EAORC BULLETIN 1,125 – 5 January 2025

CONTENTS

NOTICES

FORMATTED VERSION OF THIS BULLETIN

A pdf formatted version if this Bulletin is available for download at martinedwardes.me.uk/eaorc/eaorc_bulletins.htm.

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 – From a Bodily-based Format of Knowledge to Symbols

American Anthropologist 106:1, 17-31 (2004).

VALENTINA CUCCIO – From a Bodily-based Format of Knowledge to Symbols. The Evolution of Human Language

Although ontogeny cannot recapitulate phylogeny, a two-level model of the acquisition of language will be here proposed and its implication for the evolution of the faculty of language will be discussed. It is here proposed that the identification of the cognitive requirements of language during ontogeny could help us in the task of identifying the phylogenetic achievements that concurred, at some point, to the acquisition of language during phylogeny. In this model speaking will be considered as a complex ability that arises in two different steps. The first step of competence widely relies on a bodily-based format of knowledge. The second step relies on more abstract meta-representations and implies high-level socio-cognitive skills. It is hypothesized that in order to reach the second level of language competence, symbolic communication and interaction with a cultural community are needed. Hence, the origins of species-specific human complex language and cognition are in both the brain and culture. Moreover, in this model, data from the embodied language research will be discussed in the light of a usage-based account of language.
https://www.academia.edu/27219242/From_a_Bodily_based_Format_of_Knowledge_to_Symbols_The_Evolution_of_Human_Language

ACADEMIA.EDU – Cognitive Task-Structuring Strategies Across Different Hominin Tool-Making Events

Biosemiotics 7, 49-61 (2014)

JOANNA E. FAIRLIE & LAWRENCE S. BARHAM – From Chaîne Opératoire to Observational Analysis: A Pilot Study of a New Methodology for Analysing Changes in Cognitive Task-Structuring Strategies Across Different Hominin Tool-Making Events

The chaîne opératoire (CO) approach is a well-established method for the analysis of tool creation, use and discard, and associated cognitive processes. Its effectiveness in respect of cognition, however, is occasionally challenged. We briefly review key critiques of its epistemological and methodological limitations and consider alternative options. We suggest a new epistemological position and methodology which can link CO with alternative cognitive models and with the true complexity inherent in the stone tool archaeological record. Perception-action and embodied cognition theory are the proposed foundations of a new epistemology that allows us to reject the concept of thought processes underlying tool-making sequences as static entities selected from memory. Instead, they are described as arising, changing and flowing with and through bodily activity, or as the products of constant interaction between body, mind and environment. They are better understood as ongoing processes of situated task-structuring rather than as objectified concepts or symbols. The new methodology is designed to analyse individual tool-making processes rather than their products. We use a pilot study to explore how it can highlight variations in the gestural processes that structure different technologies and thus indicate potential differences in the associated cognitive strategies of the various tool-makers concerned.

https://www.academia.edu/109747091/From_i_Cha%C3%AEne_Op%C3%A9ratoire_i_to_Observational_Analysis_A_Pilot_Study_of_a_New_Methodology_for_Analysing_Changes_in_Cognitive_Task_Structuring_Strategies_Across_Different_Hominin_Tool_Making_Events

ACADEMIA.EDU – A common sense view on the cognitive evolution of the Pleistocene Human lineage

Arheologia Moldovei, XXXVI, 7-24 (2013)

MIRCEA ANGHELINU – Fitting the Ladder to the Tree: A common sense view on the cognitive evolution of the Pleistocene Human lineage

The mismatch between the human paleoanthropological ‘tree’ and the paleo-cognitive ‘ladder’ has been recently attributed to epistemological biases affecting the mainstream narratives on cognitive evolution. The present paper takes issue with such a perspective and argues for a rather continuous cognitive development along the human lineage, as documented archaeologically by the early emergence of a ‘familiar’ human mind and by the cumulative features of Pleistocene cultural evolution in general. These facts seriously question the paleo-cognitive relevance of the acknowledged branchy taxonomy and point strongly towards a more anagenetic view on human biological evolution. Moreover, as the prerequisites for complex behavior and a consistent ability for cultural transmission were already among the capacities of the Homo erectus grade, the scope of further major cognitive changes, as usually invoked in connection to the emergence of Homo sapiens sapiens, appears limited.

https://www.academia.edu/11493060/Fitting_the_ladder_to_the_tree_A_common_sense_view_on_the_cognitive_evolution_of_the_Pleistocene_human_lineage

ACADEMIA.EDU – The Origin of the Human Capacity

Sixty-Eighth James Arthur Lecture on the Evolution of the Human Brain. American Museum of Natural History, New York. (1998).

