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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.

EDITORIAL INTERJECTIONS

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

ACADEMIA.EDU – Early Stone Tool Use and the Evolution of Human Cognition

UMASA Journal Volume 32 (2014).

KAITLYNN R. ALARIE – Early Stone Tool Use and the Evolution of Human Cognition

Modern humans display a unique degree of social and cognitive complexity. As species we are capable of creating diverse and complex technologies to overcome the limitations of our biology and our external environments. This observed mental uniqueness, has led many researches to coin behavioural and cognitive complexity as the ‘hallmark of humanity’ and ‘behavioural modernity’. Human intelligence has evolved through time and selection, and we as a species owe our current abilities to the evolutionary precursors which came before us. Researchers in the burgeoning field of paleocognition have sought to identify the emergence of our human-like cognition within our hominin lineage through the analysis of the hominin brain size and stone tool technologies produced by extant hominins. Paleocognitive researchers have begun to systematically approach such complex issues as defining human cognition, testing long held assumptions about great ape and human cognitive analogies, and ultimately identifying the evolution of our uniquely human intelligence.

https://www.academia.edu/10522220/Early_stone_tool_use_and_the_evolution_of_human_cognition

NEWS

SCIENCEADVISER – Did Homo naledi really bury its dead?

Paleoanthropologist Lee Berger and colleagues made a big splash last year when they claimed that Homo naledi, a small-bodied and small-brained hominin, buried its dead deep within South Africa’s Rising Star Cave and made artwork on the cave walls. For a species with a brain about a third the size of humans’ to perform such acts defied common thinking that behavioral complexity generally scales with brain size. And with some of the specimens dating to just 250,000 years ago, Berger’s team also suggested these diminutive hominins shared the African continent with our own species, raising questions about how they fit into the human family tree.

Yet the findings—and especially the way they were rolled out—quickly drew darts. Other researchers bristled at the fact that Berger’s team announced their results in preprints and even participated in a Netflix documentary that outlined their scenarios. Still, most of the grousing was limited to conference gossip or social media sniping. Then about two weeks ago, a trio of researchers published a point-by-point critique of the burial preprint’s geochemistry, finding no evidence that Homo naledi buried its dead.

The publication sparked renewed criticism of how the Berger team disseminated their findings. A few accused the team of taking advantage of a new-at-the-time publishing model offered by eLife that accepts preprints and solicits peer reviews, but doesn’t ultimately judge whether a paper is worthy of publishing. “I don’t think anything has united the paleoanthropological community like this has, in saying, ‘This is not how you should do it,’” says paleoanthropologist Andy Herries. “And we are a group of people that generally don’t agree on anything.”

Researchers within the Berger team told Science that a revision to their preprints will be coming any day now.

<https://www.science.org/content/article/ancient-human-relative-really-bury-dead>

SCIENCE DAILY – Smallest arm bone in human fossil record sheds light on the dawn of Homo floresiensis

A new study reports the discovery of extremely rare early human fossils from the Indonesian island of Flores, including an astonishingly small adult limb bone. Dated to about 700,000 years old, the new findings shed light on the evolution of Homo floresiensis, the so-called ‘Hobbits’ of Flores whose remains were uncovered in 2003 at Liang Bua cave in the island’s west.

<https://www.sciencedaily.com/releases/2024/08/240806131156.htm>

SCIENCE.ORG NEWS – Is the pay-to-publish model for open access pricing scientists out?

For cash-strapped researchers, fees are exacerbating long-standing inequalities in global science.

<https://www.science.org/content/article/pay-publish-model-open-access-pricing-scientists>

SCIENCE.ORG NEWS – ‘The hobbit’ may have shrunk early, evolved from a tall human ancestor

Bones recovered from the Indonesian island of Flores help fill in the mysterious history of *Homo floresiensis*.

<https://www.science.org/content/article/hobbit-may-have-shrunk-early-evolved-tall-human-ancestor>

SCIENCE.ORG NEWS – Did an ancient human relative really bury its dead?

Critics challenge explosive claim about *Homo naledi*, with implications for both human evolution and new models of scientific publishing.

<https://www.science.org/content/article/ancient-human-relative-really-bury-dead>

SOCIETY FOR SCIENCE – Then I Am Myself the World’ ponders what it means to be conscious

Review of ‘Then I Am Myself the World’ by Christof Koch, Basic Books.

Neuroscientist Christof Koch’s new book discusses how information integration in the brain leads to consciousness and whether AI will ever be self-aware.

<https://www.sciencenews.org/article/then-i-am-myself-the-world-conscious>

THE CONVERSATION – Three forgotten women who wrote fairytales which subverted gender norms

These stories address the needs and assert the agency of women.

<https://theconversation.com/three-forgotten-women-who-wrote-fairytales-which-subverted-the-grimms-gender-norms-233931>

PUBLICATIONS

Biology Letters

PAPERS

CHARLOTTE CHRISTENSEN et al – More allogrooming is followed by higher physiological stress in wild female baboons

Social bonds increase fitness in a range of mammals. One pathway by which social bonds may increase fitness is by reducing the exposure to physiological stress, i.e. glucocorticoid (GC) hormones, that can be detrimental to health and survival. This is achieved through downregulating hypothalamic–pituitary–adrenal (HPA)-axis activity. Indeed, long-term measures of social (grooming) bonds are often negatively correlated with HPA-axis activity. However, the proximate role of physical touch through allogrooming remains an open question in the sociality–health–fitness debate. Demonstrating the potential anxiolytic benefits of grooming in the wild is hindered by methodological limitations. Here, we match accelerometer-identified grooming in wild female chacma baboons (*Papio ursinus*) to non-invasive faecal GC metabolite concentrations (fGCs). Consistent with previous work, we found a negative (but statistically non-significant) overall relationship between individual averaged fGCs and grooming rates. However, when time-matching grooming to fGCs, we found that both more giving and receiving grooming were followed by higher fGCs. This upregulation of HPA-axis activity suggests that maintaining social bonds (and its ultimate fitness benefits) may come at a shorter-term physiological cost. This finding sheds new light on a ubiquitous social behaviour typically considered ‘relaxing’ and suggests that sociopositive contact can trigger physiological stress.

