EAORC BULLETIN 1,073 – 7 January 2024

CONTENTS

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.

EDITORIAL INTERJECTIONS

Comments in curly brackets are editorial interjections. The Editor reserves the right to be wrong.

ACADEMIA.EDU – Mechanisms of Cognitive Evolution of Genus Homo

Ludus Vitalis 27:51, 1-17 (2019).

ÁNGEL RIVERA ARRIZABALAGA & SARA RIVERA VELASCO – Mechanisms of Cognitive Evolution of Genus Homo

The objective of this work is to analyse the biological, social and environmental mechanisms that made the cognitive evolution of our lineage possible. To this end, an interdisciplinary study is proposed with the sciences that have influenced most on human behaviour (Evolutionary Biology, Neurology, Psychology, Neurolinguistics, Social Anthropology, etc.). Our purpose is not to delve into any particular topic of these sciences, but to coordinate their most recent data to establish a psychobiological and social model (Functional Structuralism) on our neurological and cognitive evolution, which allows us to analyse the changes that the archaeological record offers from the beginning of the genus Homo to the present day. The main engine of these changes would be causal cognition, as a neurophysiological mechanism causing the evolutionary development of human cognition (social, emotional and technological). Its production, based on the exaptative character of our brain, presents a clear co-evolutionary procedure to produce the emergence of human cognitive capacities.
https://www.academia.edu/38377601/MECHANISMS_OF_COGNITIVE_EVOLUTION_OF_GENUS_HOMO_pdf

ACADEMIA.EDU – Paleolithic Technology and Human Evolution

Science 291, 1748-1753 (2001).

STANLEY H. AMBROSE – Paleolithic Technology and Human Evolution

Human biological and cultural evolution are closely linked to technological innovations. Direct evidence for tool manufacture and use is absent before2.5 million years ago (Ma), so reconstructions of australopithecine technology are based mainly on the behavior and anatomy of chimpanzees. Stone tool technology, robust australopithecines, and the genus Homo appeared almost simultaneously 2.5 Ma. Once this adaptive threshold was crossed, technological evolution was accompanied by increased brain size, population size, and geographical range. Aspects of behavior, economy, mental capacities, neurological functions, the origin of grammatical language, and social and symbolic systems have been inferred from the archaeological record of Paleolithic technology.
https://www.academia.edu/78946221/Paleolithic_Technology_and_Human_Evolution

CONFERENCE ALERT – EVOLANG 2024 News & Updates

follow us on X (twitter) @evolangconf to get regular updates.

Registration

Registration for Evolang XV (May 18-21) is now open! https://evolang2024.github.io/
Early bird rates are in effect until February 15th.

The conference page has been updated with info on seven accepted workshops [https://evolang.us16.list-manage.com/track/click?u=3c02037f31127170cc4814a4e&id=e128299ade&e=1da5838da4] (to take place on May 18th), and links to pre-arranged hotel blocks at Hilton Monona Terrace, and Park Hotel Madison [https://evolang.us16.list-manage.com/track/click?u=3c02037f31127170cc4814a4e&id=f7fdfde9ea&e=1da5838da4].
The registration page [https://evolang.us16.list-manage.com/track/click?u=3c02037f31127170cc4814a4e&id=432d7652dd&e=1da5838da4] has options to indicate your interest in sharing a double hotel room to save costs, and Madison-area excursions. We will be in touch with people who've indicated their interest with additional information.

See you all in Madison!
EVOLANG Scientific Committee

NEWS

SCIENCENEWS – Most people say self-control is the same as willpower. Researchers disagree

Psychologists say self-control is about planning ahead to avoid needing willpower in the moment.
https://www.sciencenews.org/article/self-control-willpower-psychology

PUBLICATIONS

Current Biology

PAPERS

ROBERTA BIANCO et al – Neural encoding of musical expectations in a non-human primate

The appreciation of music is a universal trait of humankind. Evidence supporting this notion includes the ubiquity of music across cultures and the natural predisposition toward music that humans display early in development. Are we musical animals because of species-specific predispositions? This question cannot be answered by relying on cross-cultural or

developmental studies alone, as these cannot rule out enculturation. Instead, it calls for cross-species experiments testing whether homologous neural mechanisms underlying music perception are present in non-human primates. We present music to two rhesus monkeys, reared without musical exposure, while recording electroencephalography (EEG) and pupillometry. Monkeys exhibit higher engagement and neural encoding of expectations based on the previously seeded musical context when passively listening to real music as opposed to shuffled controls. We then compare human and monkey neural responses to the same stimuli and find a species-dependent contribution of two fundamental musical features—pitch and timing—in generating expectations: while timing- and pitch-based expectations are similarly weighted in humans, monkeys rely on timing rather than pitch. Together, these results shed light on the phylogeny of music perception. They highlight monkeys' capacity for processing temporal structures beyond plain acoustic processing, and they identify a species-dependent contribution of time- and pitch-related features to the neural encoding of musical expectations.
https://www.cell.com/current-biology/fulltext/S0960-9822(23)01674-3

MARCO GANDOLFO et al – Converging evidence that left extrastriate body area supports visual sensitivity to social interactions