IAN TATTERSALL – The Origin of the Human Capacity

Just what is it, that strange quality of our consciousness that sets us off from all other living organisms —and which, as importantly,

makes us feel so entirely different from them all, even those to whom we know ourselves to be quite closely related? And, whatever it is, how and when did we acquire it? While these questions come close to being unanswerable except in the broadest of terms, they beg to be asked; for they encapsulate the most basic and profound of all the many mysteries posed by our strange and (occasionally) wonderful selves. It is thus natural that they should have been raised—in a variety of different ways and from an equally large number of perspectives— by several earlier James Arthur lecturers on The Evolution of the Human Brain.

My talk today is no exception, and I have even borrowed part of my title from one of my distinguished predecessors as a James Arthur lecturer, Alexander Marshack, who coined the term "the human capacity" to denote this elusive quality that makes humans so distinctive. In his lecture. Marshack (1985) explored the origins of the human capacity in the context of the Ice Age art and symbolism that are its most dramatic early expression. Today I would like to cast my net a little wider, looking at the evidence for the emergence of what we might call cognitive novelties throughout the hominid fossil and archaeological records, and asking whether it is possible to discern any consistent pattern among them. More precisely, I shall ask whether the final step to becoming fully human—the acquisition of the human capacity—was an abrupt or a gradual event, and whether it simply represented the culmination of earlier trends in human evolution, or was an unprecedented, emergent event that could not have been predicted from what went before. And I shall also inquire into possible causes or at least correlates of this fateful step. Before I begin to do this, however, it's necessary to digress for a moment to look briefly at the

evolutionary process itself, because the way in which we view this process profoundly affects the manner in which we interpret its manifold results.
https://www.academia.edu/126749815/The_origin_of_the_human_capacity_Ian_Tattersall

ACADEMIA.EDU – Neandertal Archaeology – Implications for Our Origins

American Anthropologist 104:1, 50-67 (2002).

G. A. CLARK – Neandertal Archaeology—Implications for Our Origins

This article identifies key aspects of the metaphysical paradigms under which European Paleolithic archaeological research is conducted and contrasts the anthropological approaches typical of anglophone New World workers with those of the "history-like" natural science-based traditions of Latin Europe. Because the Middle-Upper Paleolithic transition in Europe is thought by many to correspond to the biological replacement of Neandertals by modern humans over the ten millennia bracketing 40 kyr B.P., generalizations about the archaeological transition invoked in support of biological replacement are examined and are found to lack empirical support. Patterns in lithic technology, typology, raw material variability, reduction strategies, blank frequencies, bone and antler technologies, Paleolithic art, subsistence strategies, and settlement patterns all indicate a temporal-spatial mosaic of changing monitors of human adaptation over the transition interval that cannot be reconciled with any construal of a relatively abrupt and complete biological replacement.
https://www.academia.edu/35203717/Neandertal_ArchaeologyImplications_for_Our_Origins

NEWS

SCIENCEADVISER – T. Christina Zhao

In college, Christina Zhao did an undergraduate research project on how having older kids in the house affects newborn speech perception. She then continued in the field of auditory neuroscience in grad school and as a postdoc, this time looking more specifically at what's happening in the brain. She found that nine-month-old infants who underwent active music lessons had enhanced neurological responses to music and speech. Unfortunately, when she analyzed recordings of the sounds infants experience in their daily lives, she found that babies didn't experience a lot of music. This work made Zhao a finalist for the 2024 NOMIS and Science Young Explorer Award. ScienceAdviser sat down with her to discuss the work.
https://www.science.org/doi/10.1126/science.ads7364

SCIENCEADVISER – Was Lucy the mother of us all? Fifty years after discovery, famed skeleton has rivals

After the hard work of putting together an engaging, informative video, we also have to consider how we can entice viewers to slow their scroll and actually click on what we've made. The thumbnail needs to be visually intriguing with some leading text, while the title has to give enough information within 50 or so characters that viewers pretty much know what to expect (mysteries in YouTube titles are a big dud).