<https://royalsocietypublishing.org/doi/10.1098/rsbl.2024.0163>

LÁSZLÓ ZSOLT GARAMSZEGI & NICLAS KOLM – The reduction in relative brain size in the domesticated dog is not an evolutionary singularity among the canids

Domestication has long been considered the most powerful evolutionary engine behind dramatic reductions in brain size in several taxa, and the dog (*Canis familiaris*) is considered as a typical example that shows a substantial decrease in brain size relative to its ancestor, the grey wolf (*Canis lupus*). However, to make the case for exceptional evolution of reduced brain size under domestication requires an interspecific approach in a phylogenetic context that can quantify the extent by which domestication reduces brain size in comparison to closely related non-domesticated species responding to different selection factors in the wild. Here, we used a phylogenetic method to identify evolutionary singularities to test if the domesticated dog stands out in terms of relative brain size from other species of canids. We found that the dog does not present unambiguous signature of evolutionary singularity with regard to its small brain size, as the results were sensitive to the considerations about the ancestral trait values upon domestication. However, we obtained strong evidence for the hibernating common raccoon dog (*Nyctereutes procyonoides*) being an evolutionary outlier for its brain size. Therefore, domestication is not necessarily an exceptional case concerning evolutionary reductions in brain size in an interspecific perspective.

<https://royalsocietypublishing.org/doi/10.1098/rsbl.2024.0336>

JAMES R. USHERWOOD – The functions of leg muscles, structures and mechanisms in running

The actions of the major human leg muscles are well established; however, the functions of these muscle actions during steady running remain unclear. Here, leg structures and mechanisms are considered in terms of their functions in meeting the task of a vehicle acting as an effective machine, supporting body weight during translation with low mechanical work

demand and in supplying mechanical work economically. Legs are modelled as a sequence of linkages that predict muscle actions and reveal the varying muscle functions within the integrated leg. Work avoidance is achieved with isometric muscles and linkages that promote a sliding of the hip over the ground contact, resulting in an approximately horizontal path of the centre of mass. Economical work supply requires, for muscle with constrained power, shortening over the entire stance duration; this function is achieved by the hamstrings without disrupting the linkages resulting in work avoidance. In late stance, the two functions occur through coactivation of antagonistic muscles, providing one answer to Lombard's paradox. Quadriceps and hamstring tensions result in opposing moments about both hip and knee joints, but by doing so perform the independent yet complementary roles of work avoidance during translating weight support and economical work supply.

<https://royalsocietypublishing.org/doi/10.1098/rsbl.2024.0260>

Current Biology

ARTICLES

THOMAS A. STALNAKER – Neuroscience: A bottom-up mechanism for cognitive control?

Cognitive control is often conceived of as occurring top-down, with prefrontal cortical areas exerting control over other parts of the brain. A new study demonstrates what might be considered a 'bottom-up' mechanism for cognitive control, involving the disinhibition of orbitofrontal cortex by subcortical regions.

[https://www.cell.com/current-biology/abstract/S0960-9822\(24\)00929-1](https://www.cell.com/current-biology/abstract/S0960-9822(24)00929-1)

MICHAEL GROSS – The artificial intelligence tipping point

The explosive growth of artificial intelligence technology uses energy and water on a scale that may well sink all efforts to mitigate the climate catastrophe. Any benefit that the technology brings may have to be balanced against the considerable potential for harm.

[https://www.cell.com/current-biology/abstract/S0960-9822\(24\)00996-5](https://www.cell.com/current-biology/abstract/S0960-9822(24)00996-5)

eLife

ARTICLES

ELENI PSAROU, SHIVANGI PATEL & MARIEKE SCHÖLVINCK – Vision: Running into differences

Body movement does not significantly increase neuronal activity in the primary visual cortex of marmosets, in contrast to the effects observed in mice.

<https://elifesciences.org/articles/101013>

PAPERS

MUGE OZKER et al – Speech-induced suppression and vocal feedback sensitivity in human cortex

exception. A common hypothesis is that suppression increases sensitivity to auditory feedback, enabling the detection of vocalization errors. This hypothesis has been previously confirmed in non-human primates, however a direct link between auditory suppression and sensitivity in human speech monitoring remains elusive. To address this issue, we obtained intracranial electroencephalography (iEEG) recordings from 35 neurosurgical participants during speech production. We first characterized the detailed topography of auditory suppression, which varied across superior temporal gyrus (STG). Next, we performed a delayed auditory feedback (DAF) task to determine whether the suppressed sites were also sensitive to auditory feedback alterations. Indeed, overlapping sites showed enhanced responses to feedback, indicating sensitivity. Importantly, there was a strong correlation between the degree of auditory suppression and feedback sensitivity, suggesting suppression might be a key mechanism that underlies speech monitoring. Further, we found that when participants produced speech with simultaneous auditory feedback, posterior STG was selectively activated if participants were engaged in a DAF paradigm, suggesting that increased attentional load can modulate auditory feedback sensitivity.

