

## EAORC BULLETIN 1,017 – 11 December 2022

## CONTENTS

<b>NOTICES</b> .....	<b>2</b>
PUBLICATION ALERTS.....	2
<b>NEWS</b> .....	<b>2</b>
SCIENCE NEWS – Mysterious ancient humans may have given Papua New Guineans immune advantage.....	2
SOCIETY FOR SCIENCE – Homo naledi may have lit fires in underground caves at least 236,000 years ago.....	2
<b>PUBLICATIONS</b> .....	<b>2</b>
American Journal of Biological Anthropology.....	2
<b>PAPERS</b> .....	<b>2</b>
NATALIE M. LAUDICINA & MATT CARTMILL – Bony birth-canal dimensions and obstetric constraints in hominoids.....	2
CATHERINE E. TAYLOR et al – Halibee fossil assemblages reveal later Pleistocene cercopithecins (Cercopithecidae: Primates) in the Middle Awash of Ethiopia.....	3
Current Biology.....	3
<b>ARTICLES</b> .....	<b>3</b>
MICHAEL GROSS – When animals learned to speak.....	3
<b>PAPERS</b> .....	<b>3</b>
MANON K. SCHWEINFURTH et al with JOSEP CALL – Inter-individual coordination in walking chimpanzees.....	3
DAVID WHEATCROFT et al – Species-specific song responses emerge as a by-product of tuning to the local dialect.....	3
eLife.....	4
<b>PAPERS</b> .....	<b>4</b>
KAI R. CASPAR et al – The evolution and biological correlates of hand preferences in anthropoid primates.....	4
Frontiers in Ecology and Evolution.....	4
<b>PAPERS</b> .....	<b>4</b>
GUILLERMO SERRANO NÁJERA & KORYU KIN – Unusual occurrence of domestication syndrome amongst African mole-rats: Is the naked mole-rat a domestic animal?.....	4
FILIPA ABREU & SIMONE PIKA – Turn-taking skills in mammals: A systematic review into development and acquisition.....	4
Frontiers in Human Neuroscience.....	5
<b>PAPERS</b> .....	<b>5</b>
DOROTHEE J. CHWILLA – Context effects in language comprehension: The role of emotional state and attention on semantic and syntactic processing.....	5
Frontiers in Psychology.....	5
<b>PAPERS</b> .....	<b>5</b>
WILLIAM D. HOPKINS et al – Neuroanatomical correlates of individual differences in the object choice task in chimpanzees (Pan troglodytes).....	5
Nature Humanities & Social Sciences Communications.....	6
<b>PAPERS</b> .....	<b>6</b>
EVELINA LEIVADA – Determining the cognitive biases behind a viral linguistic universal: the order of multiple adjectives.....	6
Nature Reviews Genetics.....	6
<b>ARTICLES</b> .....	<b>6</b>
LUIS R. SARAIVA – The Neanderthal inside us.....	6
Nature Scientific Reports.....	6
<b>PAPERS</b> .....	<b>6</b>
LAURYN BENEDICT et al – A survey of vocal mimicry in companion parrots.....	6
Neuron.....	6
<b>ARTICLES</b> .....	<b>6</b>
SARAH GENON & STEPHANIE J. FORKEL – How do different parts of brain white matter develop after birth in humans?.....	6
<b>PAPERS</b> .....	<b>7</b>
ARASH NAZERI et al – Neurodevelopmental patterns of early postnatal white matter maturation represent distinct underlying microstructure and histology.....	7
MIKIKO KADOHISA et al – Frontal and temporal coding dynamics in successive steps of complex behavior.....	7
New Scientist.....	7
<b>NEWS</b> .....	<b>7</b>
Homo naledi may have used fire to cook and navigate 230,000 years ago.....	7
<b>REVIEWS</b> .....	<b>7</b>
SIMON INGS – How birds have advanced our understanding of evolution.....	7

PLoS Biology.....	7
<b>PAPERS</b> .....	7
JONAS HÅKANSSON et al – Bats expand their vocal range by recruiting different laryngeal structures for echolocation and social communication.....	7
PLoS One.....	8
<b>PAPERS</b> .....	8
MARTA BIAŁECKA-PIKUL et al – Peeking and lying in the temptation resistance paradigm in 2.5-year-olds: The role of inhibitory control.....	8
TEGENU GOSSA & ERELLA HOVERS – Continuity and change in lithic techno-economy of the early Acheulian on the Ethiopian highland: A case study from locality MW2; the Melka Wakena site-complex.....	8
HAN ZHANG & WOLFRAM HINZEN – Grammar in ‘agrammatical’ aphasia: What’s intact? .....	8
THERESA EPPERLEIN et al – Context and prediction matter for the interpretation of social interactions across species.....	8
CHAO ZHAO, YOUPIPING WANG & JOHN P. WALDEN – Diachronic shifts in lithic technological transmission between the eastern Eurasian Steppe and northern China in the Late Pleistocene.....	9
JIAJING WANG et al – New evidence for rice harvesting in the early Neolithic Lower Yangtze River, China.....	9
Science.....	9
<b>NEWS</b> .....	9
Indigenous Americans broke the cycle of destructive wildfires. Here’s how they did it.....	9
<b>SUBSCRIBE to the EAORC Bulletin</b> .....	9
<b>UNSUBSCRIBE from the EAORC Bulletin</b> .....	9
<b>PRODUCED BY AND FOR THE EAORC EMAIL GROUP</b> .....	9