Navigating our complex social world requires processing the interactions we observe. Recent psychophysical and neuroimaging studies provide parallel evidence that the human visual system may be attuned to efficiently perceive dyadic interactions. This work implies, but has not yet demonstrated, that activity in body-selective cortical regions causally supports efficient visual perception of interactions. We adopt a multi-method approach to close this important gap. First, using a large fMRI dataset (n = 92), we found that the left hemisphere extrastriate body area (EBA) responds more to face-to-face than non-facing dyads. Second, we replicated a behavioral marker of visual sensitivity to interactions: categorization of facing dyads is more impaired by inversion than non-facing dyads. Third, in a pre-registered experiment, we used fMRI-guided transcranial magnetic stimulation to show that online stimulation of the left EBA, but not a nearby control region, abolishes this selective inversion effect. Activity in left EBA, thus, causally supports the efficient perception of social interactions.
https://www.cell.com/current-biology/fulltext/S0960-9822(23)01664-0

CHARLIE LONGTINE et al – Homology and the evolution of vocal folds in the novel avian voice box

The origin of novel traits, those that are not direct modifications of a pre-existing ancestral structure, remains a fundamental problem in evolutionary biology. For example, little is known about the evolutionary and developmental origins of the novel avian vocal organ, the syrinx. Located at the tracheobronchial junction, the syrinx is responsible for avian vocalization, but it is unclear whether avian vocal folds are homologous to the laryngeal vocal folds in other tetrapods or convergently evolved. Here, we identify a core developmental program involved in avian vocal fold formation and infer the morphology of the syrinx of the ancestor of modern birds. We find that this ancestral syrinx had paired sound sources induced by a conserved developmental pathway and show that shifts in these signals correlate with syringeal diversification. We show that, despite being derived from different developmental tissues, vocal folds in the syrinx and larynx have similar tissue composition and are established through a strikingly similar developmental program, indicating that co-option of an ancestral developmental program facilitated the origin of vocal folds in the avian syrinx.
https://www.cell.com/current-biology/fulltext/S0960-9822(23)01668-8

eLife

PAPERS

ZEPENG FANG et al – The involvement of the human prefrontal cortex in the emergence of visual awareness

Exploring the neural mechanisms of awareness is a fundamental task of cognitive neuroscience. There is an ongoing dispute regarding the role of the prefrontal cortex (PFC) in the emergence of awareness, which is partially raised by the confound between report- and awareness-related activity. To address this problem, we designed a visual awareness task that can minimize report-related motor confounding. Our results show that saccadic latency is significantly shorter in the aware trials than in the unaware trials. Local field potential (LFP) data from 6 patients consistently show early (200-300 ms) awareness-related activity in the PFC, including event-related potential and high-gamma activity. Moreover, the awareness state can be reliably decoded by the neural activity in the PFC since the early stage, and the neural pattern is dynamically changed rather than being stable during the representation of awareness. Furthermore, the enhancement of dynamic functional connectivity, through the phase modulation at low frequency, between the PFC and other brain regions in the early stage of the awareness trials may explain the mechanism of conscious access. These results indicate that the PFC is critically involved in the emergence of awareness.
https://elifesciences.org/reviewed-preprints/89076

Frontiers for Young Minds

PAPERS

ALEXANDRIA N. WEAVER, MARIYA VODYANYK & SUSANNE M. JAEGGI – How Music and Art Tune and Sculpt Your Brain's Architecture

Your brain is constantly changing as you grow up and get older. Throughout your life you have all kinds of experiences, and your brain has the amazing ability to respond to those experiences in various ways. For example, when you learn something new, such as how to play a new game or speak a new language, your brain makes new connections, and these connections get stronger the more you practice or use what you learned. The experiences you had when you were younger can have lasting effects on your brain as an adult. In this article, we will talk about how playing musical instruments and creating visual art can change your brain, how these changes affect your future adult brain, and examples of a few technologies that have been used to help scientists visualize brain changes.
https://kids.frontiersin.org/articles/10.3389/frym.2023.1151914

Frontiers in Artificial Intelligence

ARTICLES

THOMAS HELLSTRÖM – AI and its consequences for the written word

The latest developments of chatbots driven by Large Language Models (LLMs), more specifically ChatGPT, have shaken the foundations of how text is created, and may drastically reduce and change the need, ability, and valuation of human writing. Furthermore, our trust in the written word is likely to decrease, as an increasing proportion of all written text will be AI-generated – and potentially incorrect. In this essay, I discuss these implications and possible scenarios for us humans, and for AI itself.
https://www.frontiersin.org/articles/10.3389/frai.2023.1326166/full

Frontiers in Psychology

PAPERS

ANDREA SCHIAVIO, MARIA A. G. WITEK & JAN STUPACHER – Meaning-making and creativity in musical entrainment

In this paper we suggest that basic forms of musical entrainment may be considered as intrinsically creative, enabling further creative behaviors which may flourish at different levels and timescales. Rooted in an agent's capacity to form meaningful couplings with their sonic, social, and cultural environment, musical entrainment favors processes of adaptation and exploration, where innovative and functional aspects are cultivated via active, bodily experience. We explore these insights through a theoretical lens that integrates findings from enactive cognitive science and creative cognition research. We center our examination on the realms of groove experience and the communicative and emotional dimensions of music, aiming to present a novel preliminary perspective on musical entrainment, rooted in the fundamental concepts of meaning-making and creativity. To do so, we draw from a suite of approaches that place particular emphasis on the role of situated experience and review a range of recent empirical work on entrainment (in musical and non-musical settings), emphasizing the latter's biological and cognitive foundations. We conclude that musical entrainment may be regarded as a building block for different musical creativities that shape one's musical development, offering a concrete example for how this theory could be empirically tested in the future.
https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1326773/full

iScience

PAPERS

RAINA VIN et al – Visual word processing engages a hierarchical, distributed, and bilateral cortical network