<https://elifesciences.org/reviewed-preprints/94198>

MICHAEL FUCHS et al with KLAUS ZUBERBÜHLER – ASBAR: an Animal Skeleton-Based Action Recognition framework. Recognizing great ape behaviors in the wild using pose estimation with domain adaptation

To date, the investigation and classification of animal behaviors have mostly relied on direct human observations or video recordings with posthoc analysis, which can be labor-intensive, time-consuming, and prone to human bias. Recent advances in machine learning for computer vision tasks, such as pose estimation and action recognition, thus have the potential to significantly improve and deepen our understanding of animal behavior. However, despite the increased availability of open-source toolboxes and large-scale datasets for animal pose estimation, their practical relevance for behavior recognition remains under-explored. In this paper, we propose an innovative framework, ASBAR, for Animal Skeleton-Based Action Recognition, which fully integrates animal pose estimation and behavior recognition. We demonstrate the use of this framework in a particularly challenging task: the classification of great ape natural behaviors in the wild. First, we built a robust pose estimator model leveraging OpenMonkeyChallenge, one of the largest available open-source primate pose datasets, through a benchmark analysis on several CNN models from DeepLabCut, integrated into our framework. Second, we extracted the great ape's skeletal motion from the PanAf dataset, a large collection of in-the-wild videos of gorillas and

chimpanzees annotated for natural behaviors, which we used to train and evaluate PoseConv3D from MMAction2, a second deep learning model fully integrated into our framework. We hereby classify behaviors into nine distinct categories and achieve a Top 1 accuracy of 74.98%, comparable to previous studies using video-based methods, while reducing the model's input size by a factor of around 20. Additionally, we provide an open-source terminal-based GUI that integrates our full pipeline and release a set of 5,440 keypoint annotations to facilitate the replication of our results on other species and/or behaviors. All models, code, and data can be accessed at: <https://github.com/MitchFuchs/asbar> .
<https://elifesciences.org/reviewed-preprints/97962>

Evolutionary Anthropology

PAPERS

GENE R. ESTRADA & ANDREW J. MARSHALL – Terrestriality across the primate order: A review and analysis of ground use in primates

Terrestriality is relatively rare in the predominantly arboreal primate order. How frequently, and when, terrestriality appears in primate evolution, and the factors that influence this behavior, are not well understood. To investigate this, we compiled data describing terrestriality in 515 extant nonhuman primate taxa. We describe the geographic and phylogenetic distribution of terrestriality, including an ancestral state reconstruction estimating the frequency and timing of evolutionary transitions to terrestriality. We review hypotheses concerning the evolution of primate terrestriality and test these using data we collected pertaining to characteristics including body mass and diet, and ecological factors including forest structure, food availability, weather, and predation pressure. Using Bayesian analyses, we find body mass and normalized difference vegetation index are the most reliable predictors of terrestriality. When considering subsets of taxa, we find ecological factors such as forest height and rainfall, and not body mass, are the most reliable predictors of terrestriality for platyrrhines and lemurs.

<https://onlinelibrary.wiley.com/doi/full/10.1002/evan.22032>

MASAHITO MORITA, YURI NISHIKAWA & YUDAI TOKUMASU – Human musical capacity and products should have been induced by the hominin-specific combination of several biosocial features: A three-phase scheme on socio-ecological, cognitive, and cultural evolution

Various selection pressures have shaped human uniqueness, for instance, music. When and why did musical universality and diversity emerge? Our hypothesis is that “music” initially originated from manipulative calls with limited musical elements. Thereafter, vocalizations became more complex and flexible along with a greater degree of social learning. Finally, constructed musical instruments and the language faculty resulted in diverse and context-specific music. Music precursors correspond to vocal communication among nonhuman primates, songbirds, and cetaceans. To place this scenario in hominin history, a three-phase scheme for music evolution is presented herein. We emphasize (1) the evolution of sociality and life history in australopithecines, (2) the evolution of cognitive and learning abilities in early/middle Homo, and (3) cultural evolution, primarily in Homo sapiens. Human musical capacity and products should be due to the hominin-specific combination of several biosocial features, including bipedalism, stable pair bonding, alloparenting, expanded brain size, and sexual selection.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.22031>

BRIAN VILLMOARE & WILLIAM KIMBEL – On the scientific credibility of paleoanthropology

Smith and Smith and Wood proposed that the human fossil record offers special challenges for causal hypotheses because “unique” adaptations resist the comparative method. We challenge their notions of “uniqueness” and offer a refutation of the idea that there is something epistemologically special about human prehistoric data. Although paleontological data may be sparse, there is nothing inherent about this information that prevents its use in the inductive or deductive process, nor in the generation and testing of scientific hypotheses. The imprecision of the fossil record is well-understood, and such imprecision is often factored into hypotheses and methods. While we acknowledge some oversteps within the discipline, we also note that the history of paleoanthropology is clearly one of progress, with ideas tested and resolution added as data (fossils) are uncovered and new technologies applied, much like in sciences as diverse as astronomy, molecular genetics, and geology.

<https://onlinelibrary.wiley.com/doi/full/10.1002/evan.22037>

Frontiers in Psychology

PAPERS

LUKE HOLMES, GERULF RIEGER & SILKE PAULMANN – The effect of sexual orientation on voice acoustic properties

Previous research has investigated sexual orientation differences in the acoustic properties of individuals' voices, often theorizing that homosexuals of both sexes would have voice properties mirroring those of heterosexuals of the opposite sex. Findings were mixed, but many of these studies have methodological limitations including small sample sizes, use of recited passages instead of natural speech, or grouping bisexual and homosexual participants together for analyses.