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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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## NEWS

### SCIENCE NEWS – Mysterious ancient humans may have given Papua New Guineans immune advantage

The genetic legacy of Denisovans may be shaping the modern immune system of southwest Pacific populations.

<https://www.science.org/content/article/mysterious-ancient-humans-may-have-given-people-papua-new-guinea-immune-advantage>

### SOCIETY FOR SCIENCE – Homo naledi may have lit fires in underground caves at least 236,000 years ago

Remnants of small fireplaces found in South African cave system, researchers announce.

<https://www.sciencenews.org/article/homo-naledi-fire-hominid-cave-human-evolution>

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## PUBLICATIONS

### American Journal of Biological Anthropology

#### PAPERS

#### **NATALIE M. LAUDICINA & MATT CARTMILL – Bony birth-canal dimensions and obstetric constraints in hominoids**

Comparative studies of the birth process in humans and other primates have focused on the pelvic inlet. This is a region of birth-canal constraint in humans, but not in other primates. Thus, the true obstetric differences between humans and other apes remain unknown. This research seeks to document nonhuman ape birth-canal morphologies and their relationships to critical dimensions of neonates, in order to determine what aspects of human birth are unique.

Computer-generated images of the scanned pelvises of six extant hominoid species are used to compare entire birth canals as three-dimensional entities, documenting and analyzing the functionally relevant metrics of the maternal pelvis and the obstetric constraints for each species.

The inlet is a poor basis of comparison for evaluating tightness of fit in nonhuman primates, whose birth canal is most constricted at the lower end of the sacrum. Previous studies have overestimated the capaciousness of the nonhuman hominoid birth canal (which appears to be just as tight a fit for the fetal head in hylobatids as it is in *Homo sapiens*) and also misrepresented it as a simple straight tube. In fact, its cross-sectional shape changes markedly from inlet to outlet in most hominoids.

Nonhuman hominoids exhibit obstetric constraints unlike those seen in modern humans. Human adaptations to maternal-fetal craniopelvic disproportion are unique owing to the constraints imposed by bipedality, and probably predate the origins of the genus *Homo*.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24659>

**CATHERINE E. TAYLOR et al – Hallbee fossil assemblages reveal later Pleistocene cercopithecins (*Cercopithecidae*: *Primates*) in the Middle Awash of Ethiopia**

The goals of this study were to describe and interpret two new fossil assemblages of cercopithecine monkeys ( $n = 328$ ), one from the Faro Daba beds (ca. 100,000 years) and the other one from the Chai Baro beds (>158,000 years old), in the Afar Rift of Ethiopia.

We describe the two assemblages and compare them to extant cercopithecine species and the smaller fossil assemblage from Asbole, Ethiopia (ca. 600 ka). We use a population-based approach to the taxonomy given the unusually large number of specimens. Craniodental and postcranial anatomy are presented. Evidence of locomotor habitus is described and evaluated in a framework of hybridization and postcranial plasticity.

We attribute all cercopithecine specimens from both beds to cf. *Chlorocebus* and conclude that the Faro Daba and Chai Baro assemblages likely sample single species at each time horizon. Subtle differences between the two assemblages, mostly in postcranial morphology, are insufficient to justify separation at the species level.

The large sample sizes and unique preservational aspects of these two assemblages open a new window into the recent evolution of guenons. Our data indicate that these fossil populations may be ancestral to the cercopithecins currently living in the Afar region of Ethiopia.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24637>

## Current Biology

### ARTICLES

**MICHAEL GROSS – When animals learned to speak**

A systematic study has revealed more than 50 vertebrate species communicating with sound although they were previously assumed to be mute. This shifts the balance in favour of an early origin of animal sounds, which may be as old as lungs. It may also call for a reassessment of the current soundscape ecology and its anthropogenic disturbances.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)01819-X](https://www.cell.com/current-biology/fulltext/S0960-9822(22)01819-X)

