

## EAORC BULLETIN 1,103 – 4 August 2024

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## NOTICES

### PUBLICATION ALERTS

If you have had a paper or book published, or you see something which would be of interest to the group, please send me a publication alert so that I can include it in the newsletter. Many thanks to those who have already sent in alerts.

If there is a journal you feel I should be tracking on a regular basis, let me know.

And if you have any other ideas for extending the “EAORC experience”, please contact me.

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### EDITORIAL INTERJECTIONS

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

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### ACADEMIA.EDU – Rethinking Sociality in Language Evolution

*Linguistic Frontiers 7, 1 (2024).*

#### **VINCENZO RAIMONDI – Rethinking Sociality in Language Evolution: Enlanguagement as a Catalyst for Shifts in Developmental Pathways**

A significant body of research on the roots of human language highlights the crucial role played by changes in ancestral sociality. Recent studies have revived the hypothesis of human self-domestication, arguing that it provides new insights into the development of human sociality, cultural evolution, and symbolic communication. While the concept of domestication offers an intriguing interpretation of the co-evolution of body, cognition, and behavior, its application to human evolution is controversial. This paper explores an alternative perspective, suggesting that the enlanguagement of interactions may have acted as a catalyst for evolutionary change. We propose that the consolidation of enlanguaged practices, underpinned by the amplification of social dispositions, set in motion an evolutionary spiral. We explore how this process may have reshaped ancestral developmental trajectories and niches, ultimately culminating in the distinctive mode of life that characterizes our species.

[https://www.academia.edu/122427768/Rethinking\\_Sociality\\_in\\_Language\\_Evolution\\_Enlanguagement\\_as\\_a\\_Catalyst\\_for\\_Shifts\\_in\\_Developmental\\_Pathways\\_Original\\_Study](https://www.academia.edu/122427768/Rethinking_Sociality_in_Language_Evolution_Enlanguagement_as_a_Catalyst_for_Shifts_in_Developmental_Pathways_Original_Study)

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## NEWS

### PEERJ BLOG – The use of vocal coordination in male African elephant group departures

Elephants signal “let’s go” with specific deep rumbles, reveals new research.

<https://peerj.com/blog/post/115284889465/article-spotlight-the-use-of-vocal-coordination-in-male-african-elephant-group-departures/>

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### SCIENCEADVISER – Monkey see, monkey map

A new experiment suggests that monkeys, like humans, can create “cognitive maps” to navigate new tasks. When shown a sequence of images, the animals were able to navigate between them in their minds—even when all the intermediate images were hidden.

<https://www.nature.com/articles/s41586-024-07557-z>

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### SCIENCE DAILY – Hunter-gatherers kept an 'orderly home' in the earliest known British dwelling

Archaeological evidence from the world-famous Mesolithic site of Star Carr in North Yorkshire has shown that hunter-gatherers likely kept an orderly home by creating 'zones' for particular domestic activities.

<https://www.sciencedaily.com/releases/2024/07/240723123322.htm>

### SCIENCE DAILY – Male elephants signal 'let's go' with deep rumbles

Male elephants use infrasonic rumbles to signal group departures, revealing complex vocal coordination and strong social bonds.

<https://www.sciencedaily.com/releases/2024/07/240722155043.htm>

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### SCIENCE DAILY – Analogies for modeling belief dynamics

Researchers who study belief dynamics often use analogies to understand and model the complex cognitive-social systems that underlie why we believe the things we do and how those beliefs can change over time. Ideas can be transmitted like a virus, for instance, 'infecting' a population as they spread from person to person. We might be drawn -- like magnets -- to others with a similar worldview. A society's beliefs can shift slowly before reaching a tipping point that thrusts society into a new phase. A new article explores the benefits -- and potential pitfalls -- of several common analogies used to model belief dynamics.

<https://www.sciencedaily.com/releases/2024/07/240729173319.htm>

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### SCIENCE DAILY – Generative AI pioneers the future of child language learning

Researchers create a storybook generation system for personalized vocabulary learning.

<https://www.sciencedaily.com/releases/2024/07/240726113406.htm>

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### SCIENCE DAILY – Large language models don't behave like people, even though we may expect them to

People generalize to form beliefs about a large language model's performance based on what they've seen from past interactions. When an LLM is misaligned with a person's beliefs, even an extremely capable model may fail unexpectedly when deployed in a real-world situation.

<https://www.sciencedaily.com/releases/2024/07/240723204757.htm>

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### SCIENCE DAILY – 'Holiday' or 'Vacation': Similar language leads to more cooperation

'Holiday' or 'vacation', 'to start' or 'to begin', 'my friend's cat' or 'the cat of my friend' -- in our language, there are different ways of expressing the same things and concepts. But can the choice of a particular variant determine whether we prefer to cooperate with certain people rather than with others? A research team investigated this and showed that people are more likely to co-operate with others if they make similar linguistic choices in a conversation. The experiment suggests that the decisive factor is probably the feeling of belonging to the same social group.

<https://www.sciencedaily.com/releases/2024/07/240730134841.htm>

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### SCIENCE DAILY – Exploring consciousness with eureka moments

We all know what it's like when the penny suddenly drops. Animals too experience such moments of insight. They could prove useful for research of consciousness.

<https://www.sciencedaily.com/releases/2024/07/240725154752.htm>

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### SCIENCE DAILY – Rock art & archaeological record reveal humanity's relationship with Amazonian animals

Rock art explored by archaeologists in the Colombian Amazon has provided an insight into the complex relationship between the earliest settlers on the continent and the animals they encountered.

