

EAORC BULLETIN 1,023 – 22 January 2023

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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.

CONFERENCE ALERT – The Science of Consciousness Conference

Registration & abstract submissions for the EHBEA 2023 Conference are now open at

<https://click.updates.cambridge.org/?qs=0f5a2ac442ef324893a9f7837c667cfea0924000515862044e4d4ef4d3973327de8f06c395a2ee57bf7ad4f672d11f53>

EHBEA's 2023 Annual Conference will be held at University College London, UK, on 18 April - 21 April 2023. Early bird registration is now open. Members can register for the conference by visiting the EHBEA Events page:

<https://click.updates.cambridge.org/?qs=0f5a2ac442ef3248d7fb2c888a81b39491c0d3c2b07ba7f32054399afd231650e548d2916c3ac2108932d5d7a091bf5c>

Submit your abstract for consideration at

<https://click.updates.cambridge.org/?qs=0f5a2ac442ef324834f5e1c56e167142547c0277bb74de4245dd8b58562a4e54ed4e2f200c78372091894021a9554f9c>

Deadline for Abstract Submission: 20th January 2023.

For more information about the conference, please visit

<https://click.updates.cambridge.org/?qs=0f5a2ac442ef32481593ac3cd8c72915fa97c780a2213bd086804b75a665b17545e94c17e50711f0c1b3d1bd8de18e5e>

Contact & Assistance

Our membership team is happy to support you with any queries you may have about conference registration. Please contact:

UK: +44 (0) 1223 326085

Or email: memberservices@cambridge.org

NEWS

NATURE BRIEFING – Dads have always been older than mums

Men have conceived children, on average, 7 years later than women have throughout the past 250,000 years. Researchers used DNA mutations that parents pass on to their children to discover that the average age of conception for women was 23.2 years and 30.7 years for men. The reasons could be biological — men are able to have children later in life than women

can — or might include social factors, such as the fact that some societies pressure men to build up their status before becoming fathers.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=7566ac4cb0&e=1db4b9a19b>

NATURE BRIEFING – Alfred Russel Wallace at 200

Two hundred years after his birth, Alfred Russel Wallace is still seen as the underdog naturalist: the self-educated Briton formulated the theory of evolution by natural selection independently of Charles Darwin, despite having few of Darwin's social and financial advantages.

Wallace experienced many setbacks during his career — none more severe than when he headed home on the *Helen* with his precious collections from Brazil in 1852. The ship caught fire, and Wallace could only watch from a lifeboat as the monkeys, parrots and other animals he had gathered — his pets as well as his best hope of impressing London's scientific elite — were incinerated.

Wallace, who was born on 8 January 1823, relied on local knowledge to craft his seminal work on species ranges in the Amazon. Two centuries later, the region's Indigenous scientists have taken charge of their research using this and other cross-cultural tools. Indigenous biodiversity researcher Dzoodzo Baniwa is turning to Wallace's writings, in part, to learn more about how his own ancestors lived.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=e886d91dc1&e=1db4b9a19b>

NATURE BRIEFING – ChatGPT banned from authoring papers

The artificial-intelligence (AI) chatbot ChatGPT has been listed as a co-author on four papers and preprints. Publishers are starting to ban AI authorship because chatbots can't take responsibility for a paper's content and integrity. Some publishers say that chatbot use should be documented in the methods or acknowledgements sections — and that not doing so could be considered plagiarism.

{So chatbots cannot take responsibility for content and integrity, but they can be responsible for the paper. Should we acknowledge the spell checker or grammar checker we use?}

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=e8cee1cbeb&e=1db4b9a19b>

THE CONVERSATION – Neanderthals: the oldest art in the world wasn't made by Homo sapiens

It makes sense that a world of individuals used art to explore identity.

<https://theconversationuk.cmail19.com/t/r-l-tjhtqld-khhiliah-b/>

THE CONVERSATION – Red Lady of Paviland: the story of a 33,000 year-old-skeleton

It's been 200 years since the discovery of one of the oldest human burial sites in western Europe on the Gower peninsula in south Wales.