### PAPERS

**MANON K. SCHWEINFURTH et al with JOSEP CALL – Inter-individual coordination in walking chimpanzees**

Humans, like many other animals, live in groups and coordinate actions with others in social settings. Such interpersonal coordination may emerge unconsciously and when the goal is not the coordination of movements, as when falling into the same rhythm when walking together. Although one of our closest living relatives, the chimpanzee (*Pan troglodytes*), shows the ability to succeed in complex joint action tasks where coordination is the goal, little is known about simpler forms of joint action. Here, we examine whether chimpanzees spontaneously synchronize their actions with conspecifics while walking together. We collected data on individual walking behavior of two groups of chimpanzees under semi-natural conditions. In addition, we assessed social relationships to investigate potential effects on the strength of coordination. When walking with a conspecific, individuals walked faster than when alone. The relative phase was symmetrically distributed around 0° with the highest frequencies around 0, indicating a tendency to coordinate actions. Further, coordination was stronger when walking with a partner compared with two individuals walking independently. Although the inter-limb entrainment was more pronounced between individuals of similar age as a proxy for height, it was not affected by the kinship or bonding status of the walkers or the behaviors they engaged in immediately after the walk. We conclude that chimpanzees adapt their individual behavior to temporally coordinate actions with others, which might provide a basis for engaging in other more complex forms of joint action. This spontaneous form of inter-individual coordination, often called entrainment, is thus shared with humans.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)01601-3](https://www.cell.com/current-biology/fulltext/S0960-9822(22)01601-3)

**DAVID WHEATCROFT et al – Species-specific song responses emerge as a by-product of tuning to the local dialect**

Oscine birds preferentially respond to certain sounds over others from an early age, which focuses subsequent learning onto sexually relevant songs. Songs vary both across species and, due to cultural evolution, among populations of the same species. As a result, early song responses are expected to be shaped by selection both to avoid the fitness costs of cross-species learning and to promote learning of population-typical songs. These sources of selection are not mutually exclusive but can result in distinct geographic patterns of song responses in juvenile birds: if the risks of interspecific mating are the main driver of early song discrimination, then discrimination should be strongest where closely related species co-occur. In contrast, if early discrimination primarily facilitates learning local songs, then it should be tuned to songs typical of the local dialect. Here, we experimentally assess the drivers of song discrimination in nestling pied flycatchers (*Ficedula hypoleuca*). We first demonstrate that early discrimination against the songs of the closely related collared flycatcher (*F. albicollis*) is not strongly affected by co-occurrence. Second, across six European populations, we show that nestlings' early song responses

are tuned to their local song dialect and that responses to the songs of collared flycatchers are similarly weak as to those of other conspecific dialects. Taken together, these findings provide clear experimental support for the hypothesis that cultural evolution, in conjunction with associated learning predispositions, drives the emergence of pre-mating reproductive barriers. [https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)01605-0](https://www.cell.com/current-biology/fulltext/S0960-9822(22)01605-0)

## eLife

### PAPERS

#### **KAI R. CASPAR et al – The evolution and biological correlates of hand preferences in anthropoid primates**

The evolution of human right-handedness has been intensively debated for decades. Manual lateralization patterns in non-human primates have the potential to elucidate evolutionary determinants of human handedness, but restricted species samples and inconsistent methodologies have so far limited comparative phylogenetic studies. By combining original data with published literature reports, we assembled data on hand preferences for standardized object manipulation in 1786 individuals from 38 species of anthropoid primates, including monkeys, apes, and humans. Based on that, we employ quantitative phylogenetic methods to test prevalent hypotheses on the roles of ecology, brain size, and tool use in primate handedness evolution. We confirm that human right-handedness represents an unparalleled extreme among anthropoids and found taxa displaying population-level handedness to be rare. Species-level direction of manual lateralization was largely uniform among non-human primates and did not strongly correlate with any of the selected biological predictors, nor with phylogeny. In contrast, we recovered highly variable patterns of hand preference strength, which show signatures of both ecology and phylogeny. In particular, terrestrial primates tend to display weaker hand preferences than arboreal species. These results challenge popular ideas on primate handedness evolution, including the postural origins hypothesis. Furthermore, they point to a potential adaptive benefit of disparate lateralization strength in primates, a measure of hand preference that has often been overlooked in the past. Finally, our data show that human lateralization patterns do not align with trends found among other anthropoids, suggesting that unique selective pressures gave rise to the unusual hand preferences of our species.