Although the Visual Word Form Area (VWFA) in left temporal cortex is considered the pre-eminent region in visual word processing, other regions are also implicated. We examined the entire text-selective circuit, using functional MRI. Ten regions of interest (ROI) per hemisphere were defined, which, based on clustering, grouped into early vision, high-level vision and language clusters. We analysed the responses of the ROIs and clusters to words, inverted words, and consonant strings using univariate, multivariate and functional connectivity measures. Bilateral modulation by stimulus condition was evident, with a stronger effect in left hemisphere regions. Last, using graph theory, we observed that the VWFA was equivalently connected with early visual and language clusters in both hemispheres, reflecting its role as a mediator in the circuit. While the individual ROIs and clusters bilaterally were flexibly altered by the nature of the input, stability held at the level of global circuit connectivity, reflecting the complex hierarchical distributed system serving visual text perception.
https://www.cell.com/iscience/fulltext/S2589-0042(24)00030-0

National Geographic

ARTICLES

SADIE DINGFELDER – We Need Play, Seriously

Adults tend to dismiss it as silly or childish, but having fun may be fundamental to the survival of our species.

https://www.nationalgeographic.com/premium/article/adults-playtime-health-benefits

Nature Communications

PAPERS

SIZHE YANG et al – Inferring language dispersal patterns with velocity field estimation

Reconstructing the spatial evolution of languages can deepen our understanding of the demic diffusion and cultural spread. However, the phylogeographic approach that is frequently used to infer language dispersal patterns has limitations, primarily because the phylogenetic tree cannot fully explain the language evolution induced by the horizontal contact among languages, such as borrowing and areal diffusion. Here, we introduce the language velocity field estimation, which does not rely on the phylogenetic tree, to infer language dispersal trajectories and centre. Its effectiveness and robustness are verified through both simulated and empirical validations. Using language velocity field estimation, we infer the dispersal patterns of four agricultural language families and groups, encompassing approximately 700 language samples. Our results show that the dispersal trajectories of these languages are primarily compatible with population movement routes inferred from ancient DNA and archaeological materials, and their dispersal centres are geographically proximate to ancient homelands of agricultural or Neolithic cultures. Our findings highlight that the agricultural languages dispersed alongside the demic diffusions and cultural spreads during the past 10,000 years. We expect that language velocity field estimation could aid the spatial analysis of language evolution and further branch out into the studies of demographic and cultural dynamics.
https://www.nature.com/articles/s41467-023-44430-5

ZHUANLAN SUN et al – Behavioral consequences of second-person pronouns in written communications between authors and reviewers of scientific papers

Pronoun usage's psychological underpinning and behavioral consequence have fascinated researchers, with much research attention paid to second-person pronouns like "you," "your," and "yours." While these pronouns' effects are understood in many contexts, their role in bilateral, dynamic conversations (especially those outside of close relationships) remains less explored. This research attempts to bridge this gap by examining 25,679 instances of peer review correspondence with Nature Communications using the difference-in-differences method. Here we show that authors addressing reviewers using second-person pronouns receive fewer questions, shorter responses, and more positive feedback. Further analyses suggest that this shift in the review process occurs because "you" (vs. non-"you") usage creates a more personal and engaging conversation. Employing the peer review process of scientific papers as a backdrop, this research reveals the behavioral and psychological effects that second-person pronouns have in interactive written communications.
https://www.nature.com/articles/s41467-023-44515-1

THOMAS W. DAVIES et al with JEAN-JACQUES HUBLIN – Dental morphology in Homo habilis and its implications for the evolution of early Homo

The phylogenetic position of Homo habilis is central to debates over the origin and early evolution of the genus Homo. A large portion of the species hypodigm consists of dental remains, but they have only been studied at the often worn enamel surface. We investigate the morphology of the H. habilis enamel-dentine junction (EDJ), which is preserved in cases of moderate tooth wear and known to carry a strong taxonomic signal. Geometric morphometrics is used to characterise dentine crown shape and size across the entire mandibular and maxillary tooth rows, compared with a broad comparative sample (n = 712). We find that EDJ morphology in H. habilis is for the most part remarkably primitive, supporting the hypothesis that the H. habilis hypodigm has more in common with Australopithecus than later Homo. Additionally, the chronologically younger specimen OH 16 displays a suite of derived features; its inclusion in H. habilis leads to excessive levels of variation.
https://www.nature.com/articles/s41467-023-44375-9

GWANGSU KIM, DONG-KYUM KIM & HAWOONG JEONG – Spontaneous emergence of rudimentary music detectors in deep neural networks

Music exists in almost every society, has universal acoustic features, and is processed by distinct neural circuits in humans even with no experience of musical training. However, it remains unclear how these innate characteristics emerge and what functions they serve. Here, using an artificial deep neural network that models the auditory information processing of the brain, we show that units tuned to music can spontaneously emerge by learning natural sound detection, even without learning music. The music-selective units encoded the temporal structure of music in multiple timescales, following the population-level response characteristics observed in the brain. We found that the process of generalization is critical for the emergence of music-selectivity and that music-selectivity can work as a functional basis for the generalization of natural sound, thereby elucidating its origin. These findings suggest that evolutionary adaptation to process natural sounds can provide an initial blueprint for our sense of music.
https://www.nature.com/articles/s41467-023-44516-0

M. C. RÜHLEMANN et al with R. M. WITTIG & K. ZUBERBÜHLER – Functional host-specific adaptation of the intestinal microbiome in hominids

