

EAORC BULLETIN 1,111 – 29 September 2024

CONTENTS

NOTICES	3
PUBLICATION ALERTS.....	3
EDITORIAL INTERJECTIONS.....	3
ACADEMIA.EDU – Transitions, Change and Prehistory.....	3
FIONA COWARD – Transitions, Change and Prehistory: An Ecosystemic Approach to Change in the Archaeological Record.....	3
ACADEMIA.EDU – What Can the Lithic Record Tell Us About the Evolution of Hominin Cognition?.....	3
ROSS PAIN – What Can the Lithic Record Tell Us About the Evolution of Hominin Cognition?.....	3
ACADEMIA.EDU – Four-Field Co-evolutionary Model for Human Cognition.....	4
MARLIZE LOMBARD & ANDERS HÖGBERG – Four-Field Co-evolutionary Model for Human Cognition: Variation in the Middle Stone Age/Middle Palaeolithic.....	4
ACADEMIA.EDU – The emergence of large flake-based Acheulian technology.....	4
TEGENU GOSSA & ERELLA HOVERS – The emergence of large flake-based Acheulian technology: perspective from the highland site-complex of Melka Wakena, Ethiopia.....	4
NEWS	4
NATURE BRIEFING – AI shows flair for scientific originality.....	4
NATURE BRIEFING – Brain finds patterns without thinking.....	5
SCIENCE DAILY – Food fussiness a largely genetic trait from toddlerhood to adolescence.....	5
SCIENCE DAILY – Networks of Beliefs theory integrates internal and external dynamics.....	5
SCIENCE DAILY – Lengthened consonants mark the beginning of words.....	5
SCIENCE DAILY – How synchronization supports social interactions.....	5
SCIENCE DAILY – A method of 'look twice, forgive once' can sustain social cooperation.....	5
SCIENCE.ORG NEWS – Scientific rigor proponents retract paper on benefits of scientific rigor.....	5
SCIENCE.ORG NEWS – Did a top NIH official manipulate Alzheimer's and Parkinson's studies for decades?.....	5
PUBLICATIONS	5
American Journal of Biological Anthropology.....	5
PAPERS	5
JOHN H. RELETFORD – Craniometric variation and the ancestry of modern humans.....	5
Biographical Memoirs of the Fellows of the Royal Society.....	6
OBITUARIES	6
FERGUS I.M. CRAIK – Endel Tulving, 26 May 1927 – 11 September 2023.....	6
Cell Reports.....	6
PAPERS	6
MANNING ZHANG et al – The representation of decision variables in orbitofrontal cortex is longitudinally stable.....	6
Current Biology.....	6
PAPERS	6
ALON HAFRI – Cognitive development: The origins of structured thought in the mind.....	6
ESTHER F. KUTTER et al – Single-neuron representation of nonsymbolic and symbolic number zero in the human medial temporal lobe.....	6
Frontiers in Developmental Psychology.....	7
PAPERS	7
FRANZISKA BAUMEISTER et al – Measuring Theory of Mind: a preliminary analysis of a novel linguistically simple and tablet-based measure for children.....	7
Frontiers in Psychology.....	7
PAPERS	7
PATRICIA MIRABILE, ROBERT VAN ROOIJ & KATRIN SCHULZ – The role of impact on the meaning of generic sentences.....	7
AHYEON CHOI et al – The impact of visual information in speech perception for individuals with hearing loss: a mini review.....	7
Interface: Journal of the Royal Society.....	8
PAPERS	8
FILIPPO ZIMMARO et al – Emergence of cooperation in the one-shot Prisoner's dilemma through Discriminatory and Samaritan AIs.....	8
iScience.....	8
PAPERS	8
DAVID G. COOPER et al – Grammar rules and exceptions for the language of transcriptional activation domains.....	8

Language and Cognition	8
PAPERS	8
INGE-MARIE EIGSTI & WIM POUW – Deliberate synchronization of speech and gesture: effects of neurodiversity and development	8
Nature	8
NEWS	8
Do AI models produce more original ideas than researchers?	8
How your brain detects patterns in the everyday: without conscious thought	9
Bigger AI chatbots more inclined to spew nonsense — and people don't always realize.....	9
PAPERS	9
SEBASTIÁN MICHEL-MATA et al – The evolution of private reputations in information-abundant landscapes	9
Nature Communications	9
PAPERS	9
CAROLINE NETTEKOVEN et al – A hierarchical atlas of the human cerebellum for functional precision mapping.....	9
Nature Communications Biology	9
PAPERS	9
JITSE S. AMELINK et al – Imaging genetics of language network functional connectivity reveals links with language-related abilities, dyslexia and handedness	9
Nature Communications Psychology	10
PAPERS	10
MARIJN VAN WINGERDEN, LINA OBERLIEßEN & TOBIAS KALENSCHER – Egalitarian preferences in young children depend on the genders of the interacting partners.....	10
Nature Human Behaviour.....	10
PAPERS	10
FREDERIC BLUM et al – Consonant lengthening marks the beginning of words across a diverse sample of languages.....	10
Nature Human Genome Variation.....	10
PAPERS	10
MORITZ OTTO et al – Detecting adaptive changes in gene copy number distribution accompanying the human out-of-Africa expansion	10
Nature Humanities & Social Sciences Communications	10
PAPERS	10
HUAFENG WANG et al – Examining the relationships between cognitive load, anxiety, and story continuation writing performance: a structural equation modeling approach	10
Nature Scientific Reports.....	11
PAPERS	11
POLICARPO SÁNCHEZ-YUSTOS et al – Initial Upper Palaeolithic lithic industry at Cueva Millán in the hinterlands of Iberia.....	11
STEFANIE KEUPP & ESTHER HERRMANN – Domain-specific inferences about conspecifics' skills by chimpanzees.....	11
Neuron.....	11
ARTICLES	11
GRETA TUCKUTE & EVELINA FEDORENKO – An abstract linguistic space for transmitting information from one mind to another.....	11
PAPERS	11
ZAID ZADA et al – A shared model-based linguistic space for transmitting our thoughts from brain to brain in natural conversations.....	11
JINGWEN LI, MIKIO C. AOI & CORY T. MILLER – Representing the dynamics of natural marmoset vocal behaviors in frontal cortex.....	11
New Scientist	12
ARTICLES	12
EMMA YOUNG – The fascinating truth about why common sense isn't really that common	12
Proceedings of the Royal Society B.....	12
PAPERS	12
SHUBHAM GAUTAM et al – Evolution of odorant receptor repertoires across Hymenoptera is not linked to the evolution of eusociality	12
Royal Society Open Science.....	12
PAPERS	12
SHENWEN XU, MASAKI TOMONAGA & IKUMA ADACHI – Chimpanzees utilize video as reference in a spatiotemporally distant search for hidden food	12
MICHAEL A. PARDO et al – Female African elephant rumbles differ between populations and sympatric social groups.....	12
Science.....	13
PAPERS	13
D. E. DIJKSTERHUIS et al with S. DEHAENE – Pronouns reactivate conceptual representations in human hippocampal neurons	13
Trends in Cognitive Sciences	13
PAPERS	13
AMITAI SHENHAV – The affective gradient hypothesis: an affect-centered account of motivated behavior	13
Trends in Genetics	13