<https://elifesciences.org/articles/77875>

## Frontiers in Ecology and Evolution

### PAPERS

#### **GUILLELMO SERRANO NÁJERA & KORYU KIN – Unusual occurrence of domestication syndrome amongst African mole-rats: Is the naked mole-rat a domestic animal?**

The Naked mole-rat (NMR) is becoming a prominent model organism due to its peculiar traits, such as eusociality, extreme longevity, cancer resistance, and reduced pain sensitivity. It belongs to the African mole-rats (AMR), a family of subterranean rodents that includes solitary, cooperative breeding and eusocial species. We identified and quantified the domestication syndrome (DS) across AMR, a set of morphological and behavioural traits significantly more common and pronounced amongst domesticated animals than in their wild counterparts. Surprisingly, the NMR shows apparent DS traits when compared to the solitary AMR. Animals can self-domesticate when a reduction of the fear response is naturally selected, such as in islands with no predators, or to improve the group's harmony in cooperative breeding species. The DS may be caused by alterations in the physiology of the neural crest cells (NCC), a transient population of cells that generate a full range of tissues during development. The NCC contribute to organs responsible for transmitting the fear response and various other tissues, including craniofacial bones. Therefore, mutations affecting the NCC can manifest as behavioural and morphological alterations in many structures across the body, as seen in neurocristopathies. We observed that all social AMRs are chisel-tooth diggers, an adaptation to hard soils that requires the flattening of the skull. We hypothesise that chisel-tooth digging could impose a selective pressure on the NCC that triggered the DS's appearance, possibly facilitating the evolution of sociality. Finally, we discuss how DS traits are neutral or beneficial for the subterranean niche, strategies to test this hypothesis and report well-studied mutations in the NMR that are associated with the NCC physiology or with the control of the fear response. In conclusion, we argue that many of the NMR's unconventional traits are compatible with the DS and provide a hypothesis about its origins. Our model proposes a novel avenue to enhance the understanding of the extraordinary biology of the NMR.

<https://www.frontiersin.org/articles/10.3389/fevo.2022.987177/full>

#### **FILIPA ABREU & SIMONE PIKA – Turn-taking skills in mammals: A systematic review into development and acquisition**

How human language evolved remains one of the most intriguing questions in science, and different approaches have been used to tackle this question. A recent hypothesis, the Interaction Engine Hypothesis, postulates that language was made possible through the special capacity for social interaction involving different social cognitive skills (e.g., joint attention, common ground) and specific characteristics such as face-to-face interaction, mutual gaze and turn-taking, the exchange of rapid communicative turns. Recently, it has been argued that this turn-taking infrastructure may be a foundational and ancient mechanism of the layered system of language because communicative turn-taking has been found in human infants and across several non-human primate species. Moreover, there is some evidence for turn-taking in different mammalian taxa, especially those capable of vocal learning. Surprisingly, however, the existing studies have mainly focused on turn-

taking production of adult individuals, while little is known about its emergence and development in young individuals. Hence, the aim of the current paper was 2-fold: First, we carried out a systematic review of turn-taking development and acquisition in mammals to evaluate possible research bias and existing gaps. Second, we highlight research avenues to spur more research into this domain and investigate if distinct turn-taking elements can be found in other non-human animal species. Since mammals exhibit an extended development period, including learning and strong parental care, they represent an excellent model group in which to investigate the acquisition and development of turn-taking abilities. We performed a systematic review including a wide range of terms and found 21 studies presenting findings on turn-taking abilities in infants and juveniles. Most of these studies were from the last decade, showing an increased interest in this field over the years. Overall, we found a considerable variation in the terminologies and methodological approaches used. In addition, studies investigating turn-taking abilities across different development periods and in relation to different social partners were very rare, thereby hampering direct, systematic comparisons within and across species. Nonetheless, the results of some studies suggested that specific turn-taking elements are innate, while others are acquired during development (e.g., flexibility). Finally, we pinpoint fruitful research avenues and hypotheses to move the field of turn-taking development forward and improve our understanding of the impact of turn-taking on language evolution.

<https://www.frontiersin.org/articles/10.3389/fevo.2022.987253/full>

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## Frontiers in Human Neuroscience

### PAPERS

#### **DOROTHEE J. CHWILLA – Context effects in language comprehension: The role of emotional state and attention on semantic and syntactic processing**

