simultaneously, evolved as a form of social grooming to circumvent this time constraint. In nonhuman primates, polyadic grooming (PG), in contrast to dyadic grooming, may similarly be a time-efficient way to maintain weak social relationships with many partners which can be important for group level cooperation. It remains unknown whether PG is used to fulfil specific cooperative needs by accessing numerous weakly bonded partners and increasing the number of partners accessed per unit of time. We compared the use and effect of PG between chimpanzees, *Pan troglodytes*, which are highly territorial and collaborative (especially males), and bonobos, *Pan paniscus*, which are less territorial and collaborative and in which females are the main co-operators. We carried out focal grooming observations in one bonobo and two chimpanzee communities in the wild. As predicted, chimpanzees engaged in more PG than bonobos. Surprisingly, males engaged in PG more than females in both species. While chimpanzees accessed more partners per minute of grooming than bonobos via dyadic grooming, PG increased the number of partners accessed per minute only in bonobos. Finally, chimpanzees primarily used PG with individuals who were close in rank and frequent grooming partners, whereas bonobos used PG with individuals who were distant in rank, close party associates and frequent grooming partners. We suggest that bonobo males use PG to

enhance conspecific social tolerance and mate choice. The overall higher rate of PG in chimpanzees suggests that between-group competition may promote polyadic affiliation, which possibly reinforces group cohesion and coordination.

https://www.sciencedirect.com/science/article/pii/S0003347220302645?dgcid=raven_sd_via_email

Current Biology

ARTICLES

TOBIAS KALENSCHER – Social Neuroscience: How the Brain Attends to the Joys and Pains of Others

Social interaction entails keeping an eye on good and bad things happening to others. A new study suggests that neurons in rat anterior cingulate cortex encode the attention paid to rewards and shocks to conspecifics, independently of empathically feeling their joy and pain.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(20\)31076-9?dgcid=raven_jbs_etoc_email](https://www.cell.com/current-biology/fulltext/S0960-9822(20)31076-9?dgcid=raven_jbs_etoc_email)

Evolutionary Anthropology

PAPERS

MICHAEL J. O'BRIEN & R. ALEXANDER BENTLEY – Genes, culture, and the human niche: An overview

The sharp distinction between biological traits and culturally based traits, which had long been standard in evolutionary approaches to behavior, was blurred in the early 1980s by mathematical models that allowed a co-dependent evolution of genetic transmission and cultural information. Niche-construction theory has since added another contrast to standard evolutionary theory, in that it views niche construction as a cause of evolutionary change rather than simply a product of selection. While offering a new understanding of the coevolution of genes, culture, and human behavior, niche-construction models also invoke multivariate causality, which require multiple time series to resolve. The empirical challenge lies in obtaining time-series data on causal pathways involved in the coevolution of genes, culture, and behavior. This is a significant issue in archeology, where time series are often sparse and causal behaviors are represented only by proxies in the material record.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21865?campaign=wolearlyview>

Language

PAPERS

JOE BLYTHE et al – Acquiring the lexicon and grammar of universal kinship

This article investigates how children learn an infinitely expanding 'universal' system of classificatory kinship terms. We report on a series of experiments designed to elicit acquisitional data on (i) nominal kinterms and (ii) sibling-inflected polysynthetic morphology in the Australian language Murrinhpatha. Photographs of the participants' own relatives are used as stimuli to assess knowledge of kinterms, kin-based grammatical contrasts, and kinship principles, across different age groups. The results show that genealogically distant kin are more difficult to classify than close kin, that children's comprehension and production of kinterms are streamlined by abstract merging principles, and that sibling-inflection is learned in tandem with number and person marking in the verbal morphology, although it is not fully mastered until mid to late childhood. We discuss how the unlimited nature of Australian kinship systems presents unusual challenges to the language learner, but suggest that, as everywhere, patterns of language acquisition are closely intertwined with children's experience of their sociocultural environment.