To address these shortcomings, the present study examined a wide range of acoustic properties in the natural voices of 142 men and 175 women of varying sexual orientations, with sexual orientation treated as a continuous variable throughout. Homosexual men had less breathy voices (as indicated by a lower harmonics-to-noise ratio) and, contrary to our prediction, a lower voice pitch and narrower pitch range than heterosexual men. Homosexual women had lower F4 formant frequency (vocal tract resonance or so-called overtone) in overall vowel production, and rougher voices (measured via jitter and spectral tilt) than heterosexual women. For those sexual orientation differences that were statistically significant, bisexuals were in-between heterosexuals and homosexuals. No sexual orientation differences were found in formants F1–F3, cepstral peak prominence, shimmer, or speech rate in either sex.

{Seems to me these three scientists should get out more; perhaps see an LGBTQ+ choir, like the Pink Singers, in action. They would understand a bit more about gendering, sex, interpersonal attraction and definitely about vocalisation. "Both sexes"? "Opposite sex"? "Natural voices"? The measuring they are doing looks good, but what they are measuring is constrained by outdated 1960s definitions.}

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1412372/full>

Heliyon

PAPERS

YERIM KIM et al – Distorted Time perception in Patients with neurocognitive impairment

Time perception is known to be distorted in patients with neuropsychiatric disorders. Therefore, this study aims to investigate the correlation between cognitive decline and time distortion by examining time perception in participants with neurocognitive impairment (Alzheimer's disease [AD], vascular dementia [VD], and Parkinson's disease dementia [PDD]) compared to those with subjective cognitive impairment (SCI).

Overall, 569 participants with cognitive decline complaints between 2013 and 2022 were investigated. Participants were subjected to a verbal estimation task, time production task, time comparison task, and neuropsychological assessments. Time perception abilities were distorted in patients with neurocognitive impairment compared to those with SCI. Despite similar educational backgrounds, the vascular cognitive impairment (VCI)/VD group demonstrated the lowest MMSE scores (22.4 ± 4.2 , p -value < 0.001) and larger time-estimation errors. Patients with VCI/VD significantly underestimated time in the 35-s (19.6 ± 12.6 s) and 60-s (28.7 ± 19.9 s) tasks. In the time production task, patients with VCI/VD produced shorter times in their 15-s (12.7 ± 4.3 ; p -value = 0.001), 30-s (23.6 ± 8.3 ; p value < 0.001), and 60-s (43.8 ± 18.9 ; p -value < 0.001) trials. In the time comparison task, the VCI/VD group had significantly fewer correct answers than that in the SCI groups (6.0 ± 1.3 vs. 7.1 ± 0.9 , p -value < 0.001). Correlation analysis revealed that multiple cognitive functions are involved in the time perception tasks. Patients with VCI/VD had the poorest time perception. These findings may provide a modest contribution to understanding the underlying pathophysiology and psychological connections related to temporal abilities in time perception.

[https://www.cell.com/heliyon/fulltext/S2405-8440\(24\)12033-6](https://www.cell.com/heliyon/fulltext/S2405-8440(24)12033-6)

Nature

NEWS

Tiny arm bone belonged to smallest ancient human ever found

Fossil humerus offers clues about the rapid evolution of remote-island 'hobbit' species *Homo floresiensis*.

<https://www.nature.com/articles/d41586-024-02548-6>

ARTICLES

NICK PETRIĆ HOWE – ChatGPT has a language problem — but science can fix it

The Large Language Models that power chatbots are known to struggle in languages outside of English — this podcast explores how this challenge can be overcome.

<https://www.nature.com/articles/d41586-024-02579-z>

Nature Communications

PAPERS

JOSHUA S. RULE et al with STEVEN T. PIANTADOSI – Symbolic metaprogram search improves learning efficiency and explains rule learning in humans

Throughout their lives, humans seem to learn a variety of rules for things like applying category labels, following procedures, and explaining causal relationships. These rules are often algorithmically rich but are nonetheless acquired with minimal data and computation. Symbolic models based on program learning successfully explain rule-learning in many domains, but performance degrades quickly as program complexity increases. It remains unclear how to scale symbolic rule-learning methods to model human performance in challenging domains. Here we show that symbolic search over the space of metaprograms—programs that revise programs—dramatically improves learning efficiency. On a behavioral benchmark of 100 algorithmically rich rules, this approach fits human learning more accurately than alternative models while also using orders of magnitude less search. The computation required to match median human performance is consistent with

conservative estimates of human thinking time. Our results suggest that metaprogram-like representations may help human learners to efficiently acquire rules.

<https://www.nature.com/articles/s41467-024-50966-x>

K. L. HUNT et al – The evolution of democratic peace in animal societies

A major goal in evolutionary biology is to elucidate common principles that drive human and other animal societies to adopt either a warlike or peaceful nature. One proposed explanation for the variation in aggression between human societies is the democratic peace hypothesis. According to this theory, autocracies are more warlike than democracies because autocratic leaders can pursue fights for private gain. However, autocratic and democratic decision-making processes are not unique to humans and are widely observed across a diverse range of non-human animal societies. We use evolutionary game theory to evaluate whether the logic of democratic peace may apply across taxa; specifically adapting the classic Hawk-Dove model to consider conflict decisions made by groups rather than individuals. We find support for the democratic peace hypothesis without mechanisms involving complex human institutions and discuss how these findings might be relevant to non-human animal societies. We suggest that the degree to which collective decisions are shared may explain variation in the intensity of intergroup conflict in nature.