Semantics and syntax are core components of language. The prevailing view was that processing of word meaning and syntactic processing happens in isolation from other systems. In light of proofed interactions between language and other systems, especially with perception, action and emotion, this view became untenable. This article reviews Event-related potential studies conducted at the Donders Centre for Cognition exploring the interplay between language comprehension and a person's emotional state. The research program was aimed at an investigation of the online effects of emotional state on semantic processing and syntactic processing. To this aim we manipulated mood via film fragments (happy vs. sad) before participants read neutral sentences while their EEG was recorded. In Part 1, it is shown that mood impacts online semantic processing (as indicated by N400) and the processing of syntactic violations (as indicated by P600). Part 2 was directed at a further determination of the mechanisms underlying these interactions. The role of heuristics was examined by investigating the effects of mood on the P600 to semantic reversals. The results revealed that mood affects heuristic processing. The next step consisted of an assessment of the role of attention, in the mood-by-semantics and mood-by-syntax interaction. This was accomplished by recording EEG while manipulating attention via task next to emotional state. Participants performed a semantic or syntactic judgment task vs. a letter-size judgment task. The main ERP results were as follows: (i) attention interacts with the mood effect on semantic processing and syntactic processing, respectively, (ii) the effects of mood on semantic processing and syntactic processing are reliable, and (iii) the mood effects on semantic processing are not fixed but context-dependent. In Part 3 the effects of mood on the processing of script knowledge and general world knowledge are presented. Part 4 closes with a discussion of the mechanisms involved in the mood-by-language interactions and recommendations for future research. Regarding the underlying mechanism we propose that heuristics based on semantic expectancies or syntactic expectancies play a key role in the mood-by-language interactions. The results support the view that language takes place in continuous interaction with other (non-language) systems.

<https://www.frontiersin.org/articles/10.3389/fnhum.2022.1014547/full>

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## Frontiers in Psychology

### PAPERS

#### **WILLIAM D. HOPKINS et al – Neuroanatomical correlates of individual differences in the object choice task in chimpanzees (*Pan troglodytes*)**

Declarative and imperative joint attention or joint engagement are important milestones in human infant development. These have been shown to be a significant predictor of later language development and are impaired in some individuals with, or at risk for, a diagnosis of autism spectrum disorder. Comparatively, while chimpanzees and other great apes have been reported to engage in imperative joint attention, evidence of declarative joint attention remains unclear based on existing studies. Some have suggested that differences in methods of assessing joint attention may have an influence on performance in nonhuman primates. Here, we report data on a measure of receptive joint attention (object choice task) in a sample of captive chimpanzees. Chimpanzees, as a group, performed significantly better than chance. By contrast, when considering individual performance, there was no significant difference in the number of those who passed and those who failed. Using quantitative genetic analyses, we found that performance on the object choice task was not significantly heritable nor were there any significant effects of sex, rearing history, or colony. Lastly, we found significant differences in gray matter covariation, between those who passed or failed the task. Those who passed contributed more to gray matter covariation in several brain regions within the social brain network, consistent with hypotheses regarding the importance of these regions in human and nonhuman primate social cognition.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.1057722/full>

## Nature Humanities & Social Sciences Communications

### PAPERS

#### **EVELINA LEIVADA – Determining the cognitive biases behind a viral linguistic universal: the order of multiple adjectives**

When people are asked to create a phrase with the elements {blue, earrings, beautiful}, they produce ‘beautiful blue earrings’. Several theories have been proposed about the origins of this universal tendency to order multiple adjectives in a specific way: an innate universal hierarchy with designated positions for each category of adjectives, sensitivity to the definiteness of the adjectival denotation, availability and psychological closeness of the adjective attributes to the speaker, the encoding of subjective vs. objective properties, and the adjective’s phonological weight. Although these theories have strong descriptive power, they often focus on what happens at the phenotypic level without explaining what cognitive needs trigger this behavior. Through a timed task that measures acceptability in ‘Adjective-Adjective-Noun’ sequences that either comply with the universal order or violate it, we adduce evidence for the high acceptability of the violating orders, whose processing did not take longer than that of the compliant orders, as should have happened if the former were non-canonical. The results suggest that ordering preferences exist but are not invariable, as one would expect if a strong linguistic universal was involved. We track the origin of adjective ordering preferences to the synergistic interplay of three cognitive biases: Zipf’s Law, Intolerance of Ambiguity, and Novel Information Bias. Last, we show that the linguistic manifestation of these preferences is sensitive to the statistical distribution of the input data, resulting to variation even among speakers of the same language.

<https://www.nature.com/articles/s41599-022-01440-w>

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## Nature Reviews Genetics

### ARTICLES

#### **LUIS R. SARAIVA – The Neanderthal inside us**

The origins of humankind have always been shrouded in mystery, and the question of where we come from is perhaps as old as humanity itself. The seminal discovery of the first Neanderthal (*Homo neanderthalensis*) fossils in the mid-1800s postulated that this species was closer to modern humans (*Homo sapiens*) than any other previously described. However, how these ancient humans are related to us remained a hot topic of debate for decades to come.