<https://muse.jhu.edu/article/764694>

Nature Communications

PAPERS

MAXIME GARCIA et al – Evolution of communication signals and information during species radiation

Communicating species identity is a key component of many animal signals. However, whether selection for species recognition systematically increases signal diversity during clade radiation remains debated. Here we show that in woodpecker drumming, a rhythmic signal used during mating and territorial defense, the amount of species identity information encoded remained stable during woodpeckers' radiation. Acoustic analyses and evolutionary reconstructions show interchange among six main drumming types despite strong phylogenetic contingencies, suggesting evolutionary tinkering of drumming structure within a constrained acoustic space. Playback experiments and quantification of species discriminability demonstrate sufficient signal differentiation to support species recognition in local communities. Finally, we only find character displacement in the rare cases where sympatric species are also closely related. Overall, our results illustrate how historical contingencies and ecological interactions can promote conservatism in signals during a clade radiation without impairing the effectiveness of information transfer relevant to inter-specific discrimination.

<https://www.nature.com/articles/s41467-020-18772-3>

EMILY L. MACKEVICIUS, MICHAEL T. L. HAPP & MICHAEL S. FEE – An avian cortical circuit for chunking tutor song syllables into simple vocal-motor units

How are brain circuits constructed to achieve complex goals? The brains of young songbirds develop motor circuits that achieve the goal of imitating a specific tutor song to which they are exposed. Here, we set out to examine how song-generating circuits may be influenced early in song learning by a cortical region (Nif) at the interface between auditory and motor systems. Single-unit recordings reveal that, during juvenile babbling, Nif neurons burst at syllable onsets, with some neurons exhibiting selectivity for particular emerging syllable types. When juvenile birds listen to their tutor, Nif neurons are also activated at tutor syllable onsets, and are often selective for particular syllable types. We examine a simple computational model in which tutor exposure imprints the correct number of syllable patterns as ensembles in an interconnected Nif network. These ensembles are then reactivated during singing to train a set of syllable sequences in the motor network.

<https://www.nature.com/articles/s41467-020-18732-x>

Nature Scientific Reports

PAPERS

AVIAD AGAM et al – Estimating temperatures of heated Lower Palaeolithic flint artefacts

Production of stone artefacts using pyro-technology is known from the Middle and Upper Palaeolithic of Europe and the Levant, and the Middle Stone Age in Africa. However, determination of temperatures to which flint artefacts were exposed is impeded by the chemical and structural variability of flint. Here we combine Raman spectroscopy and machine learning to build temperature-estimation models to infer the degree of pyro-technological control effected by inhabitants of the late Lower Palaeolithic (Acheulo-Yabrudian) site of Qesem Cave, Israel. Temperature estimation shows that blades were heated at lower median temperatures (259 °C) compared to flakes (413 °C), whereas heat-induced structural flint damage (for example, pot-lids and microcracks) appears at 447 °C. These results are consistent with a differential behaviour for selective tool production that can be viewed as part of a plethora of innovative and adaptive behaviours of Levantine hominins >300,000 years ago.

<https://www.nature.com/articles/s41562-020-00955-z>

BENJAMIN J. ASHTON, PATRICK KENNEDY & ANDREW N. RADFORD – Interactions with conspecific outsiders as drivers of cognitive evolution

The social intelligence hypothesis (SIH) posits that within-group interactions drive cognitive evolution, but it has received equivocal support. We argue the SIH overlooks a major component of social life: interactions with conspecific outsiders. Competition for vital resources means conspecific outsiders present myriad threats and opportunities in all animal taxa across the social spectrum (from individuals to groups). We detail cognitive challenges generated by conspecific outsiders, arguing these select for ‘Napoleonic’ intelligence; explain potential influences on the SIH; and highlight important considerations when empirically testing these ideas. Including interactions with conspecific outsiders may substantially improve our understanding of cognitive evolution.

<https://www.nature.com/articles/s41467-020-18780-3>

New Scientist

NEWS

Cockroach species found to live like ants with workers and a queen

Cockroaches can team up. A South American species is the first cockroach known to live in group nests with workers and a queen, like honeybees or leaf-cutter ants. “All cockroaches are solitary,” says Peter Vršanský at the Slovak Academy of Sciences in Bratislava – or so everyone thought. “It’s unbelievable. It’s like discovering ants as a group.”