<https://www.sciencedaily.com/releases/2024/07/240725154748.htm>

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### SCIENCE DAILY – A brain fingerprint: Study uncovers unique brain plasticity in people born blind

Neuroscientists reveal that the part of the brain that receives and processes visual information in sighted people develops a unique connectivity pattern in people born blind. They say this pattern in the primary visual cortex is unique to each person -- akin to a fingerprint.

<https://www.sciencedaily.com/releases/2024/07/240730202351.htm>

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### SCIENCE DAILY – Brain activity during a conversation is mirrored between speaker and listener

When two people interact, their brain activity becomes synchronized, but it was unclear until now to what extent this 'brain-to-brain coupling' is due to linguistic information or other factors, such as body language or tone of voice. Researchers report that brain-to-brain coupling during conversation can be modeled by considering the words used during that conversation, and the context in which they are used.

<https://www.sciencedaily.com/releases/2024/08/240802132837.htm>

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### SCIENCE.ORG NEWS – How easy is it to fudge your scientific rank? Meet Larry, the world's most cited cat

"Exercise in absurdity" reveals flaws in Google Scholar's productivity metrics.

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## PUBLICATIONS

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### American Journal of Biological Anthropology

#### PAPERS

##### **RHIANNA C. DRUMMOND-CLARKE et al with TRACY L. KIVELL – Sex differences in positional behavior of chimpanzees (*Pan troglodytes schweinfurthii*) living in the dry and open habitat of Issa Valley, Tanzania**

Many early fossil hominins are associated with savanna-mosaic paleohabitats, and high sexual dimorphism that may reflect differences in positional behavior between sexes. However, reconstructions of hominin behavior and the selective pressures they faced in an open habitat are limited by a lack of studies of extant apes living in contemporary, analogous habitats. Here, we describe adult chimpanzee positional behavior in the savanna-mosaic habitat of the Issa Valley, Tanzania, to test whether Issa chimpanzees show larger sex-differences in positional behavior than their forest-dwelling counterparts.

We quantified and compared adult locomotor and postural behavior across sexes (6 females, 7 males) in the riparian forest (closed) and miombo woodland (open) vegetation types at Issa Valley (13,743 focal observations). We then compared our results to published data of chimpanzee communities living in more forested habitats.

Issa females and males both spent less time arboreally in open vegetation and showed similar locomotor and postural behavior on the same substrates, notably using a high level of suspensory locomotion when arboreal. Females were, however, more arboreal than males during locomotor behavior, as well as compared with females from other communities. Issa males behaved similarly to males from other communities.

Results suggest that open habitats do not elicit less arboreal behaviors in either sex, and may even select for suspensory locomotion to effectively navigate an open canopy. An open habitat may, however, increase sex differences in positional behavior by driving female arboreality. We suggest this is because of higher energetic demands and predator pressures associated with open vegetation, which are likely exaggerated for reproducing females. These results have implications for the interpretation of how sexual dimorphism may influence reconstructions of hominin positional behavior.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.25007>

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### Current Biology

#### PAPERS

##### **BENJY BARNETT & STEPHEN M. FLEMING – Symbolic and non-symbolic representations of numerical zero in the human brain**

Representing the quantity zero as a symbolic concept is considered a unique achievement of abstract human thought. To conceptualize zero, one must abstract away from the (absence of) sensory evidence to construct a representation of numerical absence: creating “something” out of “nothing.” Previous investigations of the neural representation of natural numbers reveal distinct numerosity-selective neural populations that overlap in their tuning curves with adjacent numerosities. Importantly, a component of this neural code is thought to be invariant across non-symbolic and symbolic numerical formats. Although behavioral evidence indicates that zero occupies a place at the beginning of this mental number line, in humans zero is also associated with unique behavioral and developmental profiles compared to natural numbers, suggestive of a distinct neural basis for zero. We characterized the neural representation of zero in the human brain by employing two qualitatively different numerical tasks in concert with magnetoencephalography (MEG) recordings. We assay both neural representations of non-symbolic numerosities (dot patterns), including zero (empty sets), and symbolic numerals, including symbolic zero. Our results reveal that neural representations of zero are situated along a graded neural number line shared with other natural numbers. Notably, symbolic representations of zero generalized to predict non-symbolic empty sets. We go on to localize abstract representations of numerical zero to posterior association cortex, extending the purview of parietal cortex in human numerical cognition to encompass representations of zero.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(24\)00897-2](https://www.cell.com/current-biology/fulltext/S0960-9822(24)00897-2)

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### eLife

#### NEWS

##### **Understanding the adolescent brain**

Experiments in male rats shed light on how parts of the brain involved in addiction differ during adolescence.

<https://elifesciences.org/digests/62999/understanding-the-adolescent-brain>

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### Evolutionary Anthropology

#### REVIEWS

##### **MEGAN WILKINSON – Big brains and the human superorganism**

Review of ‘Big brains and the human superorganism: Why special brains appear in hominids and other social animals’ By Dr. Niccolo Leo Caldararo. (2017, reprint in 2020) Lanham, MD: Lexington Books, a Division of Rowman & Littlefield. pp. 1–196. No summary available.

## Frontiers in Communication

### PAPERS

#### **SADA M. BOYD et al – Use of the word “evolution” in the time of a global pandemic**

We conducted a systematic analysis to gauge the prominence of the concept of evolution in media discussions across seven English-speaking countries. This involved assessing the frequency of the term “evolve” concerning viral evolution within newspaper articles using electronic databases. Of the 4,951 newspaper articles examined in this study, 11% discussed viral evolution. Out of those articles, 12% explicitly used the word “evolve.”