<https://www.nature.com/articles/s41467-024-50621-5>

YOUSUKE KAIFU et al – Early evolution of small body size in *Homo floresiensis*

Recent discoveries of *Homo floresiensis* and *H. luzonensis* raise questions regarding how extreme body size reduction occurred in some extinct *Homo* species in insular environments. Previous investigations at Mata Menge, Flores Island, Indonesia, suggested that the early Middle Pleistocene ancestors of *H. floresiensis* had even smaller jaws and teeth. Here, we report additional hominin fossils from the same deposits at Mata Menge. An adult humerus is estimated to be 9 – 16% shorter and thinner than the type specimen of *H. floresiensis* dated to ~60,000 years ago, and is smaller than any other Plio-Pleistocene adult hominin humeri hitherto reported. The newly recovered teeth are both exceptionally small; one of them bears closer morphological similarities to early Javanese *H. erectus*. The *H. floresiensis* lineage most likely evolved from early Asian *H. erectus* and was a long-lasting lineage on Flores with markedly diminutive body size since at least ~700,000 years ago.

<https://www.nature.com/articles/s41467-024-50649-7>

Nature Communications Biology

PAPERS

YIYUAN TERESA HUANG et al – Crossmodal hierarchical predictive coding for audiovisual sequences in the human brain

Predictive coding theory suggests the brain anticipates sensory information using prior knowledge. While this theory has been extensively researched within individual sensory modalities, evidence for predictive processing across sensory modalities is limited. Here, we examine how crossmodal knowledge is represented and learned in the brain, by identifying the hierarchical networks underlying crossmodal predictions when information of one sensory modality leads to a prediction in another modality. We record electroencephalogram (EEG) during a crossmodal audiovisual local-global oddball paradigm, in which the predictability of transitions between tones and images are manipulated at both the stimulus and sequence levels. To dissect the complex predictive signals in our EEG data, we employed a model-fitting approach to untangle neural interactions across modalities and hierarchies. The model-fitting result demonstrates that audiovisual integration occurs at both the levels of individual stimulus interactions and multi-stimulus sequences. Furthermore, we identify the spatio-spectro-temporal signatures of prediction-error signals across hierarchies and modalities, and reveal that auditory and visual prediction errors are rapidly redirected to the central-parietal electrodes during learning through alpha-band interactions. Our study suggests a crossmodal predictive coding mechanism where unimodal predictions are processed by distributed brain networks to form crossmodal knowledge.

<https://www.nature.com/articles/s42003-024-06677-6>

Nature Ecology & Evolution

PAPERS

PAUL PETTITT & BERNARD WOOD – What we know and do not know after the first decade of *Homo naledi*

It has been just over 10 years since the first fossils attributed to *Homo naledi* were recovered from the Rising Star Cave system in South Africa's Cradle of Humankind. The hominin fossil evidence for *H. naledi* displays a distinctive combination of primitive and derived morphology, yet for a time-averaged fossil sample it is remarkable for its relatively low level of variation. Thus—unusually for palaeoanthropology—there has been little pushback against the decision to recognize a single novel taxon for all of the material recovered from the Rising Star Cave system. However, almost everything else claimed about *H. naledi*—its age, burial context and behaviour—has been controversial. Here we examine the strength of the evidence for these claims.

<https://www.nature.com/articles/s41559-024-02470-0>

Nature Humanities & Social Sciences Communications

PAPERS

WENDENG YANG – Evidence-based social science: why, what, and future implications

Mankind has always relied on “practical wisdom” in the sense of Aristotle to change people and society. However, practical wisdom is difficult to accumulate and pass on from generation to generation. Therefore, although “natural engineering” that is consistent with “natural technology” can be used effectively to transform the natural world, using “practical wisdom” to change people and society remains difficult. Solving this dilemma requires an effective means to separate “social science”, “social technology”, and “social engineering” to accumulate and inherit “knowledge of changing people and society” similar to other types of scientific knowledge. Today, the prevailing evidence-based social science is the opposition and unity of laws of nature and free will, truth-seeking and goodness-pursuing, individual wisdom and collective wisdom, autonomy and supervision, the universal and the special in practice. The emergence of this concept allows for the possibility to enhance the effectiveness of social science practice.

<https://www.nature.com/articles/s41599-024-03535-y>

Nature Reviews Neuroscience

COMMENTARIES

ELLIOT MURPHY & OSCAR WOOLNOUGH – The language network is topographically diverse and driven by rapid syntactic inferences

In their timely Review article, Fedorenko and colleagues highlight how the posterior temporal cortex “may be the most critical and irreplaceable” node of the language network (LN), a conclusion that we concur with (Fedorenko, E., Ivanova, A. A. & Regev, T. I. The language network as a natural kind within the broader landscape of the human brain. *Nat. Rev. Neurosci.* 25, 289–312; 2024)¹. Here, we take issue with their overreliance on fMRI-based language-selectivity criteria, and the potential oversimplifications that arise from their monolithic conception of the LN.

<https://www.nature.com/articles/s41583-024-00852-8>

EVELINA FEDORENKO, ANNA A. IVANOVA & TAMAR I. REGEV – Reply to ‘The language network is topographically diverse and driven by rapid syntactic inferences’

We thank Murphy and Woolnough for their comments on our recent Review (Fedorenko, E., Ivanova, A. A. & Regev, T. I. The language network as a natural kind within the broader landscape of the human brain. *Nat. Rev. Neurosci.* 25, 289–312; 2024)¹, which we respond to below (Murphy, E. & Woolnough, O. The language network is topographically diverse and driven by rapid syntactic inferences. *Nat. Rev. Neurosci.* <https://doi.org/10.1038/s41583-024-00852-8> (2024))².