<https://www.newscientist.com/article/2256067-cockroach-species-found-to-live-like-ants-with-workers-and-a-queen/#ixzz6aO3dOoWl>

Ancient humans harnessed fire to make stone tools 300,000 years ago

Ancient humans used controlled fire to modify their stone tools at least 300,000 years ago. Previously, the oldest hard evidence of controlled fire use was from Pinnacle Point in South Africa, 164,000 years ago. “We just doubled it,” says Filipe Natalio of the Weizmann Institute of Science in Israel. He and his colleagues studied 300,000-year-old flint tools from Qesem cave in Israel. The cave was occupied between 420,000 and 200,000 years ago, and the people who lived there regularly lit fires.

<https://www.newscientist.com/article/2256199-ancient-humans-harnessed-fire-to-make-stone-tools-300000-years-ago/#ixzz6aO4NcbNg>

MARCEL WEISS – The Lichtenberg Keilmesser - It's all about the angle

The presence of the 'Keilmesser-concept' in late Middle Paleolithic assemblages of Central and Eastern Europe defines the eponymous 'Keilmessergruppen'. The site of Lichtenberg (Lower Saxony, Germany) was discovered in 1987 and yielded one of the most important Keilmessergruppen assemblages of the northwestern European Plain. At that time, researchers used the bifacial backed knives to define a new type, the 'Lichtenberger Keilmesser', which they characterized by an aesthetic form-function concept with a specific range of morphological variability on the one hand, and a standardized convex cutting edge on the other hand. Thereby, a shape continuum was observed between different form-function concepts in the Lichtenberg assemblage, from Keilmesser through to Faustkeilblätter and handaxes. In a contrasting view, it was recently suggested that the morphology of Keilmesser, including what is defined here as type Lichtenberg, is the result of solutions to establish and maintain edge angles during resharpening. With the intention to evaluate these contrasting hypotheses, I conducted a re-analysis of the Keilmesser from Lichtenberg and their relationship to central German late Middle Paleolithic knives, using 3D geometric morphometric analyses and an automatized approach to measure edge angles on 3D models. Despite a morphological overlap of the tools from both regions, I could show that the Lichtenberg Keilmesser concept refers to one solution to create a tool with specific functionalities, like potentially cutting, prehension, and reusability. To establish and maintain its functionality, certain angles were created by the knappers along the active edges. This behavior resulted in specific shapes and positions of the active parts and created what looks like a standardized or template morphology of this Keilmesser type.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0239718>

ESZTER SOMOGYI et al – The effect of language on prosocial behaviors in preschool children

The present study investigated how linguistic group membership influences prosocial behaviors, namely helpfulness and cooperation, in preschool children. Whilst research indicates that children preferentially direct their prosocial behavior towards members of their own groups, the influence of perceived linguistic group membership on actual helpfulness and cooperation has not been investigated. We presented an experimenter to 4- and 5-year-olds either as a foreigner, who did not speak the local language or as a native person. Children were then given the opportunity to help or cooperate with this experimenter in a series of nonverbal playful tasks. Whilst 4-year-olds helped and cooperated equally with the foreign and the native experimenter, 5-year-olds required significantly more cues and prompts in order to help or cooperate in the foreign condition. We also found that children were overall more reluctant to respond prosocially in the cooperation tasks than in the helping tasks. We tested children in two European countries (France and Hungary) and found the same pattern of responses in the two locations, suggesting that our findings are not specific to the local culture. Our results extend the findings of earlier research that showed selectivity according to the language spoken by the partner for sharing and imitation. Studies that looked at helpfulness or cooperation used the minimal group paradigm to induce group membership (based on arbitrary cues) and used indirect measures of prosociality, such as different forms of reasoning about the partner. In our study, we used language, a natural cue for group membership (versus arbitrary cues or cues based on social conventions) and directly observed children's helpful and cooperative behaviors toward the experimenter. Our results also confirm previous results indicating that with age, children become selective in their prosocial behaviors as they acquire new means of social evaluation and categorization. We conclude that the language associated with a potential social partner is not only a cue for affiliation and shared knowledge but also a cue mediating children's prosocial acts.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0240028>

AINARA SISTIAGA et al with AUDAX MABULLA – Microbial biomarkers reveal a hydrothermally active landscape at Olduvai Gorge at the dawn of the Acheulean, 1.7 Ma