We found that countries did not significantly differ in their “evolve” usage, which may reflect similarities in views about COVID-19 and its evolution across countries or reliance on shared information sources when reporting on COVID-19. We also found that, as the pandemic progressed, the discussion on viral evolution as a topic had increased, but the frequency with which the word “evolve” was explicitly used had decreased.

The COVID-19 pandemic has had a substantial impact on science and health news reporting. Although evolution plays a crucial role in the progression of the COVID-19 pandemic, the term “evolve” is not frequently highlighted in COVID-19 news coverage. Our research underscores the significant implications of language choice when describing evolutionary events, particularly in shaping the public’s understanding of evolution, both in general and in the context of pandemics and infectious diseases.

<https://www.frontiersin.org/journals/communication/articles/10.3389/fcomm.2024.1427596/full>

#### **MIRA ARIEL et al – The child’s “or” construction: It’s all about choice**

“Or” is associated, in Gricean approaches, with the readings Inclusive (“at least one, and possibly both, options are true”) and Exclusive (“exactly one option is true”). Empirical findings show adults favoring Exclusive readings; but for children, the literature yields puzzling results. Laboratory comprehension tasks suggest children favor Inclusive, but naturalistic evidence suggests children’s “or” productions are overwhelmingly Exclusive. We first identify problems with previous research. Methodologically, asking children to provide truth judgements (the dominant experimental task) is not a child-friendly task. And theoretically, Inclusive and Exclusive are not optimal categories for classifying “or” readings. To resolve the comprehension-production puzzle, we adopt Ariel and Mauri’s richer analytic classification of “or” constructions, where Inclusive and Exclusive as such are not speaker-intended readings, and there are several, rather than one, “single-option” (Exclusive) readings. We apply this framework in analyzing the Berman corpus of Hebrew child language; and in designing a new, more ecologically valid, experimental task. Study 1 shows that in child-directed-speech, one specific Exclusive “or” construction, Choice Immediate (e.g.,  $\nearrow$ Chocolates? Or  $\searrow$ jelly beans?), is (i) the single dominant “or” function addressed to children, (ii) the one “or” reading children consistently respond appropriately to, and (iii) virtually the only “or” construction children produce. In Study 2, we present young children with a task involving this familiar “or” construction. The children respond with adult-like mastery even in the absence of a supporting context. These empirical findings argue for a usage-based account of how children acquire “or”.

<https://www.frontiersin.org/journals/communication/articles/10.3389/fcomm.2024.1364230/full>

## Frontiers in Developmental Psychology

### PAPERS

#### **LÉONIE TROUILLET et al – Investigating the role of verbal cues on learning of tool-use actions in 18- and 24-month-olds in an online looking time experiment**

This study was an unmoderated online experiment to investigate the impact of the semantic content of verbal cues on toddlers’ action learning. 18- and 24-month-olds (N = 89) watched videos of two tool-use actions accompanied by specific (“pressing in/pulling out”) or unspecific information (“doing that”). Learning was measured via looking times coded from webcam recordings. Regardless of age and verbal cue, toddlers looked equally long to test pictures of correct or incorrect tool-use, suggesting that meaningful verbal information did not improve the challenging video-based action learning.

However, low drop-out rates and high webcam data quality confirm the feasibility of online experiments with toddlers.

<https://www.frontiersin.org/journals/developmental-psychology/articles/10.3389/fdpys.2024.1411276/full>

## Frontiers in Psychology

### PAPERS

#### **ANQI YANG et al – Prosodic focus marking in Seoul Korean-speaking children: the use of prosodic phrasing**

Prosodic focus marking in Seoul Korean is known to be achieved primarily through prosodic phrasing, different from the use of prosody for this purpose in many other languages. This study investigates how children use prosodic phrasing for focus-marking purposes in Seoul Korean, compared to adults.

Using a picture-matching game, we elicited semi-spontaneous production of SOV sentences in various focus conditions from monolingual Seoul Korean-speaking children aged 4 to 11 years.

We found that the children varied prosodic boundaries to distinguish narrow focus from pre-focus and broad focus in a largely adult-like manner at the age of 4 to 5; at this age, they did not distinguish narrow focus from post-focus or contrastive focus using prosodic boundaries, similar to the adults. Their use of the prosodic boundaries in distinguishing the focus conditions was not fully adult-like in terms of frequency until the age of 10 to 11.

In conjunction with the findings of previous studies on the acquisition of focus marking in Germanic languages, performed using a similar experimental method, our findings suggest that Seoul Korean-speaking children acquire the use of prosodic phrasing earlier than Dutch-speaking children acquiring the use of pitch accent but slightly later than Stockholm Swedish-speaking children acquiring the use of a prominence-marking high tone. These findings imply that the rate of focus-marking acquisition depends on the transparency of the form-meaning mapping between the phonological cue and focus.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1352280/full>

### **GYU-HO SHIN – Good-enough processing, home language proficiency, cognitive skills, and task effects for Korean heritage speakers' sentence comprehension**

The present study investigates how heritage speakers conduct good-enough processing at the interface of home-language proficiency, cognitive skills (inhibitory control; working memory), and task types (acceptability judgement; self-paced reading). For this purpose, we employ two word-order patterns (verb-final vs. verb-initial) of two clausal constructions in Korean—suffixal passive and morphological causative—which contrast pertaining to the mapping between thematic roles and case-marking and the interpretive procedures driven by verbal morphology. We find that, while Korean heritage speakers demonstrate the same kind of acceptability-rating behaviour as monolingual Korean speakers do, their reading-time patterns are notably modulated by construction-specific properties, cognitive skills, and proficiency. This suggests a heritage speaker's ability and willingness to conduct both parsing routes, induced by linguistic cues in a non-dominant language, which are proportional to the computational complexity involving these cues. Implications of this study are expected to advance our understanding of a learner's mind for underrepresented languages and populations in the field.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1382668/full>