We've settled on a standard design for our thumbnails that we like, but that triangulation of visual, thumbnail text, and title to maximize information and grab attention is always our final challenge. At that point in the production process it's easy to feel drained of ideas, but I think we really nailed it with the Lucy at 50 video.

Meagan Cantwell, our Senior Video Producer, sent a range of options. An argument could be made for any of them, but with Maya Rudolph's Mother's Day SNL monologue fresh in mind, we decided to lean into the fun one. We came up with a picture of Lucy and the single-word caption "Mother?"

That face, the question mark—still make me giggle.
https://www.science.org/content/article/was-lucy-mother-us-all-fifty-years-discovery-famed-skeleton-rivals

SCIENCEADVISER – Think fast, but not that fast

In the human brain, information flows at a mere 10 bps—orders of magnitude slower than a mediocre internet connection. The study is "a bit of a counterweight to the endless hyperbole about how incredibly complex and powerful the human brain is," says one researcher.
https://www.cell.com/neuron/abstract/S0896-6273(24)00808-0

SCIENCE.ORG NEWS – Ants best humans at test of collective intelligence

Insects put their minds together in ways that sometimes eludes people.
https://www.science.org/content/article/ants-best-humans-test-collective-intelligence

THE CONVERSATION – This philosophical theory can help you stop taking criticism personally

The political thought of Hannah Arendt reminds us that we are more than our successes and failures.
https://theconversation.com/this-philosophical-theory-can-help-you-stop-taking-criticism-personally-220932

PUBLICATIONS

American Journal of Human Genetics

PAPERS

EMMANUELLE SZENKER-RAVI et mul – CIROZ is dispensable in ancestral vertebrates but essential for left-right patterning in humans

Four genes—DAND5, PKD1L1, MMP21, and CIROP—form a genetic module that has specifically evolved in vertebrate species that harbor motile cilia in their left-right organizer (LRO). We find here that CIROZ (previously known as C1orf127) is also specifically expressed in the LRO of mice, frogs, and fish, where it encodes a protein with a signal peptide followed by 3 zona pellucida N domains, consistent with extracellular localization. We report 16 individuals from 10 families with bi-allelic CIROZ inactivation variants, which cause heterotaxy with congenital heart defects. While the knockout of Ciroz in mice also leads to situs anomalies, we unexpectedly find that its targeted inactivation in zebrafish and Xenopus does not lead to observable LR anomalies. Moreover, CIROZ is absent or obsolete in select animals with motile cilia at their LRO, including Carnivora, Atherinomorpha fish, or jawless vertebrates. In summary, this evo-devo study identifies CIROZ as an essential gene for breaking bilateral embryonic symmetry in humans and mice, whereas we witness its contemporary pseudogenization in discrete vertebrate species.

https://www.cell.com/ajhg/abstract/S0002-9297(24)00448-8

Behavioral and Brain Sciences

PAPERS

SHEINA LEW-LEVY & DORSA AMIR – Children as agents of cultural adaptation

The human capacity for culture is a key determinant of our success as a species. While much work has examined adults' abilities to create and transmit cultural knowledge, relatively less work has focused on the role of children (approx. 3-17 years) in this important process. In the cases where children are acknowledged, they are largely portrayed as acquirers of cultural knowledge from adults, rather than cultural producers in their own right. In this paper, we bring attention to the important role that children play in cultural adaptation by highlighting the structure, function, and ubiquity of the large body of knowledge produced and transmitted by children, known as peer culture. Supported by evidence from diverse disciplines, we argue that children are independent producers and maintainers of these autonomous cultures, which exist with regularity across diverse societies, and persist despite compounding threats. Critically, we argue peer cultures are a source of community knowledge diversity, encompassing both material and immaterial knowledge related to geography, ecology, subsistence, norms, and language. Through a number of case studies, we further argue that peer culture products and associated practices — including exploration, learning, and the retention of abandoned adult cultural traits — may help populations adapt to changing ecological and social conditions, contribute to community resilience, and even produce new cultural communities. We end by highlighting the pressing need for research to more carefully investigate children's roles as active agents in cultural adaptation.