<https://www.nature.com/articles/s41576-022-00561-x>

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## Nature Scientific Reports

### PAPERS

#### **LAURYN BENEDICT et al – A survey of vocal mimicry in companion parrots**

Parrots are one of the rare animal taxa with life-long vocal learning. Parrot vocal repertoires are difficult to study in the wild, but companion parrots offer a valuable data source. We surveyed the public about mimicry repertoires in companion parrots to determine whether vocal learning varied by (1) species, (2) sex, (3) age, and (4) social interaction with other parrots. Species differed significantly in mimicry ability, with grey parrots (*Psittacus erithacus*) having the largest mimicry repertoires. Analyses of all birds ( $n = 877$ ) found no overarching effects of sex, age, or parrot-parrot social interactions on mimicry repertoires. Follow up analyses ( $n = 671$ ), however, revealed a human bias to assume that talking parrots are male, and indicated that five of the 19 best-sampled species exhibited sex differences. Age-specific analyses of grey parrots ( $n = 187$ ) indicated that repertoire size did not increase during adulthood. Most parrots were capable of improvisation (e.g. rearranging words) and used mimicry in appropriate human contexts. Results indicate that parrot vocal production learning varies among and within species, suggesting that the mechanisms and functions of learning also vary. Our data provide a rich foundation for future comparative research on avian vocalizations, and broaden our understanding of the underpinnings of communicative behavior and learning across all animals.

<https://www.nature.com/articles/s41598-022-24335-x>

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## Neuron

### ARTICLES

#### **SARAH GENON & STEPHANIE J. FORKEL – How do different parts of brain white matter develop after birth in humans?**

Understanding human white matter development is vital to characterize typical brain organization and developmental neurocognitive disorders. In this issue of *Neuron*, Nazeri and colleagues identify different parts of white matter in the neonatal brain and show their maturational trajectories in line with microstructural feature development.

[https://www.cell.com/neuron/fulltext/S0896-6273\(22\)01034-0](https://www.cell.com/neuron/fulltext/S0896-6273(22)01034-0)

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**PAPERS****ARASH NAZERI et al – Neurodevelopmental patterns of early postnatal white matter maturation represent distinct underlying microstructure and histology**

Cerebral white matter undergoes a rapid and complex maturation during the early postnatal period. Prior magnetic resonance imaging (MRI) studies of early postnatal development have often been limited by small sample size, single-modality imaging, and univariate analytics. Here, we applied nonnegative matrix factorization, an unsupervised multivariate pattern analysis technique, to T2w/T1w signal ratio maps from the Developing Human Connectome Project (n = 342 newborns) revealing patterns of coordinated white matter maturation. These patterns showed divergent age-related maturational trajectories, which were replicated in another independent cohort (n = 239). Furthermore, we showed that T2w/T1w signal variations in these maturational patterns are explained by differential contributions of white matter microstructural indices derived from diffusion-weighted MRI. Finally, we demonstrated how white matter maturation patterns relate to distinct histological features by comparing our findings with postmortem late fetal/early postnatal brain tissue staining. Together, these results delineate concise and effective representation of early postnatal white matter reorganization.

[https://www.cell.com/neuron/fulltext/S0896-6273\(22\)00859-5](https://www.cell.com/neuron/fulltext/S0896-6273(22)00859-5)

**MIKIKO KADOHISA et al – Frontal and temporal coding dynamics in successive steps of complex behavior**

Ventrolateral prefrontal cortex (vlPFC), dorsolateral prefrontal cortex (dlPFC), and temporal cortex (TE) all contribute to visual decision-making. Accumulating evidence suggests that vlPFC may play a central role in multiple cognitive operations, perhaps resembling domain-general regions of the human frontal lobe. We trained monkeys in a task calling for learning, retrieval, and spatial selection of rewarded target objects. Recordings of neural activity covered large areas of vlPFC, dlPFC, and TE. Results suggested a central role for vlPFC in each cognitive operation with strong coding of each task feature, while only location was strongly coded in dlPFC and current object identity in TE. During target selection, target location was communicated first from vlPFC to dlPFC, followed by extensive mutual support. In vlPFC, stimulus identities were independently coded in different task operations. The results suggest a central role for the inferior frontal convexity in controlling successive operations of a complex, multi-step task.

[https://www.cell.com/neuron/fulltext/S0896-6273\(22\)01003-0](https://www.cell.com/neuron/fulltext/S0896-6273(22)01003-0)

**New Scientist****NEWS****Homo naledi may have used fire to cook and navigate 230,000 years ago**

Archaeologists say they have found evidence that *Homo naledi*, an extinct human species with a tiny brain, used fire to cook and light up dark tunnels – though this claim remains controversial.

<https://www.newscientist.com/article/2350008-homo-naledi-may-have-used-fire-to-cook-and-navigate-230000-years-ago/>

**REVIEWS****SIMON INGS – How birds have advanced our understanding of evolution**

Review of 'How Birds Evolve' by Douglas Futuyma, Princeton University Press (2021).