Fine-scale knowledge of the changes in composition and function of the human gut microbiome compared that of our closest relatives is critical for understanding the evolutionary processes underlying its developmental trajectory. To infer taxonomic and functional changes in the gut microbiome across hominids at different timescales, we perform high-resolution metagenomic-based analyzes of the fecal microbiome from over two hundred samples including diverse human populations, as well as wild-living chimpanzees, bonobos, and gorillas. We find human-associated taxa depleted within non-human apes and patterns of host-specific gut microbiota, suggesting the widespread acquisition of novel microbial clades along the evolutionary divergence of hosts. In contrast, we reveal multiple lines of evidence for a pervasive loss of diversity in human populations in correlation with a high Human Development Index, including evolutionarily conserved clades. Similarly, patterns of co-phylogeny between microbes and hosts are found to be disrupted in humans. Together with identifying individual microbial taxa and functional adaptations that correlate to host phylogeny, these findings offer insights into specific candidates playing a role in the diverging trajectories of the gut microbiome of hominids. We find that repeated horizontal gene transfer and gene loss, as well as the adaptation to transient microaerobic conditions appear to have played a role in the evolution of the human gut microbiome.
https://www.nature.com/articles/s41467-023-44636-7

XIAOXUE GAO et al – The psychological, computational, and neural foundations of indebtedness

Receiving a favor from another person may induce a negative feeling of indebtedness for the beneficiary. In this study, we explore these hidden costs by developing and validating a conceptual model of indebtedness across three studies that combine a large-scale online questionnaire, an interpersonal game, computational modeling, and neuroimaging. Our model captures how individuals perceive the altruistic and strategic intentions of the benefactor. These inferences produce distinct feelings of guilt and obligation that together comprise indebtedness and motivate reciprocity. Perceived altruistic intentions convey care and communal concern and are associated with activity in insula, ventromedial prefrontal cortex and dorsolateral prefrontal cortex, while inferred strategic intentions convey expectations of future reciprocity and are associated with activation in temporal parietal junction and dorsomedial prefrontal cortex. We further develop a neural utility model of indebtedness using multivariate patterns of brain activity that captures the tradeoff between these feelings and reliably predicts reciprocity behavior.
https://www.nature.com/articles/s41467-023-44286-9

Nature Communications Psychology

PAPERS

ALICE VIVIEN BARCHET et al – Auditory-motor synchronization and perception suggest partially distinct time scales in speech and music

Speech and music might involve specific cognitive rhythmic timing mechanisms related to differences in the dominant rhythmic structure. We investigate the influence of different motor effectors on rate-specific processing in both domains. A perception and a synchronization task involving syllable and piano tone sequences and motor effectors typically associated with speech (whispering) and music (finger-tapping) were tested at slow (~2 Hz) and fast rates (~4.5 Hz). Although synchronization performance was generally better at slow rates, the motor effectors exhibited specific rate preferences. Finger-tapping was advantaged compared to whispering at slow but not at faster rates, with synchronization being effector-dependent at slow, but highly correlated at faster rates. Perception of speech and music was better at different rates and predicted by a fast general and a slow finger-tapping synchronization component. Our data suggests partially independent rhythmic timing mechanisms for speech and music, possibly related to a differential recruitment of cortical motor circuitry.
https://www.nature.com/articles/s44271-023-00053-6

Nature Human Behaviour

PAPERS

GRETA TUCKUTE et al – Driving and suppressing the human language network using large language models

Transformer models such as GPT generate human-like language and are predictive of human brain responses to language. Here, using functional-MRI-measured brain responses to 1,000 diverse sentences, we first show that a GPT-based encoding model can predict the magnitude of the brain response associated with each sentence. We then use the model to identify new sentences that are predicted to drive or suppress responses in the human language network. We show that these model-selected novel sentences indeed strongly drive and suppress the activity of human language areas in new individuals. A systematic analysis of the model-selected sentences reveals that surprisal and well-formedness of linguistic input are key determinants of response strength in the language network. These results establish the ability of neural network models to not only mimic human language but also non-invasively control neural activity in higher-level cortical areas, such as the language network.
https://www.nature.com/articles/s41562-023-01783-7

Nature Humanities & Social Sciences Communications

PAPERS

LIULIN ZHANG – On the Chinese resistance to lexical borrowing: a writing-driven self-purification system

The Chinese language is known for its resistance to lexical borrowing. Transliterations can hardly be retained in this language that use pre-existing characters to simply transcribe the pronunciation of the source word in the donor language. This exclusion can be attributed to the ideographic nature of Chinese characters. Given the stable graphic-meaning correspondence, novel use of characters is expected to be consistent with their usage in previous literature, while the association between the graphic form and the phonetic form has always been loose, rendering it meaningless to use characters as a mere phonetic representation. Here writing is having an effect on the assimilation of loanwords, and more generally, the purist language ideology, which runs counter to the traditionally assumed derivative position of writing, thus shedding light on the implicit effect of writing on language ideology.
https://www.nature.com/articles/s41599-023-02556-3

BEATRIZ VILLAREJO CARBALLIDO et al – The effects of children's participation and co-creation in science