https://www.cambridge.org/core/journals/behavioral-and-brain-sciences/article/children-as-agents-of-cultural-adaptation/F14F6E1809BEB70894B14FB8B5A51E91

IRIS V. WAHRING, JEFFRY A. SIMPSON & PAUL A. M. VAN LANGE – Romantic Relationships Matter More to Men than to Women

Women are often viewed as more romantic than men, and romantic relationships are assumed to be more central to the lives of women than to those of men. Despite the prevalence of these beliefs, some recent research paints a different picture. Using principles and insights based on the interdisciplinary literature on mixed-gender relationships, we advance a set of four propositions relevant to differences between men and women and their romantic relationships. We propose that relative to women: (a) men expect to obtain greater benefits from relationship formation and thus strive more strongly for a romantic partner, (b) men benefit more from romantic relationship involvement in terms of their mental and physical health, (c) men are less likely to initiate breakups, and (d) men suffer more from relationship dissolution. We offer theoretical explanations based on differences between men and women in the availability of social networks that provide intimacy and emotional support. We discuss implications for friendships in general and friendships between men and women in particular. ***{Or, to put it another way, the female is fully assured of their 50% contribution to their childrens' genes; the male relies on an act of faith in their partner's monogamy – or romance, as we like to think of it. It may also be why patrial filicide could seem like "good sense" in evolutionary terms.}***

https://www.cambridge.org/core/journals/behavioral-and-brain-sciences/article/romantic-relationships-matter-more-to-men-than-to-women/52E626D3CD7DB14CD946F9A2FBDA739C

Cell Reports

PAPERS

FRANCESCO MANTEGNA, JOAN ORPELLA & DAVID POEPPEL – Time-resolved hemispheric lateralization of audiomotor functional connectivity during covert speech production

Covert speech involves the internal generation of articulatory movements and their sensory consequences. While overt speech involves a combination of feedforward and feedback signals, feedback signals may be substantially different, or even absent, during covert speech. Despite the differences, we conjectured that sensorimotor interareal communication during covert speech is implemented through the same channels recruited during overt speech. An influential overt speech model proposed that feedforward and feedback signals are segregated to the left and right hemispheres, respectively. Here, we used magnetoencephalography to investigate the lateralization of functional connectivity before and after covert speech production. The data reveal leftward lateralization preceding and rightward lateralization following predicted covert speech onset. This alternating lateralization pattern is observed only in the connection between premotor and auditory regions and in the alpha frequency band. The electrophysiological data, derived entirely from covert speech, add a provocative perspective to adjudicate between overt speech motor control models.
https://www.cell.com/cell-reports/fulltext/S2211-1247(24)01488-8

Evolutionary Human Sciences

PAPERS

ADAM SPARKS, TYLER BURLEIGH & PAT BARCLAY – Expressed disapproval does not sustain long-term cooperation as effectively as costly punishment

Punishment plays a role in human cooperation, but it is costly. Prior research shows that people are more cooperative when they expect to receive negative feedback for non-cooperation, even in the absence of costly punishment, which would have interesting implications for theory and applications. However, based on theories of habituation and cue-based learning, we propose that people will learn to ignore expressions of disapproval that are not clearly associated with material costs or benefits. To test this hypothesis, we conducted a between-subjects, 40-round public goods game (i.e. much longer than most studies), where participants could respond to others' contributions by sending numerical disapproval messages, paying to reduce others' earnings, or neither. Consistent with previous results, we observed steadily increasing contributions in the costly punishment condition. In contrast, contributions declined after the early rounds in the expressed disapproval condition, and were eventually no higher than the basic control condition with neither costly punishment nor disapproval ratings. In other words, costless disapproval may temporarily increase cooperation, but the effects fade. We discuss the theoretical and applied implications of our findings, including the unexpectedly high levels of cooperation in a second control condition.
https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/expressed-disapproval-does-not-sustain-longterm-cooperation-as-effectively-as-costly-punishment/2BD038C7C14BC4D9FCB6C2187C42B08C