Landscape-scale reconstructions of ancient environments within the cradle of humanity may reveal insights into the relationship between early hominins and the changing resources around them. Many studies of Olduvai Gorge during Pliocene–Pleistocene times have revealed the presence of precession-driven wet–dry cycles atop a general aridification trend, though may underestimate the impact of local-scale conditions on early hominins, who likely experienced a varied and more dynamic landscape. Fossil lipid biomarkers from ancient plants and microbes encode information about their surroundings via their molecular structures and composition, and thus can shed light on past environments. Here, we employ fossil lipid biomarkers to study the paleolandscape at Olduvai Gorge at the emergence of the Acheulean technology, 1.7 Ma, through the Lower Acheulean Sandstones layer. In the context of the expansion of savanna grasslands, our results represent a resource-rich mosaic ecosystem populated by groundwater-fed rivers, aquatic plants, angiosperm shrublands, and edible plants. Evidence of a geothermally active landscape is reported via an unusual biomarker distribution consistent with the presence of hydrothermal features seen today at Yellowstone National Park. The study of hydrothermalism in ancient settings and its impact on hominin evolution has not been addressed before, although the association of thermal springs in the proximity of archaeological sites documented here can also be found at other localities. The hydrothermal features and

resources present at Olduvai Gorge may have allowed early hominins to thermally process edible plants and meat, supporting the possibility of a prefire stage of human evolution.

<https://www.pnas.org/content/117/40/24720.abstract?etoc>

XIAOMIN FANG et al – The 3.6-Ma aridity and westerlies history over midlatitude Asia linked with global climatic cooling

Midlatitude Asia (MLA), strongly influenced by westerlies-controlled climate, is a key source of global atmospheric dust, and plays a significant role in Earth's climate system. However, it remains unclear how the westerlies, MLA aridity, and dust flux from this region evolved over time. Here, we report a unique high-resolution eolian dust record covering the past 3.6 Ma, retrieved from the thickest loess borehole sequence (671 m) recovered to date, at the southern margin of the Taklimakan desert in the MLA interior. The results show that eolian dust accumulation, which is closely related to aridity and the westerlies, indicates existence of a dry climate, desert area, and stable land surface, promoting continuous loess deposition since at least ~3.6 Ma. This region experienced long-term stepwise drying at ~2.7, 1.1, and 0.5 Ma, coeval with a dominant periodicity shift from 41-ka cyclicity to 100-ka cyclicity between 1.1 Ma and 0.5 Ma. These features match well with global ice volume variability both in the time and frequency domains (including the Mid-Pleistocene Transition), highlighting global cooling-forced aridity and westerlies climate changes on these timescales. Numerical modeling demonstrates that global cooling can dry MLA and intensify the westerlies, which facilitates dust emission and transport, providing an interpretive framework. Increased dust may have promoted positive feedbacks (e.g., decreasing atmospheric CO₂ concentrations and modulating radiation budgets), contributing to further cooling. Unraveling the long-term evolution of MLA aridity and westerlies climate is an indispensable component of the unfolding mystery of global climate change.

<https://www.pnas.org/content/117/40/24729.abstract?etoc>

CHELSEA J. WEIBEL et al – Accelerated reproduction is not an adaptive response to early-life adversity in wild baboons

In humans and other long-lived species, harsh conditions in early life often lead to profound differences in adult life expectancy. In response, natural selection is expected to accelerate the timing and pace of reproduction in individuals who experience some forms of early-life adversity. However, the adaptive benefits of reproductive acceleration following early adversity remain untested. Here, we test a recent version of this theory, the internal predictive adaptive response (iPAR) model, by assessing whether accelerating reproduction following early-life adversity leads to higher lifetime reproductive success. We do so by leveraging 48 y of continuous, individual-based data from wild female baboons in the Amboseli ecosystem in Kenya, including prospective, longitudinal data on multiple sources of nutritional and psychosocial adversity in early life; reproductive pace; and lifetime reproductive success. We find that while early-life adversity led to dramatically shorter lifespans, individuals who experienced early adversity did not accelerate their reproduction compared with those who did not experience early adversity. Further, while accelerated reproduction predicted increased lifetime reproductive success overall, these benefits were not specific to females who experienced early-life adversity. Instead, females only benefited from reproductive acceleration if they also led long lives. Our results call into question the theory that accelerated reproduction is an adaptive response to both nutritional and psychosocial sources of early-life adversity in baboons and other long-lived species.