<https://theconversationuk.cmail19.com/t/r-l-tjhtkij-khhiliah-b/>

THE CONVERSATION – ChatGPT: it's a chance to rethink assessment altogether

We need to embrace the use of AI in higher education because the positives can far outweigh the negatives.

<https://theconversationuk.cmail19.com/t/r-l-tjhiitk-khhiliah-b/>

PUBLICATIONS

Current Biology

PAPERS

MANUEL MOLANO-MAZÓN et al – Recurrent networks endowed with structural priors explain suboptimal animal behavior

The strategies found by animals facing a new task are determined both by individual experience and by structural priors evolved to leverage the statistics of natural environments. Rats quickly learn to capitalize on the trial sequence correlations of two-alternative forced choice (2AFC) tasks after correct trials but consistently deviate from optimal behavior after error trials. To understand this outcome-dependent gating, we first show that recurrent neural networks (RNNs) trained in the same 2AFC task outperform rats as they can readily learn to use across-trial information both after correct and error trials. We hypothesize that, although RNNs can optimize their behavior in the 2AFC task without any a priori restrictions, rats' strategy is constrained by a structural prior adapted to a natural environment in which rewarded and non-rewarded actions provide largely asymmetric information. When pre-training RNNs in a more ecological task with more than two possible choices, networks develop a strategy by which they gate off the across-trial evidence after errors, mimicking rats' behavior. Population analyses show that the pre-trained networks form an accurate representation of the sequence statistics independently of the outcome in the previous trial. After error trials, gating is implemented by a change in the network dynamics that temporarily decouple the categorization of the stimulus from the across-trial accumulated evidence. Our

results suggest that the rats' suboptimal behavior reflects the influence of a structural prior that reacts to errors by isolating the network decision dynamics from the context, ultimately constraining the performance in a 2AFC laboratory task.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)01981-9](https://www.cell.com/current-biology/fulltext/S0960-9822(22)01981-9)

eLife

PAPERS

SAM WASS et al – Vocal communication is tied to interpersonal arousal coupling in caregiver-infant dyads

It has been argued that a necessary condition for the emergence of speech in humans is the ability to vocalise irrespective of underlying affective states, but when and how this happens during development remains unclear. To examine this, we used wearable microphones and autonomic sensors to collect multimodal naturalistic datasets from 12-month-olds and their caregivers. We observed that, across the day, clusters of vocalisations occur during elevated infant and caregiver arousal. This relationship is stronger in infants than caregivers: caregivers vocalisations show greater decoupling with their own states of arousal, and their vocal production is more influenced by the infant's arousal than their own. Different types of vocalisation elicit different patterns of change across the dyad. Cries occur following reduced infant arousal stability and lead to increased child-caregiver arousal coupling, and decreased infant arousal. Speech-like vocalisations also occur at elevated arousal, but lead to longer-lasting increases in arousal, and elicit more parental verbal responses. Our results suggest that: 12-month-old infants' vocalisations are strongly contingent on their arousal state (for both cries and speech-like vocalisations), whereas adults' vocalisations are more flexibly tied to their own arousal; that cries and speech-like vocalisations alter the intra-dyadic dynamics of arousal in different ways, which may be an important factor driving speech development; and that this selection mechanism which drives vocal development is anchored in our stress physiology.

<https://elifesciences.org/articles/77399>

SEBASTIAN MOELLER et al with JULIA FISCHER – Human and macaque pairs employ different coordination strategies in a transparent decision game

Many real-world decisions in social contexts are made while observing a partner's actions. To study dynamic interactions during such decisions, we developed a setup where two agents seated face-to-face engage in game-theoretical tasks on a shared transparent touchscreen display ('transparent games'). We compared human and macaque pairs in a transparent version of the coordination game 'Bach-or-Stravinsky', which entails a conflict about which of two individually-preferred opposing options to choose to achieve coordination. Most human pairs developed coordinated behavior and adopted dynamic turn-taking to equalize the payoffs. All macaque pairs converged on simpler, static coordination. Remarkably, two animals learned to coordinate dynamically after training with a human confederate. This pair selected the faster agent's preferred option, exhibiting turn-taking behavior that was captured by modeling the visibility of the partner's action before one's own movement. Such competitive turn-taking was unlike the prosocial turn-taking in humans, who equally often initiated switches to and from their preferred option. Thus, the dynamic coordination is not restricted to humans, but can occur on the background of different social attitudes and cognitive capacities in rhesus monkeys. Overall, our results illustrate how action visibility promotes emergence and maintenance of coordination when agents can observe and time their mutual actions.