The scientific literature shows that children's participation in video games is increasingly common. However, there is no analysis of the involvement of children in the development of video games promoting social science learning. The framework of the EU H2020 funded project "ALLINTERACT. Widening and diversifying citizen engagement in science" contributes to filling this gap by analysing the co-creation process between children, families, teachers, and researchers of a video game for children to distinguish between hoaxes and evidence to overcoming bullying. To this end, a 24-h Science Game Jam was recorded, which took place in a virtual space for group meetings in which five children, five family members, four teachers and four researchers participated in the co-creation of the video game and a collaborative document in the cloud including the guidelines of the video game, with their proposals for the development. Finally, they participated as well as in the co-creation of the video game itself. The key finding is that co-creation through an egalitarian dialogue, solidarity, and focus on scientific knowledge allowed these children to play a leading role in developing a video game where children of all educational stages learn to distinguish hoaxes and evidence in overcoming bullying. The involvement in science and the co-creation of science-based products benefited these children; as they were protagonists in science, they could express their concerns and the real problems they faced in their schools, which increased their scientific knowledge and strengthened their critical capacity about bullying. Furthermore, the adult participants also benefited from the knowledge provided by the children, especially in the development and creation of the video game.
https://www.nature.com/articles/s41599-023-02473-5

LUCILE CRÉTÉ, SIMON A. PARFITT, CHARLES DAY & SILVIA M. BELLO – Non-masticatory striations on human teeth from the British Upper Palaeolithic to the Neolithic

Non-masticatory labial striations on human anterior teeth are a form of cultural dental wear well recorded throughout the Pleistocene, which has been interpreted as resulting from the use of the mouth as a 'third hand' when processing different materials during daily activities, such as cutting meat or working hides with stone tools. Non-masticatory scratches have also been reported on the buccal surface of molars and premolars, although at a far lower frequency compared to the anterior dentition. Previous studies observed an apparent decrease through time in the occurrence of non-masticatory scratches on human teeth, with labial striations appearing to be rare for the Neolithic compared to earlier periods. This study further tests this previously observed pattern through the analysis of over 900 human teeth from 20 sites across England and Wales dating from the Upper Palaeolithic, Mesolithic, and Neolithic, to discuss the distribution and aetiology of non-masticatory striations in the British archaeological record. To record and assess the micro-morphometric characteristics of these dental alterations, macroscopic and microscopic analytical techniques were used. Results show that non-masticatory labial striations are still found on Neolithic teeth, although at a decreased frequency when compared to hunter-gatherer (Upper Palaeolithic and Mesolithic) samples. This may be partly due to changes in diets and food processing methods, as well as types of processed materials and changes in manual handling arising from the inception of the Neolithic in Britain. The sample also includes Upper Palaeolithic, Mesolithic and Neolithic teeth with non-masticatory striations likely associated with funerary practices or cannibalistic treatment of cadavers. Analyses of these marks suggest that striations inflicted during the post-mortem cutting of cadavers from cannibalism or funerary practices differ in their location and micro-morphology, compared with non-masticatory striations produced during the life of an individual using the mouth as a 'third hand'.
https://www.nature.com/articles/s41599-023-02580-3

TING NIE, YANLI GUI & YIYING HUANG – Online sharing behaviors driven by need for approval: the choice of individuals with low social intelligence and high gratitude?

Knowledge sharing as an altruistic behavior has gained widespread attention. In the information age, online sharing is increasingly popular and has become an important way of exchanging and stimulating knowledge. Through a survey of 458 employees in China, this study examines the influence mechanism of need for approval on individual online sharing behavior and the moderating effect of gratitude and social intelligence. Study findings show that self-presentation has a mediating effect between need for approval and online sharing behavior, and individual need for approval can promote online sharing behavior by enhancing self-presentation. Gratitude and social intelligence both have positive moderating effects on the

relations between self-presentation and online sharing behavior. Gratitude moderates the indirect influence of need for approval on online sharing behavior through self-presentation. Individuals with high gratitude and high social intelligence at the same time can strengthen the positive effect of self-presentation on online sharing behavior. Individuals can meet their approval need and obtain learning opportunities through online sharing behaviors. Organizations can select talents and obtain valuable information by establishing sharing platforms. Governments should also regulate online platforms for knowledge exchange as well as encourage individual online sharing behaviors.
https://www.nature.com/articles/s41599-023-02535-8

Nature Neuroscience

PAPERS

YUHANG SONG et al – Inferring neural activity before plasticity as a foundation for learning beyond backpropagation
For both humans and machines, the essence of learning is to pinpoint which components in its information processing pipeline are responsible for an error in its output, a challenge that is known as 'credit assignment'. It has long been assumed that credit assignment is best solved by backpropagation, which is also the foundation of modern machine learning. Here, we set out a fundamentally different principle on credit assignment called 'prospective configuration'. In prospective configuration, the network first infers the pattern of neural activity that should result from learning, and then the synaptic weights are modified to consolidate the change in neural activity. We demonstrate that this distinct mechanism, in contrast to backpropagation, (1) underlies learning in a well-established family of models of cortical circuits, (2) enables learning that is more efficient and effective in many contexts faced by biological organisms and (3) reproduces surprising patterns of neural activity and behavior observed in diverse human and rat learning experiments.
https://www.nature.com/articles/s41593-023-01514-1

Nature Reviews Psychology

ARTICLES

WALDIR M. SAMPAIO – The uniqueness of human cooperation
Cooperation, when agents act together to reach beneficial outcomes and create public goods, is crucial for group formation and development. Cooperation in human social groups is such a relevant theme that discussions have been sparked across various fields. One of these discussions focuses on whether people are naturally cooperative, and society discourages cooperation, or they are naturally selfish, and society influences them to cooperate.
https://www.nature.com/articles/s44159-023-00273-x