## Frontiers in Public Health

### PAPERS

#### **NATHALIA F. NASPOLINI et al – Lead contamination in human milk affects infants' language trajectory: Results from a prospective cohort study**

*Provisionally accepted*

Infants growing up in low-and middle-income countries are at increased risk of suffering adverse childhood experiences, including exposure to environmental pollution and lack of cognitive stimulation. In this study, we aimed to examine the levels of metals in the human milk of women living in Sao Paulo City, Brazil, and determine the effects on infants' neurodevelopment. For such, a total of 185 human milk samples were analyzed for arsenic (As), lead (Pb), mercury (Hg), and cadmium (Cd) using inductively coupled plasma mass spectrometry (ICP-MS). We applied the Bayley scales of infant and toddler development Third Edition (Bayley-III) to assess developmental milestones. In our analysis, we found a mean (standard deviation) concentration of As in human milk equal to 2.76 (4.09)  $\mu\text{g L}^{-1}$ , followed by Pb 2.09 (5.36) and Hg 1.96 (6.68). Cd was not detected. We observed that infants exposed to Pb presented language trajectories lower than non-exposed infants ( $\beta = -0.413$ ; 95 % CI -0.653, -0.173) after adjustment for infant age, maternal education, socioeconomic status, infant sex, and sample weights. Our results report As, Pb, and Hg contamination in human milk, and that infant exposure to Pb decreased infants' language development. These results evidence maternal-child environmental exposure and its detrimental impact on infants' health.

<https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2024.1450570/abstract>

## iScience

### PAPERS

#### **RAPHAELA HEESEN et al with ZANNA CLAY – Impact of social context on human facial and gestural emotion expressions**

Humans flexibly adapt expressions of emotional messages in social contexts. However, detailed information on how specific parts of the face and hands move in socio-emotional contexts is missing. We identified individual gesture and facial movements (through automated face tracking) of  $N = 80$  participants in the UK, produced while watching amusing, fearful or neutral movie scenes either alone or with a social partner. Amusing and fearful scenes, more so than neutral scenes, led to an overall increase in facial and gesture movements, confirming emotional responding. Furthermore, social context facilitated movements in the lower instead of upper facial areas, as well as gesture use. These findings highlight emotional signalling components that likely underwent selection for communication, a result we discuss in comparison with the nonhuman primate literature. To facilitate ecologically valid and cross-cultural comparisons on human emotion communication, we additionally offer a new stimuli database of the recorded naturalistic facial expressions.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)01888-1](https://www.cell.com/iscience/fulltext/S2589-0042(24)01888-1)

## Nature

### NEWS

#### **AI models fed AI-generated data quickly spew nonsense**

Researchers gave successive versions of a large language model information produced by previous generations of the AI — and observed rapid collapse.

*{At the risk of repeating myself, there are three types of “true” information: information which is true regardless of what we believe; information which is true because we agree it’s true; and information I believe to be true because it feels right to me. There are three types of false information: information I know to be false because I made it up; information we agree is false but can treat as true (fiction); and information that we collectively believe to be true but actually isn’t. Second-hand information is never true regardless, it is always a mixture of the other five types. As long as the AI creators treat all information as one type, the AIs will be unable to identify which type of information it actually is.}*

<https://www.nature.com/articles/d41586-024-02420-7>

### ARTICLES

#### **CHRISTINE RO – How to spot a predatory conference, and what science needs to do about them: a guide**

Researchers who have fallen prey to predatory conferences share the tell-tale signs of a dud event.

<https://www.nature.com/articles/d41586-024-02360-2>

#### **SUJAYA NEUPANE & MEHRDAD JAZAYERI – Mental maps help monkeys to navigate without sensory input**

Cognitive maps are internal representations of the external environment. Evidence from monkeys shows that a cognitive map can support the mental navigation of an array of landmarks without sensory input.

*{This is a summary of: Neupane, S. et al. Mental navigation in the primate entorhinal cortex. Nature 630, 704–711 (2024), EAORC Bulletin 1,096.}*

<https://www.nature.com/articles/d41586-024-02471-w>

### PAPERS

#### **HUAN XIA, et al with JEAN-JACQUES HUBLIN – Middle and Late Pleistocene Denisovan subsistence at Baishiya Karst Cave**

Genetic and fragmented palaeoanthropological data suggest that Denisovans were once widely distributed across eastern Eurasia. Despite limited archaeological evidence, this indicates that Denisovans were capable of adapting to a highly diverse range of environments. Here we integrate zooarchaeological and proteomic analyses of the late Middle to Late Pleistocene faunal assemblage from Baishiya Karst Cave on the Tibetan Plateau, where a Denisovan mandible and Denisovan sedimentary mitochondrial DNA were found. Using zooarchaeology by mass spectrometry, we identify a new hominin rib specimen that dates to approximately 48–32 thousand years ago (layer 3). Shotgun proteomic analysis taxonomically assigns this specimen to the Denisovan lineage, extending their presence at Baishiya Karst Cave well into the Late Pleistocene. Throughout the stratigraphic sequence, the faunal assemblage is dominated by Caprinae, together with megaherbivores, carnivores, small mammals and birds. The high proportion of anthropogenic modifications on the bone surfaces suggests that Denisovans were the primary agent of faunal accumulation. The chaîne opératoire of carcass processing indicates that animal taxa were exploited for their meat, marrow and hides, while bone was also used as raw material for the production of tools. Our results shed light on the behaviour of Denisovans and their adaptations to the diverse and fluctuating environments of the late Middle and Late Pleistocene of eastern Eurasia.