<https://elifesciences.org/articles/81641>

iScience

ARTICLES

DARIO GORDILLO et al – Do we really measure what we think we are measuring?

Tests used in the empirical sciences are often (implicitly) assumed to be representative of a given research question in the sense that similar tests should lead to similar results. Here, we show that this assumption is not always valid. We illustrate our argument with the example of resting-state electroencephalogram (EEG). We used multiple analysis methods, contrary to typical EEG studies where one analysis method is used. We found, first, that many EEG features correlated significantly with cognitive tasks. However, these EEG features correlated weakly with each other. Similarly, in a second analysis, we found that many EEG features were significantly different in older compared to younger participants. When we compared these EEG features pairwise, we did not find strong correlations. In addition, EEG features predicted cognitive tasks poorly as shown by cross-validated regression analysis. We discuss several explanations of these results.

[https://www.cell.com/iscience/fulltext/S2589-0042\(23\)00094-9](https://www.cell.com/iscience/fulltext/S2589-0042(23)00094-9)

Nature

ARTICLES

EUCHARIST KUN & VAGHEESH M. NARASIMHAN – Fast-evolving genomic regions underlie human brain development

Regions of the human genome that evolved rapidly after the separation between hominins and chimpanzees have now been charted. They contain genomic elements that are unique to humans and are linked to neurodevelopment and disease.

<https://www.nature.com/articles/d41586-023-00069-2>

Nature Ecology & Evolution

PAPERS

JÜLIDE KUBAT et al – Dietary strategies of Pleistocene Pongo sp. and Homo erectus on Java (Indonesia)

During the Early to Middle Pleistocene, Java was inhabited by hominid taxa of great diversity. However, their seasonal dietary strategies have never been explored. We undertook geochemical analyses of orangutan (*Pongo* sp.), *Homo erectus* and other mammalian Pleistocene teeth from Sangiran. We reconstructed past dietary strategies at subweekly resolution and inferred seasonal ecological patterns. Histologically controlled spatially resolved elemental analyses by laser-based plasma mass spectrometry confirmed the preservation of authentic biogenic signals despite the effect of spatially restricted diagenetic overprint. The Sr/Ca record of faunal remains is in line with expected trophic positions, contextualizing fossil hominid diet. *Pongo* sp. displays marked seasonal cycles with ~3 month-long strongly elevated Sr/Ca peaks, reflecting contrasting plant food consumption presumably during the monsoon season, while lower Sr/Ca ratios suggest different food availability during the dry season. In contrast, omnivorous *H. erectus* shows low and less accentuated intra-annual Sr/Ca variability compared to *Pongo* sp., with $\delta^{13}\text{C}$ data of one individual indicating a dietary shift from C4 to a mix of C3 and C4 plants. Our data suggest that *H. erectus* on Java was maximizing the resources available in more open mosaic habitats and was less dependent on variations in seasonal resource availability. While still influenced by seasonal food availability, we infer that *H. erectus* was affected to a lesser degree than *Pongo* sp., which inhabited monsoonal rain forests on Java. We suggest that *H. erectus* maintained a greater degree of nutritional independence by exploiting the regional diversity of food resources across the seasons.