ARTICLES.....	13
AARON D. GOLDMAN & GREGORY P. FOURNIER – The very early evolution of biological complexity	13
Trends in Neurosciences	13
PAPERS.....	13
LYLE MULLER, PATRICIA S. CHURCHLAND & TERRENCE J. SEJNOWSKI – Transformers and cortical waves: encoders for pulling in context across time.....	13
SUBSCRIBE to the EAORC Bulletin	13
UNSUBSCRIBE from the EAORC Bulletin	13
PRODUCED BY AND FOR THE EAORC EMAIL GROUP.....	13

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 – Transitions, Change and Prehistory

In Investigating prehistoric hunter-gatherer identities: case studies from Palaeolithic and Mesolithic Europe, H. Cobb, F. Coward, L. Grimshaw & S. Price, Bar Publishing (2005).

FIONA COWARD – Transitions, Change and Prehistory: An Ecosystemic Approach to Change in the Archaeological Record

Current thinking in the Palaeolithic divides the archaeological record into a succession of discrete 'cultures' defined in terms of lithic industries, thus creating 'points' of 'transition' such as the infamous 'Middle-Upper Palaeolithic transition', where differences in the archaeological record have been explained away as being the result of 'evolution', applied in a simplistic post hoc, accommodative way.

Such a 'top-down' perspective assumes qualitative differences between Neanderthals and 'modern' humans, particularly in terms of their mental abilities regarding abstract thought. Such assumptions are dangerous in the limitations that they place on the interpretation of the record - hominids, sites, industries, etc., can only ever be 'modern' or 'non-modern', with both categories pre-defined and pre-'explained'. A 'bottom-up' approach can be developed from the conceptualisation of both hominid and human populations as inevitably immersed within a four-dimensional world as a fundamental fact of their existence. Crucially, these ecosystems are not individual and discrete but are inescapably shared with other 'persons', whether these are hominid, human or animal, with whom interactions occurred on a daily basis. Thus the archaeological record - and particularly the faunal record - can be seen as demonstrating the signatures of certain kinds of interaction, providing clues to the 'place' and 'time' at which they occurred and therefore to the kinds of movement and interaction that constituted the identities and personhoods of the people who deposited material there.

This paper presents a methodology for addressing the four-dimensional structure described by the potential paths of movement and activity that were centred on some of the Palaeolithic sites from Vasco-Cantabrian Spain, along with something of the quality of the interactions that occurred between the people who lived there and other persons and types of person in that ecosystem. The results demonstrate the way in which fragments of the narratives of the lives of persons in prehistory can be represented, and highlight the potential of this methodology for reconsidering the lives of past populations and the similarities and differences of Neanderthals and 'modern' humans.

[https://www.academia.edu/8549555/Coward F Transitions Change and Prehistory an ecosystemic approach to change in the archaeological Record](https://www.academia.edu/8549555/Coward_F_Transitions_Change_and_Prehistory_an_ecosystemic_approach_to_change_in_the_archaeological_Record)

ACADEMIA.EDU – What Can the Lithic Record Tell Us About the Evolution of Hominin Cognition?

Topoi 40, 245-259 (2021).

ROSS PAIN – What Can the Lithic Record Tell Us About the Evolution of Hominin Cognition?

This paper examines the inferential framework employed by Palaeolithic cognitive archaeologists, using the work of Wynn and Coolidge as a case study. I begin by distinguishing minimal-capacity inferences from cognitive-transition inferences.

Minimal-capacity inferences attempt to infer the cognitive prerequisites required for the production of a technology.

Cognitive-transition inferences use transitions in technological complexity to infer transitions in cognitive evolution. I argue that cognitive archaeology has typically used cognitive-transition inferences informed by minimal-capacity inferences, and that this reflects a tendency to favour cognitive explanations for transitions in technological complexity. Next I look at two

alternative explanations for transitions in technological complexity: the demographic hypothesis and the environmental hypothesis. This presents us with a dilemma: either reject these alternative explanations or reject traditional cognitive-transition inferences. Rejecting the former is unappealing as there is strong evidence that demographic and environmental influences play some causal role in technological transitions. Rejecting the latter is unappealing as it means abandoning the idea that technological transitions tell us anything about transitions in hominin cognitive evolution. I finish by briefly outlining some conceptual tools from the philosophical literature that might help shed some light on the problem.

https://www.academia.edu/40748638/What_Can_the_Lithic_Record_Tell_Us_About_the_Evolution_of_Hominin_Cognition

ACADEMIA.EDU – Four-Field Co-evolutionary Model for Human Cognition

Journal of Archaeological Method and Theory 28, 142-177 (2021).

MARLIZE LOMBARD & ANDERS HÖGBERG – Four-Field Co-evolutionary Model for Human Cognition: Variation in the Middle Stone Age/Middle Palaeolithic

Here we explore variation and similarities in the two best-represented population groups who lived during the Middle Stone Age and Middle Palaeolithic—the Neanderthals and Homo sapiens. Building on approaches such as gene-culture co-evolution, we propose a four-field model to discuss relationships between human cognitive evolution, biology, technology, society, and ecology. We focus on the pre-50-ka phase, because we reason that later admixing between Neanderthals and Homo sapiens in Eurasia may make it difficult to separate them in terms of cognition, or any of the other fields discussed in this paper. Using our model enabled us to highlight similarities in cognition between the two populations in terms of symbolic behaviour and social learning and to identify differences in aspects of technical and social cognition. Dissimilarities in brain-selective gene variants and brain morphology strongly suggest differences in some evolutionary trajectories that would have affected cognition. We therefore suggest that rather than insisting that Neanderthals were cognitively ‘the same’ as Homo sapiens, it may be useful to focus future studies on Neanderthal-specific cognition that may have been well-developed within their specific context at the time.

https://www.academia.edu/61833433/Four_Field_Co_evolutionary_Model_for_Human_Cognition_Variation_in_the_Middle_Stone_Age_Middle_Palaeolithic

ACADEMIA.EDU – The emergence of large flake-based Acheulian technology

Archaeological and Anthropological Sciences 16:172 (2024).