<https://www.nature.com/articles/s41586-024-07612-9>

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## Nature Communications

### PAPERS

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

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

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



**VALERIA FASCIANELLI et al – Neural representational geometries reflect behavioral differences in monkeys and recurrent neural networks**

Animals likely use a variety of strategies to solve laboratory tasks. Traditionally, combined analysis of behavioral and neural recording data across subjects employing different strategies may obscure important signals and give confusing results. Hence, it is essential to develop techniques that can infer strategy at the single-subject level. We analyzed an experiment in which two male monkeys performed a visually cued rule-based task. The analysis of their performance shows no indication that they used a different strategy. However, when we examined the geometry of stimulus representations in the state space of the neural activities recorded in dorsolateral prefrontal cortex, we found striking differences between the two monkeys. Our purely neural results induced us to reanalyze the behavior. The new analysis showed that the differences in representational geometry are associated with differences in the reaction times, revealing behavioral differences we were unaware of. All these analyses suggest that the monkeys are using different strategies. Finally, using recurrent neural network models trained to perform the same task, we show that these strategies correlate with the amount of training, suggesting a possible explanation for the observed neural and behavioral differences.

<https://www.nature.com/articles/s41467-024-50503-w>

**Nature Human Behaviour****PAPERS****JESSICA BROUGH et al – Cognitive causes of ‘like me’ race and gender biases in human language production**

Natural language contains and communicates social biases, often reflecting attitudes, prejudices and stereotypes. Here we provide evidence for a novel psychological pathway for the expression of such biases, in which they arise as a consequence of the automatized mechanisms by which humans retrieve words to produce sentences. Four experiments show that, when describing events, speakers tend to mention people who are more like them first and, thus, tend to highlight the perspectives of their own social groups. This ‘like me’ effect was seen in speakers from multiple demographic groups, in both English and Chinese speakers and in both first- and second-language English speakers. Psycholinguistic manipulations pinpoint that the bias is caused by greater accessibility in memory of words that refer to in-group than out-group members. These data provide a new cognitive explanation for why people produce biased language and highlight how detailed cognitive theories can have social implications.

<https://www.nature.com/articles/s41562-024-01943-3>

**Nature Humanities & Social Sciences Communications****PAPERS****STEPHAN LEWANDOWSKY et al – Liars know they are lying: differentiating disinformation from disagreement**

Mis- and disinformation pose substantial societal challenges, and have thus become the focus of a substantive field of research. However, the field of misinformation research has recently come under scrutiny on two fronts. First, a political response has emerged, claiming that misinformation research aims to censor conservative voices. Second, some scholars have questioned the utility of misinformation research altogether, arguing that misinformation is not sufficiently identifiable or widespread to warrant much concern or action. Here, we rebut these claims. We contend that the spread of misinformation—and in particular willful disinformation—is demonstrably harmful to public health, evidence-informed policymaking, and democratic processes. We also show that disinformation and outright lies can often be identified and differ from good-faith political contestation. We conclude by showing how misinformation and disinformation can be at least partially mitigated using a variety of empirically validated, rights-preserving methods that do not involve censorship.

<https://www.nature.com/articles/s41599-024-03503-6>

**Nature Scientific Reports****PAPERS****FLORIAN HINTZ et al – The role of general cognitive skills in Integrating visual and linguistic information during sentence comprehension: Individual differences across the lifespan**

Individuals exhibit massive variability in general cognitive skills that affect language processing. This variability is partly developmental. Here, we recruited a large sample of participants (N = 487), ranging from 9 to 90 years of age, and examined the involvement of nonverbal processing speed (assessed using visual and auditory reaction time tasks) and working memory (assessed using forward and backward Digit Span tasks) in a visual world task. Participants saw two objects on the screen and heard a sentence that referred to one of them. In half of the sentences, the target object could be predicted based on verb-selectional restrictions. We observed evidence for anticipatory processing on predictable compared to non-predictable trials. Visual and auditory processing speed had main effects on sentence comprehension and facilitated predictive processing, as evidenced by an interaction. We observed only weak evidence for the involvement of working memory in predictive sentence comprehension. Age had a nonlinear main effect (younger adults responded faster than children and older adults), but it did not differentially modulate predictive and non-predictive processing, nor did it modulate the involvement of processing speed and working memory. Our results contribute to delineating the cognitive skills that are involved in language-vision interactions.

<https://www.nature.com/articles/s41598-024-68674-3>

**STEPHAN P. KAUFHOLD et al – Chimpanzees (*Pan troglodytes*) strategically manipulate their environment to deny conspecifics access to food**

Humans modify their environment to grant or prevent others' access to valuable resources, for example by using locks. We tested whether sanctuary-living chimpanzees (N = 10) would flexibly modify their environment to either allow or deny a dominant conspecific access to a shared food source by giving them the option to change a food reward's pathway prior to releasing it. The food could end up in one of two locations: one was accessible to both the subject and a dominant conspecific, the other one was only accessible to the subject. We further manipulated the extent of inhibitory control needed for modifying the pathway by varying the subjects' starting position. Our subjects reoriented the pathway competitively to monopolize food but changed the pathway less often in trials with high inhibitory demands. We further show how inhibitory task demands in a social context influence chimpanzees' future planning. Our results show that chimpanzees will strategically manipulate their environment to maximize their own and deny a dominant conspecific access to food.