<https://www.newscientist.com/article/mg25634161-500-how-birds-evolve-review-in-depth-and-passionate/>

**PLoS Biology****PAPERS****JONAS HÅKANSSON et al – Bats expand their vocal range by recruiting different laryngeal structures for echolocation and social communication**

Echolocating bats produce very diverse vocal signals for echolocation and social communication that span an impressive frequency range of 1 to 120 kHz or 7 octaves. This tremendous vocal range is unparalleled in mammalian sound production and thought to be produced by specialized laryngeal vocal membranes on top of vocal folds. However, their function in vocal production remains untested. By filming vocal membranes in excised bat larynges (*Myotis daubentonii*) in vitro with ultra-high-speed video (up to 250,000 fps) and using deep learning networks to extract their motion, we provide the first direct observations that vocal membranes exhibit flow-induced self-sustained vibrations to produce 10 to 95 kHz echolocation and social communication calls in bats. The vocal membranes achieve the highest fundamental frequencies ( $f_0$ 's) of any mammal, but their vocal range is with 3 to 4 octaves comparable to most mammals. We evaluate the currently outstanding hypotheses for vocal membrane function and propose that most laryngeal adaptations in echolocating bats result from selection for producing high-frequency, rapid echolocation calls to catch fast-moving prey. Furthermore, we show that bats extend their lower vocal range by recruiting their ventricular folds—as in death metal growls—that vibrate at distinctly lower frequencies of 1 to 5 kHz for producing agonistic social calls. The different selection pressures for echolocation and social communication facilitated the evolution of separate laryngeal structures that together vastly expanded the vocal range in bats.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001881>

**MARTA BIAŁECKA-PIKUL et al – Peeking and lying in the temptation resistance paradigm in 2.5-year-olds: The role of Inhibitory control**

The main aim of the present study was to establish whether inhibitory control (IC) abilities influence the peeking and lying behaviours of 2.5-year-olds, as measured by a modified temptation resistance paradigm (mTRP). Using a longitudinal design, 252 children's IC abilities were tested at ages 1.5, 2 and 2.5, as well as their ability to lie at age 2.5. Results showed that 35% of 2.5-year-olds peeked, 27% of peekers lied and 40% of non-peekers falsely confessed they had peeked. Non-peekers had higher IC than peekers at ages 2 and 2.5. Lower IC at age 2 increased the probability of peeking at age 2.5 by 6 times. The highest level of IC was presented in children who followed the adult's restrictions in the mTRP and were then able to tell the truth about their behaviour. These results suggested that the first, or so-called primary, lies of 2.5-year-olds are probably spontaneous, rather than deliberate. Implications for further research were discussed.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0278099>

**TEGENU GOSSA & ERELLA HOVERS – Continuity and change in lithic techno-economy of the early Acheulian on the Ethiopian highland: A case study from locality MW2; the Melka Wakena site-complex**

Recent research has made great strides clarifying the chronology, temporal span, and geographic and technological patterning of the Acheulian in eastern Africa. However, highland occurrences of the Acheulian remain under-represented and their relationship to cultural dynamics in the Rift are still poorly understood. Recently, a stratified sequence of four archaeological layers, recording Acheulian occupations dated between ~1.6 Ma and ~1.3 Ma, has been discovered in locality MW2 of the Melka Wakena site-complex (south-central Ethiopian highlands). This database enabled a systematic exploration of the question of tempo and mode of technological changes at a local sequence, allowing, for the first time, comparison with other highland sites as well as in the Rift. The detailed techno-economic study presented in this study shows that the early Acheulian at the locality was characterized by the co-existence of lithic reduction sequences for small debitage and for flake-based Large Cutting Tool production. In the early, ~1.6 Ma assemblage, a strategy of variable raw material exploitation and technological emphasis on small debitage were coupled with production of few crude bifacial elements. These shifted at ~1.4 Ma towards a preferential and intensive exploitation of a highly knappable glassy ignimbrite and emphasis on Large Cutting Tool production, including higher investment in their techno-morphological aspects. The MW2 sequence tracks lithic technological trends observed in the Rift, with only a short time lag. Diachronic changes in the raw material economy and land use patterns may have occurred at MW2 earlier than previously reported for the Acheulian on the highlands. The behavioral dynamics gleaned from the early Acheulian assemblages at MW2 are important for our understanding of the diachronic changes in the abilities of Acheulian hominins to exploit the diverse geographic and ecological habitats of eastern Africa and beyond.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0277029>

**HAN ZHANG & WOLFRAM HINZEN – Grammar in 'agrammatical' aphasia: What's intact?**

Aphasia following cerebro-vascular accidents has been a primary source of insight for models of language in the brain. However, deviant language patterns in aphasia may reflect processing limitations and cognitive impairment more than language impairment per se.

We sought to obtain new evidence from spontaneous speech in Broca's aphasia (BA) for the intactness of grammatical knowledge, operationalized as the preservation of the basic hierarchical structure of syntactic projections.