Nature Scientific Reports

PAPERS

RACHEL SCHLUND, ROSEANNA SOMMERS & VANESSA K. BOHNS – Giving people the words to say no leads them to feel freer to say yes
We examine how to structure requests to help people feel they can say no (or yes) more voluntarily. Specifically, we examine the effect of having the requester provide the request-target with an explicit phrase they can use to decline requests. Part of the difficulty of saying no is finding the words to do so when put on the spot. Providing individuals with an explicit script they can use to decline a request may help override implicit scripts and norms of politeness that generally dictate compliance. This should make individuals feel more comfortable refusing requests and make agreement feel more voluntary. Hence, we hypothesized that telling people how to say no (by providing them with an explicit script) would make compliance decisions feel more voluntary above and beyond merely telling them they can say no. Across two experimental lab studies (N = 535), we find support for this prediction.
https://www.nature.com/articles/s41598-023-50532-3

ELAINE KIT LING YEUNG & HIM CHEUNG – Intensionality is more cognitively demanding than false belief in adults: evidence from a non-inferential sentence-reading task
Children are said to understand false belief if they can appreciate an agent's wrong description of an object as a result of misinformation, and intensionality if they can appreciate and switch between alternative descriptions from different epistemic viewpoints. Most previous studies have investigated the developmental trajectories of these capacities in the age range from 3 to 10 years aiming to discern their conceptual nature. The present research examines whether intensionality incurs lower performance accuracies and longer response times than false belief in adults, using a task in which participants read sentences that explicitly state an agent's beliefs. Experiment 1 showed that participants were less accurate in rejecting verbal probes that contradicted an agent's alternative than false thoughts about objects. Experiments 2 and 3 replicated this finding using thoughts about object identities but not properties. These results suggest that compared to false belief, intensionality is cognitively demanding for adults to process because of the availability of more than one identity candidate under the agent's perspective.
https://www.nature.com/articles/s41598-024-51181-w

KEITA UMEJIMA, SUZANNE FLYNN & KUNIYOSHI L. SAKAI – Enhanced activations in the dorsal inferior frontal gyrus specifying the who, when, and what for successful building of sentence structures in a new language

It has been argued that the principles constraining first language acquisition also constrain second language acquisition; however, neuroscientific evidence for this is scant, and even less for third and subsequent languages. We conducted fMRI experiments to evaluate this claim by focusing on the building of complex sentence structures in Kazakh, a new language for participants having acquired at least two languages. The participants performed grammaticality judgment and subject-verb matching tasks with spoken sentences. We divided the participants into two groups based on the performance levels attained in one of the experimental tasks: High in Group I and Low in Group II. A direct comparison of the two groups, which examined those participants who parsed the structures, indicated significantly stronger activations for Group I in the dorsal left inferior frontal gyrus (L. IFG). Focusing on Group I, we tested the contrast between the initial and final phases in our testing, which examined when the structures were parsed, as well as the contrast which examined what structures were parsed. These analyses further demonstrated focal activations in the dorsal L. IFG alone. Among the individual participants, stronger activation in the dorsal L. IFG, measured during the sentence presentations, predicted higher accuracy rates and shorter response times for executing the tasks that followed. These results cannot be explained by task difficulty or memory loads, and they, instead, indicate a critical and consistent role of the dorsal L. IFG during the initial to intermediate stages of grammar acquisition in a new target language. Such functional specificity of the dorsal L. IFG provides neuroscientific evidence consistent with the claims made by the Cumulative-Enhancement model in investigating language acquisition beyond target second and third languages.
https://www.nature.com/articles/s41598-023-50896-6

XIN LIU et al – Individual differences in the neural architecture in semantic processing

Neural mechanisms underlying semantic processing have been extensively studied by using functional magnetic resonance imaging, nevertheless, the individual differences of it are yet to be unveiled. To further our understanding of functional and anatomical brain organization underlying semantic processing to the level of individual humans, we used out-of-scanner language behavioral data, T1, resting-state, and story comprehension task-evoked functional image data in the Human Connectome Project, to investigate individual variability in the task-evoked semantic processing network, and attempted to predict individuals' language skills based on task and intrinsic functional connectivity of highly variable regions, by employing a machine-learning framework. Our findings first confirmed that individual variability in both functional and anatomical markers were heterogeneously distributed throughout the semantic processing network, and that the variability increased towards higher levels in the processing hierarchy. Furthermore, intrinsic functional connectivities among these highly variable regions were found to contribute to predict individual reading decoding abilities. The contributing nodes in the overall network were distributed in the left superior, inferior frontal, and temporo-parietal cortices. Our results suggested that the individual differences of neurobiological markers were heterogeneously distributed in the semantic processing network, and that neurobiological markers of highly variable areas are not only linked to individual variability in language skills, but can predict language skills at the individual level.
https://www.nature.com/articles/s41598-023-49538-8

DANIELE GATTI et al – Semantic and episodic processes differently predict false memories in the DRM task

There is a fervent debate about the processes underpinning false memories formation. Seminal theories have suggested that semantic memory would be involved in false memories production, while episodic memory would counter their formation. Yet, direct evidence corroborating such view is still lacking. Here, we tested this possibility by asking participants to perform the Deese–Roediger–McDermott (DRM) task, a typical false memory paradigm, in which they had to study lists of words and subsequently to recognize and distinguish them from new words (i.e., the false memory items). The same participants were also required to perform a semantic task and an episodic-source memory task. Our results showed that a higher number of false memories in the DRM task occurred for those participants with better semantic memory abilities, while a lower number of false memories occurred for participants with better episodic abilities. These findings support a key role of semantic processes in false memory formation and, more generally, help clarify the specific contribution of different memory systems to false recognitions.
https://www.nature.com/articles/s41598-023-50687-z

STUART HAWKINS et al – Earliest known funerary rites in Wallacea after the last glacial maximum