Frontiers in Psychology

PAPERS

JILL G. DE VILLIERS & PETER DE VILLIERS – The contributions of language and inhibitory control to false belief reasoning over time

The role of language in false belief reasoning has been much debated for twenty-five years or more, especially the relative contributions of general language development, complement syntax, vocabulary, and executive function. However, the empirical studies so far have fallen short, in that they generally have too few participants for adequate statistical modeling; they do not include control variables; or they are cross-sectional rather than longitudinal, making inferences about causal direction much more tenuous.

The present study considers the role of these different variables in the development of false belief reasoning over several months of testing, with 258 children aged three to five years. The children are also from under-resourced communities, broadening the populations that generally contribute such data.

A cross-sectional and a longitudinal regression analysis reveals the contribution of each variable to the children's success on the false belief measures. Finally, a structural equation model tests the relative contribution of the different potential factors over time, how they interact, and change. The model is an excellent fit to the data. Inhibitory control, complement comprehension and vocabulary all have effects on false belief reasoning at the first time point (T1). However, at T3, the major proximal contribution is the child's comprehension of complements, though the longitudinal pathways of vocabulary and inhibitory control also pave the way.

Our data confirm the specific contribution of complement syntax but also makes clear, as do training studies, that a certain amount of preparedness in vocabulary and in executive function skills is also necessary.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1455941/full

iScience

PAPERS

DOMENICO FULGIONE et al – Flame-forged divergence? Ancient human fires and the evolution of diurnal and nocturnal lineages in Moorish geckos

Using a multidisciplinary approach, we investigated whether human-controlled fire has historically influenced temporal niche partitioning between dark-diurnal and pale-nocturnal lineages of the Moorish gecko (Tarentola mauritanica). The pale-nocturnal variant exhibited lower skin melanin levels, smaller and fewer melanosomes, and lower plasma α-Melanocyte Stimulating Hormone levels than its dark-diurnal counterpart. Mitochondrial genome analyses indicated that the common ancestor of these gecko lineages diverged approximately 6,600 years ago, coinciding with the transition of modern humans from nomadic hunter-gatherers to settled agricultural societies. Species distribution models suggested coexistence between humans and geckos during the emergence of these lineages. Additionally, we demonstrated that fire attracts phototactic arthropods, concentrating prey resources. These findings imply that human-controlled fire may have created a novel foraging niche for pale-nocturnal geckos, likely driving the divergence of the two variants.
https://www.cell.com/iscience/fulltext/S2589-0042(24)02942-0

Nature Communications

PAPERS

LUKAS GALKE, YOAV RAM & LIMOR RAVIV – Deep neural networks and humans both benefit from compositional language structure

Deep neural networks drive the success of natural language processing. A fundamental property of language is its compositional structure, allowing humans to systematically produce forms for new meanings. For humans, languages with more compositional and transparent structures are typically easier to learn than those with opaque and irregular structures. However, this learnability advantage has not yet been shown for deep neural networks, limiting their use as models for human language learning. Here, we directly test how neural networks compare to humans in learning and generalizing different languages that vary in their degree of compositional structure. We evaluate the memorization and generalization capabilities of a large language model and recurrent neural networks, and show that both deep neural networks exhibit a learnability advantage for more structured linguistic input: neural networks exposed to more compositional languages show more systematic generalization, greater agreement between different agents, and greater similarity to human learners.
https://www.nature.com/articles/s41467-024-55158-1

PERE GELABERT et al – A sedimentary ancient DNA perspective on human and carnivore persistence through the Late Pleistocene in El Mirón Cave, Spain