<https://www.nature.com/articles/s41559-022-01947-0>

MARGHERITA MUSSI et al – A surge in obsidian exploitation more than 1.2 million years ago at Simbiro III (Melka Kunture, Upper Awash, Ethiopia)

Pleistocene archaeology records the changing behaviour and capacities of early hominins. These behavioural changes, for example, to stone tools, are commonly linked to environmental constraints. It has been argued that, in earlier times, multiple activities of everyday life were all uniformly conducted at the same spot. The separation of focused activities across different localities, which indicates a degree of planning, according to this mindset characterizes later hominins since only 500,000 years ago. Simbiro III level C, in the upper Awash valley of Ethiopia, allows us to test this assumption in its assemblage of stone tools made only with obsidian, dated to more than 1.2 million years (Myr) old. Here we first reconstruct the palaeoenvironment, showing that the landscape was seasonally flooded. Following the deposition of an accumulation of obsidian cobbles by a meandering river, hominins began to exploit these in new ways, producing large tools with sharp cutting edges. We show through statistical analysis that this was a focused activity, that very standardized handaxes were produced and that this was a stone-tool workshop. We argue that at Simbiro III, hominins were doing much more than simply reacting to environmental changes; they were taking advantage of new opportunities, and developing new techniques and new skills according to them.

<https://www.nature.com/articles/s41559-022-01970-1>

Nature Human Behaviour

PAPERS

PAUL I. JAFFE et al – Modelling human behaviour in cognitive tasks with latent dynamical systems

Response time data collected from cognitive tasks are a cornerstone of psychology and neuroscience research, yet existing models of these data either make strong assumptions about the data-generating process or are limited to modelling single trials. We introduce task-DyVA, a deep learning framework in which expressive dynamical systems are trained to reproduce sequences of response times observed in data from individual human subjects. Models fitted to a large task-switching dataset captured subject-specific behavioural differences with high temporal precision, including task-switching costs. Through perturbation experiments and analyses of the models' latent dynamics, we find support for a rational account of switch costs in terms of a stability–flexibility trade-off. Thus, our framework can be used to discover interpretable cognitive theories that explain how the brain dynamically gives rise to behaviour.

<https://www.nature.com/articles/s41562-022-01510-8>

POL VAN RIJN & PAULINE LARROUY-MAESTRI – Modelling individual and cross-cultural variation in the mapping of emotions to speech prosody

The existence of a mapping between emotions and speech prosody is commonly assumed. We propose a Bayesian modelling framework to analyse this mapping. Our models are fitted to a large collection of intended emotional prosody, yielding more than 3,000 minutes of recordings. Our descriptive study reveals that the mapping within corpora is relatively constant, whereas the mapping varies across corpora. To account for this heterogeneity, we fit a series of increasingly complex models. Model comparison reveals that models taking into account mapping differences across countries, languages, sexes and individuals outperform models that only assume a global mapping. Further analysis shows that differences across individuals, cultures and sexes contribute more to the model prediction than a shared global mapping. Our models, which can be

explored in an online interactive visualization, offer a description of the mapping between acoustic features and emotions in prosody.

<https://www.nature.com/articles/s41562-022-01505-5>

Nature Neuroscience

PAPERS

JULIA COX et al – A neural substrate of sex-dependent modulation of motivation

While there is emerging evidence of sex differences in decision-making behavior, the neural substrates that underlie such differences remain largely unknown. Here we demonstrate that in mice performing a value-based decision-making task, while choices are similar between the sexes, motivation to engage in the task is modulated by action value more strongly in females than in males. Inhibition of activity in anterior cingulate cortex (ACC) neurons that project to the dorsomedial striatum (DMS) preferentially disrupts this relationship between value and motivation in females, without affecting choice in either sex. In line with these effects, in females compared to males, ACC–DMS neurons have stronger representations of negative outcomes and more neurons are active when the value of the chosen option is low. By contrast, the representation of each choice is similar between the sexes. Thus, we identify a neural substrate that contributes to sex-specific modulation of motivation by value.