TEGENU GOSSA & ERELLA HOVERS – The emergence of large flake-based Acheulian technology: perspective from the highland site-complex of Melka Wakena, Ethiopia

Isaac GL (1969) proposed that Large Cutting Tools (LCTs) made on large flake blanks detached from giant/boulder cores are the key technological variable that distinguishes the Acheulian from the Oldowan. The production of large flake blanks was initially observed in the earliest records of the Acheulian technology in Africa ca. 1.75 Ma, subsequently becoming a technological feature of many sites across eastern Africa. Still, the mode and tempo of evolution of the large flake-based Acheulian technology remains poorly understood. Here we report on the large flake-based Acheulian assemblage at locality MW5 in the Melka Wakena site-complex, chronologically constrained between 1.37 and 1.34 Ma. At the site-complex level we note that aspects related to small flake production remain relatively unchanged since ~ 1.6 Ma. Secondary modification of small flakes by retouch remained marginal and there is only a slight increase in the frequency of structured reduction of cores, compared to the earlier 1.6 Ma assemblage. In contrast, the MW5 lithic assemblages inform of the diachronic shift of lithic techno-economy into a large flake-based LCTs technology. This shift is characterized by: (1) A highly selective use of a specific raw material (glassy ignimbrite) for the production of large flake blanks; (2) transport of prepared large flake blanks from relatively distant sources into the sites as part of a spatially and temporally fragmented reduction sequence; (3) improved know-how of large flake production, (4) the introduction of the Kombewa technology; (5) a unified technological concept for the production of handaxes and cleavers, diverging only in the specific decisions determining their final shape parameters. Taken together, these trends indicate changes in techno-economic strategies related to LCT production, including higher levels of pre-planning in the raw material acquisition stage and higher investment in controlling the morphometric properties of the artifacts.

https://www.academia.edu/124221239/Gossa_Aredo_T_and_Hovers_E_2024_The_emergence_of_large_flake_based_Acheulian_technology_A_perspective_from_the_highland_site_complex_of_Melka_Wakena_Ethiopia_Archaeological_and_Anthropological_Sciences_16_172_https_doi_org_10_1007_s12520_024_02072_8

NEWS

NATURE BRIEFING – AI shows flair for scientific originality

An artificial intelligence (AI) ideas generator came up with more original research ideas than did 50 scientists, according to a preprint study. The ideas were blind evaluated by reviewers, who scored AI-generated concepts as more exciting, but slightly less feasible, than those from people. Critics say that pitting scientists against an LLM that can generate thousands of ideas in hours isn't exactly a fair fight. “You have to compare apples to apples,” says computational social scientist Jevin West.

<https://www.nature.com/articles/d41586-024-03070-5>

NATURE BRIEFING – Brain finds patterns without thinking

Our brains are constantly recognizing patterns in everyday life, even without us being consciously aware of it. Researchers have identified neurons in key brain regions that combine information on what occurs and when, which allows the brain to pick out patterns in events as they unfold. The findings suggest that the brain can learn to predict future events based on the patterns it learns. “This is something that is not explicit,” says neuroscientist Itzhak Fried. “The brain gets it, essentially, very quickly, and we can see those changes in the individual cells.”

<https://www.nature.com/articles/d41586-024-03116-8>

SCIENCE DAILY – Food fussiness a largely genetic trait from toddlerhood to adolescence

A new study compared survey results of parents with identical or non-identical twins in England and Wales from the ages of 16 months to 13 years. The study found that fussy eating is mainly influenced by genes and is a stable trait lasting from toddlerhood to early adolescence.

<https://www.sciencedaily.com/releases/2024/09/240919193539.htm>

SCIENCE DAILY – Networks of Beliefs theory integrates internal and external dynamics

The beliefs we hold develop from a complex dance between our internal and external lives. A recent study uses well-known formalisms in statistical physics to model multiple aspects of belief-network dynamics. This multidimensional approach to modeling belief dynamics could offer new tools for tackling various real-world problems such as polarization or the spread of disinformation.

<https://www.sciencedaily.com/releases/2024/09/240919174839.htm>

SCIENCE DAILY – Lengthened consonants mark the beginning of words

Speech consists of a continuous stream of acoustic signals, yet humans can segment words from each other with astonishing precision and speed. To find out how this is possible, a team of linguists has analysed durations of consonants at different positions in words and utterances across a diverse sample of languages. They have found that word-initial consonants are, on average, around 13 milliseconds longer than their non-initial counterparts. The diversity of languages for which this effect was found suggests that this might be a species-wide pattern -- and one of several key factors for speech perception to distinguish the beginning of words within the stream of speech.

<https://www.sciencedaily.com/releases/2024/09/240924123006.htm>

SCIENCE DAILY – How synchronization supports social interactions

Turn-taking dynamics of social interactions are important for speech and gesture synchronization, enabling conversations to proceed efficiently, according to a new study.

<https://www.sciencedaily.com/releases/2024/09/240925144006.htm>

SCIENCE DAILY – A method of 'look twice, forgive once' can sustain social cooperation

Using mathematical modeling, researchers found a way to maintain cooperation without relying on complex norms or institutions.

<https://www.sciencedaily.com/releases/2024/09/240926132048.htm>

SCIENCE.ORG NEWS – Scientific rigor proponents retract paper on benefits of scientific rigor

Authors acknowledge “elemental errors” in a study showing ways to boost research replicability.

<https://www.science.org/content/article/we-are-embarrassed-scientific-rigor-proponents-retract-paper-benefits-scientific-rigor>

SCIENCE.ORG NEWS – Did a top NIH official manipulate Alzheimer's and Parkinson's studies for decades?

Agency announces research misconduct finding for neuroscientist Eliezer Masliah as scores of his papers fall under suspicion.

<https://www.science.org/content/article/research-misconduct-finding-neuroscientist-eliezer-masliah-papers-under-suspicion>

PUBLICATIONS

American Journal of Biological Anthropology

PAPERS

JOHN H. RELETFORD – Craniometric variation and the ancestry of modern humans

Ancient and contemporary DNA provide information about geographic variation in the ancestry of present-day humans. All living populations have ancestry from early Homo sapiens originating in sub-Saharan Africa. Populations of Eurasian descent

also have a small amount of Neandertal ancestry. This study examines whether craniometric distances between recent modern human samples reflect this geographic variation in ancestry. Among recent modern humans, Eurasians are expected to be more similar to Neandertals, whereas both sub-Saharan Africans and Eurasians are expected to be equidistant from early *H. sapiens*.