Caves are primary sites for studying human and animal subsistence patterns and genetic ancestry throughout the Palaeolithic. Iberia served as a critical human and animal refugium in Europe during the Last Glacial Maximum (LGM), 26.5 to 19 thousand years before the present (cal kya). Therefore, it is a key location for understanding human and animal population dynamics during this event. We recover and analyse sedimentary ancient DNA (sedaDNA) data from the lower archaeological stratigraphic sequence of El Mirón Cave (Cantabria, Spain), encompassing the (1) Late Mousterian period, associated with Neanderthals, and (2) the Gravettian (c. 31.5 cal kya), Solutrean (c. 24.5–22 cal kya), and Initial Magdalenian (d. 21–20.5 cal kya) periods, associated with anatomically modern humans. We identify 28 animal taxa including humans. Fifteen of these taxa had not been identified from the archaeozoological (i.e., faunal) record, including the presence of hyenas in the Magdalenian. Additionally, we provide phylogenetic analyses on 70 sedaDNA mtDNA genomes of fauna including the densest Iberian Pleistocene sampling of C. lupus. Finally, we recover three human mtDNA sequences from the Solutrean levels. These sequences, along with published data, suggest mtDNA haplogroup continuity in Iberia throughout the Solutrean/Last Glacial Maximum period.
https://www.nature.com/articles/s41467-024-55740-7

Nature Communications Biology

PAPERS

STEFANIE DUYCK et al – A computational deep learning investigation of animacy perception in the human brain

The functional organization of the human object vision pathway distinguishes between animate and inanimate objects. To understand animacy perception, we explore the case of zoomorphic objects resembling animals. While the perception of these objects as animal-like seems obvious to humans, such “Animal bias” is a striking discrepancy between the human brain and deep neural networks (DNNs). We computationally investigated the potential origins of this bias. We successfully induced this bias in DNNs trained explicitly with zoomorphic objects. Alternative training schedules failed to cause an Animal bias. We considered the superordinate distinction between animate and inanimate classes, the sensitivity for faces and bodies, the bias for shape over texture, the role of ecologically valid categories, recurrent connections, and language-informed visual processing. These findings provide computational support that the Animal bias for zoomorphic objects is a unique property of human perception yet can be explained by human learning history.
https://www.nature.com/articles/s42003-024-07415-8

Nature Scientific Reports

PAPERS

FANG LI, JIALING LI & FRANCIS ABZA – Sentiment analysis of tweets employing convolutional neural network optimized by enhanced gorilla troops optimization algorithm

Sentiment analysis has become a difficult and important task in the current world. Because of several features of data, including abbreviations, length of tweet, and spelling error, there should be some other non-conventional methods to achieve the accurate results and overcome the current issue. In other words, because of those issues, conventional approaches cannot perform well and accomplish results with high efficiency. Emotional feelings, such as fear, anxiety, or traumas, often stem from many psychological issues experienced during childhood that can persist throughout life. In addition, people discuss and share their ideas on social media, often unconsciously representing their hidden emotions in the comments. This study is about sentiment analysis of tweets shared by several people. In fact, sentiment analysis can determine whether the shared comments and tweets are positive or negative. The paper introduces the use of a Convolutional Neural Network (CNN), a kind of neural network, optimized by the Enhanced Gorilla Troops Optimization Algorithm (CNN-EGTO). Two datasets provided by the SemEval-2016 are used to evaluate the system, while the polarity of tweets were manually determined. It was determined by the findings of the present study that the suggested model could approximately achieve the values of 98%, 95%, 98%, and 96.47% for accuracy, precision, recall, and F1-score, respectively, for positive polarity. In addition, the suggested model could gain the values of 97, 96, 98, and 97.49 for precision, recall, accuracy, and F1-score, respectively, for negative polarity. Consequently, it was found that the suggested model could outperform the other models by considering their performance and efficiency. These values of performance metrics represent that the suggested model could determine the polarity of sentence, positive or negative, with great efficiency.
https://www.nature.com/articles/s41598-025-85392-6