<https://www.nature.com/articles/s41583-024-00853-7>

Nature Scientific Reports

PAPERS

LAURA SALAS-MORELLÓN, IGNACIO PALACIOS-HUERTA & JOSEP CALL – Dynamic inconsistency in great apes

When presented with the option of either an immediate benefit or a larger, later reward, we may behave impatiently by choosing instant gratification. Nonetheless, when we can make the same decision ahead of time and plan for the future, we tend to make more patient choices. Here, we explored whether great apes share this core feature of human decision-making, often referred to as dynamic inconsistency. We found that orangutans, bonobos, and gorillas tended to act impatiently and with considerable variability between individuals when choosing between an immediate reward and a larger-later reward, which is a commonly employed testing method in the field. However, with the inclusion of a front-end delay for both alternatives, their decisions became more patient and homogeneous. These results show that great apes are dynamically inconsistent. They also suggest that, when choosing between future outcomes, they are more patient than previously reported. We advocate for the inclusion of diverse time ranges in comparative research, especially considering the intertwining of intertemporal choices and future-oriented behavior.

<https://www.nature.com/articles/s41598-024-67771-7>

OLIVIA RIVERO et al – Experimental insights into cognition, motor skills, and artistic expertise in Paleolithic art

The production of Paleolithic art represents one of the most intricate technical and cognitive endeavors of *Homo sapiens*, marked by its profound antiquity and vast temporal and spatial framework. Despite its significance, there have been no prior studies aimed at understanding the cognitive and motor skills linked to the creation of realistic images characteristic of this artistic cycle. This research integrates archaeology and experimental psychology, premised on the assumption that the neurological basis of Anatomically Modern Humans has not changed substantially since the Upper Paleolithic. This work employs an innovative interdisciplinary approach, utilizing psychometric tests and drawing and engraving tasks monitored by motion-sensing gloves, to compare the performance of experts and non-experts in visual arts when faced with challenges akin to those of Upper Paleolithic artistic production. The results revealed that expertise in visual arts is linked to enhanced spatial abilities and specific patterns in drawing from memory. Additionally, both experts and non-experts displayed similar

motor skills when engraving using Paleolithic techniques, suggesting that these techniques required specialized training in the contemporary experts. In conclusion, this research deepens our understanding of the processes involved in Upper Paleolithic artistic production.

<https://www.nature.com/articles/s41598-024-68861-2>

PHILIPPE CROMBÉ et al – Human response to the Younger Dryas along the southern North Sea basin, Northwest Europe

Currently in NW Europe little is known about the human response to the extensive cold reversal at the end of the Pleistocene, the Younger Dryas (ca. 12,850 till ca. 11,650 cal BP), mainly due to the poor chronological resolution of the archaeological sites belonging to the Ahrensburgian Culture. Here we present a series of 33 radiocarbon dates performed on the seminal cave site of Remouchamps, situated in the Belgian Meuse basin. Combined with a revision of the available radiocarbon evidence along the southern North Sea basin (Belgium, southern Netherlands, western Germany), it is suggested that the first half of the Younger Dryas, characterized as extremely cold and wet, faced a significant population reduction. Repopulation started around the middle of the Younger Dryas, from ca. 12,200 cal BP onward, probably in response to a slight climatic improvement leading to somewhat warmer summers. This might be considered a prelude to the subsequent population boost of the Early Holocene (Mesolithic).

<https://www.nature.com/articles/s41598-024-68686-z>

ALEX DAYER et al – Intuitive moral bias favors the religiously faithful

Belief in powerful supernatural agents that enforce moral norms has been theoretically linked with cooperative altruism and prosociality. Correspondingly, prior research reveals an implicit association between atheism and extreme antisociality (e.g., serial murder). However, findings centered on associations between lack of faith and moral transgression do not directly address the hypothesized conceptual association between religious belief and prosociality. Accordingly, we conducted two pre-registered experiments depicting a “serial helper” to assess biases related to extraordinary helpfulness, mirroring designs depicting a serial killer used in prior cross-cultural work. In both a predominantly religious society (the U.S., Study 1) and a predominantly secular society (New Zealand, Study 2), we successfully replicated previous research linking atheism with transgression, and obtained evidence for a substantially stronger conceptual association between religiosity and virtue. The results suggest that stereotypes linking religiosity with prosociality are both real and global in scale.

<https://www.nature.com/articles/s41598-024-67960-4>

New Scientist

NEWS

Hobbit hominins from Indonesia may have had even smaller ancestors

An arm bone from an ancient human that lived 700,000 years ago on the island of Flores is the smallest ever found from an adult hominin, adding a new piece to the puzzle of *Homo floresiensis*.

<https://www.newscientist.com/article/2442686-hobbit-hominins-from-indonesia-may-have-had-even-smaller-ancestors/>

Philosophical Transactions of the Royal Society B

PAPERS

HARRY HEFT – Behaviour settings, situated action and complexity theory

In spite of the fact that Roger Barker’s groundbreaking research was acclaimed sixty years ago by his contemporaries, it has all been but forgotten among recent generations of psychologists. However, in the wake of developments in dynamical systems and complexity theory, its value for understanding psychological processes in everyday life should be recognized anew. Barker’s naturalistic studies of children’s daily behaviours in their community revealed that their actions which initially seemed only marginally predictable at the level of individual interaction were, in fact, reliably context-dependent. These results led to the discovery that there are nested structures operating in human habitats as there are throughout the natural world. Barker’s discovery of emergent eco-psychological structures, behaviour settings, that are generated from interdependent actions among individuals in the course of everyday life has yet to be fully appreciated because of the continuing dominance of linear, mechanistic models. His recognition of nested systems operating in human habitats is finally coming into its own with the current metatheoretical shift in psychology embracing dynamical models. Additionally, new understanding arises from the consideration of convergent individual developmental histories of situated action and their role in maintaining the historical dimensions of behaviour settings.