Data on 33 craniometric traits from 2524 recent modern humans were compared with data from the literature for Neandertals and early *H. sapiens*. Mahalanobis distances were computed for each modern specimen to both the Neandertal and early *H. sapiens* means. These distances were examined for differences between recent humans from sub-Saharan Africa (N = 373) and those of Eurasian descent (N = 2151).

Eurasians as a group are significantly closer than sub-Saharan Africans to Neandertals. There is no significant difference between the distances of sub-Saharan Africans and Eurasians to early *H. sapiens*.

The differences between sub-Saharan Africans and Eurasians for both Neandertals and early *H. sapiens* are as expected. Although there has been geographic differentiation among recent modern humans, including differences in Neandertal admixture, these differences have not affected overall similarity of recent modern sub-Saharan Africans and Eurasians to the earliest samples of *H. sapiens*.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.25028>

Biographical Memoirs of the Fellows of the Royal Society

OBITUARIES

FERGUS I.M. CRAIK – Endel Tulving. 26 May 1927 – 11 September 2023

Endel Tulving was an Estonian–Canadian cognitive psychologist and cognitive neuroscientist who transformed the study of human memory in the 50 years between 1960 and 2010.

<https://royalsocietypublishing.org/doi/10.1098/rsbm.2024.0017>

Cell Reports

PAPERS

MANNING ZHANG et al – The representation of decision variables in orbitofrontal cortex is longitudinally stable

The computation and comparison of subjective values underlying economic choices rely on the orbitofrontal cortex (OFC). In this area, distinct groups of neurons encode the value of individual options, the binary choice outcome, and the chosen value. These variables capture both the choice input and the choice output, suggesting that the cell groups found in the OFC constitute the building blocks of a decision circuit. Here, we show that this neural circuit is longitudinally stable. Using two-photon calcium imaging, we record from the OFC of mice engaged in a juice-choice task. Imaging of individual cells continues for up to 40 weeks. For each cell and each session pair, we compare activity profiles using cosine similarity, and we assess whether the neuron encodes the same variable in both sessions. We find a high degree of stability and a modest representational drift. Quantitative estimates indicate that this drift would not randomize the circuit within the animal's lifetime.

[https://www.cell.com/cell-reports/fulltext/S2211-1247\(24\)01123-9](https://www.cell.com/cell-reports/fulltext/S2211-1247(24)01123-9)

Current Biology

PAPERS

ALON HAFRI – Cognitive development: The origins of structured thought in the mind

Linguistic syntax lets us communicate complex, structured thoughts, like whether a dog chased a man or vice versa. New work shows that seven-month-olds can entertain such structured thoughts even before acquiring their native language, revealing the origins of this sophisticated ability.

[https://www.cell.com/current-biology/abstract/S0960-9822\(24\)01067-4](https://www.cell.com/current-biology/abstract/S0960-9822(24)01067-4)

ESTHER F. KUTTER et al – Single-neuron representation of nonsymbolic and symbolic number zero in the human medial temporal lobe

The number zero holds a special status among numbers, indispensable for developing a comprehensive number theory.^{1–4} Despite its importance in mathematics, the neuronal foundation of zero in the human brain is unknown. We conducted single-neuron recordings in neurosurgical patients while they made judgments involving nonsymbolic number representations (dot numerosity), including the empty set, and symbolic numbers (Arabic numerals), including numeral zero. Neurons showed responsiveness to either the empty set or numeral zero, but not both. Neuronal activity to zero in both nonsymbolic and symbolic formats exhibited a numerical distance effect, indicating that zero representations are integrated together with countable numerosities and positive integers at the low end of the number line.^{8,9} A boundary in neuronal coding existed between the nonsymbolic empty set and small numerosities, correlating with the relative difficulty in discriminating numerosity zero behaviorally. Conversely, no such boundary was found for symbolic zero activity, suggesting that symbolic representations integrate zero with other numerals along the number line, reconciling its outlier role. The status of zero as a special nonsymbolic numerical quantity is reflected in the activity of neurons in the human brain, which seems to serve as a scaffold for more advanced representations of zero as a symbolic number.

Frontiers in Developmental Psychology

PAPERS

FRANZISKA BAUMEISTER et al – Measuring Theory of Mind: a preliminary analysis of a novel linguistically simple and tablet-based measure for children

This study introduces a novel linguistically simple, tablet-based, behavioral Theory of Mind (ToM) measure, designed for neurotypical (NT) and autistic children aged 4–10 years. A synthesis of five comprehensive reviews of existing ToM measures revealed significant gaps in their designs; the weaknesses include a mismatch between the operational and conceptual definition of ToM, high verbal demands in most measures, materials that are minimally interesting for children, and often a lack of psychometric evaluations. These findings call into question the suitability of most of the currently available ToM measures used in children, both with and without developmental disorders, such as children with autism spectrum disorder (ASD). For example, the assessment of ToM in children with ASD may require reduced reliance on complex language or social interaction that can be part of the diagnostic criteria of the condition. This newly designed ToM measure, developed in line with the “Standards for Educational and Psychological Testing” of the American Educational Research Association, is linguistically simple, tablet-based, suitable for children with ASD, and is available in English, German, French, Italian, and Spanish. With a sample of 234 participants, including 152 NT children and 82 children with ASD between 4 and 10 years of age, the new ToM measure's psychometric properties were preliminarily evaluated. Descriptive statistics, measures of internal consistency, inter-item correlation, and validity checks were conducted in both groups. Further inspections of the measure's scale- and item-level characteristics were conducted with the help of exploratory factor analyses (EFA), and item response theory (IRT) within the NT children's group. These preliminary evaluations suggest that the newly developed ToM measure possesses good psychometric properties and is both accessible and engaging for children. Further investigation with a larger group of participants is necessary to reinforce these initial results. This will allow item- and scale-level assessments within a wider range of autistic children. For this purpose, the task will be made freely available to the scientific community.