The insular region of Wallacea has become a focal point for studying Pleistocene human ecological and cultural adaptations in island environments, however, little is understood about early burial traditions during the Pleistocene. Here we investigate maritime interactions and burial practices at Ratu Mali 2, an elevated coastal cave site on the small island of Kisar in the Lesser Sunda Islands of eastern Indonesia dated to 15,500–3700 cal. BP. This multidisciplinary study demonstrates extreme marine dietary adaptations, engagement with an extensive exchange network across open seas, and early mortuary practices. A flexed male and a female, interred in a single grave with abundant shellfish and obsidian at Ratu Mali 2 by 14.7 ka are the oldest known human burials in Wallacea with established funerary rites. These findings highlight the impressive flexibility of our species in marginal environments and provide insight into the earliest known ritualised treatment of the dead in Wallacea.

https://www.nature.com/articles/s41598-023-50294-y

FARSHAD ALIZADEH MANSOURI, MARK J. BUCKLEY & KEIJI TANAKA – Mapping causal links between prefrontal cortical regions and intra-individual behavioral variability

Intra-individual behavioral variability is significantly heightened by aging or neuropsychological disorders, however it is unknown which brain regions are causally linked to such variabilities. We examine response time (RT) variability in 21 macaque monkeys performing a rule-guided decision-making task. In monkeys with selective-bilateral lesions in the anterior cingulate cortex (ACC) or in the dorsolateral prefrontal cortex, cognitive flexibility is impaired, but the RT variability is significantly diminished. Bilateral lesions within the frontopolar cortex or within the mid-dorsolateral prefrontal cortex, has no significant effect on cognitive flexibility or RT variability. In monkeys with lesions in the posterior cingulate cortex, the RT variability significantly increases without any deficit in cognitive flexibility. The effect of lesions in the orbitofrontal cortex (OFC) is unique in that it leads to deficits in cognitive flexibility and a significant increase in RT variability. Our findings indicate remarkable dissociations in contribution of frontal cortical regions to behavioral variability. They suggest that the altered variability in OFC-lesioned monkeys is related to deficits in assessing and accumulating evidence to inform a rule-guided decision, whereas in ACC-lesioned monkeys it results from a non-adaptive decrease in decision threshold and consequently immature impulsive responses.
https://www.nature.com/articles/s41467-023-44341-5

HOLLY E. ANDERSON et al with MIKE W. MORLEY – The microstratigraphy and depositional environments of Lida Ajer and Ngalau Gupin, two fossil-bearing tropical limestone caves of west Sumatra

Lida Ajer and Ngalau Gupin are karstic caves situated in the Padang Highlands, western Sumatra, Indonesia. Lida Ajer is best known for yielding fossil evidence that places the arrival of Homo sapiens in Southeast Asia during Marine Isotope Stage 4, one of the earliest records for the region. Ngalau Gupin recently produced the first record of hippopotamid Hexaprotodon on the island, representing the only globally extinct taxon in Pleistocene deposits from Sumatra. Microstratigraphic (micromorphological) analyses were applied to unconsolidated fossil-bearing cave sediments from these two sites. We use micromorphology as part of a micro-contextualised taphonomic approach to identify the diagenetic processes affecting fossils and sediments within these caves, through phases of their depositional history. The fossil-bearing sediments in Lida Ajer have been subjected to a suite of natural sedimentation processes ranging from water action to carnivore occupation, which would indicate the fossils underwent significant reworking prior to lithification of the deposit. The results demonstrate that the base of the unconsolidated fossil-bearing sediments in Ngalau Gupin were derived from the interior of the cave, where the matrix was partially phosphatized as a result of guano-driven diagenesis. These observations can be used to test hypotheses about the integrity of incorporated vertebrate remains and to aid in local palaeoenvironmental reconstructions. The methods employed in this research have not previously been applied to cave sediments from sites in the Padang Highlands and provide key new insights into the palaeontological and natural history of the western region of Sumatra.
https://www.nature.com/articles/s41598-023-50975-8

New Scientist

NEWS

Chimpanzees recognise photos of friends they haven't seen for decades

Bonobos and chimps in zoos remember individuals they lived with more than 20 years ago, showing a long-term social memory comparable to that of humans.
https://www.newscientist.com/article/2409344-chimpanzees-recognise-photos-of-friends-they-havent-seen-for-decades/

PLoS One

PAPERS

JOHANNE NEDERGAARD & KENNY SMITH – Are you thinking what I'm thinking? Perspective-taking in a language game

Many theories of communication claim that perspective-taking is a fundamental component of the successful design of utterances for a specific audience. In three experiments, we investigated perspective-taking in a constrained communication situation: Participants played a word guessing game where each trial required them to select a clue word to communicate a single target word to their partner. In many cases, the task requires participants to take the perspective of their partner when generating, evaluating, and selecting potential clue words. For example, if the target word was 'heart', the first word that came to mind might be 'love', but this would not in fact be a very useful clue word. Instead, a word like 'cardiovascular' is much more likely than 'love' to make the partner guess 'heart'. Pairs of participants took turns giving and receiving clues to guess target words, receiving feedback after each trial. In Experiment 1, participants appeared unable to improve their perspective-taking over repeated interactions, despite a baseline performance that suggested strong perspective-taking abilities. In Experiment 2, which included extensive feedback after each trial and only target words for which good clues existed and which required perspective-taking, some measures of perspective-taking showed modest improvements. In Experiment 3, which was conducted online, we used Experiment 2 feedback with Experiment 1 target words. As in Experiment 1, participants did not improve over the course of the game in Experiment 3. The results of these three

experiments show quite strong limits on people's ability to adapt and improve perspective-taking without the context provided by interaction history and growing common ground.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0288330