<https://royalsocietypublishing.org/doi/10.1098/rstb.2023.0284>

EDWARD BAGGS & GUILHERME SANCHES DE OLIVEIRA – Rewilding psychology

Some commentators have recently argued that scientific psychology is overly reliant on artificial laboratory-based activities and that it undervalues field-based investigations. However, it remains unclear how a field-based programme of psychological research might be organized in a scalable way. We examine and compare two existing field-based approaches: Roger Barker’s behaviour settings programme and Edwin Hutchins’s distributed cognition programme. Both programmes

prioritize observational work, and both reject the individual as the unit of analysis in favour of a community-scale unit. However, whereas the behaviour settings programme is concerned with structural properties of community life, distributed cognition is concerned more narrowly with the functional analysis of expert team performance. We discuss how these programmes can inform a future community-scale approach to studying psychology in the wild. We conclude that the two programmes are proof of concept of the possibility of a scientific psychology that rejects methodological individualism.

<https://royalsocietypublishing.org/doi/10.1098/rstb.2023.0287>

MAREK MCGANN – Reorienting psychological science

Psychological phenomena occur across a wide range of scales, ranging from small, quick events of neurology and biology, to broader, more prolonged unfoldings typical of extended cultural practices. Although theories deployed by psychologists of different stripes have tended to incorporate these different scales, this is typically done in a manner that is implicit, and often unsystematic. That is, typical psychological research is conducted in a manner that is 'scale-blind'. In this article, I explore some of the historical and more recent recognition of this scale-blindness and place it in the context of recent work on the concept and implications of scale. I conclude by elucidating some of the important ways in which behaviour settings theory, and the researchers who developed it, are explicit and disciplined in their approach to scale, and how such scale-aware work promises practical value in improving scientific practice.

<https://royalsocietypublishing.org/doi/10.1098/rstb.2023.0288>

ANNEMARIE KALIS, JOSEPHINE PASCOE & MIGUEL SEGUNDO ORTIN – Running away from the marshmallow: the relevance of behaviour settings for a situated science of self-control

The behaviour settings approach was introduced as a means to study the variability of human beings' behaviour outside the lab. More recently, it has been argued that it also provides a fruitful avenue for developing situated accounts of cognition. This article will provide a proof of concept for the latter suggestion, focusing on the science of self-control. Self-control is the ability of individuals to pursue goals they value in the face of conflicting motivations. The hypothesis we bring forward is that this ability should be understood as a set of skills by which individuals modulate their relation to their environment, more specifically the behaviour settings they inhabit. With this conception of self-control in hand, we will take a critical look at well-known experiments involving delayed gratification tasks and propose concrete suggestions on how to improve them. This will bring us to the conclusion that the behaviour settings framework might have a valuable role to play in developing a situated science of self-control.

<https://royalsocietypublishing.org/doi/10.1098/rstb.2023.0289>

ROBERT AUNGER et al – Applying the Barker School concept of 'behaviour settings' to virtual contexts

People are spending more and more time interacting with virtual objects and environments. We argue that Roger Barker's concept of a 'behaviour setting' can be usefully applied to such experiences with relatively little modification if we recognize subjective aspects of such experiences such as presence and immersion. We define virtual behaviour settings as virtual environments where the partly or fully digital milieu is synomorphic with and circumjacent to embodied behaviour, as opposed to the fragmented behaviour settings of much-mediated interaction. We present two tools that can help explain and predict the outcomes of virtual experiences—the behaviour setting canvas (BSC) and model—and demonstrate their utility through examples. We conclude that the behaviour setting concept is helpful in both designing virtual environments and understanding their impact, while virtual environments offer a powerful new methodological paradigm for studying behaviour settings.

<https://royalsocietypublishing.org/doi/10.1098/rstb.2023.0291>

MELINA GASTELUM-VARGAS, ANTHONY CHERERO & VICENTE RAJA – Places for reasoning

In this article, we explore behaviour settings that enable reasoning and the diversity of constraints that not only limit but also make these behaviour settings possible. We focus specifically on reasoning and surveying how behaviour settings allow for the generation of norms of action that are nevertheless differentiated by geographies and sociocultural systems. These geographies and sociocultural systems involve diverse trajectories for reasoning even within similar behaviour settings. We will touch on places for reasoning like Twitter, social movements, traditional knowledge and laboratories set up for experimentation on our reasoning abilities. We will show how these places and the behaviour settings that emerge in them can be studied in terms of the complexity of the interactions between their participants and in terms of enabling constraints. *{I remain neutral on the value of behaviour settings theory, mainly because it addresses what, when and where questions, while the rest of psychology seems to be concentrating on who, how and why questions. For balance, a selection of the papers is listed here.}*

<https://royalsocietypublishing.org/doi/10.1098/rstb.2023.0294>

Proceedings of the Royal Society B

PAPERS

EVY VAN BERLO et al – Selective and prolonged attention to emotional scenes in humans and bonobos

Perceiving emotions in others is at the foundation of higher-order social cognition. The importance of emotions is evidenced by the fact that they receive prioritized attention at early stages of processing the environment in humans and some other primates. Nevertheless, we do not fully understand how emotion modulates attention over longer durations in primates, particularly in great apes. Bonobos, one of our closest relatives, stand out in emotion processing and regulation among great apes. This makes them an interesting comparison species and a valuable model for studying the evolution of emotion perception in hominids. We investigated how bonobos and humans spontaneously attend to emotionally valent scenes in a preferential looking task using eye-tracking. With Bayesian mixed modelling, we found that bonobos and humans generally looked longer at emotional scenes, mainly of conspecifics. Moreover, while bonobos did not have a bias toward emotional human scenes, humans sustained their attention toward bonobos playing, grooming and having sex. Furthermore, when exploring an immediate bias for emotions, humans showed a bias toward affiliative human scenes, and bonobos showed a bias away from bonobos-in-distress scenes. These findings suggest that emotions modulate attention at early and later attentional stages in bonobos, similar to humans.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2024.0433>

Royal Society Open Science

PAPERS

SANDRA WACHTER, BRENT MITTELSTADT & CHRIS RUSSELL – Do large language models have a legal duty to tell the truth?