<https://www.nature.com/articles/s41598-024-68159-3>

**Neuron**

**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)

**New Scientist**

**ARTICLES**

**COLIN BARRAS – What made us human? The fossils redefining our evolutionary origins**

From Neanderthals to Australopithecus and Paranthropus, the more we've learned about ancient hominins, the harder it has become to define what a human is.

<https://www.newscientist.com/article/mg26335023-000-what-made-us-human-the-fossils-redefining-our-evolutionary-origins/>

**JAMES WOODFORD – Neanderthal cooking skills put to the test with birds and stone tools**

In an effort to understand ancient Neanderthal food preparation techniques, researchers butchered five wild birds using flint stone tools and roasted them.

<https://www.newscientist.com/article/2440715-neanderthal-cooking-skills-put-to-the-test-with-birds-and-stone-tools/>

**Philosophical Transactions of the Royal Society B**

**PAPERS**

**MAREK MCGANN – Reorienting psychological science**

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

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

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

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

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

**PLoS One****PAPERS****AYME ARANGO MONNAR, JORGE PEREZ ROJAS & BARBARA POLETE LABRA – Cross-lingual hate speech detection using domain-specific word embeddings**

*THIS ARTICLE USES WORDS OR LANGUAGE THAT IS CONSIDERED PROFANE, VULGAR, OR OFFENSIVE BY SOME READERS.*

Hate speech detection in online social networks is a multidimensional problem, dependent on language and cultural factors. Most supervised learning resources for this task, such as labeled datasets and Natural Language Processing (NLP) tools, have been specifically tailored for English. However, a large portion of web users around the world speak different languages, creating an important need for efficient multilingual hate speech detection approaches. In particular, such approaches should be able to leverage the limited cross-lingual resources currently existing in their learning process. The cross-lingual transfer in this task has been difficult to achieve successfully. Therefore, we propose a simple yet effective method to approach this problem. To our knowledge, ours is the first attempt to create a multilingual embedding model specific to this problem. We validate the effectiveness of our approach by performing an extensive comparative evaluation against several well-known general-purpose language models that, unlike ours, have been trained on massive amounts of data. We focus on a zero-shot cross-lingual evaluation scenario in which we classify hate speech in one language without having access to any labeled data. Despite its simplicity, our embeddings outperform more complex models for most experimental settings we tested. In addition, we provide further evidence of the effectiveness of our approach through an ad hoc qualitative exploratory analysis, which captures how hate speech is displayed in different languages. This analysis allows us to find new cross-lingual relations between words in the hate-speech domain. Overall, our findings indicate common patterns in how hate speech is expressed across languages and that our proposed model can capture such relationships significantly.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0306521>

**MARÍA BARRERA-CRUZ et al – Weaving social networks from cultural similarities on the neolithisation process in the Western Mediterranean: Evolutionary trajectories using projectile tools**

In this paper, we concentrate on the neolithisation process in Mediterranean Iberia through a diachronic view (from 8600–6800 cal. BP), focusing on social interaction as a factor in articulating new cultural ties. To do this, we apply techniques centred on similarities in material culture by applying Social Network Analysis (SNA). For the first time, we point to the geometric projectiles, taking into account their recurrence in both Mesolithic and Neolithic groups as part of their characteristic hunting equipment. We hypothesise that patterns of cultural variability would express the changing flow of information between communities according to their mobility strategies (last hunter-gatherer groups), including economic and social behaviour, and that these relationships will be restructured with the arrival of the newcomer farmers and herders and their new spatial and social arrangement. The results obtained allow us to describe a connected and homogeneous Late Mesolithic network dramatically structured by the Neolithic arrival. Since then, a heterogenous pattern emerged, involving connected periods, network ruptures, and small-world phenomena. The emergence of this characteristic could support the flow of information when the network presents a clustered structure, the last probably due to regionalisation events. These diachronic dynamics fit well with demographic and socioecological trends observed from regional literature.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0306027>

**AKILA KADAMBI, QI XIE & HONGJING LU – Individual differences and motor planning influence self-recognition of actions**

Although humans can recognize their body movements in point-light displays, self-recognition ability varies substantially across action types and participants. Are these variations primarily due to an awareness of visually distinct movement patterns, or to underlying factors related to motoric planning and/or individual differences? To address this question, we conducted a large-scale study in self-action recognition (N = 101). We motion captured whole-body movements of participants who performed 27 different actions across action goals and degree of motor planning. After a long delay period (~ 1 month), participants were tested in a self-recognition task: identifying their point-light action amongst three other point-light actors performing identical actions. We report a self-advantage effect from point-light actions, consistent with prior

work in self-action recognition. Further, we found that self-recognition was modulated by the action complexity (associated with the degree of motor planning in performed actions) and individual differences linked to motor imagery and subclinical autism and schizotypy. Using dynamic time warping, we found sparse evidence in support of visual distinctiveness as a primary contributor to self-recognition, though speed distinctiveness negatively influenced self-recognition performance. Together, our results reveal that self-action recognition involves more than an awareness of visually distinct movements, with important implications for how the motor system may be involved.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0303820>

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## Proceedings of the Royal Society B