KAREE GARVIN, ELIANA SPRADLING & KATHRYN FRANICH – Co-speech gestures influence the magnitude and stability of articulatory movements: evidence for coupling-based enhancement

Humans rarely speak without producing co-speech gestures of the hands, head, and other parts of the body. Co-speech gestures are also highly restricted in how they are timed with speech, typically synchronizing with prosodically-prominent syllables. What functional principles underlie this relationship? Here, we examine how the production of co-speech manual gestures influences spatiotemporal patterns of the oral articulators during speech production. We provide novel evidence that words uttered with accompanying co-speech gestures are produced with more extreme tongue and jaw displacement, and that presence of a co-speech gesture contributes to greater temporal stability of oral articulatory movements. This effect–which we term coupling enhancement–differs from stress-based hyperarticulation in that differences in articulatory magnitude are not vowel-specific in their patterning. Speech and gesture synergies therefore constitute an independent variable to consider when modeling the effects of prosodic prominence on articulatory patterns. Our results are consistent with work in language acquisition and speech-motor control suggesting that synchronizing speech to gesture can entrain acoustic prominence.
https://www.nature.com/articles/s41598-024-84097-6

TAKASHI HAYAKAWA et al – Genome-scale evolution in local populations of wild chimpanzees

Analysis of genome-scale evolution has been difficult in large, endangered animals because opportunities to collect high-quality genetic samples are limited. There is a need for novel field-friendly, cost-effective genetic techniques. This study conducted an exome-wide analysis of a total of 42 chimpanzees (Pan troglodytes) across six African regions, providing insights into population discrimination techniques. Wild chimpanzee DNA was extracted noninvasively from collected fecal samples using the lysis-buffer storage method. To target genome-scale regions of host DNA, exome-capture sequencing was performed using cost-effective baits originally designed for humans (closely related to chimpanzees). Multivariate analysis effectively discriminated differences in local populations, aiding in the identification of samples' geographical origins. Exome-wide heterozygosity was negatively correlated significantly with genome-wide nonsynonymous–synonymous substitution ratios, suggesting that mutation loads exist at the local population level. Exome sequences revealed functional diversity and protein-coding gene divergence. Segregating pseudogenes were comprehensively annotated, with many being population-specific and others shared among populations. Focusing on multicopy chemosensory receptor genes, the segregating pseudogenes OR7D4 (an olfactory receptor) and TAS2R42 (a bitter taste receptor) were shared among western and eastern chimpanzees. Overall, our analytical framework offers ecological insights into chimpanzees and may be applicable to other organisms.
https://www.nature.com/articles/s41598-024-84163-z

MENG HUO et al – Empathy is associated with older adults' social behaviors and verbal emotional expressions throughout the day

Empathy plays a crucial role in promoting older adults' interpersonal experiences, but it remains unclear how these benefits of empathy occur. To address this gap, we examined associations between empathy and how older adults behave and express emotions during their daily interpersonal encounters. Participants included 268 adults aged 65+ (46% men, n = 124)

from the Daily Experiences and Well-being Study. They reported background characteristics and empathy in baseline interviews and indicated interpersonal encounters every 3 hours across 5 to 6 days. Participants wore electronically activated recorders (EAR), an app that captured 30-second snippets of ambient sounds every 7 minutes. Verbatim transcripts were coded for positive and negative social behaviors (e.g., praise, complain) and text was analyzed via Linguistic Inquiry and Word Count (LIWC) software for verbal expressions of positive and negative emotions (e.g., happy, hope, hate, hurt). Multilevel models showed that greater empathy was associated with greater variety in positive social behaviors throughout the day. More empathic older adults expressed more positive emotions while engaging in positive behaviors and less negative emotions when engaging in negative behaviors. This study innovatively draws on naturalistic data to delineate how more empathic older adults may have more positive and less negative social experiences than their less empathic counterparts. Findings may inform interventions that can incorporate empathy training to target those at higher risk of poor interpersonal experiences and outcomes (e.g., social isolation).
https://www.nature.com/articles/s41598-024-82550-0