<https://www.frontiersin.org/journals/developmental-psychology/articles/10.3389/fdyps.2024.1445406/full>

Frontiers in Psychology

PAPERS

PATRICIA MIRABILE, ROBERT VAN ROOIJ & KATRIN SCHULZ – The role of impact on the meaning of generic sentences

Generic sentences (e.g., “Dogs bark”) express generalizations about groups or individuals. Accounting for the meaning of generic sentences has been proven challenging, and there is still a very lively debate about which factors matter for whether or not we are willing to endorse a particular generic sentence. In this paper we study the effect of impact on the assertability of generic sentences, where impact refers to the dangerousness of the property the generic is ascribing to a group or individual. We run three preregistered experiments, testing assertability and endorsement of novel generic sentences with visual and textual stimuli. Employing Bayesian statistics we found that impact influences the assertability, and endorsement, of generic statements. However, we observed that the size of the effect impact value may have been previously overestimated by theoretical and experimental works alike. We also run an additional descriptive survey testing standard examples from the linguistic literature and found that at least for some of the examples endorsement appears to be lower than assumed. We end with exploring possible explanations for our results.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1363390/full>

AHYEON CHOI et al – The impact of visual information in speech perception for individuals with hearing loss: a mini review

This review examines how visual information enhances speech perception in individuals with hearing loss, focusing on the impact of age, linguistic stimuli, and specific hearing loss factors on the effectiveness of audiovisual (AV) integration. While existing studies offer varied and sometimes conflicting findings regarding the use of visual cues, our analysis shows that these key factors can distinctly shape AV speech perception outcomes. For instance, younger individuals and those who receive early intervention tend to benefit more from visual cues, particularly when linguistic complexity is lower. Additionally, languages with dense phoneme spaces demonstrate a higher dependency on visual information, underscoring the importance of tailoring rehabilitation strategies to specific linguistic contexts. By considering these influences, we highlight areas where understanding is still developing and suggest how personalized rehabilitation strategies and supportive systems could be tailored to better meet individual needs. Furthermore, this review brings attention to important aspects that warrant further investigation, aiming to refine theoretical models and contribute to more effective, customized approaches to hearing rehabilitation.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1399084/full>

Interface: Journal of the Royal Society**PAPERS****FILIPPO ZIMMARO et al – Emergence of cooperation in the one-shot Prisoner's dilemma through Discriminatory and Samaritan AIs**

As artificial intelligence (AI) systems are increasingly embedded in our lives, their presence leads to interactions that shape our behaviour, decision-making and social interactions. Existing theoretical research on the emergence and stability of cooperation, particularly in the context of social dilemmas, has primarily focused on human-to-human interactions, overlooking the unique dynamics triggered by the presence of AI. Resorting to methods from evolutionary game theory, we study how different forms of AI can influence cooperation in a population of human-like agents playing the one-shot Prisoner's dilemma game. We found that Samaritan AI agents who help everyone unconditionally, including defectors, can promote higher levels of cooperation in humans than Discriminatory AI that only helps those considered worthy/cooperative, especially in slow-moving societies where change based on payoff difference is moderate (small intensities of selection). Only in fast-moving societies (high intensities of selection), Discriminatory AIs promote higher levels of cooperation than Samaritan AIs. Furthermore, when it is possible to identify whether a co-player is a human or an AI, we found that cooperation is enhanced when human-like agents disregard AI performance. Our findings provide novel insights into the design and implementation of context-dependent AI systems for addressing social dilemmas.

<https://royalsocietypublishing.org/doi/10.1098/rsif.2024.0212>

iScience**PAPERS****DAVID G. COOPER et al – Grammar rules and exceptions for the language of transcriptional activation domains**

Transcriptional activation domains (ADs) of gene activators have remained enigmatic for decades as short, extremely variable, and structurally disordered sequences. Using a rational design and high throughput in vivo experimentation, we determine the grammar rules and exceptions for the language of ADs. According to identified rules, billions of highly active ADs can be composed of balanced amounts of acidic/aromatic amino acids, with either mixed composition of aromatic residues, or using only one aromatic residue mixed with acidic residues. However, equally active sequences can be composed of only aliphatic leucine and aspartic acid residues. The much rarer LD exceptions have a higher ratio of hydrophobic/acidic balance and display a specific LDL(L/D)DLL motif. For aromatic/acidic ADs the intermixing of proline residues in context of amphipathic α -helix structures significantly increases the AD activity. The identified grammar rules and exceptions are interpreted in application to the biochemistry of AD function and eukaryotic gene expression.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)02282-X](https://www.cell.com/iscience/fulltext/S2589-0042(24)02282-X)

Language and Cognition**PAPERS****INGE-MARIE EIGSTI & WIM POUW – Deliberate synchronization of speech and gesture: effects of neurodiversity and development**

The production of speech and gesture is exquisitely temporally coordinated. In autistic individuals, speech-gesture synchrony during spontaneous discourse is disrupted. To evaluate whether this asynchrony reflects motor coordination versus language production processes, the current study examined deliberately performed hand movements during speech in youth with autism spectrum disorder (ASD) compared to neurotypical youth. Neurotypical adult performance provided a mature baseline. Participants read aloud rhythmic nursery rhymes, while producing a beat-like hand movement. An automated pixel-change video measure identified kinematic peaks; using smoothed acoustic envelope analyses, we identified peaks in speech. Results indicated few diagnostic group differences in explicit speech-movement coordination, although adolescent performance differed from adults. Adults demonstrated higher tempo and greater rhythmicity in their coordination; this group difference suggests that the method is sufficiently subtle to reveal individual differences and that this form of complex coordination undergoes ongoing maturation beyond adolescence. The sample is small, and thus results are necessarily preliminary. In the context of prior speech-gesture coordination studies, these findings of intact synchrony are consistent with the hypothesis that it is the demands of discourse planning, rather than motor coordination, that have led to prior findings of asynchrony during spontaneous speech; this possibility awaits future research.

<https://www.cambridge.org/core/journals/language-and-cognition/article/deliberate-synchronization-of-speech-and-gesture-effects-of-neurodiversity-and-development/CFF349E1474D10DB5F98233CF2FDCC3E>

Nature**NEWS****Do AI models produce more original ideas than researchers?**

The concepts were judged by reviewers. They were not told who or what had created them.

<https://www.nature.com/articles/d41586-024-03070-5>

How your brain detects patterns in the everyday: without conscious thought

Neurons in certain brain areas integrate ‘what’ and ‘when’ information to discern hidden order in events in real time.

<https://www.nature.com/articles/d41586-024-03116-8>

Bigger AI chatbots more inclined to spew nonsense – and people don't always realize

Artificial-intelligence models are improving overall but are more likely to answer every question, leading to wrong answers.