<https://www.nature.com/articles/s41593-022-01229-9>

Nature Scientific Reports

PAPERS

VARDAN ARUTIUNIAN et al – Structural brain abnormalities and their association with language impairment in school-aged children with Autism Spectrum Disorder

Language impairment is comorbid in most children with Autism Spectrum Disorder (ASD) but its neural basis is poorly understood. Using structural magnetic resonance imaging (MRI), the present study provides the whole-brain comparison of both volume- and surface-based characteristics between groups of children with and without ASD and investigates the relationships between these characteristics in language-related areas and the language abilities of children with ASD measured with standardized tools. A total of 36 school-aged children participated in the study: 18 children with ASD and 18 age- and sex-matched typically developing controls. The results revealed that multiple regions differed between groups of children in gray matter volume, gray matter thickness, gyrification, and cortical complexity (fractal dimension). White matter volume and sulcus depth did not differ between groups of children in any region. Importantly, gray matter thickness and gyrification of language-related areas were related to language functioning in children with ASD. Thus, the results of the present study shed some light on the structural brain abnormalities associated with language impairment in ASD.

<https://www.nature.com/articles/s41598-023-28463-w>

SANDRA STOJIC, VANJA TOPIĆ & ZOLTAN NADASDY – Children and adults rely on different heuristics for estimation of durations

Time is a uniquely human yet culturally ubiquitous concept acquired over childhood and provides an underlying dimension for episodic memory and estimating durations. Because time, unlike distance, lacks a sensory representation, we hypothesized that subjects at different ages attribute different meanings to it when comparing durations; pre-kindergarten children compare the density of events, while adults use the concept of observer-independent absolute time. We asked groups of pre-kindergarteners, school-age children, and adults to compare the durations of an "eventful" and "uneventful" video, both 1-minute long but durations unknown to subjects. In addition, participants were asked to express the durations of both videos non-verbally with simple hand gestures. Statistical analysis has revealed highly polarized temporal biases in each group, where pre-kindergarteners estimated the duration of the eventful video as "longer." In contrast, the school-age group of children and adults claimed the same about the uneventful video. The tendency to represent temporal durations with a horizontal hand gesture was evident among all three groups, with an increasing prevalence with age. These results support the hypothesis that pre-kindergarten-age children use heuristics to estimate time, and they convert from availability to sampling heuristics between pre-kindergarten and school age.

<https://www.nature.com/articles/s41598-023-27419-4>

RALUCA PETRICAN et al – Overlapping brain correlates of superior cognition among children at genetic risk for Alzheimer's disease and/or major depressive disorder

Early life adversity (ELA) tends to accelerate neurobiological ageing, which, in turn, is thought to heighten vulnerability to both major depressive disorder (MDD) and Alzheimer's disease (AD). The two conditions are putatively related, with MDD representing either a risk factor or early symptom of AD. Given the substantial environmental susceptibility of both disorders, timely identification of their neurocognitive markers could facilitate interventions to prevent clinical onset. To this end, we analysed multimodal data from the Adolescent Brain and Cognitive Development study (ages 9–10 years). To disentangle genetic from correlated genetic-environmental influences, while also probing gene-adversity interactions, we compared adoptees, a group generally exposed to substantial ELA, with children raised by their biological families via genetic risk scores

(GRS) from genome-wide association studies. AD and MDD GRSs predicted overlapping and widespread neurodevelopmental alterations associated with superior fluid cognition. Specifically, among adoptees only, greater AD GRS were related to accelerated structural maturation (i.e., cortical thinning) and higher MDD GRS were linked to delayed functional neurodevelopment, as reflected in compensatory brain activation on an inhibitory control task. Our study identifies compensatory mechanisms linked to MDD risk and highlights the potential cognitive benefits of accelerated maturation linked to AD vulnerability in late childhood.

<https://www.nature.com/articles/s41598-023-28057-6>

METTE PEDERSEN et al – Localization and quantification of glottal gaps on deep learning segmentation of vocal folds

The entire glottis has mostly been the focus in the tracking of the vocal folds, both manually and automatically. From a treatment point of view, the various regions of the glottis are of specific interest. The aim of the study was to test if it was possible to supplement an existing convolutional neural network (CNN) with post-network calculations for the localization and quantification of posterior glottal gaps during phonation, usable for vocal fold function analysis of e.g. laryngopharyngeal reflux findings. 30 subjects/videos with insufficient closure in the rear glottal area and 20 normal subjects/videos were selected from our database, recorded with a commercial high-speed video setup (HSV with 4000 frames per second), and segmented with an open-source CNN for validating voice function. We made post-network calculations to localize and quantify the 10% and 50% distance lines from the rear part of the glottis. The results showed a significant difference using the algorithm at the 10% line distance between the two groups of $p < 0.0001$ and no difference at 50%. These novel results show that it is possible to use post-network calculations on CNNs for the localization and quantification of posterior glottal gaps.