Royal Society Open Science

PAPERS

NICKY MCGRATH et al – Humans can identify reward-related call types of chickens

Humans can decode emotional information from vocalizations of animals. However, little is known if these interpretations relate to the ability of humans to identify if calls were made in a rewarded or non-rewarded context. We tested whether humans could identify calls made by chickens (Gallus gallus) in these contexts, and whether demographic factors or experience with chickens affected their correct identification context and the ratings of perceived positive and negative emotions (valence) and excitement (arousal) of chickens. Participants (n = 194) listened to eight calls when chickens were anticipating a reward, and eight calls in non-rewarded contexts, and indicated whether the vocalizing chicken was experiencing pleasure/displeasure, and high/low excitement, using visual analogue scales. Sixty-nine per cent of participants correctly assigned reward and non-reward calls to their respective categories. Participants performed better at categorizing reward-related calls, with 71% of reward calls classified correctly, compared with 67% of non-reward calls. Older people were less accurate in context identification. Older people's ratings of the excitement or arousal levels of reward-related calls were higher than younger people's ratings, while older people rated non-reward calls as representing higher positive emotions or pleasure (higher valence) compared to ratings made by younger people. Our study strengthens evidence that humans perceive emotions across different taxa, and that specific acoustic cues may embody a homologous signalling system among vertebrates. Importantly, humans could identify reward-related calls, and this ability could enhance the management of farmed chickens to improve their welfare.
https://royalsocietypublishing.org/doi/10.1098/rsos.231284

SIMON A. PARFITT & SILVIA M. BELLO – Bone tools, carnivore chewing and heavy percussion: assessing conflicting interpretations of Lower and Upper Palaeolithic bone assemblages

However, identifying minimally modified or unshaped Palaeolithic osseous tools can be challenging, particularly when they are mixed with bones altered by natural taphonomic processes. This has hampered the study of key technical innovations, such as the use of bones, antlers and teeth as hammers or pressure-flakers to work (knap) stone tools. Bones chewed by carnivores can resemble osseous knapping tools and have sometimes been mistaken for them. In this paper, we review recent advances in the study of osseous knapping tools with a focus on two Palaeolithic sites in the UK, the Acheulean Horse Butchery Site at Boxgrove and the Magdalenian site of Gough's Cave, where knapping tools were mis-attributed to carnivore chewing. These osseous knapping tools are investigated using microscopy, high-resolution imaging and comparisons with experimental knapping tools. This allows for new insights into human behaviour at these sites and opens fresh avenues for future research.
https://royalsocietypublishing.org/doi/10.1098/rsos.231163

Trends in Cognitive Sciences

PAPERS

KYLE FIORE LAW et al – Ethical reasoning versus empathic bias: a false dichotomy?

Does empathy necessarily impede equity in altruism? Emerging findings from cognitive and affective science suggest that rationality and empathy are mutually compatible, contradicting some earlier, prominent arguments that empathy impedes equitable giving. We propose alternative conceptualizations of relationships among empathy, rationality, and equity, drawing on interdisciplinary advances in altruism research.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00264-4

MARK DINGEMANSE & N.J. ENFIELD – Interactive repair and the foundations of language

The robustness and flexibility of human language is underpinned by a machinery of interactive repair. Repair is deeply intertwined with two core properties of human language: reflexivity (it can communicate about itself) and accountability (it is used to publicly enforce social norms). We review empirical and theoretical advances from across the cognitive sciences that mark interactive repair as a domain of pragmatic universals, a key place to study metacognition in interaction, and a system that enables collective computation. This provides novel insights into the role of repair in comparative cognition, language development, and human–computer interaction. As an always-available fallback option and an infrastructure for negotiating social commitments, interactive repair is foundational to the resilience, complexity, and flexibility of human language.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00250-4

PABLO FERNANDEZ-VELASCO & HUGO J. SPIERS – Wayfinding across ocean and tundra: what traditional cultures teach us about navigation

Research on human navigation by psychologists and neuroscientists has come mainly from a limited range of environments and participants inhabiting western countries. By contrast, numerous anthropological accounts illustrate the diverse ways in which cultures adapt to their surrounding environment to navigate. Here, we provide an overview of these studies and relate them to cognitive science research. The diversity of cues in traditional navigation is much higher and multimodal compared with navigation experiments in the laboratory. It typically involves an integrated system of methods, drawing on a detailed understanding of the environmental cues, specific tools, and forms part of a broader cultural system. We highlight recent methodological developments for measuring navigation skill and modelling behaviour that will aid future research into how culture and environment shape human navigation.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00251-6

Trends in Ecology and Evolution

PAPERS

EAMONN I.F. WOOSTER et al – Animal cognition and culture mediate predator–prey interactions

Predator–prey ecology and the study of animal cognition and culture have emerged as independent disciplines. Research combining these disciplines suggests that both animal cognition and culture can shape the outcomes of predator–prey interactions and their influence on ecosystems. We review the growing body of work that weaves animal cognition or culture into predator–prey ecology, and argue that both cognition and culture are significant but poorly understood mechanisms mediating how predators structure ecosystems. We present a framework exploring how previous experiences with the predation process creates feedback loops that alter the predation sequence. Cognitive and cultural predator–prey ecology offers ecologists new lenses through which to understand species interactions, their ecological consequences, and novel methods to conserve wildlife in a changing world.
https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(23)00243-4

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