Speech obtained with the AphasiaBank protocol from 20 people with BA, which were independently rated as also being agrammatic, was analyzed and compared to 20 matched non-brain-damaged controls. We quantified (i) marking of Aspect, Tense, and Modality (A-T-M), which are located at specific (high) layers of the syntactic hierarchy and ordered in relation to one another ([M...[T...[A...]]]); (ii) hierarchies of clausal units ([C...[C]]); (iii) discourse markers embedding clauses, located at the highest layer of the hierarchy; and (iv) attachment of adjuncts at different heights of a given hierarchical syntactic structure. Supplementary evidence was obtained from a typology of errors and from pauses subcategorized according to their hierarchical syntactic position.

Groups did not quantitatively differ on rates of either Aspect or Modality but underproduced T and embedded clauses.

Evidence for compensatory effects was seen in both of the latter two cases. While all adjunct types were underproduced in BA, and pauses overproduced, both showed the same relative proportions within both groups. Errors were largely restricted to omissions, of a kind that would also be expected in condensed neurotypical speech.

Overall, these patterns support the hypothesis of intactness of grammatical knowledge in BA clinically rated as agrammatic, questioning it as a disease model of language impairment.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0278676>

**THERESA EPPERLEIN et al – Context and prediction matter for the interpretation of social interactions across species**

Predictions about others' future actions are crucial during social interactions, in order to react optimally. Another way to assess such interactions is to define the social context of the situations explicitly and categorize them according to their affective content. Here we investigate how humans assess aggressive, playful and neutral interactions between members of



three species: human children, dogs and macaques. We presented human participants with short video clips of real-life interactions of dyads of the three species and asked them either to categorize the context of the situation or to predict the outcome of the observed interaction. Participants performed above chance level in assessing social situations in humans, in dogs and in monkeys. How accurately participants predicted and categorized the situations depended both on the species and on the context. Contrary to our hypothesis, participants were not better at assessing aggressive situations than playful or neutral situations. Importantly, participants performed particularly poorly when assessing aggressive behaviour for dogs. Also, participants were not better at assessing social interactions of humans compared to those of other species. We discuss what mechanism humans use to assess social situations and to what extent this skill can also be found in other social species. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0277783>

### **CHAO ZHAO, YOUPIING WANG & JOHN P. WALDEN – Diachronic shifts in lithic technological transmission between the eastern Eurasian Steppe and northern China in the Late Pleistocene**

The successful occupation of the eastern Eurasian Steppe in the Late Pleistocene improved cultural connections between western Eurasia and East Asia. We document multiple waves of lithic technological transmission between the eastern Eurasian Steppe and northern China during 50–11 cal. ka BP. These waves are apparent in the sequential appearance of three techno-complexes in northern China: (1) the Mousterian techno-complex, (2) the blade techno-complex mixed with Mousterian elements, (3) and the microlithized blade techno-complex. These lithic techno-complexes were transmitted under different paleoenvironmental conditions along different pathways through the eastern Eurasian Steppe. The Mousterian techno-complex and the blade techno-complex mixed with Mousterian elements were only dispersed in the north and west peripheries of northern China (50–33 cal. ka BP). We argue that these techno-complexes failed to penetrate into the hinterland of northern China because they were not well suited to local geographical conditions. In contrast, the microlithized blade technology which diffused from the eastern Eurasian Steppe was locally modified into a Microblade techno-complex which was highly suited to local environmental conditions, and proliferated across the hinterland of northern China (28/27-11 cal. ka BP). The subsequent spread of microblade technology over vast regions of Mongolia and Siberia indicates that the Pleistocene inhabitants of northern China not only adopted and modified technologies from their neighbors in the Eurasian Steppe, but these modified variants were subsequently transmitted back into the Eurasian Steppe. These episodes of technological transmission indicate complicated patterns of population dispersal and technological interaction across northern China and the eastern Eurasian Steppe.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0275162>

### **JIAJING WANG et al – New evidence for rice harvesting in the early Neolithic Lower Yangtze River, China**

The Lower Yangtze River of China has been identified as an independent center of rice domestication, but tracing the earliest evidence for rice cultivation practices has been challenging. Here we report the first evidence for rice harvesting, based on use-wear and phytolith residue analyses of 52 flaked stone tools (10000–7000 BP) from the Shangshan and Hehuashan sites. The tools reflect two harvesting methods: reaping the panicles at the top and cutting the stalk near the base. Thus, our research provides a new method for investigating prehistoric cereal cultivation, and the data lend support to the evidence of rice domestication in the early Holocene. The results also show the complexity of rice harvesting strategies several millennia before the emergence of full-fledged agriculture in the Lower Yangtze.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0278200>

## Science

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