<https://www.nature.com/articles/d41586-024-03137-3>

PAPERS**SEBASTIÁN MICHEL-MATA et al – The evolution of private reputations in information-abundant landscapes**

Reputations are critical to human societies, as individuals are treated differently based on their social standing. For instance, those who garner a good reputation by helping others are more likely to be rewarded by third parties. Achieving widespread cooperation in this way requires that reputations accurately reflect behaviour and that individuals agree about each other's standings. With few exceptions, theoretical work has assumed that information is limited, which hinders consensus unless there are mechanisms to enforce agreement, such as empathy, gossip or public institutions. Such mechanisms face challenges in a world where empathy, effective communication and institutional trust are compromised. However, information about others is now abundant and readily available, particularly through social media. Here we demonstrate that assigning private reputations by aggregating several observations of an individual can accurately capture behaviour, foster emergent agreement without enforcement mechanisms and maintain cooperation, provided individuals exhibit some tolerance for bad actions. This finding holds for both first- and second-order norms of judgement and is robust even when norms vary within a population. When the aggregation rule itself can evolve, selection indeed favours the use of several observations and tolerant judgements. Nonetheless, even when information is freely accessible, individuals do not typically evolve to use all of it. This method of assessing reputations—‘look twice, forgive once’, in a nutshell—is simple enough to have arisen early in human culture and powerful enough to persist as a fundamental component of social heuristics.

<https://www.nature.com/articles/s41586-024-07977-x>

Nature Communications**PAPERS****CAROLINE NETTEKOVEN et al – A hierarchical atlas of the human cerebellum for functional precision mapping**

The human cerebellum is activated by a wide variety of cognitive and motor tasks. Previous functional atlases have relied on single task-based or resting-state fMRI datasets. Here, we present a functional atlas that integrates information from seven large-scale datasets, outperforming existing group atlases. The atlas has three further advantages. First, the atlas allows for precision mapping in individuals: the integration of the probabilistic group atlas with an individual localizer scan results in a marked improvement in prediction of individual boundaries. Second, we provide both asymmetric and symmetric versions of the atlas. The symmetric version, which is obtained by constraining the boundaries to be the same across hemispheres, is especially useful in studying functional lateralization. Finally, the regions are hierarchically organized across three levels, allowing analyses at the appropriate level of granularity. Overall, the present atlas is an important resource for the study of the interdigitated functional organization of the human cerebellum in health and disease.

<https://www.nature.com/articles/s41467-024-52371-w>

Nature Communications Biology**PAPERS****JITSE S. AMELINK et al – Imaging genetics of language network functional connectivity reveals links with language-related abilities, dyslexia and handedness**

Language is supported by a distributed network of brain regions with a particular contribution from the left hemisphere. A multi-level understanding of this network requires studying its genetic architecture. We used resting-state imaging data from 29,681 participants (UK Biobank) to measure connectivity between 18 left-hemisphere regions involved in multimodal sentence-level processing, as well as their right-hemisphere homotopes, and interhemispheric connections. Multivariate genome-wide association analysis of this total network, based on genetic variants with population frequencies >1%, identified 14 genomic loci, of which three were also associated with asymmetry of intrahemispheric connectivity. Polygenic dispositions to lower language-related abilities, dyslexia and left-handedness were associated with generally reduced leftward asymmetry of functional connectivity. Exome-wide association analysis based on rare, protein-altering variants (frequencies <1%) suggested 7 additional genes. These findings shed new light on genetic contributions to language network organization and related behavioural traits.

<https://www.nature.com/articles/s42003-024-06890-3>

Nature Communications Psychology

PAPERS

MARIJN VAN WINGERDEN, LINA OBERLIEßEN & TOBIAS KALENSCHER – Egalitarian preferences in young children depend on the genders of the interacting partners

In decisions between equal and unequal resource distributions, women are often believed to be more prosocial than men. Previous research showed that fairness attitudes develop in childhood, but their—possibly gendered, developmental trajectory remains unclear. We hypothesised that gender-related fairness attitudes might depend not only on the gender of the Allocator, but also on that of the Recipient. To examine this, we tested 332 three to 8-year-old children in a paired resource allocation task, with both boys and girls acting as Allocators and Recipients. We indeed found gender-related effects: girls more than boys aimed to reduce advantageous inequity, and Allocators of both genders were more averse against male Recipients being better off. Notably, older girls exhibited an envy bias, i.e., they tolerated disadvantageous inequity more when the resource allocation was in favour of other girls than when it favoured boys. We also observed a gender-related spite gap in boys aged 7-8: unlike girls, boys treated other boys with spite, i.e., they valued unfair distributions in their own favour over equal outcomes, especially if rejecting advantageous inequity was costly. This pattern hints at contextualised gender-related fairness preferences that evolve with age that could depend on same- and cross-gender past interaction experiences.

<https://www.nature.com/articles/s44271-024-00139-9>

Nature Human Behaviour

PAPERS

FREDERIC BLUM et al – Consonant lengthening marks the beginning of words across a diverse sample of languages

Speech consists of a continuous stream of acoustic signals, yet humans can segment words and other constituents from each other with astonishing precision. The acoustic properties that support this process are not well understood and remain understudied for the vast majority of the world's languages, in particular regarding their potential variation. Here we report cross-linguistic evidence for the lengthening of word-initial consonants across a typologically diverse sample of 51 languages. Using Bayesian multilevel regression, we find that on average, word-initial consonants are about 13 ms longer than word-medial consonants. The cross-linguistic distribution of the effect indicates that despite individual differences in the phonology of the sampled languages, the lengthening of word-initial consonants is a widespread strategy to mark the onset of words in the continuous acoustic signal of human speech. These findings may be crucial for a better understanding of the incremental processing of speech and speech segmentation.

<https://www.nature.com/articles/s41562-024-01988-4>

Nature Human Genome Variation

PAPERS

MORITZ OTTO et al – Detecting adaptive changes in gene copy number distribution accompanying the human out-of-Africa expansion

Genes with multiple copies are likely to be maintained by stabilizing selection, which puts a bound to unlimited expansion of copy number. We designed a model in which copy number variation is generated by unequal recombination, which fits well with several genes surveyed in three human populations. Based on this theoretical model and computer simulations, we were interested in determining whether the gene copy number distribution in the derived European and Asian populations can be explained by a purely demographic scenario or whether shifts in the distribution are signatures of adaptation. Although the copy number distribution in most of the analyzed gene clusters can be explained by a bottleneck, such as in the out-of-Africa expansion of *Homo sapiens* 60–10 kys ago, we identified several candidate genes, such as *AMY1A* and *PGA3*, whose copy numbers are likely to differ among African, Asian, and European populations.