### PAPERS

#### **LAUREN A. STANTON et al – Wild raccoons demonstrate flexibility and individuality in innovative problem-solving**

Cognitive skills, such as innovative problem-solving, are hypothesized to aid animals in urban environments. However, the significance of innovation in wild populations, and its expression across individuals and socio-ecological conditions, is poorly understood. To identify how and when innovation arises in urban-dwelling species, we used advanced technologies and new testing and analytical methods to evaluate innovative problem-solving abilities of wild raccoons (*Procyon lotor*). We deployed multi-compartment puzzle boxes with either one or multiple solution types and identified raccoons using radio frequency identification. Raccoons solved these novel extractive foraging tasks, and their success was influenced by age and exploratory diversity. Successful raccoons always discovered multiple different solution types, highlighting flexible problem-solving. Using a unique, comparative sequence analysis approach, we found that variation in raccoon solving techniques was greater between individuals than within individuals, and this self-similarity intensified during times of competition. Finally, the inclusion of an easier solution in the multi-solution trials enabled previously unsuccessful raccoons to bootstrap their learning and successfully open multiple difficult solutions. Our study suggests that innovative problem-solving is probably influenced by many factors and has provided novel field and analytical methods, as well as new insights on the socio-ecological dynamics of urban populations.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2024.0911>

#### **MILICA NIKOLIĆ et al – The blushing brain: neural substrates of cheek temperature increase in response to self-observation**

Darwin proposed that blushing—the reddening of the face owing to heightened self-awareness—is ‘the most human of all expressions’. Yet, relatively little is known about the underlying mechanisms of blushing. Theories diverge on whether it is a rapid, spontaneous emotional response that does not involve reflection upon the self or whether it results from higher-order socio-cognitive processes. Investigating the neural substrates of blushing can shed light on the mental processes underlying blushing and the mechanisms involved in self-awareness. To reveal neural activity associated with blushing, 16–20 year-old participants ( $n = 40$ ) watched pre-recorded videos of themselves (versus other people as a control condition) singing karaoke in a magnetic resonance imaging scanner. We measured participants’ cheek temperature increase—an indicator of blushing—and their brain activity. The results showed that blushing is higher when watching oneself versus others sing. Those who blushed more while watching themselves sing had, on average, higher activation in the cerebellum (lobule V) and the left paracentral lobe and exhibited more time-locked processing of the videos in early visual cortices. These findings show that blushing is associated with the activation of brain areas involved in emotional arousal, suggesting that it may occur independently of higher-order socio-cognitive processes. Our results provide new avenues for future research on self-awareness in infants and non-human animals.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2024.0958>

#### **TOMAS KAY et al – Ant social network structure is highly conserved across species**

The ecological success of social insects makes their colony organization fascinating to scientists studying collective systems. In recent years, the combination of automated behavioural tracking and social network analysis has deepened our understanding of many aspects of colony organization. However, because studies have typically worked with single species, we know little about interspecific variation in network structure. Here, we conduct a comparative network analysis across five ant species from five subfamilies, separated by more than 100 Myr of evolution. We find that social network structure is highly conserved across subfamilies. All species studied form modular networks, with two social communities, a similar distribution of individuals between the two communities, and equivalent mapping of task performance onto the communities. Against this backdrop of organizational similarity, queens of the different species occupied qualitatively distinct network positions. The deep conservation of the two community structure implies that the most fundamental behavioural division of labour in social insects is between workers that stay in the nest to rear brood, and those that leave the nest to forage. This division has parallels across the animal kingdom in systems of biparental care and probably represents the most readily evolvable form of behavioural division of labour.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2024.0898>

**MADITA ZETSCHE et al – Combined perceptual and chemical analyses show no compelling evidence for ovulatory cycle shifts in women’s axillary odour**

Although men’s attraction to women’s body odour has been suggested to vary over the ovulatory cycle, peaking around the fertile window, we still lack methodologically robust evidence corroborating this effect. Further, the chemical underpinnings of male preference for the odour of ovulating women remain unknown. Here, we combined perceptual and chemical analyses to investigate the axillary odour of naturally cycling women over 10 days, covering the gradual change in fertility across the ovulatory cycle with a focus on fertile days. The fertile state was confirmed by urinary ovulation tests as well as salivary oestradiol and progesterone levels. Men rated the scent of unfamiliar women, resembling a first encounter. We used multivariate analyses to relate variation in both odour ratings and chemical composition to female conception probability, temporal distance to ovulation and ovarian hormone levels. Our results provide no evidence that males prefer the odour of fertile women. Furthermore, the volatile analysis indicated no link between axillary odour composition and current fertility status. Together, our results showed no convincing support for a chemical fertility cue in women’s axillary odour, questioning the presence of olfactory fertility information that is recognizable during first encounters in modern humans.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2023.2712>

**J. WHITEHOUSE et al – Facial expressivity in dominant macaques is linked to group cohesion**

Social living affords primates (including humans) many benefits. Communication has been proposed to be the key mechanism used to bond social connections, which could explain why primates have evolved such expressive faces. We assessed whether the facial expressivity of the dominant male (quantified from the coding of anatomically based facial movement) was related to social network properties (based on social proximity and grooming) in nine groups of captive rhesus macaques (*Macaca mulatta*) housed in uniform physical and social environments. More facially expressive dominant male macaques were more socially connected and had more cohesive social groups. These findings show that inter-individual differences in facial expressivity are related to differential social outcomes at both an individual and group level. More expressive individuals occupy more beneficial social positions, which could help explain the selection for complex facial communication in primates.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2024.0984>

**HILLARY LENFESTY et al with ROBERT BOYD – Third-party arbitration and forgiving strategies increase cooperation when perception errors are common**

Humans cooperate in groups in which mutual monitoring is common, and this provides the possibility of third-party arbitration. Third-party arbitration stabilizes reciprocity in at least two ways: first, when it is accurate, it reduces the frequency of misunderstandings resulting from perception errors, and second, even when it is inaccurate, it provides a public signal that allows pairs to align their expectations about how to behave after errors occur. Here, we describe experiments that test for these two effects. We find that in an iterated, sequential Prisoner’s Dilemma game with errors, players with the highest average payoffs are those who make use of third-party arbitration and who also employ forgiving strategies. The combination of these two behaviours reduces the detrimental effects of errors on reciprocity, resulting in more cooperation.