<https://www.nature.com/articles/s41598-023-27980-y>

ROGER S. GAMBLE, JULIE D. HENRY & ERIC J. VANMAN – Empathy moderates the relationship between cognitive load and prosocial behaviour

Cognitive load reduces both empathy and prosocial behaviour. However, studies demonstrating these effects have induced cognitive load in a temporally limited, artificial manner that fails to capture real-world cognitive load. Drawing from cognitive load theory, we investigated whether naturally occurring cognitive load from the ongoing COVID-19 pandemic moderated the relationship between empathy and prosocial behaviour (operationalised as support for public health measures). This large study in an Australian sample ($N = 600$) identified negative relationships between pandemic fatigue, empathy for people vulnerable to COVID-19, and prosocial behaviour, and a positive relationship between empathy and prosocial behaviour. Additionally, we found that the negative effect of the pandemic on prosocial behaviour depended on empathy for vulnerable others, with pandemic fatigue's effects lowest for those with the highest empathy. These findings highlight the interrelationships of cognitive load and empathy, and the potential value of eliciting empathy to ease the impact of real-world cognitive load on prosocial behaviour.

<https://www.nature.com/articles/s41598-023-28098-x>

PLoS Biology

PAPERS

TOMOYA NAKAI et al – Cortical representations of numbers and nonsymbolic quantities expand and segregate in children from 5 to 8 years of age

Number symbols, such as Arabic numerals, are cultural inventions that have transformed human mathematical skills. Although their acquisition is at the core of early elementary education in children, it remains unknown how the neural representations of numerals emerge during that period. It is also unclear whether these relate to an ontogenetically earlier sense of approximate quantity. Here, we used multivariate fMRI adaptation coupled with within- and between-format machine learning to probe the cortical representations of Arabic numerals and approximate nonsymbolic quantity in 89 children either at the beginning (age 5) or four years into formal education (age 8). Although the cortical representations of both numerals and nonsymbolic quantities expanded from age 5 to age 8, these representations also segregated with learning and development. Specifically, a format-independent neural representation of quantity was found in the right parietal cortex, but only for 5-year-olds. These results are consistent with the so-called symbolic estrangement hypothesis, which argues that the relation between symbolic and nonsymbolic quantity weakens with exposure to formal mathematics in children.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001935>

SALOMÉ FROMONTEIL et al – Sexual selection in females and the evolution of polyandry

Over the last decades, the field of sexual selection underwent a paradigm shift from sexual-stereotype thinking of “eager” males and “coy” females towards a more nuanced perspective acknowledging that not only males but also females can benefit from multiple mating and compete for mating partners. Yet, sexual selection in females is still considered a peculiarity, and the evolution of polyandry is often viewed to result from a higher mating interest of males. Here, we present meta-analytic evidence from 77 species across a broad range of animal taxa to demonstrate that female reproductive success is overall positively correlated with mating success, suggesting that females typically benefit from multiple mating.

Importantly, we found that these fitness gains likely promote the evolution of polyandry. Our findings offer support for the idea that sexual selection is widespread in females and to play a key role for the evolution of animal mating systems. Thereby, our results extend our understanding of the evolutionary consequences of sexual reproduction and contribute to a more balanced view of how sexual selection operates in males and females.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001916>

PLoS One

PAPERS

EMILIE BERLIOZ, EUGÉNIE CAPDEPON & EMMANUEL DISCAMPS – A long-term perspective on Neanderthal environment and subsistence: Insights from the dental microwear texture analysis of hunted ungulates at Combe-Grenal (Dordogne, France)