New Scientist

NEWS

How DNA in dirt is reshaping our understanding of Stone Age humans
The surprise discovery that ancient human DNA can survive in sediments and soil is revolutionising the study of Paleolithic minds, behaviours and lifestyles.
https://www.newscientist.com/article/mg26435240-900-how-dna-in-dirt-is-reshaping-our-understanding-of-stone-age-humans/

Can we use quantum computers to test a radical consciousness theory?
Hartmut Neven, who leads Google's Quantum AI lab, wants to entangle our brains with quantum processors to test the idea that consciousness involves quantum phenomena.
https://www.newscientist.com/article/mg26435241-000-can-we-use-quantum-computers-to-test-a-radical-consciousness-theory/

Physics of Life Reviews

PAPERS

K. EVERS et al – Preliminaries to artificial consciousness: a multidimensional heuristic approach.
The pursuit of artificial consciousness requires conceptual clarity to navigate its theoretical and empirical challenges. This paper introduces a composite, multilevel, and multidimensional model of consciousness as a heuristic framework to guide research in this field. Consciousness is treated as a complex phenomenon, with distinct constituents and dimensions that can be operationalized for study and for evaluating their replication. We argue that this model provides a balanced approach to artificial consciousness research by avoiding binary thinking (e.g., conscious vs. non-conscious) and offering a structured basis for testable hypotheses. To illustrate its utility, we focus on "awareness" as a case study, demonstrating how specific dimensions of consciousness can be pragmatically analyzed and targeted for potential artificial instantiation. By breaking down the conceptual intricacies of consciousness and aligning them with practical research goals, this paper lays the groundwork for a robust strategy to advance the scientific and technical understanding of artificial consciousness.
{Maybe AI consciousness can be determined in relation to natural consciousness, or maybe vice versa, or maybe they are quite different things. However, I still think we need an effective definition of consciousness before we can make any progress, and I don't see the philosophical approach suggested here being particularly helpful. I'm still awaiting the conscious thoughts of AI on consciousness – the day when I will be able to replace "et al" with "et AI".}
https://www.sciencedirect.com/science/article/pii/S1571064525000028

PLoS One

PAPERS

JAMIL ZAGHIR et al – Human-machine interactions with clinical phrase prediction system, aligning with Zipf's least effort principle?
The essence of language and its evolutionary determinants have long been research subjects with multifaceted explorations. This work reports on a large-scale observational study focused on the language use of clinicians interacting with a phrase prediction system in a clinical setting. By adopting principles of adaptation to evolutionary selection pressure, we attempt to identify the major determinants of language emergence specific to this context. The observed adaptation of clinicians' language behaviour with technology have been confronted to properties shaping language use, and more specifically on two driving forces: conciseness and distinctiveness. Our results suggest that users tailor their interactions to meet these specific forces to minimise the effort required to achieve their objective. At the same time, the study shows that the optimisation is mainly driven by the distinctive nature of interactions, favouring communication accuracy over ease. These results, published for the first time on a large-scale observational study to our knowledge, offer novel fundamental qualitative and quantitative

insights into the mechanisms underlying linguistic behaviour among clinicians and its potential implications for language adaptation in human-machine interactions.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0316177

Trends in Ecology and Evolution

PAPERS

JENNIFER K. HELLMANN & ANDREW SIH – Integrating social learning, social networks, and non-parental transgenerational plasticity

Transgenerational plasticity (TGP) has largely focused on how parental exposure to ecological conditions shapes the phenotypes of future generations. However, organisms acquire information about their ecological environment via social learning, which can also shape TGP in profound ways. We demonstrate that non-parents alter how parents detect and respond to environmental cues in ways that spillover to affect offspring, non-parents influence offspring even without direct physical interactions, and parental cues received by offspring can alter the phenotypes of other juveniles. Because parents can draw on the experiences of a network of non-parents, these socially acquired cues may increase parents' ability to accurately detect environmental shifts and may explain why TGP is surprisingly ubiquitous despite theory predicting that it should be relatively rare.
https://www.cell.com/trends/ecology-evolution/abstract/S0169-5347(24)00309-4

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