<https://www.nature.com/articles/s41439-024-00293-w>

Nature Humanities & Social Sciences Communications

PAPERS

HUAFENG WANG et al – Examining the relationships between cognitive load, anxiety, and story continuation writing performance: a structural equation modeling approach

Previous studies have left a significant gap in researching the relationships among affective variables, cognitive factors, and learning outcomes in second language (L2) writing. To fill in this research gap, the present study set out to unveil the relationships between L2 writers' cognitive load, anxiety, and writing performance. A total of 197 Grade 12 students from a Chinese public high school were recruited. Participants were required to complete a story continuation writing task (SCWT), the L2 Writing Cognitive Load Scale, and the L2 Writing Anxiety Scale. Structural equation modeling showed that: 1) L2 learners' cognitive load had a direct effect on writing anxiety which in turn directly impacted SCWT performance; 2) L2 writing anxiety fully mediated the effect of cognitive load on SCWT performance; and 3) Cognitive load mainly influenced cognitive anxiety, a subcomponent of writing anxiety. The implications of the findings for L2 teaching and learning are discussed.

<https://www.nature.com/articles/s41599-024-03840-6>

Nature Scientific Reports

PAPERS

POLICARPO SÁNCHEZ-YUSTOS et al – Initial Upper Palaeolithic lithic industry at Cueva Millán in the hinterlands of Iberia

The extended period of coexistence between Neanderthals and Homo sapiens in Europe coincided with the emergence of regionally distinctive lithic industries, signalling the onset of the Upper Palaeolithic. The Iberian Peninsula was on the periphery of pioneering Upper Palaeolithic developments, with archaeological remains primarily found in northern territories. We report the discovery of an initial Upper Palaeolithic lithic industry at Cueva Millán in the hinterlands of Iberia. This industry, termed here Arlanzian, not only represents the earliest and southernmost evidence of such industries in Iberia but also lacks a direct counterpart. However, it exhibits chronological and technological parallels with the lithic industries associated with the earliest expansion of Homo sapiens throughout Eurasia. We interpret this as potential evidence of its intrusive nature, but not necessarily associated with a migration event, as more complex scenarios derived from inter-population connectivity must be also considered. The biological identity of the Arlanzian makers remains unknown, but they coexisted with declining Neanderthal groups from neighbouring territories.

<https://www.nature.com/articles/s41598-024-69913-3>

STEFANIE KEUPP & ESTHER HERRMANN – Domain-specific inferences about conspecifics' skills by chimpanzees

Chimpanzees collaborate with conspecifics in their daily life. However, the cognitive processes underlying partner recruitment aren't fully understood. In the current study, chimpanzees needed to recruit a conspecific partner for either a cooperative or competitive experimental task. They spontaneously preferred to recruit cooperation partners who they have seen performing successfully before on a similar task, over partners who had failed. In contrast, the chimpanzees needed to experience the consequences of competing against co-action partners before settling on a preference for the unsuccessful partner. This divergent pattern may be due to increased cognitive demands of competitive compared to cooperative tasks. Despite the observed differences of social information use in our cooperative and competitive experimental tasks, the findings are exciting as they extend our knowledge of chimpanzee's social evaluation abilities by showing that they can draw domain-specific inferences about conspecifics' skills.

<https://www.nature.com/articles/s41598-024-73340-9>

Neuron

ARTICLES

GRETA TUCKUTE & EVELINA FEDORENKO – An abstract linguistic space for transmitting information from one mind to another

In this issue of Neuron, Zada et al. examine how linguistic information flows from a speaker's brain to a listener's brain during face-to-face spontaneous conversation. The authors use intracranial recordings from five pairs of epilepsy patients and neural network language models to establish the existence of an abstract, linguistic space that is shared during conversation.

[https://www.cell.com/neuron/abstract/S0896-6273\(24\)00653-6](https://www.cell.com/neuron/abstract/S0896-6273(24)00653-6)

PAPERS

ZAID ZADA et al – A shared model-based linguistic space for transmitting our thoughts from brain to brain in natural conversations

Effective communication hinges on a mutual understanding of word meaning in different contexts. We recorded brain activity using electrocorticography during spontaneous, face-to-face conversations in five pairs of epilepsy patients. We developed a model-based coupling framework that aligns brain activity in both speaker and listener to a shared embedding space from a large language model (LLM). The context-sensitive LLM embeddings allow us to track the exchange of linguistic information, word by word, from one brain to another in natural conversations. Linguistic content emerges in the speaker's brain before word articulation and rapidly re-emerges in the listener's brain after word articulation. The contextual embeddings better capture word-by-word neural alignment between speaker and listener than syntactic and articulatory models. Our findings indicate that the contextual embeddings learned by LLMs can serve as an explicit numerical model of the shared, context-rich meaning space humans use to communicate their thoughts to one another.

[https://www.cell.com/neuron/fulltext/S0896-6273\(24\)00460-4](https://www.cell.com/neuron/fulltext/S0896-6273(24)00460-4)

JINGWEN LI, MIKIO C. AOI & CORY T. MILLER – Representing the dynamics of natural marmoset vocal behaviors in frontal cortex

Here, we tested the respective contributions of primate premotor and prefrontal cortex to support vocal behavior. We applied a model-based generalized linear model (GLM) analysis that better accounts for the inherent variance in natural, continuous behaviors to characterize the activity of neurons throughout the frontal cortex as freely moving marmosets engaged in conversational exchanges. While analyses revealed functional clusters of neural activity related to the different

processes involved in the vocal behavior, these clusters did not map to subfields of prefrontal or premotor cortex, as has been observed in more conventional task-based paradigms. Our results suggest a distributed functional organization for the myriad neural mechanisms underlying natural social interactions and have implications for our concepts of the role that frontal cortex plays in governing ethological behaviors in primates.

[https://www.cell.com/neuron/fulltext/S0896-6273\(24\)00644-5](https://www.cell.com/neuron/fulltext/S0896-6273(24)00644-5)

New Scientist

ARTICLES

EMMA YOUNG – The fascinating truth about why common sense isn't really that common

New research is revealing that common sense is a lot more idiosyncratic than we thought, with important implications for tackling political polarisation and the future of AI.