Careless speech is a new type of harm created by large language models (LLM) that poses cumulative, long-term risks to science, education and shared social truth in democratic societies. LLMs produce responses that are plausible, helpful and confident, but that contain factual inaccuracies, misleading references and biased information. These subtle mistruths are poised to cumulatively degrade and homogenize knowledge over time. This article examines the existence and feasibility of a legal duty for LLM providers to create models that ‘tell the truth’. We argue that LLM providers should be required to mitigate careless speech and better align their models with truth through open, democratic processes. We define careless speech against ‘ground truth’ in LLMs and related risks including hallucinations, misinformation and disinformation. We assess the existence of truth-related obligations in EU human rights law and the Artificial Intelligence Act, Digital Services Act, Product Liability Directive and Artificial Intelligence Liability Directive. Current frameworks contain limited, sector-specific truth duties. Drawing on duties in science and academia, education, archives and libraries, and a German case in which Google was held liable for defamation caused by autocomplete, we propose a pathway to create a legal truth duty for providers of narrow- and general-purpose LLMs.

{I agree that “LLM providers should be required to mitigate careless speech and better align their models with truth through open, democratic processes”, but what kind of truth?}

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.240197>

KAUSHIK BASU & JÖRGEN WEIBULL – A knowledge curse: how knowledge can reduce human welfare

Greater knowledge is always an advantage for a rational individual. However, this article shows that for a group of rational individuals greater knowledge can backfire, leading to a worse outcome for all. Surprisingly, this can happen even when new knowledge does not mean the discovery of a new action but simply provides a deeper understanding of the interaction at stake. More specifically, enhanced knowledge about the current state of nature may hinder cooperation among purely self-interested individuals. The paper describes this paradoxical possibility—a ‘knowledge curse’—and analyses the evolutionary process that occurs if, initially, only a few people have access to the greater knowledge. It concludes with a tentative comment on ways to avert this potential knowledge backlash.

<https://royalsocietypublishing.org/doi/10.1098/rsos.240358>

Science

NEWS

Did an ancient human relative really bury its dead?

Critics challenge explosive claim about *Homo naledi*, with implications for both human evolution and new models of scientific publishing,

<https://www.science.org/content/article/ancient-human-relative-really-bury-dead>

Trends in Cognitive Sciences

PAPERS

RHODRI CUSACK, MARC'AURELIO RANZATO & CHRISTINE J. CHARVET – Helpless infants are learning a foundation model

Humans have a protracted postnatal helplessness period, typically attributed to human-specific maternal constraints causing an early birth when the brain is highly immature. By aligning neurodevelopmental events across species, however, it has been found that humans are not born with especially immature brains compared with animal species with a shorter helpless period. Consistent with this, the rapidly growing field of infant neuroimaging has found that brain connectivity and functional activation at birth share many similarities with the mature brain. Inspired by machine learning, where deep neural networks also benefit from a 'helpless period' of pre-training, we propose that human infants are learning a foundation model: a set of fundamental representations that underpin later cognition with high performance and rapid generalisation.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(24\)00114-1](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00114-1)

STEVEN T. PIANTADOSI et al – Why concepts are (probably) vectors

For decades, cognitive scientists have debated what kind of representation might characterize human concepts. Whatever the format of the representation, it must allow for the computation of varied properties, including similarities, features, categories, definitions, and relations. It must also support the development of theories, ad hoc categories, and knowledge of procedures. Here, we discuss why vector-based representations provide a compelling account that can meet all these needs while being plausibly encoded into neural architectures. This view has become especially promising with recent advances in both large language models and vector symbolic architectures. These innovations show how vectors can handle many properties traditionally thought to be out of reach for neural models, including compositionality, definitions, structures, and symbolic computational processes.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(24\)00171-2](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00171-2)

SAMUEL G.B. JOHNSON, PATRICK R. SCHOTANUS & J.A. SCOTT KELSO – Minds and markets as complex systems: an emerging approach to cognitive economics

Cognitive economics is an emerging interdisciplinary field that uses the tools of cognitive science to study economic and social decision-making. Although most strains of cognitive economics share commitments to bridging levels of analysis (cognitive, behavioral, and systems) and embracing interdisciplinary approaches, we review a newer strand of cognitive economic thinking with a further commitment: conceptualizing minds and markets each as complex adaptive systems. We describe three ongoing research programs that strive toward these goals: (i) studying narratives as a cognitive and social representation used to guide decision-making; (ii) building cognitively informed agent-based models; and (iii) understanding markets as an extended mind – the Market Mind Hypothesis – analyzed using the concepts, methods, and tools of Coordination Dynamics.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(24\)00174-8](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00174-8)

Trends in Neurosciences

PAPERS

ANGELA C. ROBERTS & KEVIN G. MULVIHILL – Multiple faces of anxiety: a frontal lobe perspective

Marked dysregulation of the human prefrontal cortex (PFC) and anterior cingulate cortex (ACC) characterises a variety of anxiety disorders, and its amelioration is a key feature of treatment success. Overall treatment response, however, is highly variable, and about a third of patients are resistant to treatment. In this review we hypothesise that a major contributor to this variation in treatment response are the multiple faces of anxiety induced by distinct forms of frontal cortex dysregulation. Comparison of findings from humans and non-human primates reveals marked similarity in the functional organisation of threat regulation across the frontal lobes. This organisation is discussed in relation to the 'predatory imminence continuum' model of threat and the differential engagement of executive functions at the core of both emotion generation and regulation strategies.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(24\)00126-7](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(24)00126-7)

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