<https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2024.0861>

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**Royal Society Open Science**
**PAPERS****RUIHAN WU et al – Do autistic adults spontaneously reason about belief? A detailed exploration of alternative explanations**

Southgate et al.’s (Southgate 2007 *Psychol. Sci.* 18, 587-92 (doi:10.1111/j.1467-9280.2007.01944.x)) anticipatory-looking paradigm has presented exciting yet inconclusive evidence surrounding spontaneous mentalizing in autism. The present study aimed to develop this paradigm to address alternative explanations for the lack of predictive eye movements on false-belief tasks by autistic adults. This was achieved through implementing a multi-trial design with matched true-belief conditions, and both high and low inhibitory demand false-belief conditions. We also sought to inspect if any group differences were related to group-specific patterns of attention on key events. Autistic adults were compared with non-autistic adults on this adapted implicit mentalizing task and an established explicit task. The two groups performed equally well in the explicit task; however, autistic adults did not show anticipatory-looking behaviour in the false-belief trials of the implicit task. Critically, both groups showed the same attentional distribution in the implicit task prior to action prediction, indicating that autistic adults process information from social cues in the same way as non-autistic adults, but this information is not then used to update mental representations. Our findings further document that many autistic people struggle to spontaneously mentalize others’ beliefs, and this non-verbal paradigm holds promise for use with a wide range of ages and abilities.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.231889>

**KASIA WEZOWSKI & IAN S. PENTON-VOAK – Relationship between low mood and micro-expression processing: evidence of negative bias in interpreting fleeting facial expressions**

Depression affects the recognition of emotion in facial expressions by reducing the detection accuracy and adding a bias towards negativity. However, no study has examined associations between depression and the recognition of microfacial expressions (fleeting facial cues of emotions in people's faces). Thus, we investigated associations between low mood and micro-expression processing using video stimuli of micro-expressions. We examined whether (i) individuals with low mood had trouble recognizing emotions, (ii) were more likely to perceive happy facial expressions as neutral and neutral facial expressions as sad, and (iii) recognized sad emotional expressions better than control subjects ( $n = 349$ ). We found that participants with low mood showed poorer performance when judging emotions in faces ( $p = 0.03$ ). Furthermore, there was a specific deficit among them in recognizing happiness. Lastly, participants with low moods were more likely to perceive neutral faces as sad ( $p = 0.042$ ). However, no evidence was found that individuals with low moods confused happy faces as neutral or were better than the control group at recognizing sad faces. Our results show that mood affects the perception of emotions in facial expressions, which has the potential to negatively affect interpersonal interactions and ultimately quality of life.

<https://royalsocietypublishing.org/doi/10.1098/rsos.231944>

**GIORGIO VALLORTIGARA & GIUSEPPE VITIELLO – Brain asymmetry as minimization of free energy: a theoretical model**

The asymmetry between the left and right sides seems to be a general principle of organization of the nervous systems in Bilateria, providing the foundations for a plethora of leftward and rightward biases in behaviour as documented in species ranging from *Caenorhabditis elegans* nematodes to humans. Several theories have been put forward to account for the existence and maintenance in the evolution of the asymmetric organization of the brain at both individual and population levels. However, what is missing in theorizing about the evolution of brain asymmetry is an overarching general hypothesis that may subsume all different aspects of current models. Here, we tried to provide an overarching general framework based on the energy and free-energy minimization principle, which proved so valuable in other areas of neuroscience. We found that at the individual level the antisymmetric singlet configuration realizes the lowest energy state of the system, whereas at the group level, the spontaneous emergence of directional asymmetry arises as a consequence of the minimization of the free energy of the system, which guarantees its stability and equilibrium. We thus argue that the various phenomenological aspects of brain asymmetry that have been captured in biology—e.g. sparing of neural tissue, control of unitary motor responses and, at the population level, evolutionarily stable strategies described by mathematical games theory—may be thought of as the manifestation of a more general principle of energy minimization generating, among others, asymmetry of the brains.

<https://royalsocietypublishing.org/doi/10.1098/rsos.240465>

**Science****ARTICLES****JEFFREY BRAINARD – Open for business**

Authors are increasingly paying to publish their papers open access. But is it fair or sustainable?

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

**Science Advances****PAPERS****RAJKUMAR VASUDEVA RAJU et al – Space is a latent sequence: A theory of the hippocampus**

Fascinating phenomena such as landmark vector cells and splitter cells are frequently discovered in the hippocampus. Without a unifying principle, each experiment seemingly uncovers new anomalies or coding types. Here, we provide a unifying principle that the mental representation of space is an emergent property of latent higher-order sequence learning. Treating space as a sequence resolves numerous phenomena and suggests that the place field mapping methodology that interprets sequential neuronal responses in Euclidean terms might itself be a source of anomalies. Our model, clone-structured causal graph (CSCG), employs higher-order graph scaffolding to learn latent representations by mapping aliased egocentric sensory inputs to unique contexts. Learning to compress sequential and episodic experiences using CSCGs yields allocentric cognitive maps that are suitable for planning, introspection, consolidation, and abstraction. By explicating the role of Euclidean place field mapping and demonstrating how latent sequential representations unify myriad observed phenomena, our work positions the hippocampus in a sequence-centric paradigm, challenging the prevailing space-centric view.

<https://www.science.org/doi/10.1126/sciadv.adm8470>

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