Large bovids and cervids constituted major components of the European Middle Palaeolithic faunas and hence a key resource for Neanderthal populations. In paleoenvironmental reconstructions, red deer (*Cervus elaphus*) occurrence is classically considered as a tree-cover indicator while Bovinae (*Bison priscus* and *Bos primigenius*) and reindeer (*Rangifer tarandus*) occurrences are typically associated with open landscapes. However, insights into the ecology of extant ungulate populations show a more complex reality. Exploring the diet of past ungulates allows to better comprehend the hunting strategies of Palaeolithic populations and to reconstruct the modifications through time of past landscapes. By reflecting what animals have eaten during the last days or weeks of their life, dental microwear textures of herbivores link a population and its environment. Here we analyzed, via Dental Microwear Texture Analysis (DMTA), the diet of 50 *Bos/Bison*, 202 *R. tarandus* and 116 *C. elaphus* preyed upon by the Neanderthals that occupied Combe-Grenal rock-shelter, one of the most important Mousterian archaeo-sequences in southwestern France considering its long stratigraphy, abundance of faunal remains and the variations perceptible in Palaeolithic material culture. Grazers and mixed-feeders are the most represented dietary categories among Combe-Grenal's guild of herbivores, highlighting the availability, along the sequence, of open landscapes. The absence of clear changes in the use of plant resources by hunted ungulates through time, even though palaeoenvironmental changes were well-documented by previous studies along the sequence, is interpreted as resulting from the hunting of non-randomly selected prey by Neanderthals, preferentially in open environments. Thus, these results provide further insight into the hunting strategies of Neanderthals and modify our perception of potential links between subsistence and material culture. Combe-Grenal hunters "stayed in the open" through millennia, and were not forced to switch to hunting tactics and material technology adapted to close encounters in forested environments.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0278395>

Proceedings of the Royal Society B

PAPERS

ALEXANDER J. STEWART & NICHOLA RAIHANI – Group reciprocity and the evolution of stereotyping

Stereotypes are generalized beliefs about groups of people, which are used to make decisions and judgements about them. Although such heuristics can be useful when decisions must be made quickly, or when information is lacking, they can also serve as the basis for prejudice and discrimination. In this paper, we study the evolution of stereotypes through group reciprocity. We characterize the warmth of a stereotype as the willingness to cooperate with an individual based solely on the identity of the group they belong to. We show that when stereotype groups are large, such group reciprocity is less likely to evolve, and stereotypes tend to be negative. We also show that, even when stereotypes are broadly positive, individuals are often overly pessimistic about the willingness of those they stereotype to cooperate. We then show that the tendency for stereotyping itself to evolve is driven by the costs of cognition, so that more people are stereotyped with greater coarseness as costs increase. Finally we show that extrinsic 'shocks', in which the benefits of cooperation are suddenly reduced, can cause stereotype warmth and judgement bias to turn sharply negative, consistent with the view that economic and other crises are drivers of out-group animosity.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2022.1834>

E. REINDL et al with J. CALL – The shifting shelf task: a new, non-verbal measure for attentional set shifting

Attentional set shifting is a core ingredient of cognition, allowing for fast adaptation to changes in the environment. How this skill compares between humans and other primates is not well known. We examined performance of 3- to 5-year-old children and chimpanzees on a new attentional set shifting task. We presented participants with two shelves holding the same set of four boxes. To choose the correct box on each shelf, one has to switch attention depending on which shelf one is currently presented with. Experiment 1 (forty-six 3- to 5-year olds, predominantly European White) established content validity, showing that the majority of errors were specific switching mistakes indicating failure to shift attention. Experiment 2 (one hundred and seventy-eight 3- to 6-year olds, predominantly European White) showed that older children made fewer mistakes, but if mistakes were made, a larger proportion were switching mistakes rather than 'random' errors. Experiment 3 (52 chimpanzees) established suitability of the task for non-human great apes and showed that chimpanzees' performance was comparable to the performance of 3- and 4-year olds, but worse than 5-year olds. These results suggest that

chimpanzees and young children share attentional set shifting capacities, but that there are unique changes in the human lineage from 5 years of age.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2022.1496>