<https://www.pnas.org/content/117/40/24909.abstract?etoc>

MONIKA CECHOVA et al – Dynamic evolution of great ape Y chromosomes

The mammalian male-specific Y chromosome plays a critical role in sex determination and male fertility. However, because of its repetitive and haploid nature, it is frequently absent from genome assemblies and remains enigmatic. The Y chromosomes of great apes represent a particular puzzle: their gene content is more similar between human and gorilla than between human and chimpanzee, even though human and chimpanzee share a more recent common ancestor. To solve this puzzle, here we constructed a dataset including Ys from all extant great ape genera. We generated assemblies of bonobo and orangutan Ys from short and long sequencing reads and aligned them with the publicly available human, chimpanzee, and gorilla Y assemblies. Analyzing this dataset, we found that the genus *Pan*, which includes chimpanzee and bonobo, experienced accelerated substitution rates. *Pan* also exhibited elevated gene death rates. These observations are consistent with high levels of sperm competition in *Pan*. Furthermore, we inferred that the great ape common ancestor already possessed multicopy sequences homologous to most human and chimpanzee palindromes. Nonetheless, each species also acquired distinct ampliconic sequences. We also detected increased chromatin contacts between and within palindromes (from Hi-C data), likely facilitating gene conversion and structural rearrangements. Our results highlight the dynamic mode of Y chromosome evolution and open avenues for studies of male-specific dispersal in endangered great ape species.

<https://www.pnas.org/content/early/2020/10/02/2001749117.abstract?etoc>

Science Advances

PAPERS

DANIEL GARCÍA-MARTÍNEZ et al – Early development of the Neanderthal ribcage reveals a different body shape at birth compared to modern humans

Ontogenetic studies provide clues for understanding important paleobiological aspects of extinct species. When compared to that of modern humans, the adult Neanderthal thorax was shorter, deeper, and wider. This is related to the wide

Neanderthal body and is consistent with their hypothetical large requirements for energy and oxygen. Whether these differences were already established at birth or appeared later during development is unknown. To delve into this question, we use virtual reconstruction tools and geometric morphometrics to recover the 3D morphology of the ribcages of four neanderthal individuals from birth to around 3 years old: Mezmaiskaya, le Moustier, Dederiyeh, and Roc de Marsal. Our results indicate that the comparatively deep and short ribcage of the Neanderthals was already present at birth, as were other skeletal species-specific traits. This morphology possibly represents the plesiomorphic condition shared with Homo erectus, and it is likely linked to large energetic requirements.

https://advances.sciencemag.org/content/6/41/eabb4377?utm_campaign=toc_advances_2020-10-09&et rid=17774313&et cid=3514914

Trends in Cognitive Sciences

PAPERS

THOMAS L. GRIFFITHS – Understanding Human Intelligence through Human Limitations

The solutions to these problems involve mathematical formalisms such as Bayesian inference and meta-learning, rational meta-reasoning, and distributed algorithms, which may be particularly relevant to cognitive science.

Recent progress in artificial intelligence provides the opportunity to ask the question of what is unique about human intelligence, but with a new comparison class. I argue that we can understand human intelligence, and the ways in which it may differ from artificial intelligence, by considering the characteristics of the kind of computational problems that human minds have to solve. I claim that these problems acquire their structure from three fundamental limitations that apply to human beings: limited time, limited computation, and limited communication. From these limitations we can derive many of the properties we associate with human intelligence, such as rapid learning, the ability to break down problems into parts, and the capacity for cumulative cultural evolution.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(20\)30215-1?dgcid=raven_jbs_aip_email](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(20)30215-1?dgcid=raven_jbs_aip_email)

MURRAY SHANAHAN et al – Artificial Intelligence and the Common Sense of Animals

The problem of common sense remains a major obstacle to progress in artificial intelligence. Here, we argue that common sense in humans is founded on a set of basic capacities that are possessed by many other animals, capacities pertaining to the understanding of objects, space, and causality. The field of animal cognition has developed numerous experimental protocols for studying these capacities and, thanks to progress in deep reinforcement learning (RL), it is now possible to apply these methods directly to evaluate RL agents in 3D environments. Besides evaluation, the animal cognition literature offers a rich source of behavioural data, which can serve as inspiration for RL tasks and curricula.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(20\)30216-3?dgcid=raven_jbs_aip_email](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(20)30216-3?dgcid=raven_jbs_aip_email)

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