<https://www.newscientist.com/article/mg26335100-100-the-fascinating-truth-about-why-common-sense-isnt-really-that-common/>

Proceedings of the Royal Society B

PAPERS

SHUBHAM GAUTAM et al – Evolution of odorant receptor repertoires across Hymenoptera is not linked to the evolution of eusociality

Communication is essential for social organisms. In eusocial insects, olfaction facilitates communication and recognition between nestmates. The study of certain model organisms has led to the hypothesis that odorant receptors are expanded in eusocial Hymenoptera. This has become a widely mentioned idea in the literature, albeit with conflicting reports, and has not been tested with a broad comparative analysis. Here we combined existing genomic and new neuroanatomical data, including from an approximately 100 Myr old fossil ant, across a phylogenetically broad sample of hymenopteran lineages. We find no evidence that variation in the size and evolutionary tempo of odorant receptor repertoires is related to eusociality. Post hoc exploration of our data hinted at loss of flight as a possible factor shaping some of the variation in OR repertoires in Hymenoptera. Nevertheless, our analyses revealed a complex pattern of evolutionary variation, and raise new questions about the ecological, behavioural and social factors that shape olfactory abilities.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2024.1280>

Royal Society Open Science

PAPERS

SHENWEN XU, MASAKI TOMONAGA & IKUMA ADACHI – Chimpanzees utilize video as reference in a spatiotemporally distant search for hidden food

Referring to things that are displaced in space and time is one of the defining features of human language. In order to better understand the evolution of human language, it is therefore important to explore how widely the ability for displaced reference is shared in animal kingdom. In this study, we explored whether chimpanzees are capable of utilizing video as a displaced reference in a spatiotemporally distant task. We used video to inform chimpanzees about an otherwise unobservable food-hiding. We examined the extent to which chimpanzees would make use of video as a source of information to guide their retrieval of hidden food from a target container. We found that when the event of observing food-hiding and the event of retrieving hidden food were close in space and time within the same room, all chimpanzees solved the task. Some chimpanzees continued to solve the task even when the two events were distant and separated spatiotemporally, in which they had to move to the next room between the events. Our findings suggested that chimpanzees can utilize video as a displaced reference to retrieve hidden food later when solving real-life problems.

<https://royalsocietypublishing.org/doi/10.1098/rsos.240440>

MICHAEL A. PARDO et al – Female African elephant rumbles differ between populations and sympatric social groups

Vocalizations often vary in structure within a species, from the individual to population level. Vocal differences among social groups and populations can provide insight into biological processes such as vocal learning and evolutionary divergence, with important conservation implications. As vocal learners of conservation concern, intraspecific vocal variation is of particular interest in elephants. We recorded calls from individuals in multiple, wild elephant social groups in two distinct Kenyan populations. We used machine learning to investigate vocal differentiation among individual callers, core groups, bond groups (collections of core groups) and populations. We found clear evidence for vocal distinctiveness at the individual and population level, and evidence for much subtler vocal differences among social groups. Social group membership was a better predictor of call similarity than genetic relatedness, suggesting that subtle vocal differences among social groups may be learned. Vocal divergence among populations and social groups has conservation implications for the effects of social disruption and translocation of elephants.

<https://royalsocietypublishing.org/doi/10.1098/rsos.241264>

Science

PAPERS

D. E. DIJKSTERHUIS et al with S. DEHAENE – Pronouns reactivate conceptual representations in human hippocampal neurons

During discourse comprehension, every new word adds to an evolving representation of meaning that accumulates over consecutive sentences and constrains the next words. To minimize repetition and utterance length, languages use pronouns, like the word “she,” to refer to nouns and phrases that were previously introduced. It has been suggested that language comprehension requires that pronouns activate the same neuronal representations as the nouns themselves. We recorded from individual neurons in the human hippocampus during a reading task. Cells that were selective to a particular noun were later reactivated by pronouns that refer to the cells’ preferred noun. These results imply that concept cells contribute to a rapid and dynamic semantic memory network that is recruited during language comprehension.

<https://www.science.org/doi/10.1126/science.adr2813>

Trends in Cognitive Sciences

PAPERS

AMITAI SHENHAV – The affective gradient hypothesis: an affect-centered account of motivated behavior

Everyone agrees that feelings and actions are intertwined, but cannot agree how. According to dominant models, actions are directed by estimates of value and these values shape or are shaped by affect. I propose instead that affect is the only form of value that drives actions. Our mind constantly represents potential future states and how they would make us feel. These states collectively form a gradient reflecting feelings we could experience depending on actions we take. Motivated behavior reflects the process of traversing this affective gradient, towards desirable states and away from undesirable ones. This affective gradient hypothesis solves the puzzle of where values and goals come from, and offers a parsimonious account of apparent conflicts between emotion and cognition.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(24\)00202-X?dgcid=raven_jbs_aip_email](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00202-X?dgcid=raven_jbs_aip_email)

Trends in Genetics

ARTICLES

AARON D. GOLDMAN & GREGORY P. FOURNIER – The very early evolution of biological complexity

All extant life is descended from a common ancestor, which, despite being very ancient, appears to have been a complex cellular organism. A new study by Moody et al. shows that this ancestor was not only a complex cell, but also lived within a microbial ecology likely inhabited by other complex cells.

[https://www.cell.com/trends/genetics/fulltext/S0168-9525\(24\)00209-9](https://www.cell.com/trends/genetics/fulltext/S0168-9525(24)00209-9)

Trends in Neurosciences

PAPERS

LYLE MULLER, PATRICIA S. CHURCHLAND & TERRENCE J. SEJNOWSKI – Transformers and cortical waves: encoders for pulling in context across time

The capabilities of transformer networks such as ChatGPT and other large language models (LLMs) have captured the world’s attention. The crucial computational mechanism underlying their performance relies on transforming a complete input sequence – for example, all the words in a sentence – into a long ‘encoding vector’ that allows transformers to learn long-range temporal dependencies in naturalistic sequences. Specifically, ‘self-attention’ applied to this encoding vector enhances temporal context in transformers by computing associations between pairs of words in the input sequence. We suggest that waves of neural activity traveling across single cortical areas, or multiple regions on the whole-brain scale, could implement a similar encoding principle. By encapsulating recent input history into a single spatial pattern at each moment in time, cortical waves may enable a temporal context to be extracted from sequences of sensory inputs, the same computational principle as that used in transformers.

[https://www.cell.com/trends/neurosciences/abstract/S0166-2236\(24\)00149-8](https://www.cell.com/trends/neurosciences/abstract/S0166-2236(24)00149-8)

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