ZOË GOLDSBOROUGH, ANNE MARIJKE SCHEL & EDWIN J. C. VAN LEEUWEN – Chimpanzees communicate to coordinate a cultural practice

Human culture thrives by virtue of communication, yet whether communication plays an influential role in the cultural lives of other animals remains understudied. Here, we investigated whether chimpanzees use communication to engage in a cultural practice by analysing grooming handclasp (GHC) interactions—a socio-cultural behaviour requiring interindividual coordination for successful execution. Previous accounts attributed GHC initiations to behavioural shaping, whereby the initiator physically moulds the partner's arm into the desired GHC posture. Using frame-by-frame analysis and matched-control methodology, we find that chimpanzees do not only shape their partner's posture (22%), but also use gestural communication to initiate GHC (44%), which requires an active and synchronized response from the partner. Moreover, in a third (34%) of the GHC initiations, the requisite coordination was achieved by seemingly effortless synchrony. Lastly, using a longitudinal approach, we find that for GHC initiations, communication occurs more frequently than shaping in experienced dyads and less in mother–offspring dyads. These findings are consistent with ontogenetic ritualization, thereby reflecting first documentation of chimpanzees communicating to coordinate a cultural practice. We conclude that chimpanzees show interactional flexibility in the socio-cultural domain, opening the possibility that the interplay between communication and culture is rooted in our deep evolutionary history.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2022.1754>

Scientific American

ARTICLES

STEVEN PHELPS, ZOE DONALDSON & DEV MANOLI – Monogamous Prairie Voles Reveal the Neurobiology of Love

Studies of prairie voles are providing surprising new insights into how social bonds form.

<https://www.scientificamerican.com/article/monogamous-prairie-voles-reveal-the-neurobiology-of-love/>

Trends in Cognitive Sciences

PAPERS

MARK S. BLUMBERG & KAREN E. ADOLPH – Protracted development of motor cortex constrains rich interpretations of infant cognition

Cognition in preverbal human infants must be inferred from overt motor behaviors such as gaze shifts, head turns, or reaching for objects. However, infant mammals – including human infants – show protracted postnatal development of cortical motor outflow. Cortical control of eye, face, head, and limb movements is absent at birth and slowly emerges over the first postnatal year and beyond. Accordingly, the neonatal cortex in humans cannot generate the motor behaviors routinely used to support inferences about infants' cognitive abilities, and thus claims of developmental continuity between infant and adult cognition are suspect. Recognition of the protracted development of motor cortex should temper rich interpretations of infant cognition and motivate more serious consideration of the role of subcortical mechanisms in early cognitive development.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00331-X](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00331-X)

Trends in Neurosciences

PAPERS

NANCY KANWISHER, MEENAKSHI KHOSLA & KATHARINA DOBS – Using artificial neural networks to ask 'why' questions of minds and brains

Neuroscientists have long characterized the properties and functions of the nervous system, and are increasingly succeeding in answering how brains perform the tasks they do. But the question 'why' brains work the way they do is asked less often. The new ability to optimize artificial neural networks (ANNs) for performance on human-like tasks now enables us to approach these 'why' questions by asking when the properties of networks optimized for a given task mirror the behavioral and neural characteristics of humans performing the same task. Here we highlight the recent success of this strategy in explaining why the visual and auditory systems work the way they do, at both behavioral and neural levels.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(22\)00262-4](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(22)00262-4)

TIMO FLESCH, ANDREW SAXE & CHRISTOPHER SUMMERFIELD – Continual task learning in natural and artificial agents

How do humans and other animals learn new tasks? A wave of brain recording studies has investigated how neural representations change during task learning, with a focus on how tasks can be acquired and coded in ways that minimise mutual interference. We review recent work that has explored the geometry and dimensionality of neural task representations in neocortex, and computational models that have exploited these findings to understand how the brain may

partition knowledge between tasks. We discuss how ideas from machine learning, including those that combine supervised and unsupervised learning, are helping neuroscientists understand how natural tasks are learned and coded in biological brains.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(22\)00260-0](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(22)00260-0)

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